NORAD-FAO PROGRAMME
GCP/GLO/690/NOR

CRUISE REPORTS *DR FRIDTJOF NANSEN*
EAF-Nansen/CR/2019/9

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

Liberia, Sierra Leone, Guinea, Guinea-Bissau

22 August–23 September 2019

National Fisheries and Aquaculture Authority
Liberia

Institute of Marine Research
Bergen, Norway

University of the Western Cape
South Africa

Oceanographic Research Institute
South Africa

Centre de Recherches Océanologiques
Côte d'Ivoire

Centre National Des Sciences Halieutiques De Boussoura
Guinea

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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CRUISE REPORTS *DR FRIDTJOF NANSEN*

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

Liberia, Sierra Leone, Guinea, Guinea-Bissau

22 August–23 September 2019

by

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Institute of Marine Research
Bergen, 2021

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EXECUTIVE SUMMARY

The survey was a transboundary coverage of the demersal and pelagic resources and ecosystems of the Western Gulf of Guinea (Leg 3.2, Liberia to Guinea-Bissau), covering the continental shelf (20 m to 100 m depth) and the slope (100 m to 500 m depth) within respective EEZs. In addition to pelagic and demersal resources, oceanographic conditions were recorded, in terms of physical, chemical, and biological oceanography (plankton). While data collected are used for preparing this report, they are further analyzed as part of the scientific work planned under the EAF-Nansen Science Plan.

The atmospheric conditions during the survey were dominated by the persistence of the south-westerly trade winds with variable speeds. Surface water temperatures were high (reaching 29°C), the thermocline well defined throughout the survey. More oxygenated surface waters generally occupied the top 20 m with dissolved oxygen concentrations greater than 4 ml/l above the thermocline. In deeper layers between 200–300 m, the oxygen minimum zones proved to be hypoxic for a majority of the survey. pH minimum zones coincided with observed oxygen minimum below 1.1 ml/l indicating possible deoxygenation from microbial respiration and therefore increased plankton concentrations in the 400–500m layer.

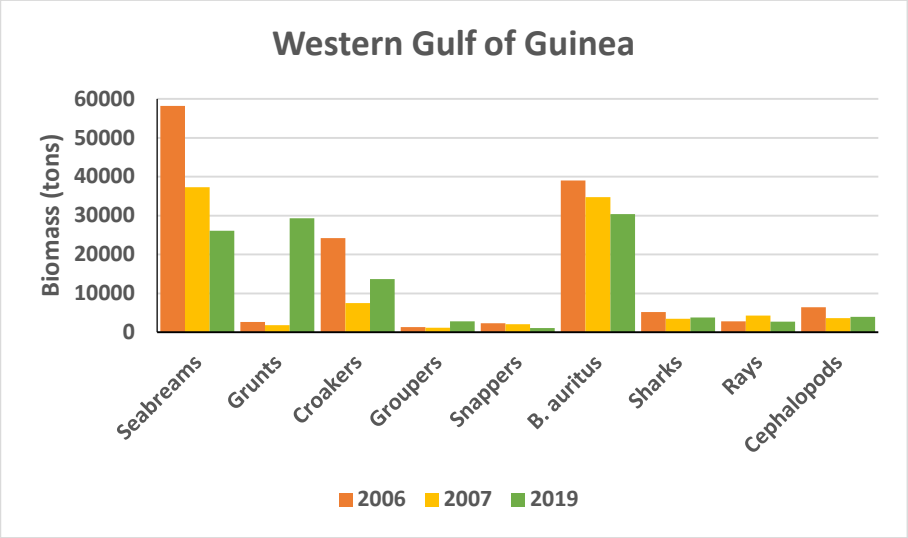
Surface currents off Liberia and Sierra Leone were generally southerly along the continental shelf. These surface currents could be the eastern (or southern) branch of the NECC that strengthens the Guinea Current at this time of the year. In the subsurface zones off Liberia, a counter current was present at the coast from 35–40 m depth.

Pelagic fish were present over large parts of the region. The main densities were found on the shelf at depths <100 m. The survey did not cover depths <20 m.

The concentrations of Sardinella increased substantially from southeast to northwest. As the continental shelf is generally wider in the western part of the region, most of the Sardinella was found in Guinea and Guinea-Bissau. Similar patterns were found in Pelagic 2 species. The total biomass of sardinellas was nearly as high as in 2006, and substantially higher than in 2007 and 2017. Total sardinella biomass was estimated at 1 205 569 tonnes, while Pel 2 species (including carangids, scombrids, barracudas and hairtails) was 302 000 tonnes.

Demersal fish biomass of valuable species consisted of seabreams, grunts and croakers. *B. auritus* was also a dominant species. Most of the grunts (excluding *B. auritus*) were caught in Liberia and Sierra Leone, croakers mainly in Sierra Leone and seabreams were the only demersal group that was abundant in Guinea. The total biomass was higher in Liberia and Sierra Leone than in Guinea and Guinea-Bissau (it should be noted, though, that both Guinea and Guinea-Bissau have substantial areas shallower the 20 m that were not surveyed).

Compared to earlier surveys, biomass estimates of demersal fish in the present survey were about at the same level as in previous years, with trends differing in different groups. Seabreams, croakers and large eye grunt show a declining trend while grunts seem to have increased.


Western Gulf of Guinea
Biomass (tons)
60000
50000
40000
30000
20000
10000
0
Seabreams
Grunts
Croakers
Groupers
Snappers
B. auritus
Sharks
Rays
Cephalopods
2006
2007
2019

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.

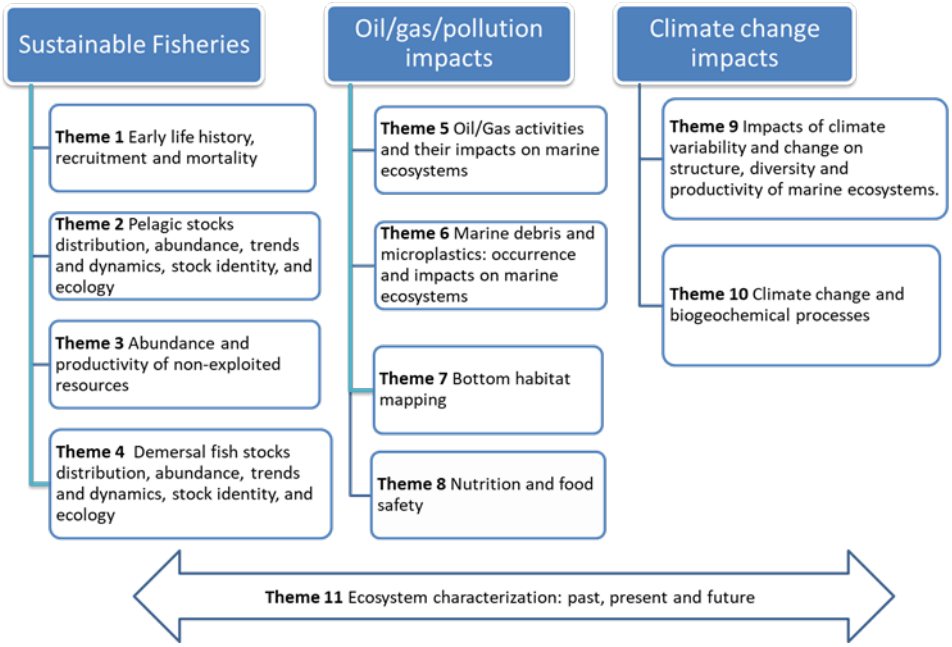


Figure 1. Research themes of the EAF-Nansen science plan

1.1 Survey objectives

The objectives of Leg 3.2 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, ichthyoplankton and jellyfish

- To describe the primary productivity and the abundance and biomass patterns of phytoplankton of the region.
- To provide information on the abundance patterns of ichthyoplankton community (fish eggs and larvae), at the lowest possible taxonomic level.

- 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.

1.1.3 Demersal resources

- Distribution and abundance of demersal resources using the swept-area method.
- Biological parameters for priority species (length, weight, maturity).
- Identification of spawning/nursery areas.

1.1.4 Pelagic resources

- 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

- Map the occurrence of microplastics.
- Record the occurrence of marine debris in surface waters.
- Record the occurrence of floating seaweed aggregations (*Sargassum* sp.) and collect opportunistic samples for genetic studies.

1.1.6 Top predators and *Sargassum* weed

- To register the occurrence of marine mammals, seabirds and floating *Sargassum* weed.

1.2 The survey area

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

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

1.3 Participation

A total of 28 researchers and technicians from South Africa, Côte d'Ivoire, Liberia, Sierra Leone, Guinea, Guinea-Bissau, Morocco and Norway participated in the survey. The full list of the participants and their affiliations is given in Table 1 below.

Table 1. List of participants, their role, affiliation and country of residence

NAME	ROLE	AFFILIATION	COUNTRY
Tore Johannessen	Cruise Leader	IMR	Norway
Geir Landa	Chief Instrument Engineer	IMR	Norway
Hege Rognaldsen	Instrument Engineer	IMR	Norway
Irene Huse	Fish, Team Leader	IMR	Norway
Bernadine Everett	Fish, Team Leader	ORI	South Africa
David Cervantes	Water Chemistry, Team Leader	IMR	Norway
Margot Nyeggen	Plankton, Team Leader	IMR	Norway
D. Wisseh Kay	Co-Cruise Leader	NaFAA	Liberia
J. Adonis Zuweh, Jr.	Fish	NaFAA	Liberia
Roosevelt Sansun Daniels	Fish	NaFAA	Liberia
Lenn G. Gomah	Water Chemistry/Oceanography	NaFAA	Liberia
Nathaniel Decius Leesolee	Mammals/Birds/Sargassum	NaFAA	Liberia
Amadeu Mendes de Almeida	Fish	CIPA	Guinea-Bissau
Menda Abrigo	Fish	CIPA	Guinea-Bissau
Noelo Silva Akays Cordoso	Plankton/Oceanography	CIPA	Guinea-Bissau
Martinho Joaquim Gomes	Water Chemistry/Oceanography	CIPA	Guinea-Bissau
Traore Diafode	Fish	CNSHB	Guinea
Harouna Camara	Fish	CNSHB	Guinea
Raymond Koïvogui	Plankton	CNSHB	Guinea
Bowa Kolie	Water Chemistry	CNSHB	Guinea
Aboubacar Sane	Mammals/Birds/Sargassum	CNSHB	Guinea
Konoyima Jossie Kombo	Fish	USL-FBC, IMBO	Sierra Leone
Mamoud Mansaray	Fish	MFMR	Sierra Leone
Ivorymae Chrismil Remi Coker	Fish	MFMR	Sierra Leone

NAME	ROLE	AFFILIATION	COUNTRY
Lynette Emily Natly John	Plankton	USL-FBC, IMBO	Sierra Leone
Michael Kenneth Brown	Jellyfish/Fish	UWC	South Africa
N'GEUSSAN Kouadio Benjamin	Oceanography, Team Leader	CRO	Côte d'Ivoire
Mohamed-Reda Benallal	Plankton	INRH	Morocco

List of institution abbreviations: IMR - Institute of Marine Research, Norway; ORI - Oceanographic Research Institute, Durban, South Africa, NaFAA - National Fisheries and Aquaculture Authority, Liberia; CIPA - Centro de Investigação Pesqueira Aplicada, Guinea-Bissau; USL- FBC, IMBO - Institute of Marine Biology and Oceanography, Fourah Bay College, University of Sierra Leone; MFMR - Ministry of Fisheries and Marine Resources. Freetown; UWC - University of the Western Cape, South Africa; EPA - Environmental Protection Agency of Liberia, Liberia; CNSHB - Centre National des Sciences Halieutiques de Boussoura, Guinea; CRO - Centre de Recherches Océanologiques, Côte d'Ivoire; INRH - National institue research marine, Morocco.

1.4 Narrative

The vessel departed from Abidjan, Côte d'Ivoire, at 08h00 on 23 August 2019, slightly delayed due to dredging in the entrance channel to Abidjan harbour. We entered Liberian waters on 24 August 2019 at 17h30 and reached the outermost station on the deep-water environmental transect at Cape Palmas.

The survey was carried out by parallel transects, perpendicular to the coastline, between the 20 m and 500 m isobaths. The distance between transects was 15 NM. At every fourth transect (60 NM apart), extended sampling of various environmental and biological variables was conducted, so-called super-stations. The survey combined semi-random bottom trawl sampling along the transects to measure the abundance of demersal fish based on the swept area method, and measurements of pelagic fish using acoustics. Most of the bottom trawl hauls were obtained between 20 m and 100 m depth. Deeper, the bottom generally slopes steeply to greater depths in most of the area covered by this survey. Only in the western part of Guinea and part of Guinea-Bissau, the bottom slopes more gradually at depths >100 m and thus allows bottom trawling.

Survey dates per country are shown in Table 2. The weather was favourable, and no days were lost due to bad weather. Twenty-four hours were lost in Guinea due to problems with logging of acoustic data. Nevertheless, we were able to finish all planned activities. There is no agreement about the borderline between Senegal and Guinea-Bissau, and a triangle where the two countries share the fisheries resources has been established (the AGC area). As there was no specific license for R/V *Dr Fridtjof Nansen* to operate in this area, this area was not included in the survey.

The vessel arrived in Dakar, Senegal, at 13h00 on 22 September 2019.

Table 2. Survey dates for Liberia, Sierra Leone, Guinea and Guinea-Bissau

Country	Days	Date Start	Date End
Liberia	8	24/08/2019	02/09/2019
Sierra Leone	5	02/09/2019	07/09/2019
Guinea	10	07/09/2019	17/08/2019
Guinea-Bissau	5	17/09/2019	21/09/2019

1.5 Survey effort

The design of the survey and sampling followed the Sailing Orders for Leg 3.2 and was in agreement with past demersal and pelagic surveys with R/V *Dr Fridtjof Nansen* in this area. Demersal trawling for biomass estimations was conducted between sunrise and sunset, except for stations deeper than 300 m, which were also carried out during dark hours. Pelagic trawl hauls were carried out to determine species composition and size of fish observed in the water column by the echosounders.

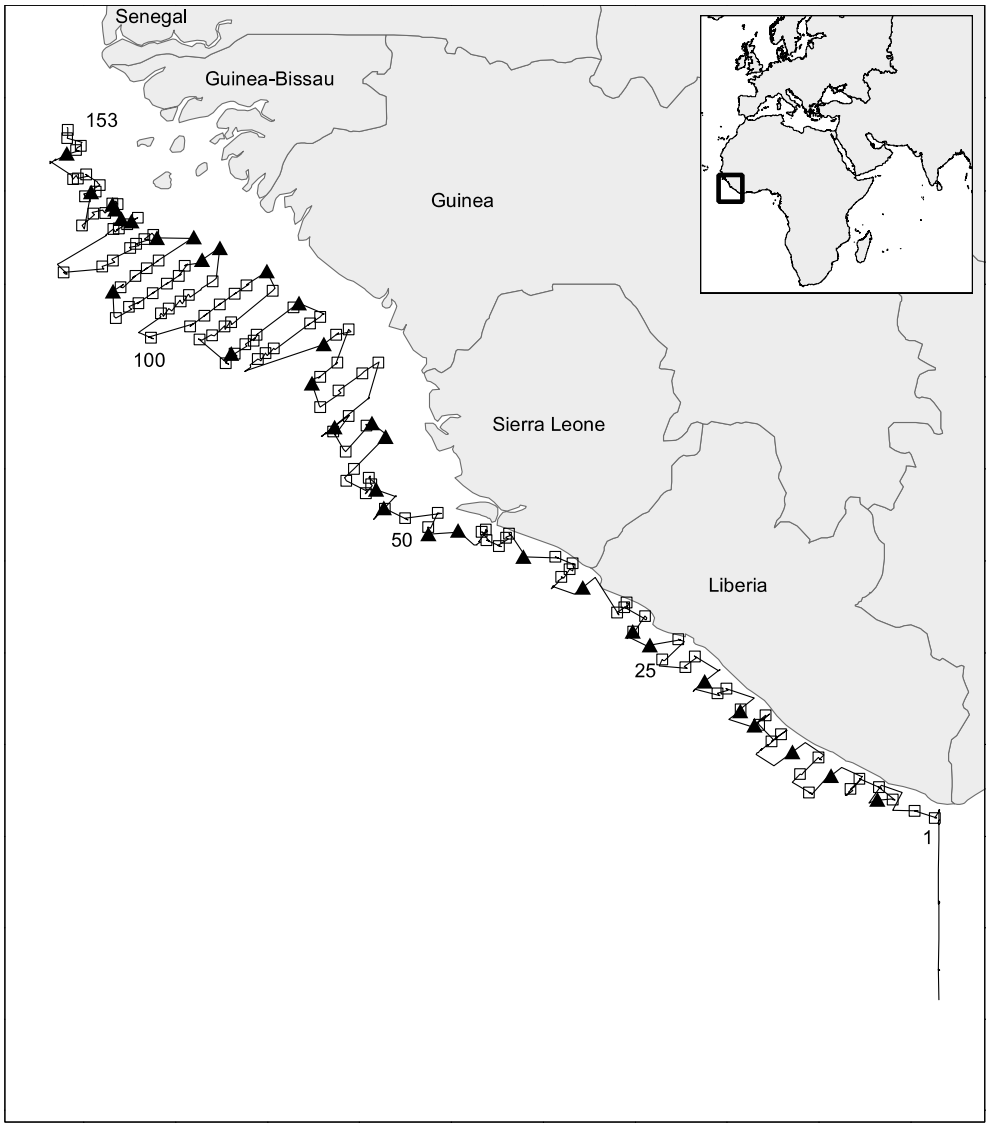
CTD casts were carried out at all bottom trawl stations. At every fourth transect (~60 NM apart), extended sampling was carried out, including CTDs with water samples for chemical and nutrient analyses, zooplankton/ichthyoplankton sampling and microplastics. Additionally, during every bottom trawl a sediment sample was collected. Table 3 summarises the survey effort in each country, while Table 4 shows number of bottom trawl hauls by depth strata and country. The cruise track with trawl stations is presented in Figure 3, cruise track with CTD stations in Figure 4, and cruise track with plankton stations in Figure 5.

Table 3. Survey effort in terms of number of sampling stations (total and by country). 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

Country	Distance	CTD	WP-2	Bongo	Manta	BT	PT
Liberia	1 109	45	17	17	17	25	9
Sierra Leone	741	35	12	12	9	23	8
Guinea	1 480	52	6	6	6	46	9
Guinea-Bissau	686	31	6	6	6	26	7
Total	4 016	163	41	41	38	120	33

Table 4. Bottom trawl hauls per country and depth strata

Country	20-30 m	31-50 m	51-100 m	101-200 m	201-300 m	>300 m
Liberia	3	2	19	0	0	1
Sierra Leone	7	7	9	0	0	0
Guinea	9	19	14	1	0	3
Guinea-Bissau	6	7	8	2	2	1
Total	25	35	50	3	2	5



n" (Chart II)

22 August–23 September 2019

Trawl st.no 1-153
▲ Pelagic trawl
□ Bottom trawl

Figure 3. Course track with bottom (squares) and pelagic trawl (triangle) stations

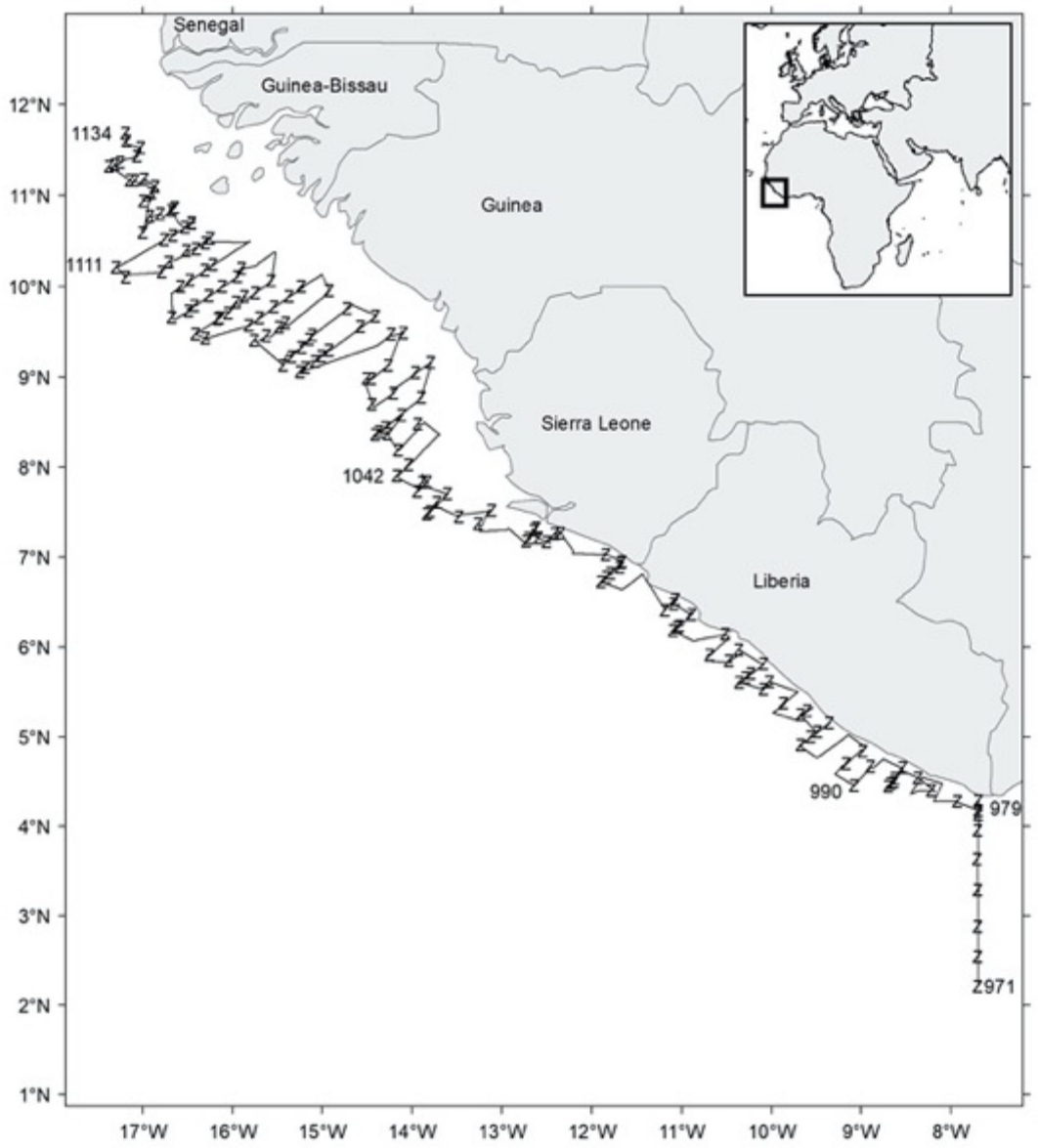


Figure 4. Course track with CTD stations

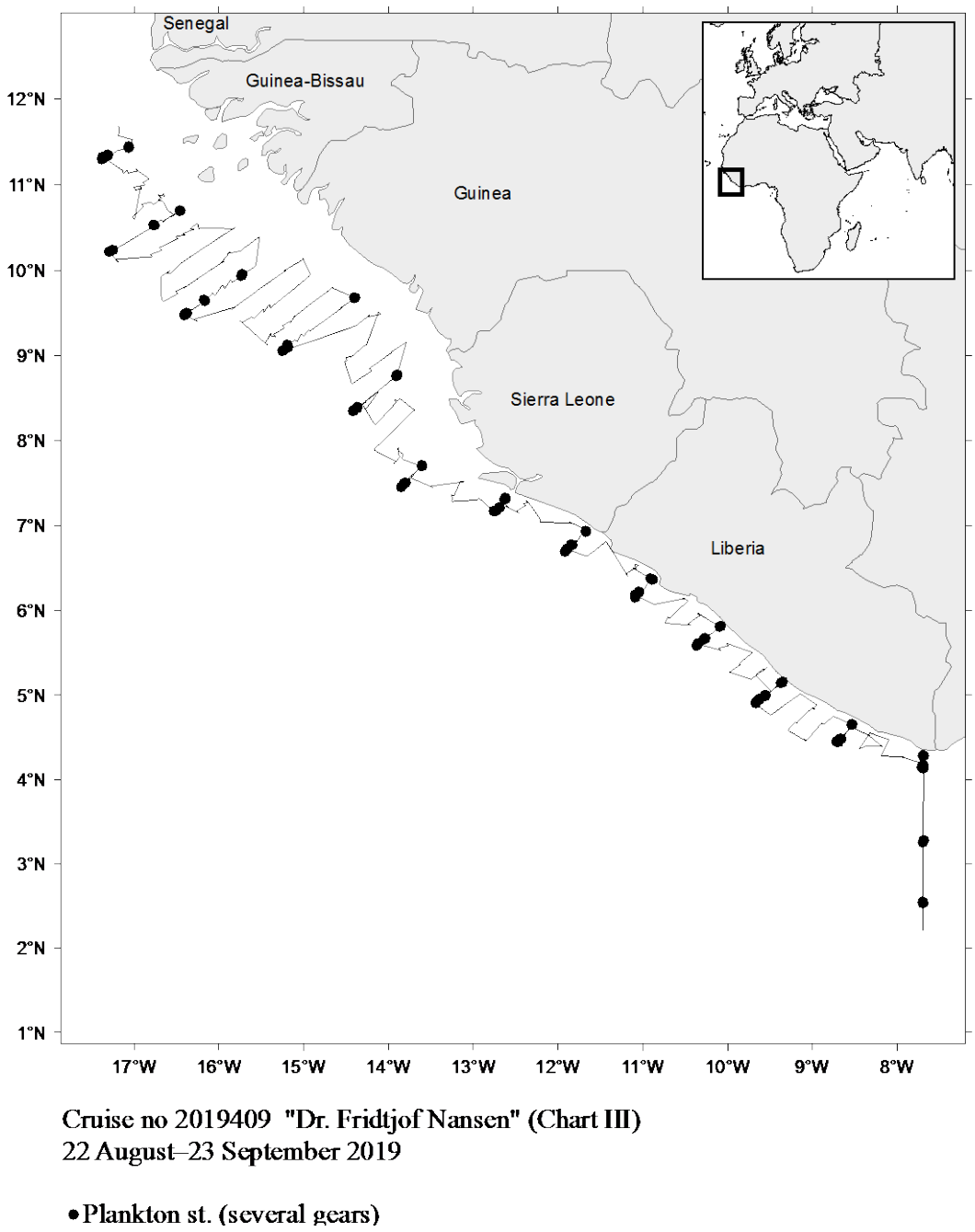


Figure 5. Course track with plankton stations (super-stations)

CHAPTER 2. METHODS

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

Two SBE 21 SeaCAT Thermosalinographs (TSG) ran continuously during the survey, obtaining samples at 4 m depth and 6 m depths to measure seawater salinity and temperature (internally and externally) every 10 seconds. The 4 m TSG measured water from the intake of the engine cooling water, whereas the 6 m TSG measured water from the drop keel intake. The 6 m TSG was also equipped with a Sea-Bird WETStar Fluorometer for sub-surface fluorescence levels.

2.1.3 Current speed and direction measurements (ADCP)

The ocean current data was collected with a Teledyne RDI Ocean Surveyor Acoustic Doppler Profiler (ADCP) OS150, operating at a 150kHz frequency. The 75kHz ADCP, which is also fitted on board was not operational during this survey. The Lowered Acoustic Doppler Profiler (LADCP) was attached to the CTD frame to extend the current information to the maximum depth of the CTD casts to support the demersal zone observations. The RDI ran in narrow band mode and averaged data in 8 m vertical bins. Heading, pitch, roll and positional data were acquired by a Kongsberg Marine SEAPATH unit. RDI's VmDAS software will be used to convert the ADCP's along beam velocities into earth coordinates.

2.1.4 Bottom mapping echo sounder

The EM 710 multibeam echo sounder is a high-resolution seabed mapping system. The EM 710 is mounted on the drop keel and the operational depths of the EM 710 are 3 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 EM 710 was not operational for most of the survey. Data from the EM710 was logged to the onboard Olex plotting system and to raw data files.

2.2 Fixed station sampling

Bottom trawl sampling and acoustic measurements were carried out along transects perpendicular to the coastline, approximately 15 NM apart (Figure 3). A series of fixed hydrographic transects were sampled along every 4th acoustic transect. These stations were referred to as "super-stations" where additional hydrographical and biological sampling occurred. The standard Nansen sampling protocol is for super-stations to be at the 30 m, 100 m and 500 m bottom depths with pre-defined water bottle depths (Figure 6). Depending on the width of the continental shelf, additional CTD casts were performed to increase the hydrographical resolution of the transect. Apart from the standard environmental transects, a more extended and deeper transect was occupied at Cape Palmas, Liberia, consisting of five super-stations and four CTD only casts, with the deepest being at 4 000 m. In addition to these environmental transect stations, additional CTDs were cast at each bottom trawl to observe the water conditions of the demersal zone.

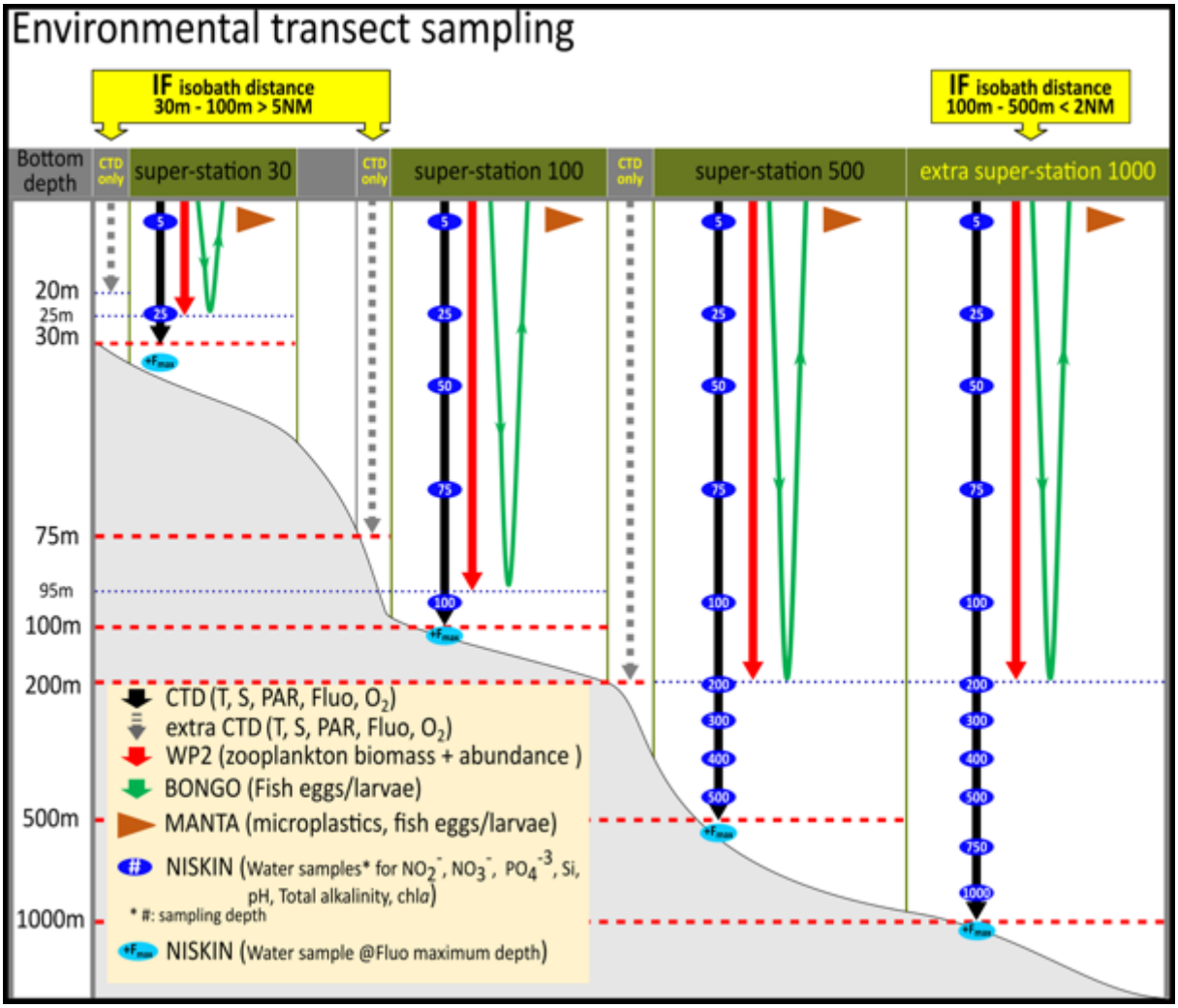


Figure 6. Sampling along environmental transects

2.2.1 CTD Sensors

A Sea-Bird 911plus CTD containing two SBE 3plus temperature sensors, two SBE 4C conductivity sensors, a Digiquarts pressure sensor, a SBE 43 dissolved oxygen sensor, a WET Labs ECO-AFL fluorometer and a Satlantic Photosynthetically Active Radiation LOG ICSW sensor were mounted to a 12-bottle rosette for every CTD deployment. All sensor logging and profiling were performed using Sea-Bird's Seasave software.

Water was collected from low-gradient depths of 100 m and below to perform on board validations of the dissolved oxygen sensor values. Measurements were performed using a Metrohm 916 Ti-Touch potentiometric titrator performing Winkler (Grasshoff *et al.*, 1983) and Karl Fischer titrations (validation results in Annex I). The Guideline Portasal Salinometer 8410A was being repaired during the survey and therefore onboard validation of the CTD derived salinity values could not be performed. However, salinity values will be checked by the salinity samples collected from the previous and subsequent surveys when the salinometer returns to R/V *Dr Fridtjof Nansen*.

2.2.2 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 Titrando 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 analyses to determine the correction factor appropriate for sample measurements. All total alkalinity titrations were performed in triplicates on board.

2.2.3 Nutrient samples

Nutrient samples for nitrite, nitrate, phosphate and silicate determination were collected at standard depths at all environmental stations (Figure 6). 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. The analysis is performed using a Skalar San++ Continuous Flow Analyser while following standard procedures (Grasshoff *et al.*, 1999).

2.2.4 Chlorophyll a

Water samples for chlorophyll-*a* were collected in 1 000 ml polyethylene bottles and subsequently divided into two 260 ml bottles for duplicate analyses. 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 µm 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).

2.2.5 Plankton sampling

The environmental sampling consisted of 41 superstations (Figure 7) located over the isobaths of 30 m, 100 m and 500 m (station 972 to 1131). At each station sampling was conducted with a WP2 net (180 µm), Manta trawl (335 µm) and a Bongo net (405 µm). Due to either too much *Sargassum* floating in the area, adverse weather conditions or a combination of the two, the deployment of all sampling devices was not possible at every station. The total number of stations sampled with each sampling device, and the stations where sampling was not conducted, are summarised in Table 5.

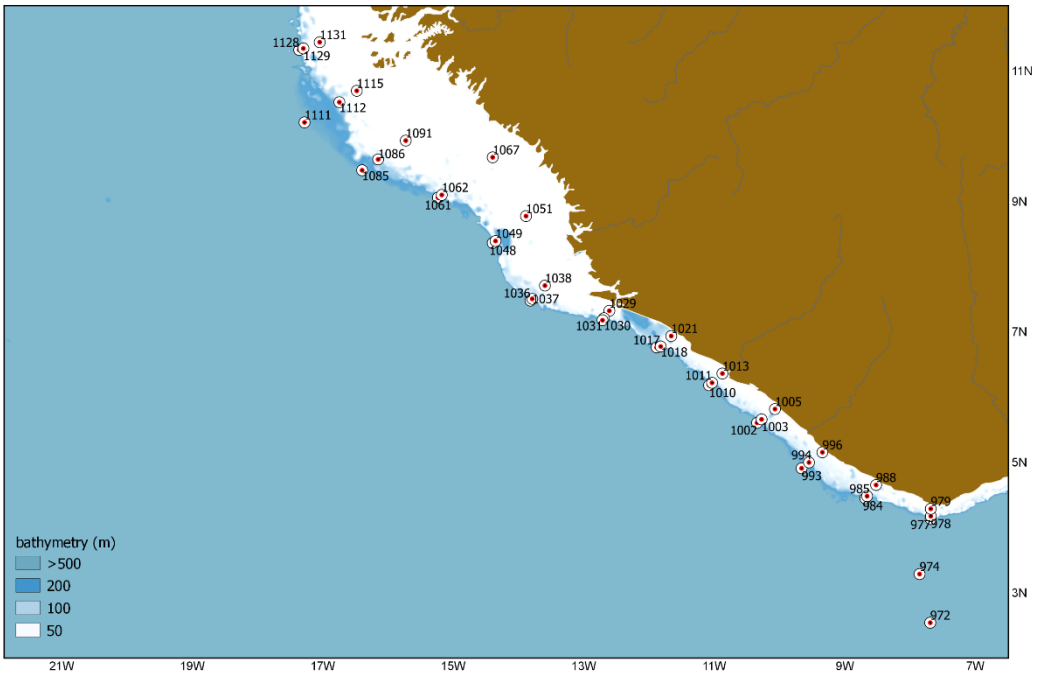


Figure 7. Superstation sampling grid in the surveyed area

Table 5: Overview of the stations sampled during the 2019409 survey, including stations where sampling was not conducted with given sampling device

Sampling device	Number of sampled stations	Stations not sampled
WP2 (180 µm)	41	
Manta trawl (335 µm)	38	978*, 1003**,1018, 1036, 1037
Bongo net (405 µm)	41	

*A sample was taken with the Manta trawl at station 978 but came up completely full of medusae. No larvae or microplastics were found in the sample, and the sample was not preserved due to the high amount of jellyfish.

**A sample was taken with the Manta trawl at station 1003 but was not processed due to high amounts of *Sargassum* in the net making the sample unviable.

2.2.6 Zooplankton

Zooplankton samples were collected with vertical tows of a WP2 net (180 µm). Sample collection and processing followed the sailing orders of the survey. Specifically, the net was towed from 5 m above the sea floor to the surface, or from 200 m depth to the surface at deep stations, with a speed of 30 m min-1. Each sample was halved into parts with a Motoda splitter. One half was size fractionated through 2 000 um, 1 000 µm and 180 µm mesh sizes, and dried in the oven (60 ºC) in pre-weighed aluminium.

2.2.7 Ichtyoplankton

Ichthyoplankton was collected with double oblique tows of a Bongo net (405 µm). Samples were collected according to the sailing orders using double oblique tows down to 5 m above the sea floor (or a maximum depth of 200 m at deep stations) to the surface. The Bongo was towed at a speed of 24 m min^{-1} going down and 15 m min^{-1} going up, while the ship kept a speed of 2-3 knots. Once the Bongo was on board, the different nets were treated as following:

a) Bongo V was directly preserved in 4% borax buffered formaldehyde made for ichthyoplankton. Bongo V samples were sorted at IMR laboratory to provide more accurate estimations of larval abundance and eggs.

b) Bongo H was examined under the microscope and fish larvae were picked out. When there was no time available for direct sorting, the total sample was preserved in 96% ethanol and sorting was conducted at a later point. Sorting was conducted on all Bongo H samples, either of the total sample or from a sample fraction (from splitting with the Motoda splitter) when larvae were too abundant. The sorted larvae were photographed and preserved in 96% ethanol in 20 mL scintillation vials. The bulk sample was preserved in labelled bottles (as “sorted”) in 4% formaldehyde made for ichthyoplankton or in 96% ethanol when the sample was originally preserved in ethanol or when a fraction of the sample was sorted.

When present, large fish juveniles were picked out from both nets and preserved in 96% ethanol in 100 mL bottles. 5 bottles with juveniles from Bongo H and 1 from Bongo V were transferred to IMR for future processing. In addition, Manta trawl was used to collect ichtyoplankton at the surface (see below).

2.2.8 Microplastics and ichtyoplankton at the surface

Microplastics and ichthyoplankton were sampled with a Manta trawl (335 μm) at the surface. Samples were collected and processed according to the sailing orders. Specifically, the Manta was towed for 15 minutes while the vessel kept a speed of 2-3 knots. Samples were sorted onboard for microplastics and ichthyoplankton, either directly after sampling or from a 96% ethanol (methylated) preserved sample. Microplastics were rinsed with fresh water, photographed and dried at 60 ºC for 24 hours. Fish larvae and eggs were picked out, either from the total sample or from a subsample when too abundant, and fixed in 96% ethanol, either methylated or unmethylated depending on whether sorting was done from a live or fixed sample. Fish juveniles were picked out from the sample and preserved in 100 mL bottles, or 20 mL scintillation vials when found in small quantities and fixed with methylated ethanol.

2.3 Acoustic Sampling

2.3.1 Sonor data

Sonars were not used due to displaying malfunction. For this reason, sonars could not be used to facilitate school detection during the survey.

2.3.2 Acoustic estimates of fish biomass

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 11-12th May 2019 and hence the echo sounder gains were adjusted at the start of this survey accordingly. In Annex III the details of the acoustic settings used during the survey are provided. Acoustic data were processed onboard 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, 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:

$TS = 20 \log L - 72$ dB

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

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

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:

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

where

ρ_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 (σ_{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 based on species composition obtained in trawl hauls in the study area

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

During the survey, allocation of sound was done for all groups shown in Table 2.1, however, results are presented only for sufficiently high numbers for reliable allocation of sound.

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

1) The average s_A-value for the region,

2) The surface area in square nautical miles, NM^2

3) A representative length distribution of the fish in the region.

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 addes to nearby trawl stations before normalizing. 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.

The process followed was therefore to:

a) divide the s_A-value between groups of fish and/or species,

b) produce pooled length distributions of a target species/category for use in the above equation, and

c) calculate the biomass estimates for a region,

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 (ρ/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.

2.4 Trawl sampling

2.4.1 Pelagic trawl

A small pelagic trawl (see Annex III) was used during dark hours to sample pelagic fish for species identification and to obtain size distributions. Sampling during daytime was unsuccessful due to gear avoidance. The majority of the pelagic trawl hauls was targeting schools, but some “blind” hauls were carried out to identify potential pelagic fish in the plankton layer. Based on obtained measurements, length-weight relationships were established for acoustic estimates of the biomass of target species.

2.4.2 Bottom trawl

A stratified, semi-random design was used with depth and area as stratification factors. Trawl stations were located along a systematic survey track with approximately parallel transect lines perpendicular to the coastline, from 20 m to 500 m depth, equally spaced approximately 15 NM apart. Bottom trawling was carried out during daylight hours (ca. 07h00 to 19h00 UTC), except stations >300 m which were also sampled during night.

Trawl duration was standardized to 30 minutes. Trawling start time was controlled by using a “SCANMAR" sensor to detect the landing of the trawl on the bottom, and the stop-time was defined as the time when the winches started retrieving the trawl. In a few cases, towing was interrupted before 30 minutes either due to poor bottom conditions or larger catches of fish

indicated by the installed catch sensors. Trawl hauls of more than 15 minutes were included in the estimates. A detailed description of instruments and fishing gear is given in Annex III. The complete records of fishing stations and catches are shown in Annex IV.

2.4.3 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 (Ficke *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 according to the list of priority taxa (Table 7).

For the priority taxa (Table 7), pooled length frequency distributions are shown by area in Annex VII. All biological data records were entered in the Nansis database and were quality controlled during the survey. The catch rates (kg/h) by main groups caught, in valid swept area bottom trawl hauls, are presented in Tables 13 to 24. The distribution of density (tonnes / NM^2) of some of the main species along the coast is presented in Figures 45 to 48.

Table 7. Priority species (demersal and pelagic) for which biological sampling was carried out during the survey and additional type of sampling for selected species related to specific projects of the EAF-Nansen Science Plan and/or partner needs

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

2.4.4 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.

2.4.5 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. All jellyfish were subsequently individually identified, measured across the upper surface of the bell and weighed. Specimens in good condition of a variety of sizes from across the survey area, were photographed and small pieces of oral arm tissue removed and preserved in 96% ethanol prior to storage in the freezer; and the balance of the specimen preserved in 5% formaldehyde.

2.4.6 Benthic Epifauna

Benthic epifauna in the bottom trawls was identified to the lowest possible taxonomic level and information was stored in the Nansis database. For each bottom trawl haul, one picture of all benthic epifauna was taken. Species that could not be identified were preserved in formalin or ethanol.

2.4.7 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 strata (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 $\bar{X}_i$ 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 $W_i = \frac{N_i}{\mathrm{N}} = \frac{A_i}{\mathrm{A}}$ is the statistical weighting factor expressed as relative size of the ith stratum with A_i the area of the ith 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/NM²), the effective fishing area was considered as the product of the wing spread and the haul length, or distance over the bottom, as measured by means of the SCANMAR® equipment based on GPS readings. The area swept for each haul was thus 18.5 m (traditionally applied wing spread for the "Nansen" bottom trawl) times the distance trawled, raised to NM²/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 NM². Diagrams of the bottom trawl used are shown in Annex III.

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).

2.5 Top predator observations

Observations of top predators were carried out by two observers from the third deck, situated 11 m above sea level, during daylight hours between 08h00 and 18h00 (with breaks). Marine mammal observations were the main objective, with seabird 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 the distribution patterns of these species in the region.

2.6 Seaweed observations and sampling

During the survey, the marine mammals and seabirds observers kept records of floating *Sargassum* 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.

CHAPTER 3. RESULTS

3.1 Underway sampling

3.1.1 Wind speed and direction

Although most data were recovered from the AANDERRA Smartguard meteorological station, several minute gaps in the wind speed and direction data occurred during the Leg 3.2 occupation. These gaps were masked and averaged with a lag of 3 and a threshold of 0.03. The data were regularised to a node of 4 km before plotting.

The wind speed and direction observed along the survey track are presented separately for each country (Figures 8 to 11). In general, south-westerly winds prevailed over much of the surveyed area. These south-westerlies are the seasonal feature in the northern Gulf of Guinea, associated with the meridional displacement of the Intertropical Convergence Zone (ITCZ) and development of the West African Monsoon (WAM) during summer. Onshore blowing, steady monsoon wind regime dominated the observations off Liberia and partly off Sierra Leone (Figure 8 and Figure 9), but waned gradually as the survey entered Guinea waters (Figure 10) and were almost absent off Guinea-Bissau (Figure 11).

3.1.1.1 Liberia

The average wind speed observed in the Liberian EEZ was in the range of 8-10 ms^{-1}, except the two relaxation events, observed off Sasstown and Buchanan; each approximately of a diurnal period (Figure 8).

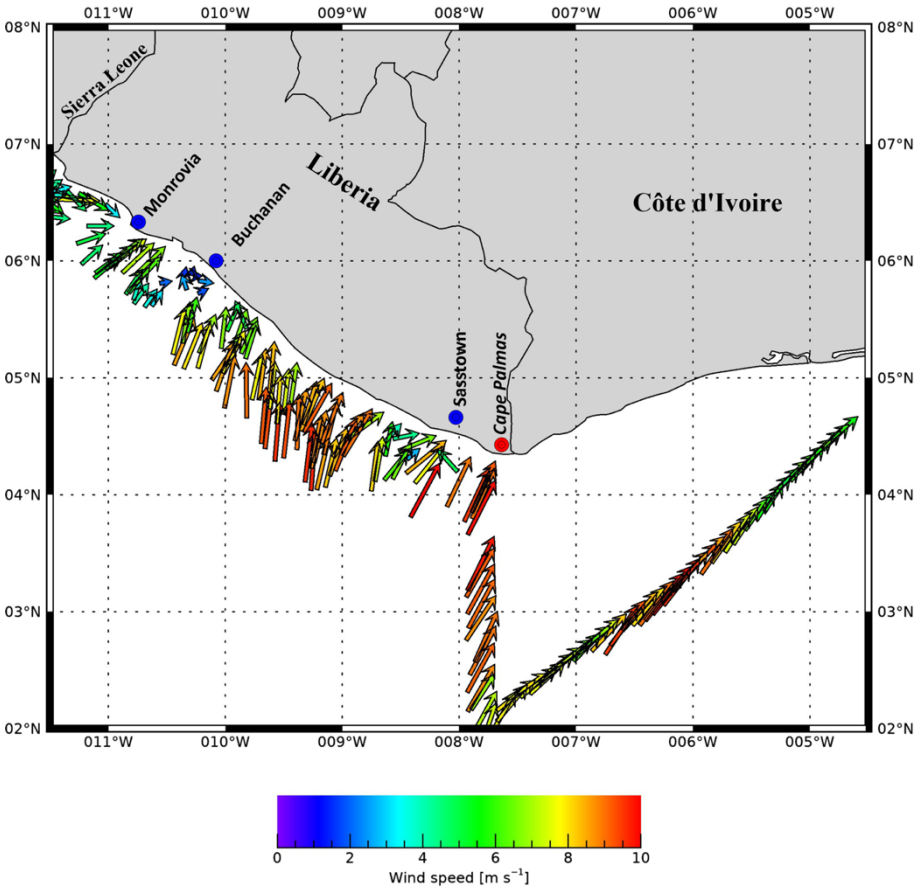


Figure 8. Distribution of wind speed and direction along the survey track over western part of Côte d'Ivoire (from 22 to 24 August), along Palmas transect from 24 to 26 August and off the Liberian coast from 26 August to 2 September 2019

3.1.1.2 Sierra Leone

In the EEZ of Sierra Leone, two wind regimes were observed. The onshore south-westerlies dominated the central section of the coast between Free Town and Bonthe. In contrast, the eastern and northern coasts faced a northeasterly wind regime (Figure 9). Subjected to this regime, the region between Bonthe and Sulima on the east coast, exhibited upwelling-favourable conditions as the wind reached speeds of 6.5 - 8 ms^{-1} blowing parallel to the coast with the open ocean boundary on its right side.

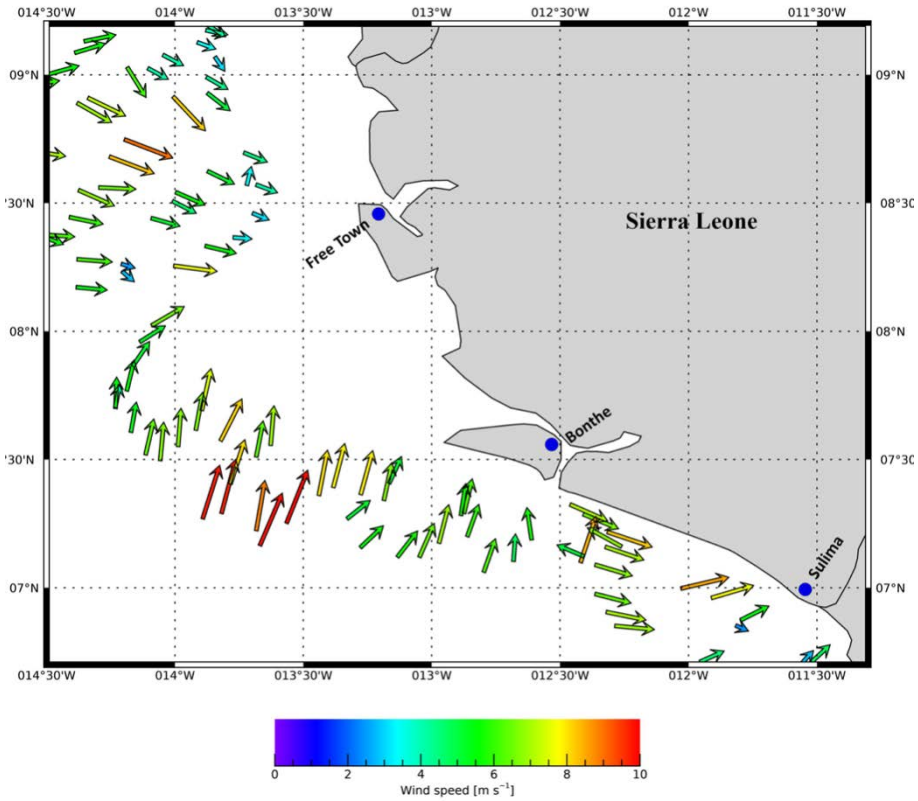


Figure 9. Along track wind speed and direction off Sierra Leone from 2 to 6 September 2019

3.1.1.3 Guinea

The northeasterly wind regime continued to dominate the ship-based observations in the southern part of Guinea before the survey reached the latitude of Conakry (Figure 10). The wind direction was aligned with the coast, indicating upwelling-favourable conditions. However, the wind speed range of 4-6 ms^{-1} was lower than that observed off the Sierra Leone coast and thus indicating a weaker upwelling.

The dominant south-westerly wind regime was restored as the survey passed Conakry. Along the coastal stretch between Bofa and Kamsa, onshore winds were prevalent with a speed range of 4 to 5 ms^{-1}. These generally moderate wind conditions were modulated with semi-diurnal oscillations at the peak velocities greater than 8 ms^{-1}, observed on 10 and 12 September.

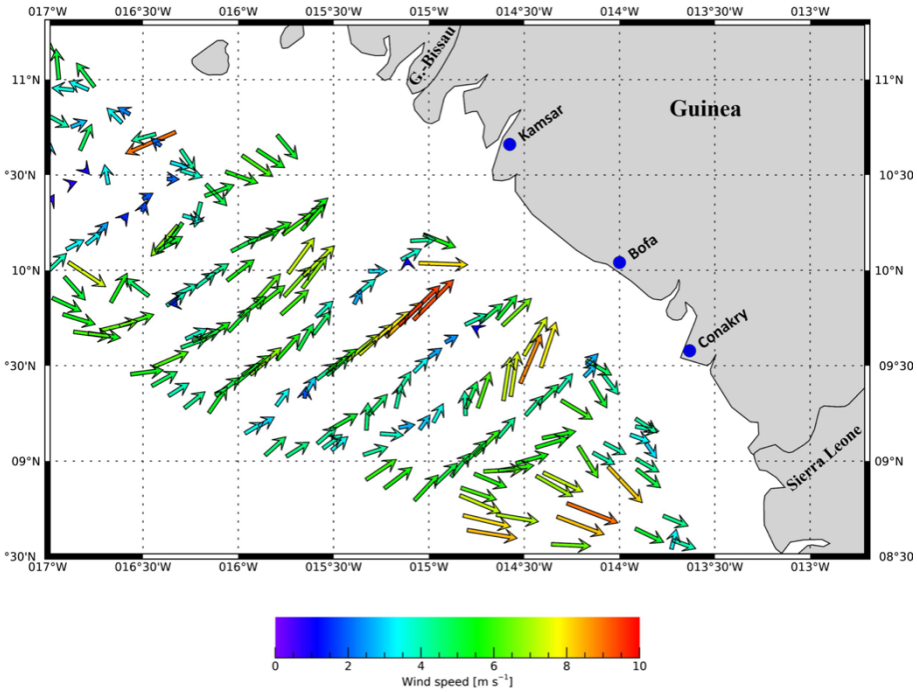


Figure 10. Distribution of wind speed and direction along the survey track on continental shelf of Guinea from 6 to 14 September 2019

3.1.1.4 Guinea-Bissau

Over the shelf of Guinea-Bissau, the observed winds were weak, with speeds below 5 ms^{-1} and the wind direction varied on the daily timescale (Figure 11).

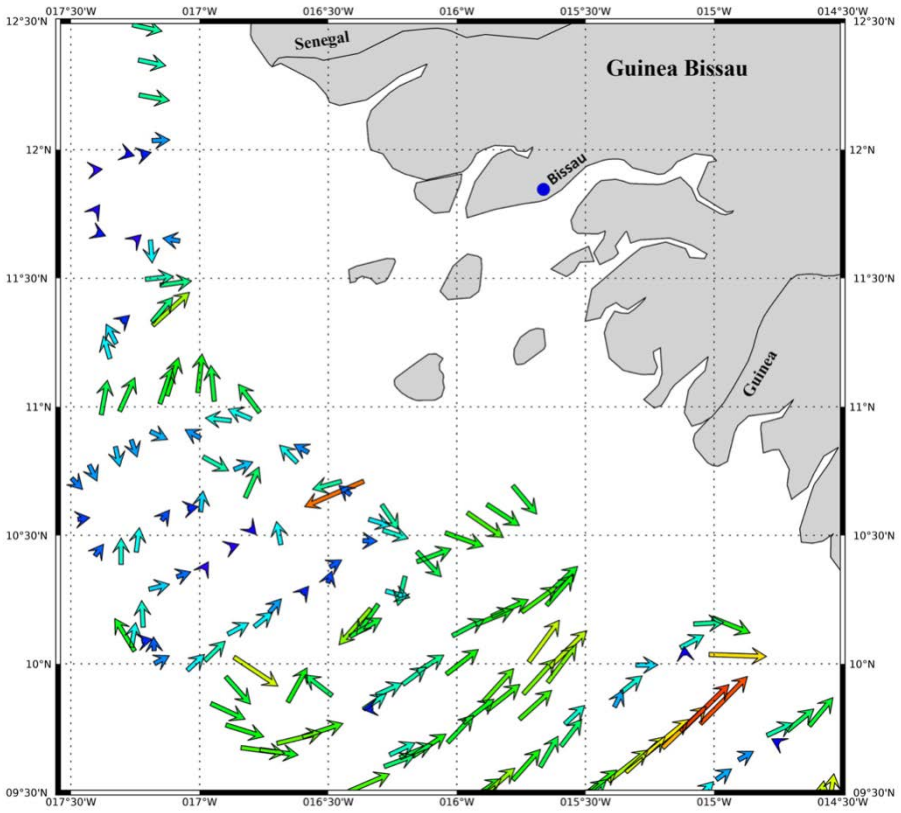


Figure 11. Distribution of wind speed and direction along the survey track on continental shelf of Guinea-Bissau from 14 to 21 September 2019. The color scale is the same as in the previous figures in this section

3.1.2 Currents

The true vessel's track veered frequently from the nominal transect direction, causing the spatial clustering of the collected underway ADCP data. To account for the clustering, the ADCP time-series segments were regularized along straight lines nearest to the principal direction of each cross-shelf section. Each vector in this section represents an average current projected onto a 2.5 NM bin along such lines.

The current data are presented separately for each country surveyed. However, there are some general aspects of the area can be illustrated (Figures 12 and 13). The surface flow along the Côte d'Ivoire–Liberia transect (approximately 7.7°W off Cape Palmas) highlights the Eastward surface Guinea Current (GC, Figure 12). The main core of the GC is detached from the coast and located around 3°N, with velocities ranging from 50 to 60 cm/s. The GC presumably generates coastally trapped eddies when detaching from the coast, as suggested by Djakoure *et al*. (2014). Using observation data, Herbert *et al*. (2016) also observed this eastward flow associated to the GC in the upper 50 m, during three cruises carried out in June 2005, 2006 and 2007 between 2°30'N and 5°N, but with lesser core velocities (about 20 cm/s). This peeling off of the GC seems therefore to affect the entire Côte d'Ivoire coast,

and could explain the observed upwelling occurring along the coast. Thus, our observations confirm the reinforcement of the GC from June to September.

In deeper layers, down to 250 m, the core of the eastward flowing GC extends to the sub-thermocline layer (Figure 13), showing a reversal flow with velocities ranging between 30-35 cm/s when approaching the continental shelf break. This deeper extension was also observed by Herbert *et al.* (2016) in June 2006 and 2007, with the GC embedded between two westward flows. One of these flows was assimilated to the surface GUC, located at the coast, north of 5°N and extended down to 250 m depth. Vertical sections of zonal velocity down to 250-300 m depth could help in understanding the structure of these currents.

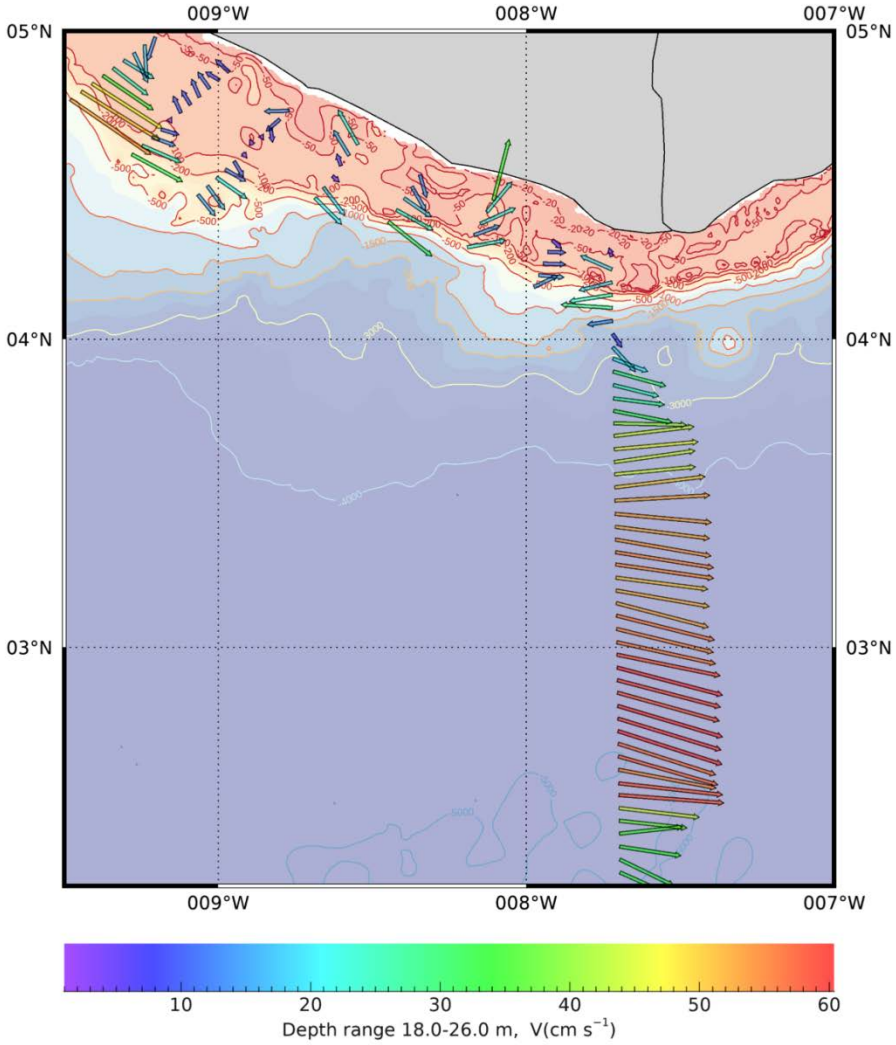


Figure 12. Sub-thermocline flow, in the layer 18–26 m over Côte d'Ivoire – Liberia transect off Cape Palmas as observed on 24–26/08 2019

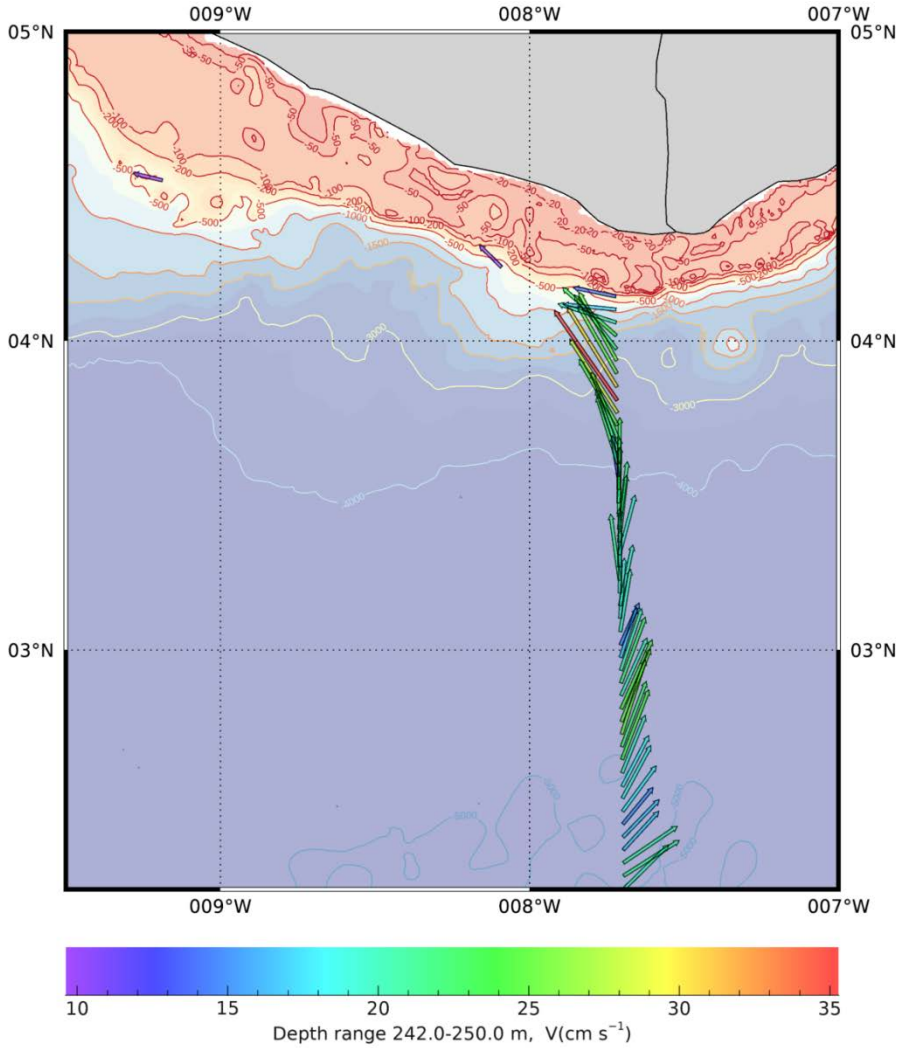


Figure 13. Sub-thermocline flow, in the layer 242–250 m over Côte d'Ivoire – Liberia transect off Cape Palmas as observed on 24–26/08 2019

3.1.2.1 Liberia

Along the shore, a subsurface current (Figure 14) flowing southward with most velocities ranging between 30–40 cm/s can be seen covering the entire Liberian coast, extending over the 500 m isobaths. This current could be the eastward-flowing North Equatorial Counter Current (NECC) with maximum velocities in August when the ITCZ is located at the northernmost position. This current is known to have two ramifications: the first being the flow eastward, feeding and reinforcing the Guinea Current. The second being a shift northward along the coast (Richardson, 1984; Stramma *et al.*, 1999). Figure 14 also depicts the northward flow along the Liberian shore, sinking below the southward flow in the vicinity of 8°W. These two opposite flows could form a region of a strong current shear which needs to be investigated on some vertical sections. This subsurface current could be the above-mentioned Guinea Undercurrent (GUC) (Lemasson and Rebert 1973a, Herbert *et al.*, 2016), which would originate in the Bight of Biafra as a return branch of the Equatorial Undercurrent and sinking under the Guinea Current as it flows westward (Longhurst, 1964; Binet and

Marchal, 1993). Ingham (1970) suggests that it could be a reversal of the Guinea Current, but Djakoure *et al.* (2014), based on the results of a simulation, argue that it is the signature of cyclonic eddies dissipating energy into the currents. Other results from McGrail (1979) found that it could extend beyond Cape Palmas over the continental shelf of Liberia, Sierra Leone, Guinea and Guinea-Bissau. Recently, Herbert *et al.* (2016), based on observational data from surveys and using a numerical simulation, demonstrated that the coastal branch of the Guinean Undercurrent reverses during September to August. Thus, a precise description of its circulation in the northern Gulf of Guinea is needed.

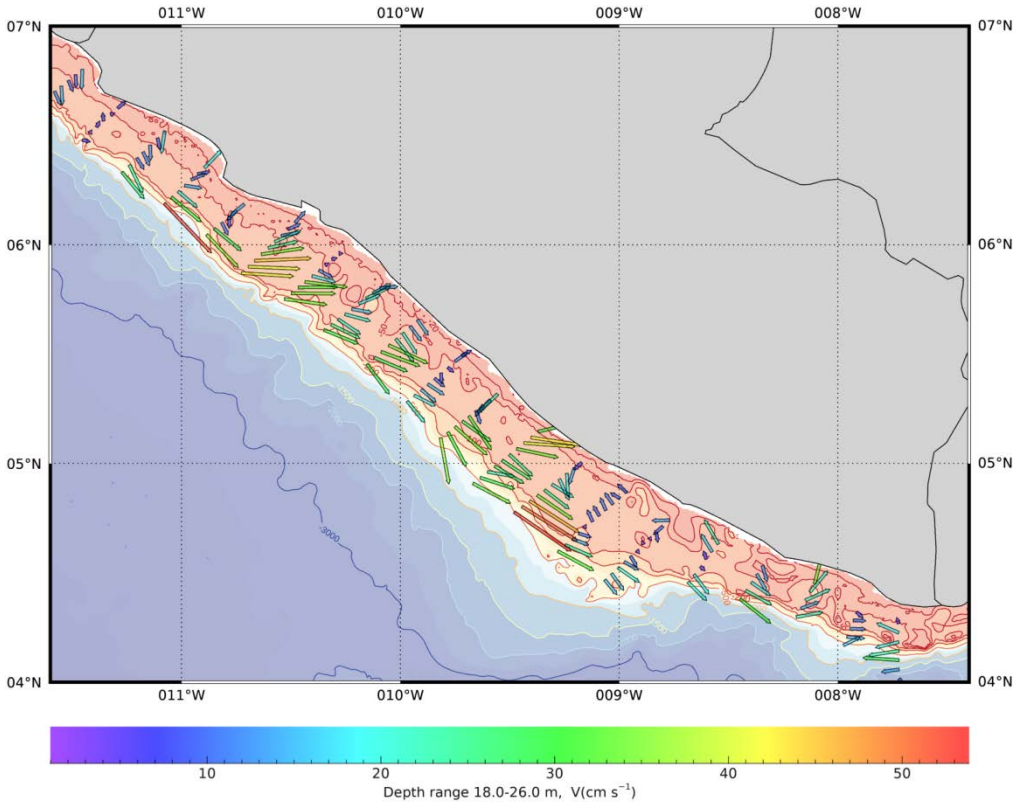


Figure 14. Subsurface current (18–26 m) recorded along the coast of Liberia with the R/V *Dr Fridtjof Nansen*, survey 2019409, 24/08–02/09, 2019. Presented are only the currents collected along the nominal cross-shelf transects

3.1.2.2 Sierra Leone

Current signatures over the Sierra Leone continental shelf (Figure 15) seem to indicate two different patterns from either side of 13°W – 07°30'N: (1) A surface northward continental-shelf flow, extending until 14°30'W – 8°N, over isobaths deeper than 50 m, with velocities between 10–40 cm/s. This flow deviates towards the coast on shallower depths leading to meanders observed between 13°30'N and 8 – 8°30'N. In the northern boundary of Sierra Leone, a wide southward flow occupying the entire width of the continental shelf is also observed. (2) A southward and alongshore flow, feeding the Liberia surface coastal current, observed in the southern part of Sierra Leone.

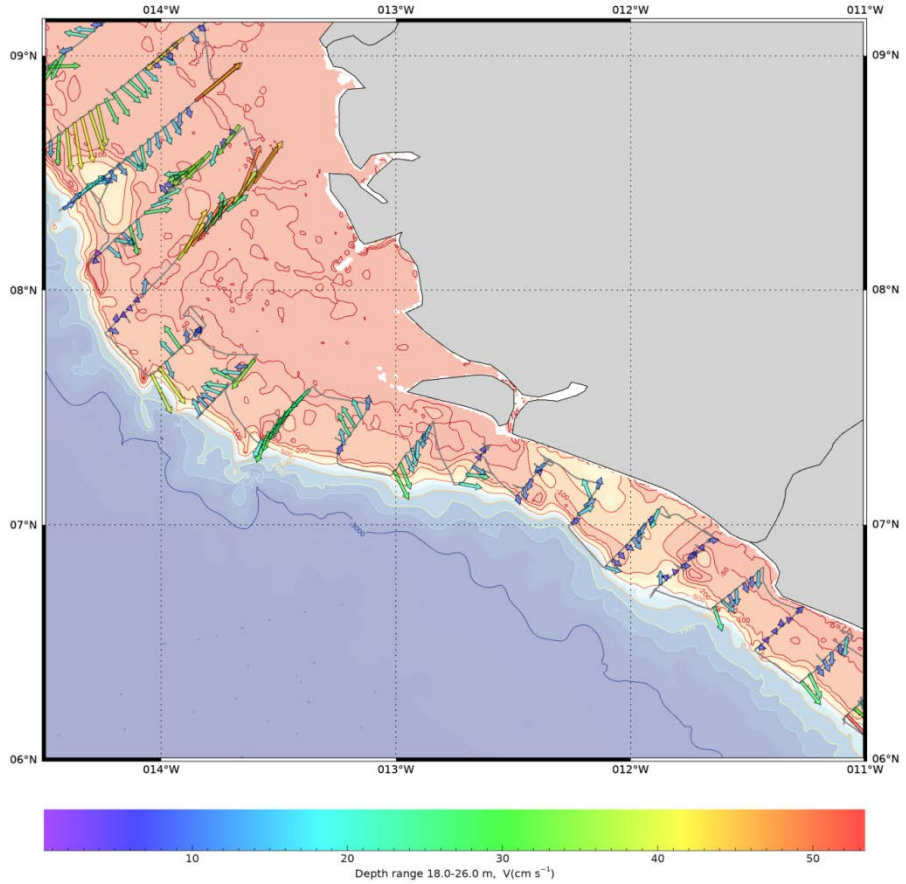


Figure 15. Subsurface current (18–26 m) recorded along the coast Sierra Leone 02–06/09, 2019

3.1.2.3 Guinea and Guinea-Bissau

Along the coasts of Guinea and Guinea-Bissau, the signature of the strong southward current which flows along the Sierra Leone and Liberia coasts had vanished around the border between Sierra Leone and Guinea as the continental shelf broadened (Figure 16). Two patterns were also observed over the width of the shore: Onshore over shallower depths (less than 100 m) as a continuation of the deviated flow from Sierra Leone coast, a northward flow was observed. South of 11°N until 9°N, offshore, and trapped to the shelf break over depths deeper than 100 m a second and strong southward flow can be seen. Otherwise, north of 11°N and offshore, a northward flow was also observed. These two offshore clearly defined northward and the southward flows could be the eastward and northward extensions of NECC, which dominates the surface area circulation during August and reinforces when the ITCZ moves upward. However, the complex scheme of this local circulation needs to be resolved, using winds, tides and salinity data, or model simulations.

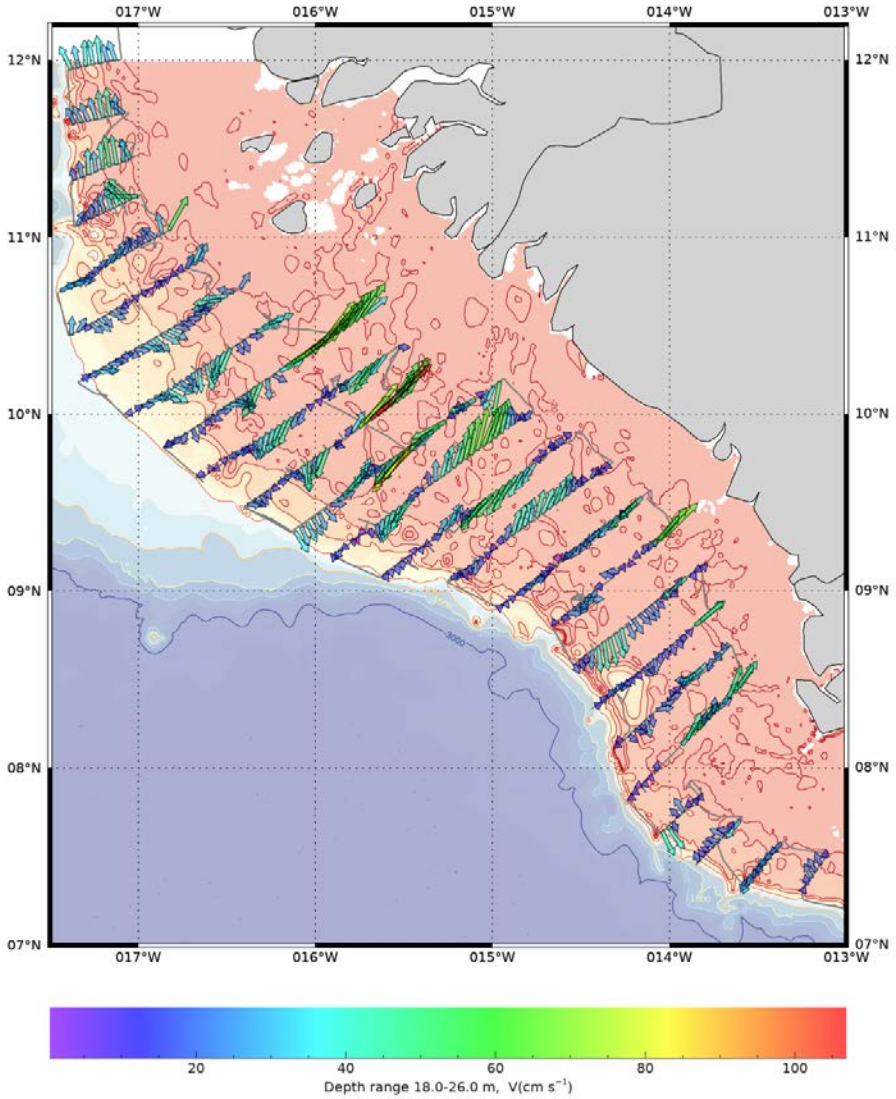


Figure 16. Subsurface current (18–26 m) recorded along the coasts of Guinea and Guinea-Bissau 07-22/09, 2019

3.1.3 Horizontal distribution of oceanographic parameters - subsurface

Both thermosalinographs produced erroneous salinity and fluorescence data throughout the survey and, although the temperature values appeared reasonable, both units have been recommended to be sent for repairs. Therefore, the subsurface horizontal distribution of Liberia, Sierra Leone, Guinea and Guinea-Bissau were analysed using the 163 CTDs performed during Leg 3.2 (Figure 17). Temperature results from the TSG can be seen in Annex XIV. The CTDs were also used to analyse the demersal environment of the trawling areas for each country.

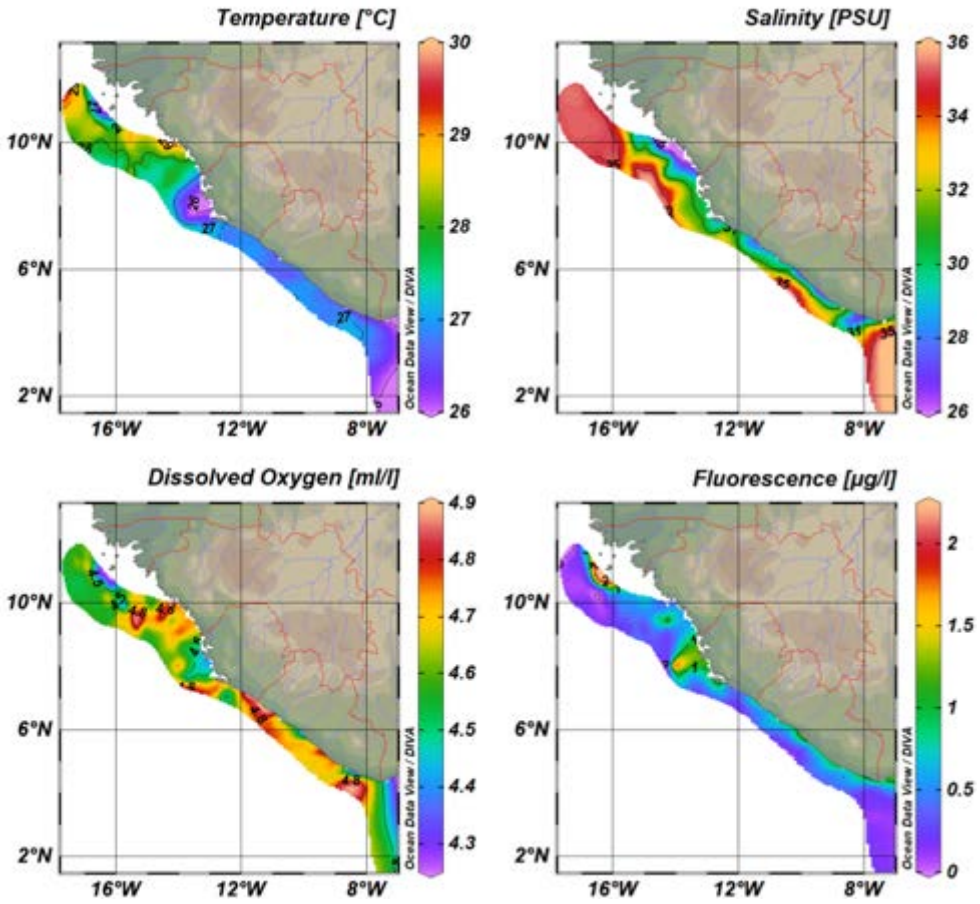


Figure 17. Horizontal distribution of subsurface (5 m) temperature, salinity, dissolved oxygen and fluorescence in Liberia, Sierra Leone, Guinea and Guinea-Bissau

Subsurface temperatures ranged from below 26ºC to ~27ºC, without much fluctuation in Liberia and Sierra Leone. After Sierra Leone, temperatures approached 29ºC as the shelf extended out much further from the coast. This wider shallow shelf in Guinea and Guinea-Bissau could possibly result in more stagnant waters with greater solar influence as opposed to narrower shelves that have a greater chance of mixing with deeper, cooler waters. However, subsurface temperatures dropped below 27ºC against a concentrated area of the Guinea-Bissau coast, which were slightly cooler than demersal waters (30ºC) in the same shallow area. This coupled with fluorescence levels reaching 2 µg/l could indicate an influence from a cooler subsurface current bringing nutrients into the area. Upwelling might be possible, but the shelf provides limitations for that. Cooler river flow like what is observed in northern Liberia might be a possibility, but salinity levels stayed above 35 PSU in Guinea-Bissau, whereas they drop to 26 PSU against the Guinean coast. Liberia and Sierra Leone also showed influence of fresh water on salinity from rivers along their coasts. Subsurface fluorescence levels approached 1 µg/l against their coasts, except for a fluorescence increase above 1 µg/l near the Liberian border. All four countries had fluctuations in a short range of 4.5 and 4.9 ml/l for dissolved oxygen. Sierra Leone and Guinea-Bissau, however, are the only two countries that exhibited dissolved oxygen levels dropping below 4.5 ml/l. Both in the same decreased temperature and increased fluorescence areas mentioned above.

3.2 Fixed stations

Locations of all the CTD deployments carried out during the survey are shown in Figure 4 and transects where water samples and additional sampling for plankton and microplastics occurred are shown in Figure 5. All figures in this section are based on the hydrographical transects.

3.2.1 Horizontal distribution – demersal zone

3.2.1.1 Liberia – demersal zone

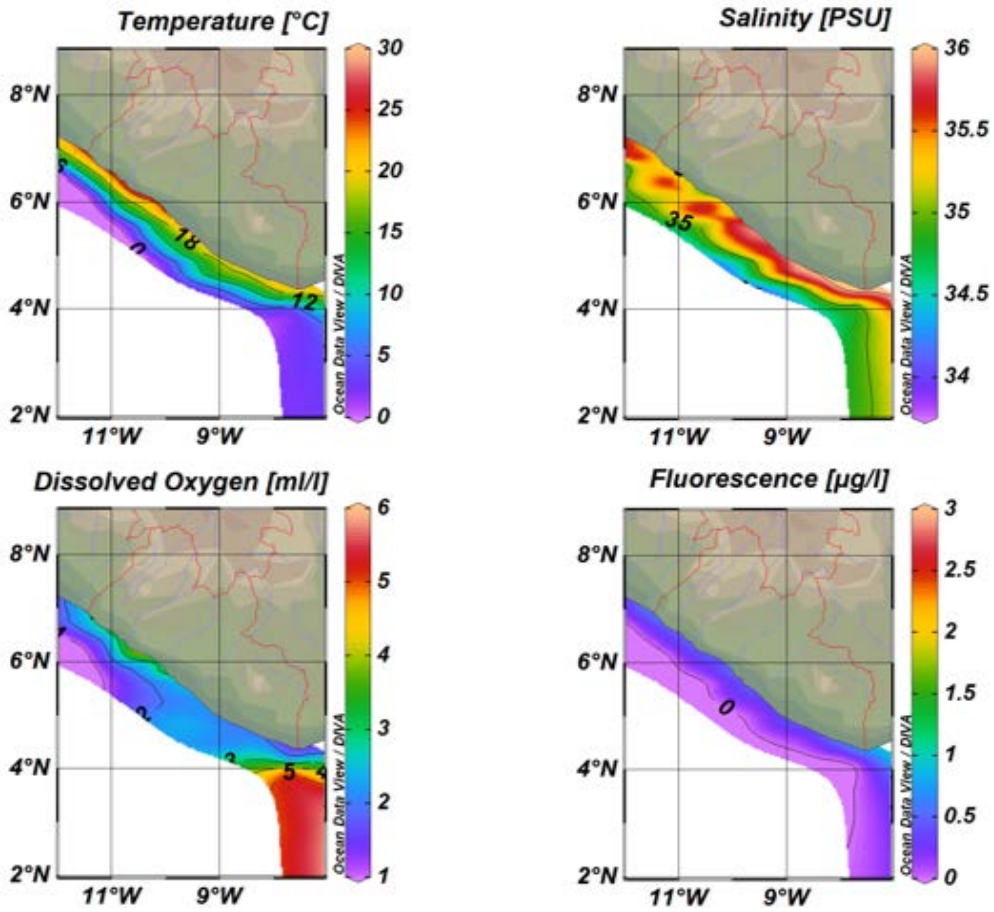


Figure 18. Demersal zone distribution of temperature, salinity, dissolved oxygen and fluorescence in Liberia

With Liberia being the only country occupied with an extended transect, temperatures of 4ºC and dissolved oxygen above 5 ml/l were observed outside the shelf at 4 000 m (Figure 18). On the shelf, however, demersal temperatures increase significantly above 25ºC as would be expected with bottom depths above 100 m, 50 m and 30 m. Low oxygen levels approaching 1 ml/l were observed along the shelf. However, these levels were above those observed higher up in the water column's oxygen minimum zone. These demersal oxygen levels are still low, however, and could signal plankton concentrations slightly above those depicted in the oxygen minimum zone since plankton are linked to microbial respiration. Although slightly

influenced by the many river outlets, salinity levels approached 36 PSU in the demersal zones near the coast. Fluorescence levels only approached 1 µg/l, even at the shallow bottom depths.

3.2.1.2 Sierra Leone – demersal zone

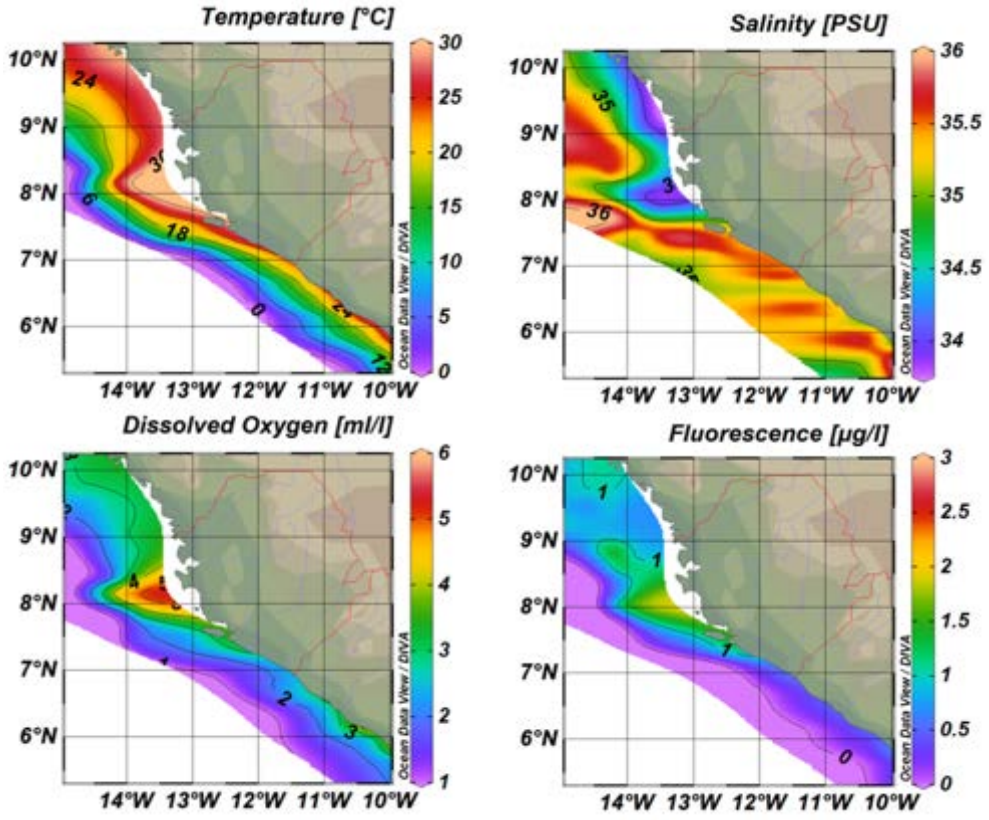


Figure 19. Demersal zone distribution of temperature, salinity, dissolved oxygen and fluorescence in Sierra Leone

Because of the more extended shelf occupied as the survey moved up the coast, a wider spread of warmer waters (30ºC) was observed in the demersal zone of Sierra Leone (Figure 19), especially in the northern regions. Along with warmer water, salinity levels appear to be more influenced by more freshwater river runoff in the northern, shallow regions as they reached 34 PSU. The deeper area outside the shelf showed low oxygen levels (1 ml/l), but increased to higher levels as depth decreased towards the shore. Oxygen levels up to 5 ml/l were observed outside the mouth of two rivers in the northern region. Fluorescence levels increased to over 1 µg/l in the northern shallow demersal zone.

3.2.1.3 Guinea – demersal zone

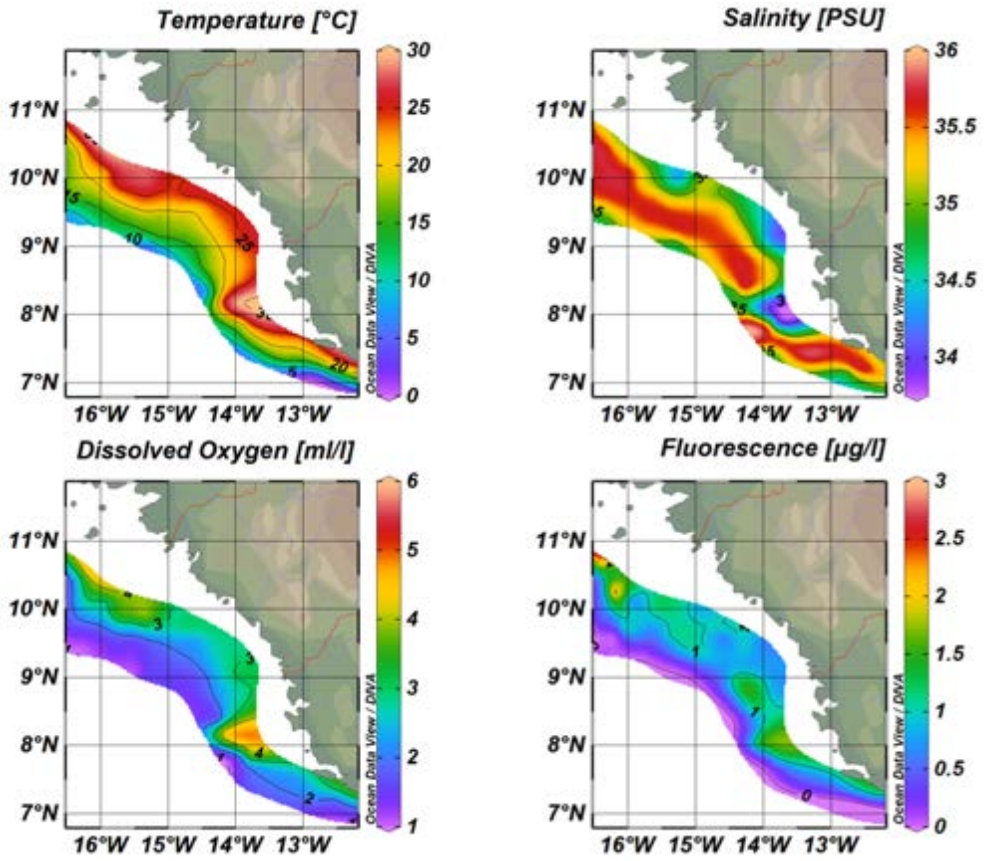


Figure 20. Demersal zone distribution of temperature, salinity, dissolved oxygen and fluorescence in Guinea

With an even more extended shelf, Guinea (Figure 20) showed the same trend of temperature stratification and dispersion as was observed in Sierra Leone (Figure 19), with levels just surpassing 25ºC. Dissolved oxygen levels stay below 4 ml/l in Guinea, but had a larger spread of oxygen above 3 m/l. Lower demersal zone salinity levels (below 35 PSU), although more dispersed, appear to be more influenced by the two river outlets as opposed to the southern region. Fluorescence levels continued to increase as the survey moved northwards, reaching 1.5 µg/l, and also appeared to be more dispersed along the wider Guinean coast.

3.2.1.4 Guinea-Bissau – demersal zone

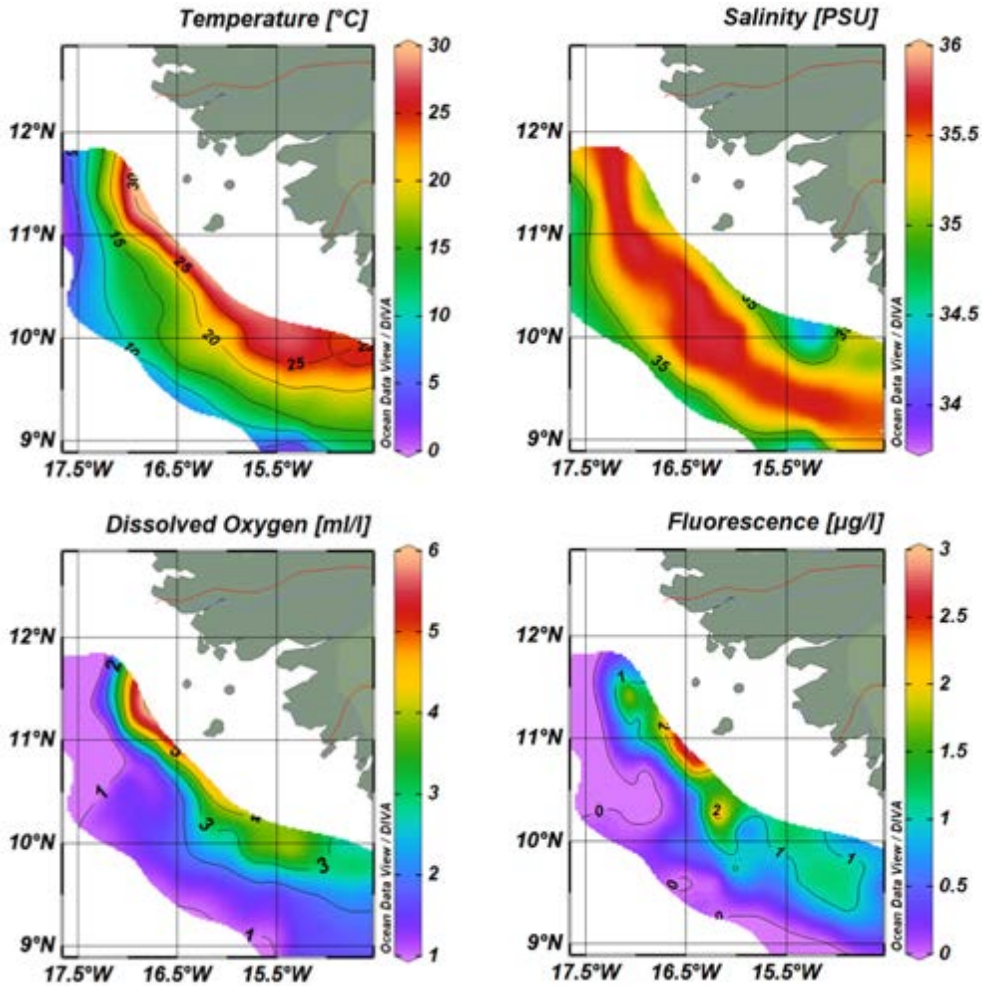


Figure 21. Demersal zone distribution of temperature, salinity, dissolved oxygen and fluorescence in Guinea-Bissau

In Guinea-Bissau (Figure 21), the warm demersal zone water continued its trend of being more dispersed on the extended continental shelf, with temperatures reaching 30ºC. Although affected slightly, salinity levels appeared to be less influenced by freshwater from the coast. The highest salinities were observed at the outer shelf at close to 36 PSU, but decreased again in deeper waters along the slope. Outside the shelf, dissolved oxygen levels drop below 1 ml/l, which was the lowest observed during the survey. Demersal fluorescence levels were highest in shallower waters and reached their maximum levels on the survey surpassing 2 µg/l near the coast.

3.2.2 Vertical distribution of hydrographic transects

A total of 163 CTDs were deployed, 41 of which were chosen for extra hydrographic sampling (Table 8). One transect has been chosen to summarize each country's coastal characteristics, but more detailed descriptions of additional transects can be found in Annex XIV.

Table 8. CTD stations, super stations, and hydrographic samples by four participating countries

	Liberia	**Sierra Leone**	**Guinea**	**Guinea-Bissau**	**Total**
Total CTD stations	45	35	52	31	**163**
Super stations	17	12	6	6	**41**
pH	102	66	37	36	**241**
Total alkalinity	102	66	37	36	**241**
Chlorophyll a	62	52	26	29	**169**
Nutrients	102	66	37	36	**241**

3.2.2.1 Liberia

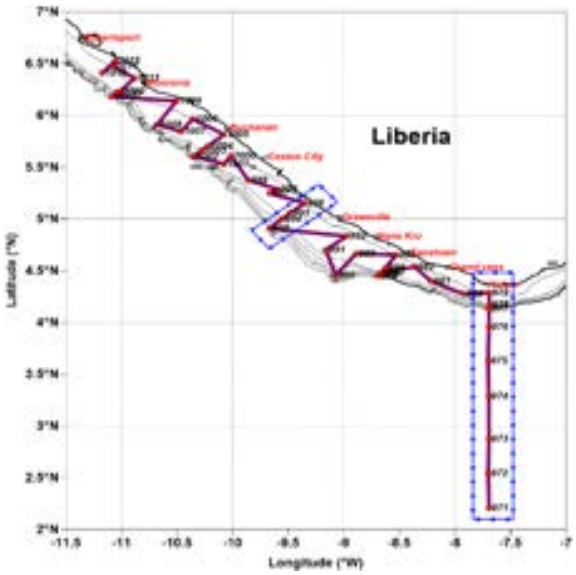


Figure 22. CTD stations and cruise track in Liberia. The blue boxes indicate transects of significance

Warm surface waters with temperatures between 26–27°C were observed to begin the survey in Libera (Figure 23) with a thermocline located at 20 m at the coast and 50 m offshore. At 200 m, temperatures reached 13ºC, but at 4 000 m (not plotted), temperatures reach 4ºC. Surface water salinity is 29 PSU at the coast but quickly increased to 35.5 as the transect extends into the open ocean. At 30–100 m, a salinity maximum was observed with values reaching 36 PSU. Increased fluorescence levels were seen ranging between 0.8 and 1.8 mg/m^3. At the coast, this zone extended between the surface and 30 m and sank offshore down to 70 m.

Surface oxygen concentrations varied from 4.2 to 4.8 ml/l. The maximum was observed around 50 m between 2°N and 3°N. The oxycline was near 20 m at the coast and 50 m at the end of the transect. An oxygen minimum zone (OMZ) was observed between 200–300 m with a core concentration of 1.3 ml/l, which identifies the zone as hypoxic (Paulmier and Ruiz-

Pino, 2009). According to Lemasson and Rebert (1973), this can be the Guinea Under Current, carrying waters of low dissolved oxygen because of the oxidation of organic matter from the upwelling located in the northern coasts of the Gulf of Guinea.

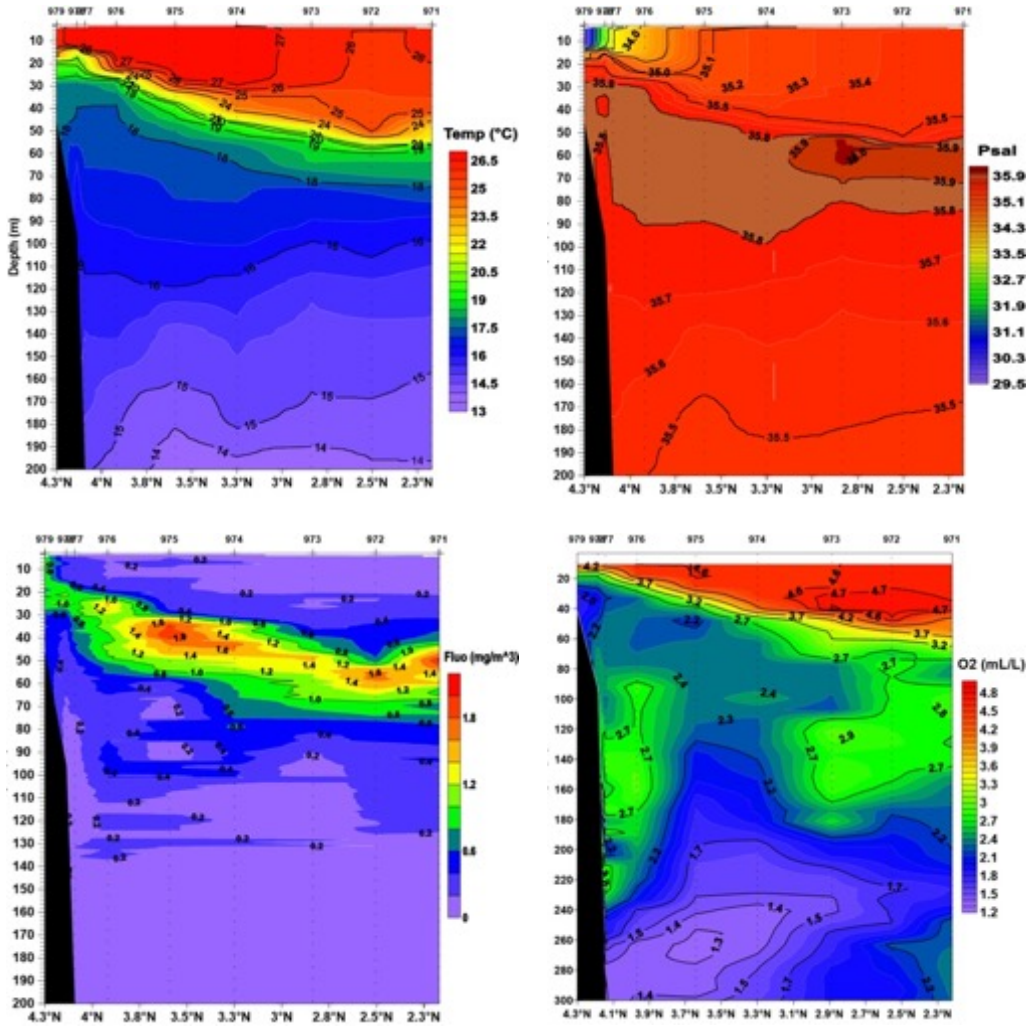


Figure 23. Latitudinal distribution of hydrographical parameters on the Côte d'Ivoire – Liberia transect with depths of 200 m and 300 m

Ocean surface layers in this area were influenced by Guinean waters with warm water and low salinities due to heavy rainfalls caused by the upward position of the ITCZ during this season. Liberia's climate is dominated by the abundant rainfall during the rainy season from May to October (Ndehedehe *et al.*, 2016). In addition, Liberia has six major river outlets draining into coastal waters, most of which originate in Guinea with a maximum rainfall in July and August (Pezennec O.,1999; UNEP, 2004).

3.2.2.2 Sierra Leone

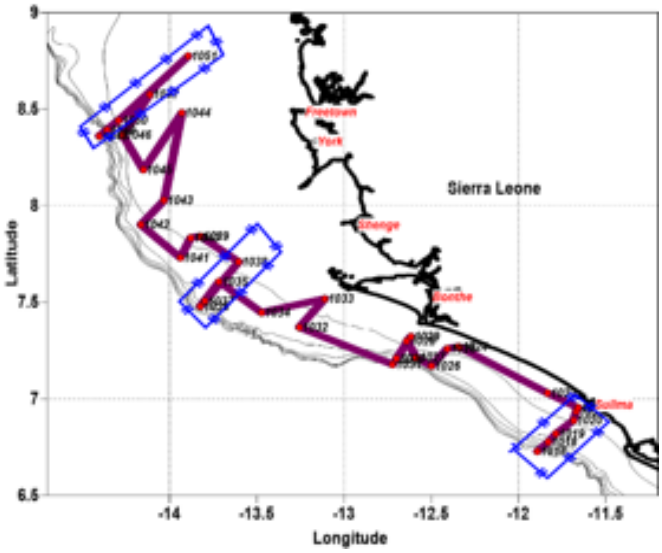


Figure 24. CTD stations and cruise track in Sierra Leone. The blue boxes indicate environmental transects of significance

Surface temperature levels surpassed 27ºC at Sierra Leone's northernmost transect (Figure 25), with a consistent 30 m thermocline throughout. Below the thermocline at 200 m, colder waters of 14°C were observed. Salinity values below 29.5 PSU were seen in the first 10 m as far as 14 NM from the coast. Beyond that, salinity levels began to increase as waters mix with the open ocean. Subsurface dissolved oxygen levels above 4.2 ml/l were observed inshore with a maximum reaching 4.6 ml/l offshore. The oxycline was located near 20 m until a large hypoxic zone was reached with values at 1.3 ml/l. As normally seen, fluorescence levels were low (0.8 mg/m^3) near the surface, but an extended band of fluorescence maxima reaching 2.4 mg/m^3 was seen throughout the transect near 25 m.

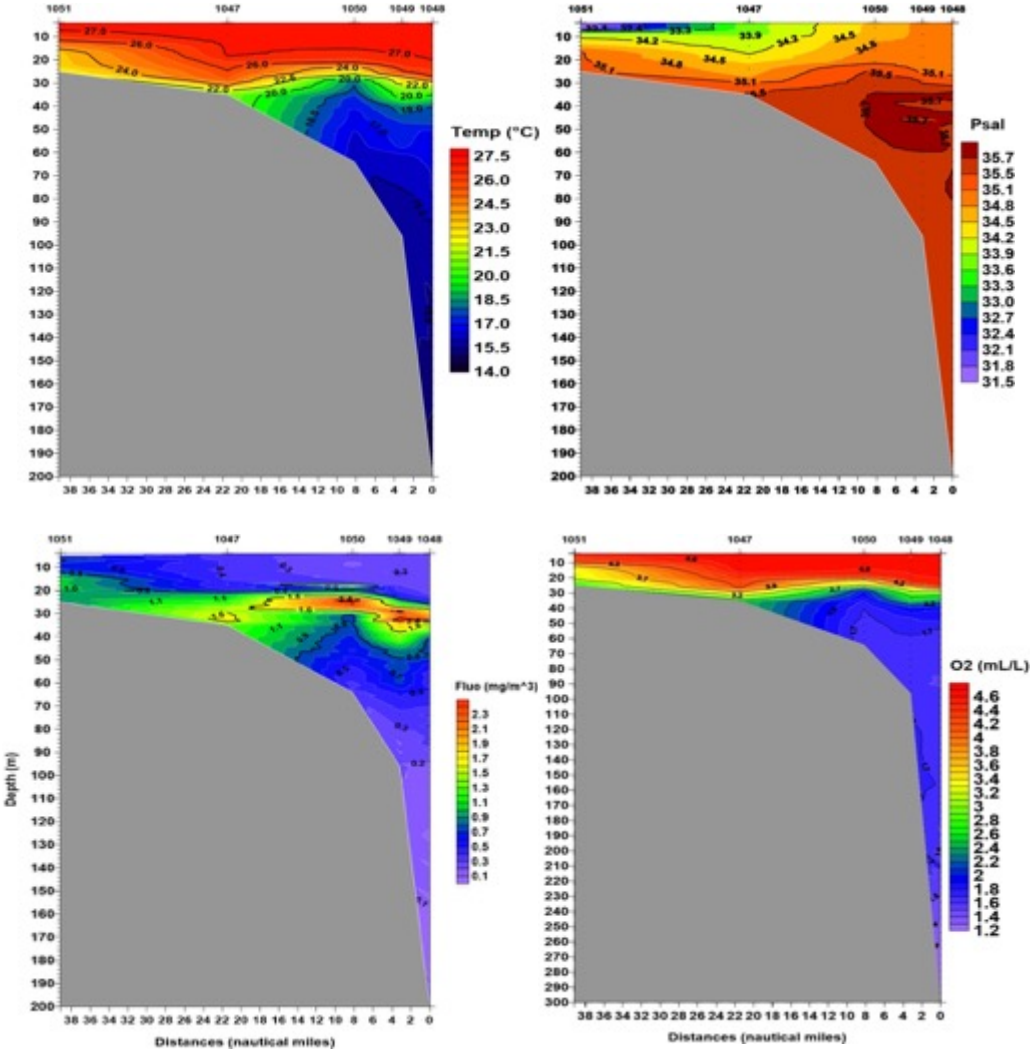


Figure 25. Vertical distribution of temperature, salinity, dissolved oxygen and fluorescence, northern transect, Sierra Leone

3.2.2.3 Guinea

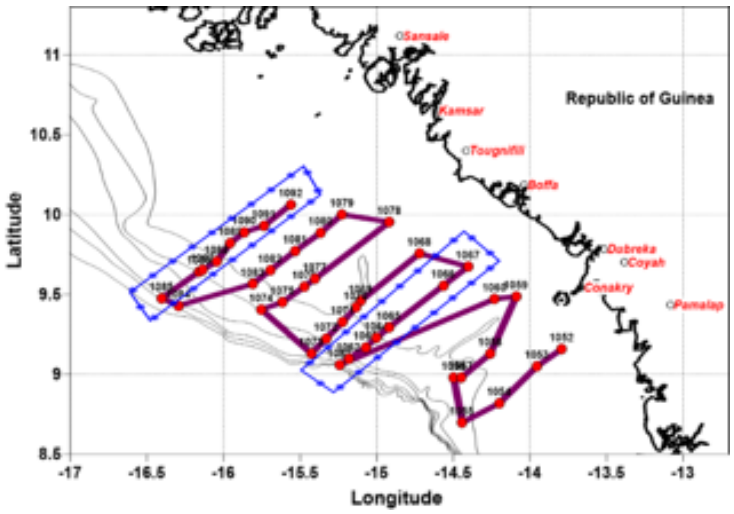


Figure 26. CTD stations and cruise track in Guinea. The blue boxes indicate environmental transects of significance

In the southern boundary of the shelf lies the Boffa transect (Figure 26). Subsurface waters reached 28°C with salinity below 30 PSU (Figure 27), indicating freshwater river influence. These upper layers were stratified with the thermocline between 30–35 m. The salinity maximum (35.8 PSU) remained underneath the thermocline on the shelf. Fluorescence levels were below 0.7 mg/m^3 in the first 10 m, but surpass 2.8 mg/m^3 quickly near 14 m and above the thermocline near the coast. Dissolved oxygen levels above 4.5 ml/l were seen 10 m near the coast and down to 20 m as the shelf begins to deepen. Hypoxic levels were reached again beyond 280 m, with dissolved oxygen values reaching 1.1 ml/l.

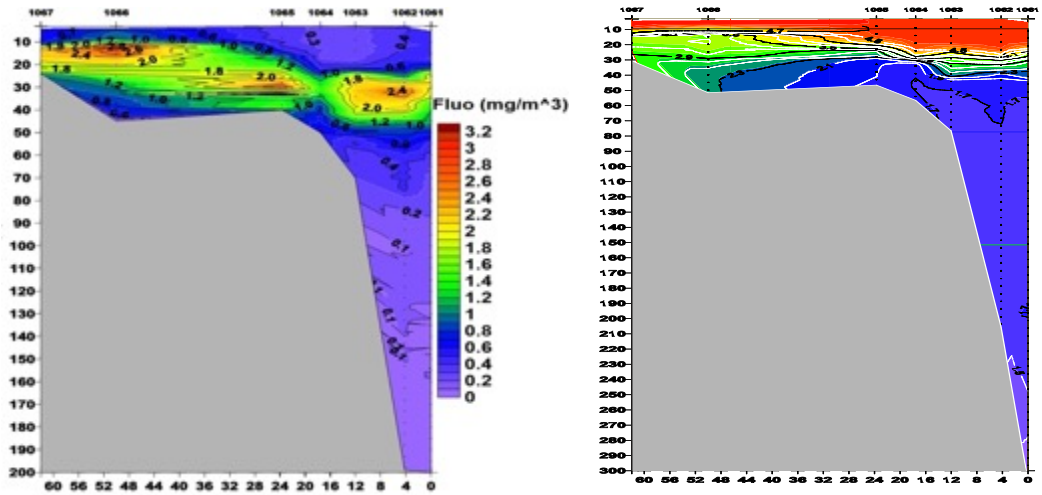


Figure 27. Vertical distribution of temperature, salinity, dissolved oxygen and fluorescence along the Boffa transect, Guinea

3.2.2.4 Guinea-Bissau

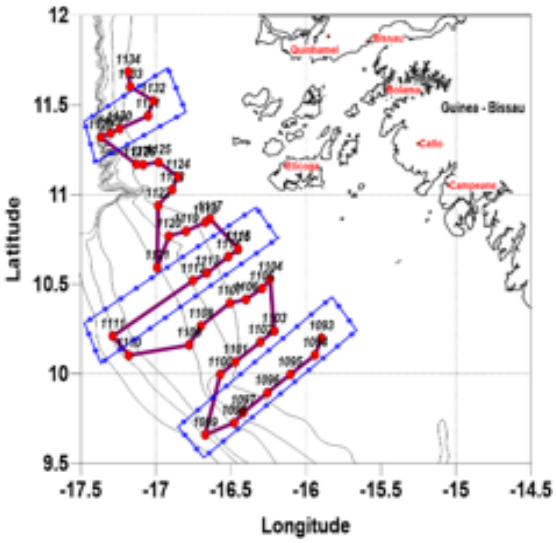


Figure 28. CTD stations and cruise track in Guinea-Bissau. The blue boxes indicate transects of significance

The upper layers of the Catio transect (Figure 28) was dominated by warm waters with temperatures between 27-28°C in the first 20 m, with the thermocline located near 30 m depth (Figure 29). Subsurface salinity ranges between 35.3 and 35.4 PSU with a small observed minimum at the coast (35-35.1 PSU). The salinity maximum is visible offshore near 40 m with a value of 35.8 PSU. The fluorescence maximum is located between 20–40 m with the highest values of the entire survey reaching 5.6 mg/m^3. The surface waters are more oxygenated in the first 30 m with concentrations above 4.0 ml/l. Near 300 m, dissolved oxygen concentrations reach lows of 1.4 ml/l, verifying another hypoxic region.

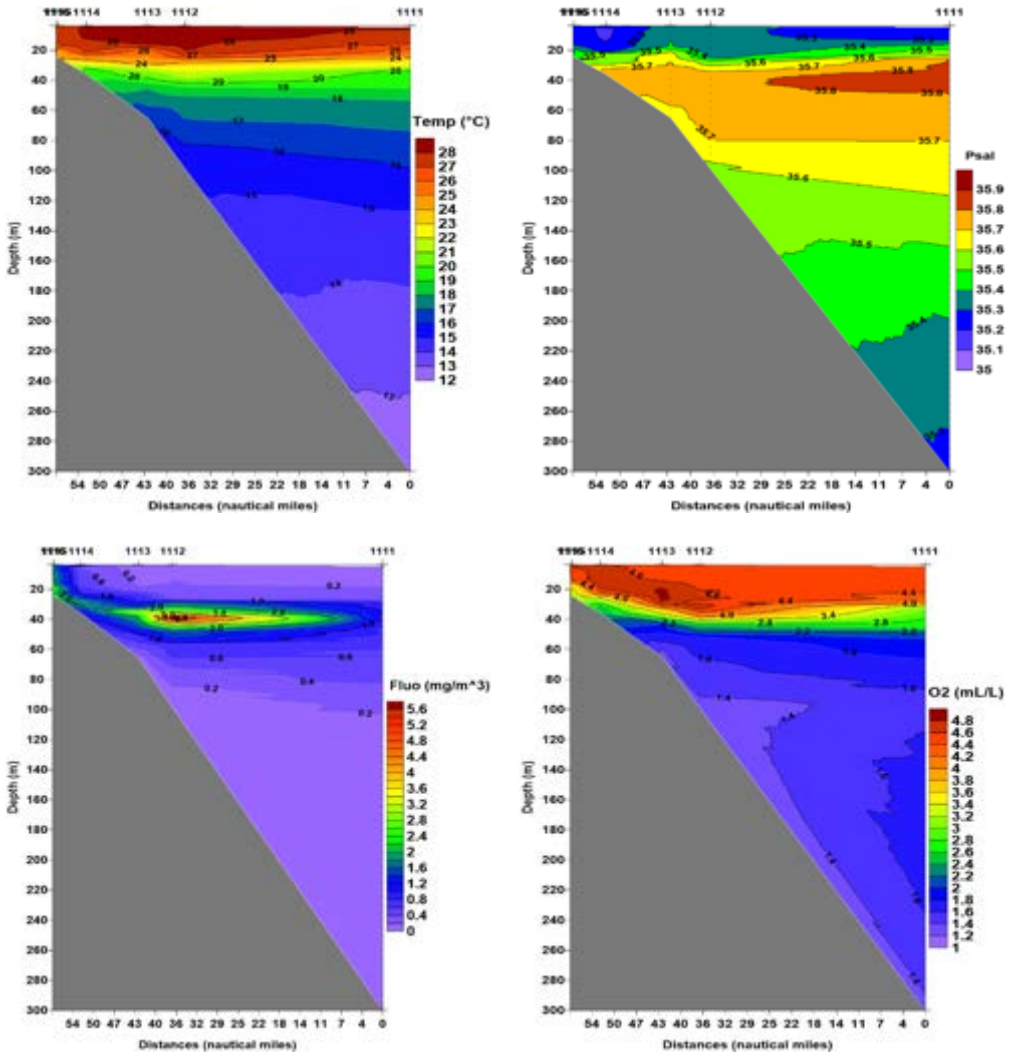


Figure 29. Vertical distribution of temperature, salinity, dissolved oxygen and fluorescence along the Catio transect, Guinea-Bissau

3.2.3 Ocean Acidification

On board analyses of pH and total alkalinity were performed during the survey to describe the oceanic CO_2 characteristics of Liberia, Sierra Leone, Guinea and Guinea-Bissau. In combination with the nutrient samples analysed at IMR, the aragonite saturation state of each country can be calculated to determine the status of ocean acidification in the region.

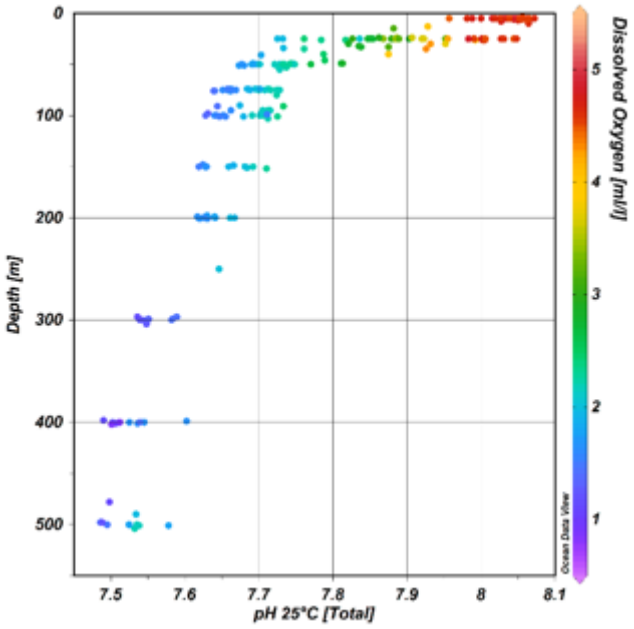


Figure 30. Relationship between pH and dissolved oxygen in Liberia, Sierra Leone, Guinea and Guinea-Bissau

A large area of low pH and dissolved oxygen levels at similar depths is typically an indication of increased microbial respiration from planktonic organisms as is believed to be seen in Figure 30. Both pH and dissolved oxygen minima (7.49 and 0.86 ml/l respectively) were consistently observed at 100 m and below. However, the largest dissolved oxygen minimum zone was mostly located in the northern region of the survey, indicating a possible increase in plankton concentration between 400–500 m. Consistently high pH levels at the surface show little indication of upwelling for most of the surveyed area, as upwelling also brings CO_2 to surfaces, lowering the pH.

3.3 Plankton

3.3.1 Zooplankton

A total of 117 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 (g m^{-2}) has been presented in Figure 31. Total zooplankton biomass ranged between 0.6–10 g m^{-2}, with higher values at offshore stations, particularly at the south and north sites of the surveyed 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 32).

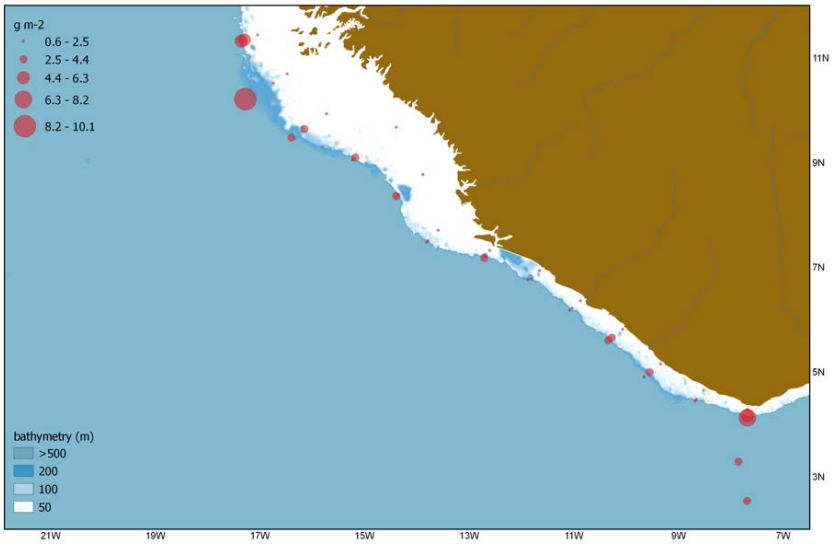


Figure 31. Horizontal distribution of total zooplankton biomass

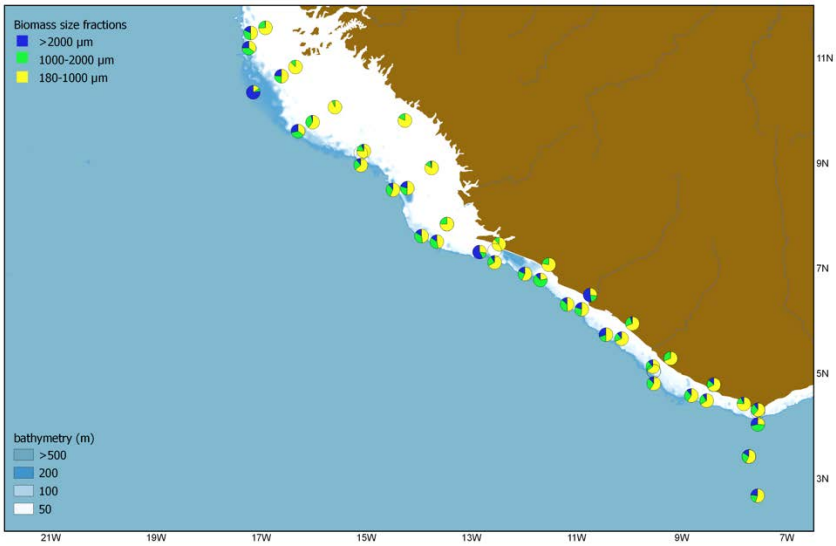


Figure 32. Contribution of three different size fractions to the total mesozooplankton biomass recorded along the station grid

3.3.2 Ichtyoplankton

3.3.2.1 Bongo net

A total of 41 Bongo V samples (in 43 bottles) preserved in formaldehyde were transferred to IMR for future sorting. From Bongo H a total of 41 jars with bulk plankton sample (21 in 96% ethanol and 20 in 4% formaldehyde), and 48 scintillation vials and 1 Eppendorf tube with fish larvae and juveniles (all preserved with 96% ethanol) were also transferred to IMR for future processing.

Figure 33 shows that only 30% of the larvae in the collections was sorted onboard, while the volumes of water filtered by the two nets was similar, as expected.

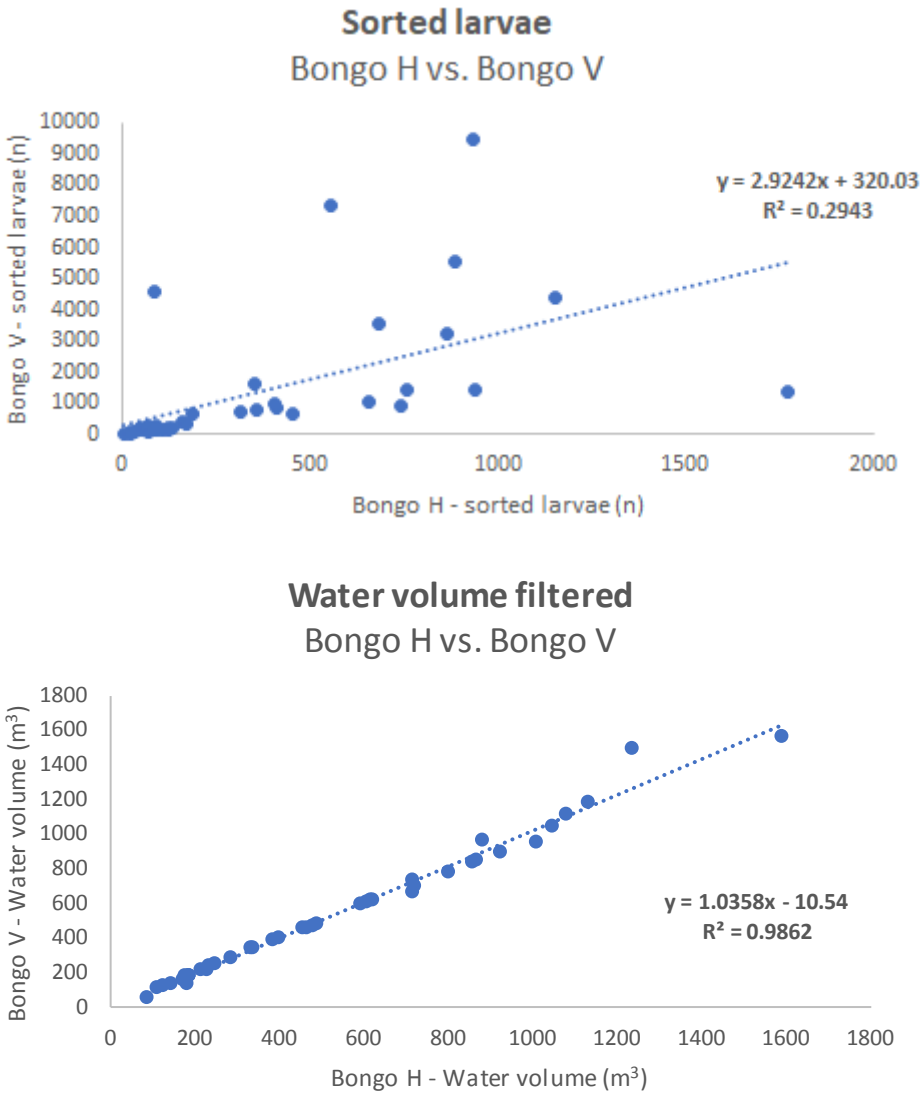


Figure 33. Comparison of number of larval fish sorted and water volume filtered between Bongo-H and Bongo-V net

A total of 14 602 larvae and 4 639 eggs were sorted from Bongo V samples. Horizontal distribution of the abundance of larval fish ranged from 10 to 7 004 larvae m^{-2}, showing higher concentrations at the northern part of the surveyed area (Guinea and Guinea-Bissau), and particularly at sites located offshore (Figure 34). Station 1086 located at the 100 m isobath presented particularly high values reaching 7 004 larvae m^{-2}. Fish egg abundance ranged from 3 to 758 eggs m^{-2} with the highest values presented at shallower depth stations and particularly in the northern part of the surveyed area (Figure 35).

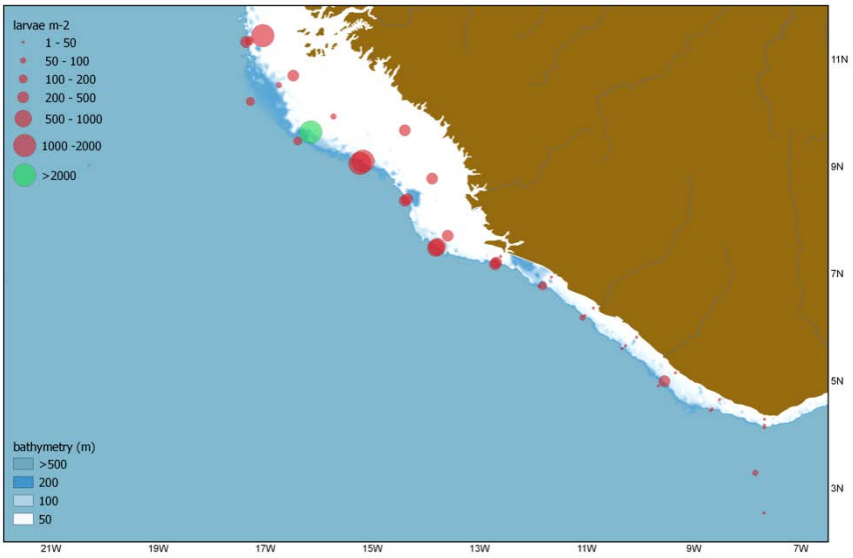


Figure 34. Horizontal distribution of total fish larvae (larvae m^{-2}) along the superstation grid

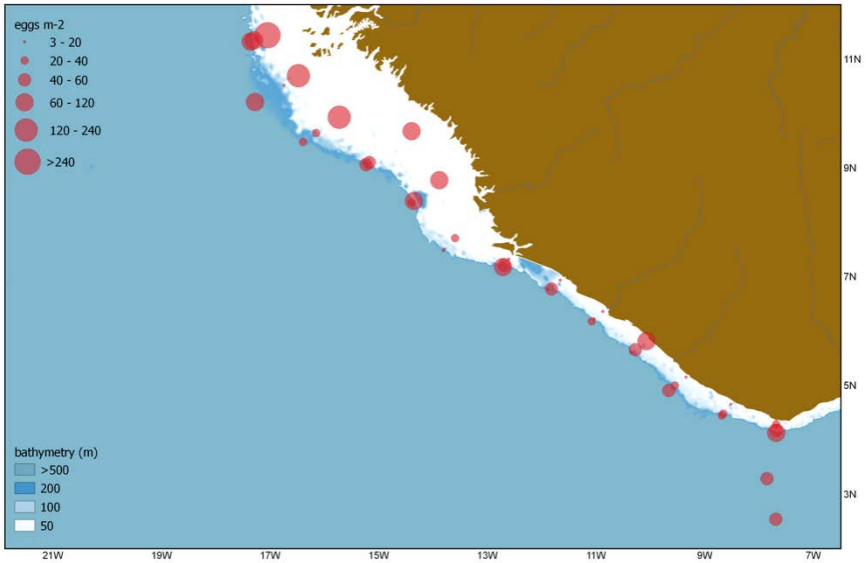


Figure 35. Horizontal distribution of total fish eggs (eggs m^{-2}) along the superstation grid

3.3.2.2 Manta net

From the manta net, a total of 40 scintillation vials and 13 Eppendorf tubes with sorted juveniles, larvae and eggs preserved in 96% ethanol (30 vials in methylated and 21 in unmethylated ethanol), and 13 100 mL bottles with fish juveniles, were transferred to IMR for taxonomic identification. A total 41 of bulk Manta trawl samples preserved in 96% ethanol (methylated) were transferred to UWC for future analysis.

As for the water column, the surface samples (Figure 36) showed low concentrations of fish larvae in Liberia. In Sierra Leone, slightly higher concentrations were observed with the highest values at the 30 m stations on the two westernmost transects (0.2 larvae m^{-2}). In Guinea, the very same station that had by far the highest concentration of fish larvae in the

water column (Figure 32), had the highest concentrations of the region in the surface layer. In Guinea-Bissau, the concentrations of fish larvae in the surface layer were consistently low.

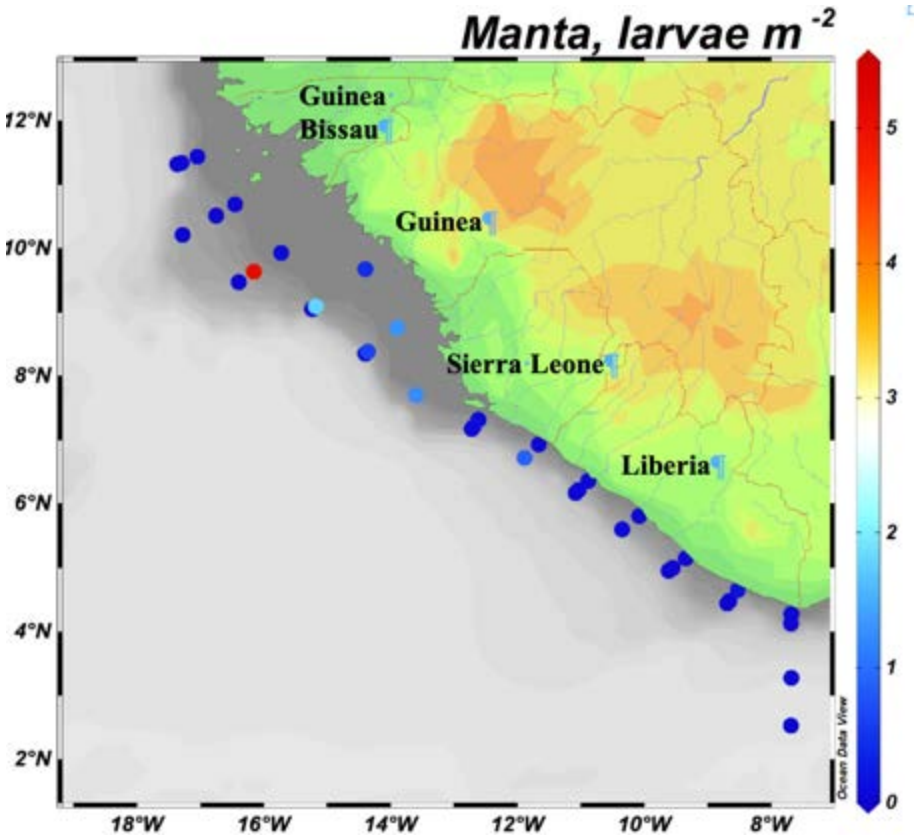


Figure 36. Concentrations of fish larvae (n m^{-3}) in the Manta net, sampling the surface

In Liberia, fish eggs were found in low numbers at all stations, except at the station closest to the coast on the southernmost transect, where 751 eggs were found in the sample corresponding to 0.82 eggs m^{-2} (Figure 37). Egg concentrations were also low in Sierra Leone with maximum values of 0.2 eggs m^{-2} at the 30 m stations on the two westernmost transects. In Guinea and Guinea-Bissau, egg concentrations were slightly higher with maximum values of 0.6 and 1.0 eggs m^{-2}, both at 30 m stations.

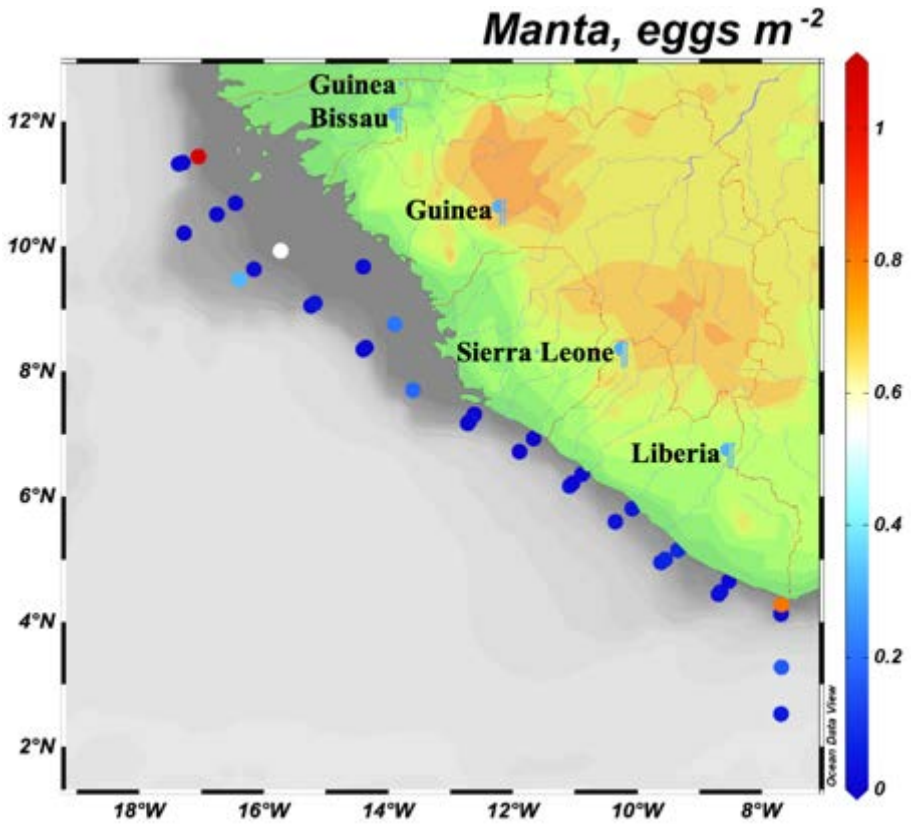


Figure 37. Concentration of fish eggs in the Manta net, sampling the surface (n m^{-2})

3.3.3 Jellyfish

Jellyfish were mainly collected in the trawl, but some were also sampled in the plankton sampling gears. Table 9 presents the number of jellyfish per species and country. There were generally lower than expected abundances of jellyfish in the region.

Table 9. Number of observed jellyfish species per country

Country	Species	Number
Liberia	Salp	2
Liberia	*Pelagia noctiluca*	13
Liberia	Unidentified Scyphozoans	5
Liberia	*Aurelia* sp	10
Liberia	*Chrysaora hysoscella*	3
Liberia	*Chrysaora* sp.	2
Liberia	*Aequorea* sp.	5
Liberia	Ctenophore	1
Liberia	Chirodropidae	2
Liberia	Cubozoa	3
Liberia	*Catostylus* sp.	1
Liberia	*Rizostoma octopus*	3
Sierra Leone	*Chrysaora hysoscella*	2
Sierra Leone	*Rhizostoma octopus*	3
Guinea	*Carybdea* sp.	1
Guinea	*Rhizostoma octopus*	4
Guinea-Bissau	No identifiable jellyfish	0

3.3.4 Microplastics

A total of 28 aluminium trays with microplastics were shipped to IMR for further processing. In Liberia, microplastics were found in low (<0.01 pieces m^{-2}) concentrations at all stations (Figure 38), except at the station closest to the coast on the westernmost transect where 36 pieces were found in one sample (0.05 pieces m^{-2}). In Sierra Leone, microplastics were found in low numbers at all stations (<0.02 pieces m^{-2}). The highest concentrations of microplastics in the region were found at a 30 m station in Guinea with 77 pieces corresponding to 0.1 pieces m^{-2}. In Guinea-Bissau, few pieces of plastic were found in surface waters (<0.004 pieces m^{-2}).

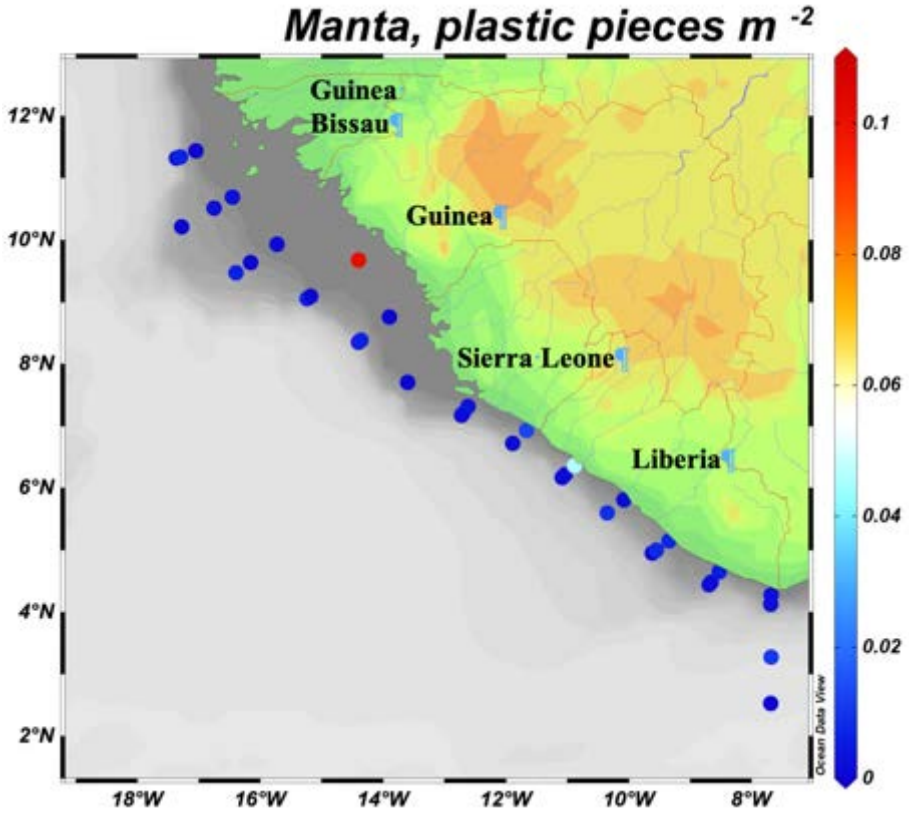


Figure 38. Concentrations of microplastic found in surface waters (n m^{-2}) at all sampled stations

3.4 Pelagic fish – distribution, abundance and size

Among the pelagic target species, only *Sardinella aurita*, *S. maderensis* and the group of species called Pelagic 2, appeared in sufficient abundances for estimation of biomass and drawing of distribution maps. It is worth noting the differences of width of the shelf along the surveyed area (Figure 38). The shelf is narrow along Liberia and the eastern half of Sierra Leone, whereas Guinea has the widest shelf. Pelagic fish were only observed on the shelf, mainly at depths <100 m.

3.4.1 Sardinellas

It is not possible to distinguish between *S. aurita* and *S. maderensis* from the echosounder results. Therefore, a common distribution of the two species is presented in Figure 39. Three separate strata were observed, Stratum 1 in Liberia, Stratum 2 mainly in Sierra Leone and Stratum 3 in Guinea and Guinea-Bissau. The density of Sardinella increased from east to west, with mean sA values of 12 in Stratum 1, 112 in Stratum 2, 550 in the part of Stratum 3 in Guinea and 849 in Guinea-Bissau.

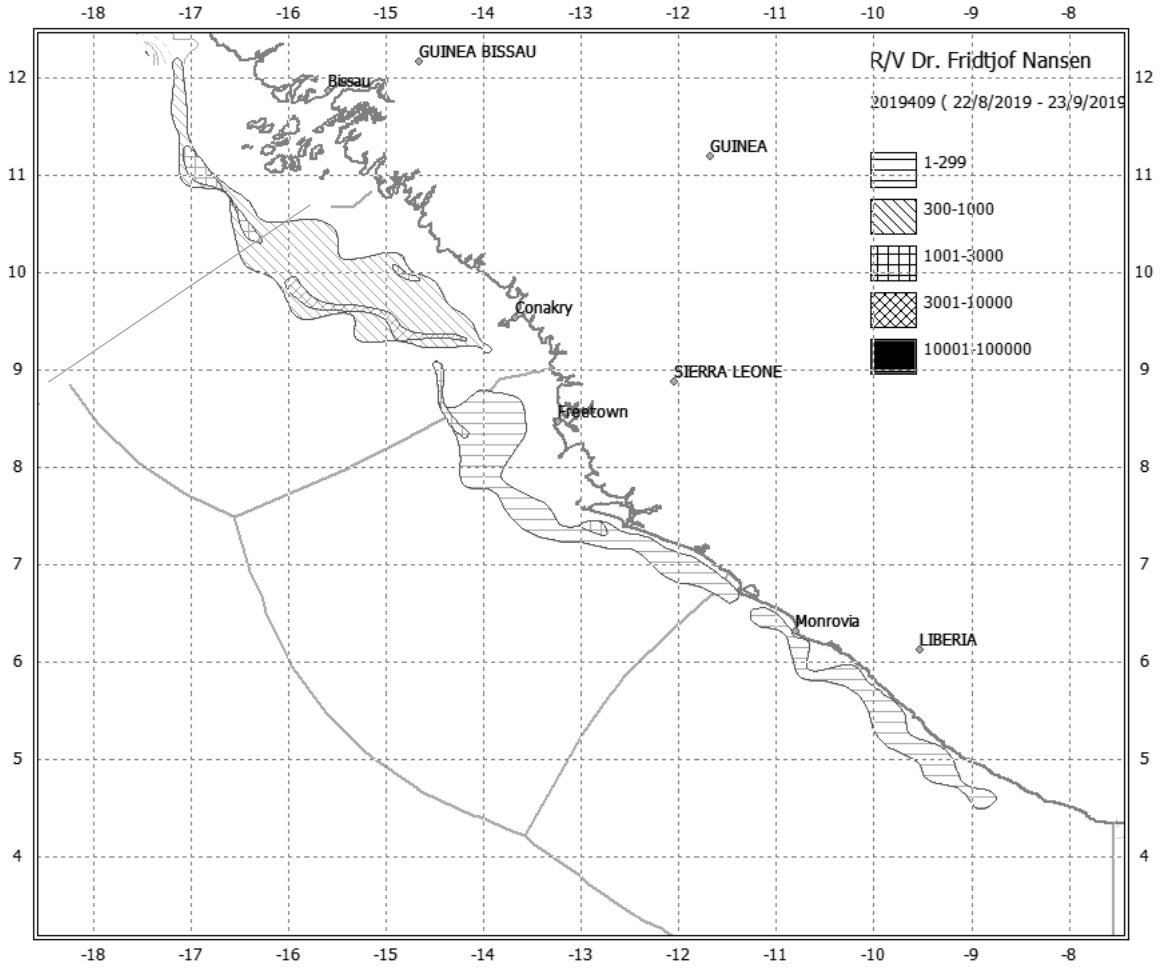


Figure 39. Distribution (density= m^2/NM^2) of *S. aurita* and *S. maderensis* in Liberia, Sierra Leone, Guinea and Guinea-Bissau

The composition of the trawl catches was used to estimate the biomass of the two Sardinella species separately. Length-weight parameters for *S. aurita* and *S. maderensis* are presented in Table 10. Common length-weight relationships for all three strata were used as splitting by stratum had insignificant influence on the estimates.

Table 10. Length-weight parameters used for estimating biomass of Sardinella

	Length-weight parameters	
Species	a	b
S. aurita	0.0079	3.02
S. maderensis	0.0129	2.87

The difference in abundance is also reflected in the biomass of *S. aurita* and *S. maderensis* for the various countries (Table 11). The higher biomass in Guinea reflects a wider area of distribution. In Liberia and Sierra Leone, *S. aurita* was the most abundant species, whereas *S. maderensis* was more abundant in Guinea and Guinea-Bissau. The total estimates of *S. aurita* and *S. maderensis* were 458 000 tonnes and 747 000 tonnes , respectively, and the total biomass of both species 1 205 thousand tonnes. Numbers and biomass per species and length (1 cm intervals) for the various countries are presented in Annex IX.

Table 11. Estimated biomass of *S. aurita* and *S. maderensis* in Liberia, Sierra Leone, Guinea and Guinea-Bissau (1 000 tons)

Species	Liberia	Sierra Leone	Guinea	Guinea-Bissau	Total
S. aurita	5.6	67.2	251.0	134.4	458.2
S. maderensis	0.2	28.3	500.3	218.5	747.3
Total	5.8	95.5	751.3	352.9	1 205.6

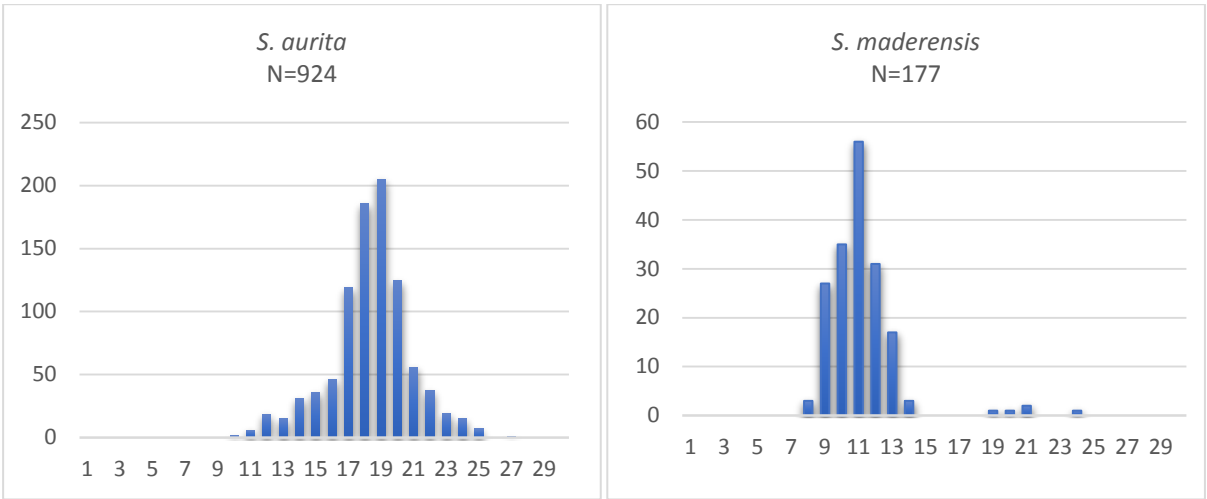


Figure 40. Length frequency distributions of *S. aurita* and *S. maderensis* in Liberia

In Liberia, the length frequency distribution (Figure 40) of *S. aurita* was unimodal and quite wide with a peak at 19 cm. In contrast, *S. maderensis*, which were found in lower numbers, was dominated by small individuals peaking at 11 cm.

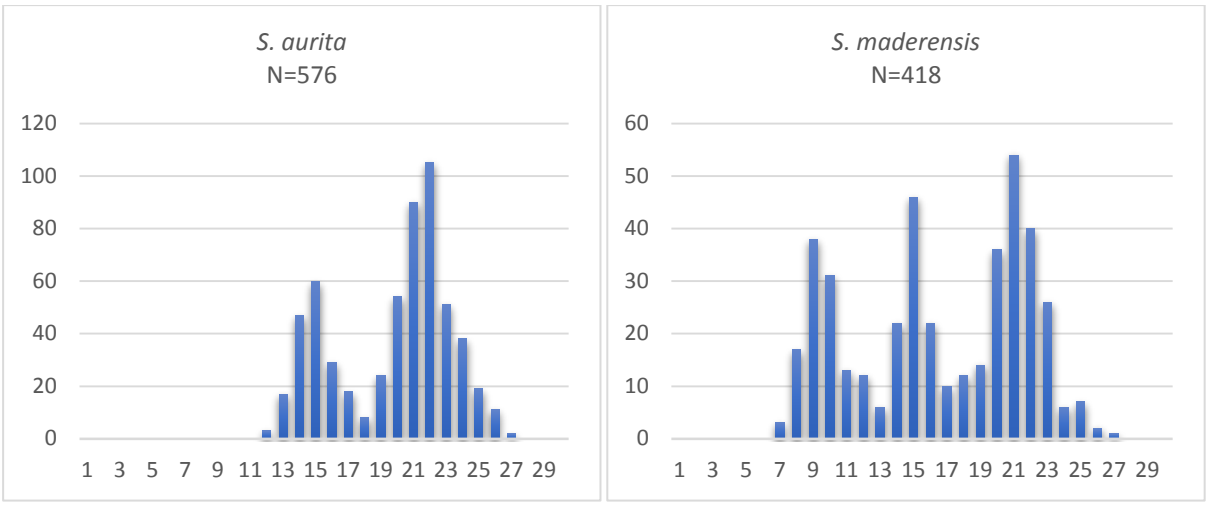


Figure 41. Length frequency distributions of *S. aurita* and *S. maderensis* in Sierra Leone

In Sierra Leone, *S. aurita* had a bimodal distribution peaking at 15 and 22 cm, respectively. The length frequency distribution of *S. maderensis* suggests presence of three different cohorts with approximately the same number of individuals in each cohort (Figure 41).

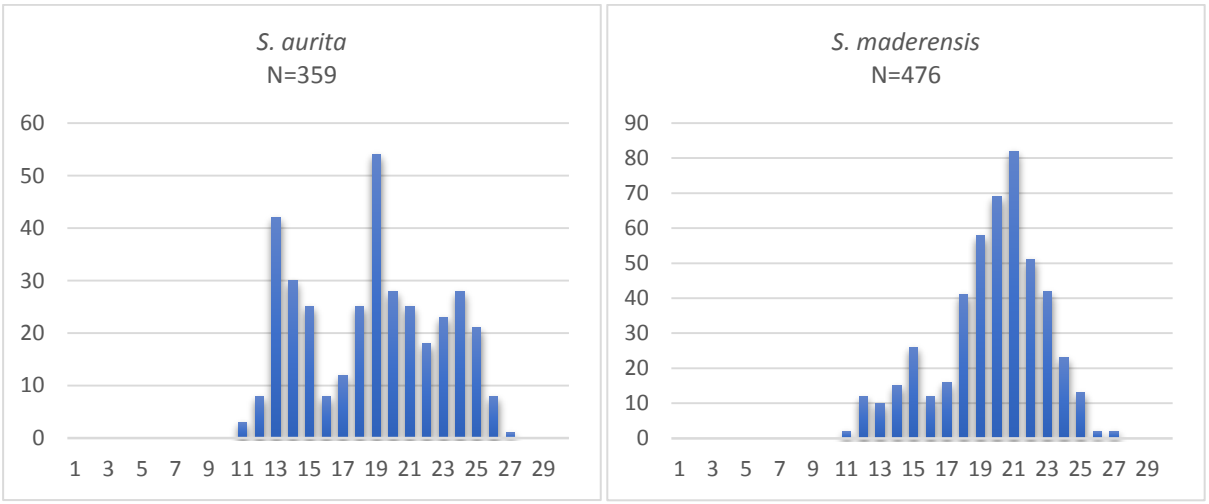


Figure 42. Length frequency distributions of *S. aurita* and *S. maderensis* in Guinea

In Guinea, *S. aurita* had a small cohort peaking at 13 cm and indication of two larger cohorts. *S. madrensis* had a bimodal distribution with peaks at 15 and 21 cm, respectively.

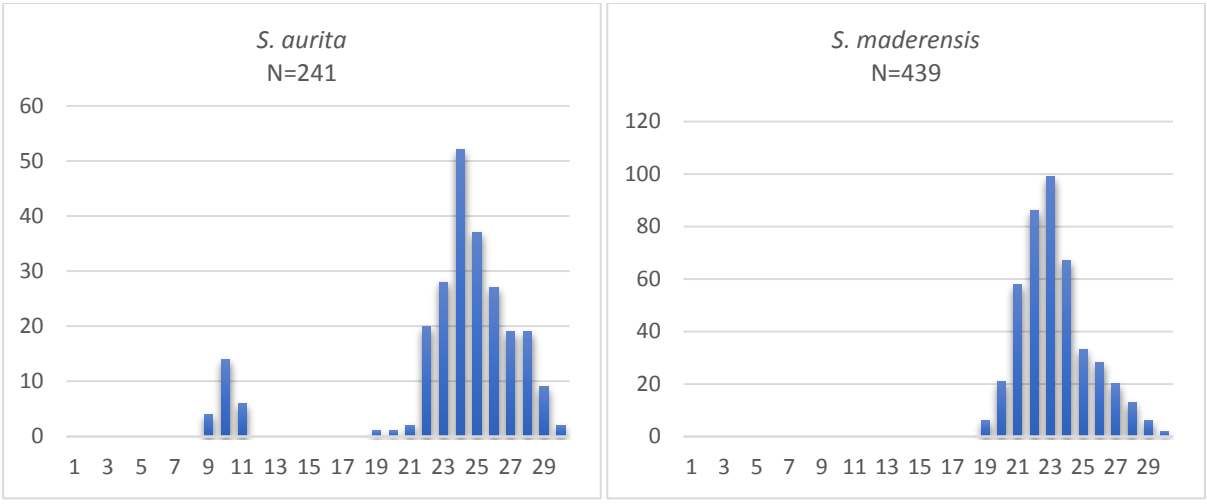


Figure 43. Length frequency distributions of *S. aurita* and *S. maderensis* in Guinea-Bissau

Guinea-Bissau had the largest Sardinellas of the region. A small proportion of *S. aurita* were 9-11 cm, whereas the majority were larger than 21 cm. *S. maderenis* had a unimodal distribution ranging from 19 to 30 cm. Hence, the size of both sardinella species appeared to increase from southeast to northwest.

3.4.2 Pelagic 2

The species category Pelagic 2 consisted of Carangidae, Scombridae, Trichiuridae and Sphyraenidae. The most abundant Pelagic 2 species in the trawl catches were the carangids *Chloroscombrus chrysurus*, *Caranx rhonchus*, *Decapterus puncta*tus and *Selene dorsalis*. Because Pelagic 2 is a mixture of species and none of the species dominated, estimates of biomass was carried out based on a mean length of 23 cm and a condition factor of 0.88, which is in agreement with earlier surveys.

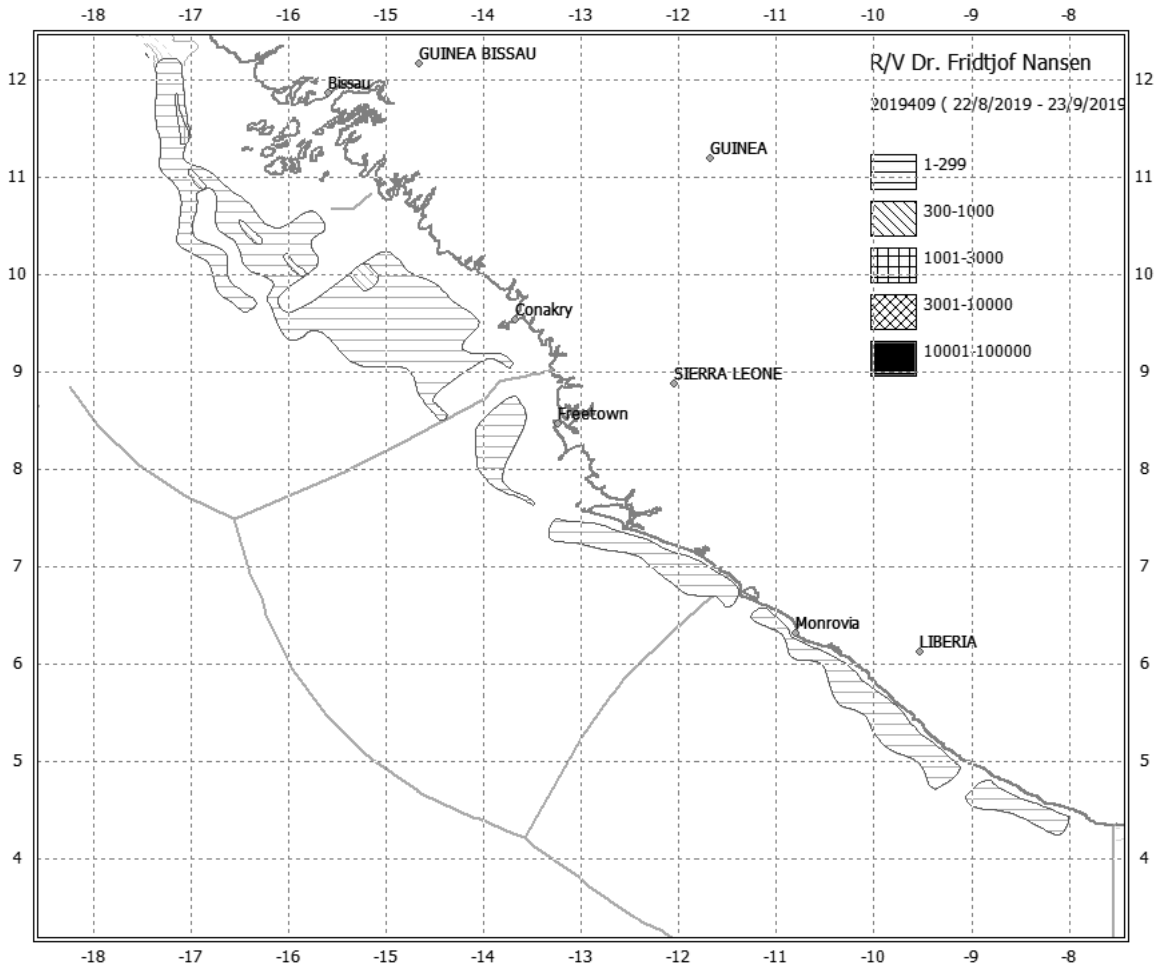


Figure 44. Distribution (density= m^2/NM^2) of Pelagic 2 species in Liberia, Sierra Leone, Guinea and Guinea-Bissau

Schools of Pelagic 2 species were found along the whole coastline (Figure 44) in generally low concentrations. As for Sardinella, the concentrations increased from east to west, and in the western part Guinea and in Guinea-Bissau, patches with higher concentrations were observed. The total biomass of the region was estimated to 302 000 tonnes, with approximately the same biomass in Guinea and Guinea-Bissau.

Earlier surveys have reported relatively high concentrations of horse mackerel (*Trachurus trecae*). However, during the present survey few horse mackerel were caught, and no identifiable schools were observed.

Table 12. Estimated biomass of Pelagic 2 species in Liberia, Sierra Leone, Guinea and Guinea-Bissau (1 000 tons)

Species	Liberia	Sierra Leone	Guinea	Guinea-Bissau	Total
Pelagic 2	12.6	21.2	133.5	135.1	302.3

3.4.3 Other pelagic species

No other pelagic spices were found in identifiable concentrations. *Ilisha africana* was caught in a few trawl hauls, mainly in the western part of Liberia. *Engraulis encrasicolus* was caught once only, at the westernmost trawl station in Guinea-Bissau.

3.5 Demersal resources

The demersal resources are described in terms of geographical distribution of priority species (S. 3.5.1), catch rates of species grouped together in various taxa (S. 3.5.2) and estimated biomass for the same taxa (S. 3.5.3). For priority species the length frequency distributions are presented in Annex VIII, and gender proportions and sexual maturity in Annex VII.

3.5.1 Distribution

The geographical distribution of priority species is presented in terms of catch rates (tonnes/NM^2) per bottom trawl station. It should be noted that no trawl hauls were carried out on the inner shelf (0–50 m) of the eastern part of Liberia due to hard and rough bottom. Hence, fish mainly found on the inner shelf might be underestimated in eastern Liberia.

The highest concentrations of *Pagellus bellottii* were found in Guinea and Guinea-Bissau (Figure 45), but was only sporadically caught in Sierra Leone and Liberia. *Dentex angolensis* showed the opposite distribution by being most abundant in the eastern part of the survey area. *D. canariensis* was caught only sporadically, whereas *Lutjanus fulgens* was not caught at all.

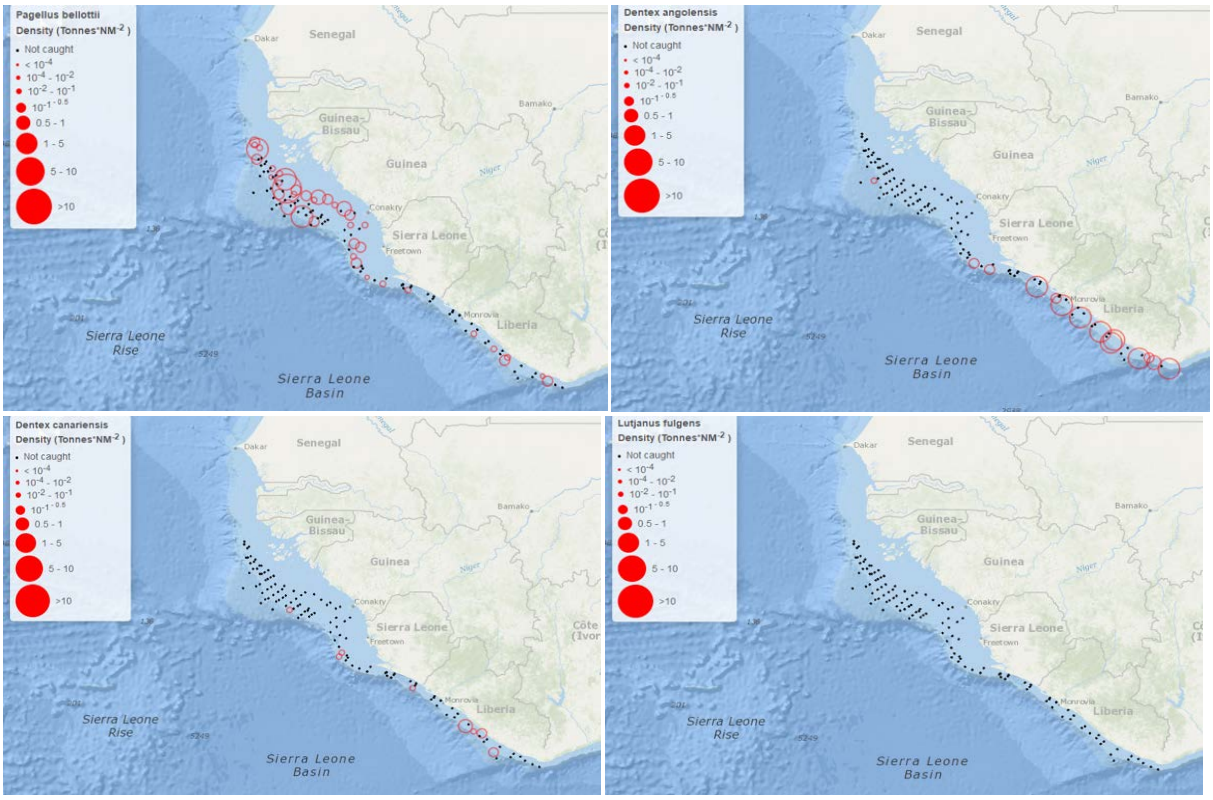


Figure 45. Catch rates (Tonnes NM^{-2}) for Pagellus bellottii and the three priority snapper species Dentex *angolensis*, *D. canariensis* and *Lutjanus fulgens*

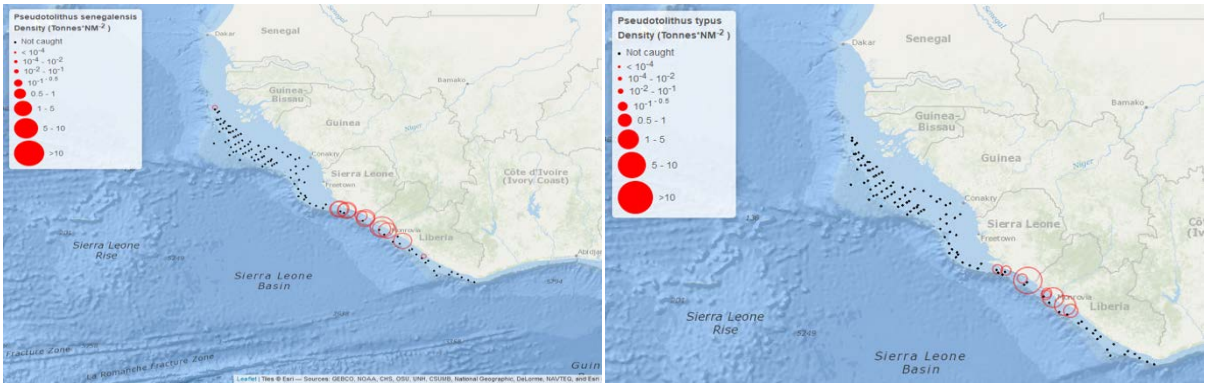


Figure 46. Catch rates (Tonnes NM^{-2}) of *Pseudotolithus senegalensis* and *P. typus*

The two croaker species, *Pseudotolithus senegalensis* and *P. typus*, were only caught along the narrow shelf of eastern Sierra Leone and western Liberia (Figure 46). However, as both species mainly inhabit shallower water (<50 m), the abundance in the eastern part of Liberia might be underestimated.

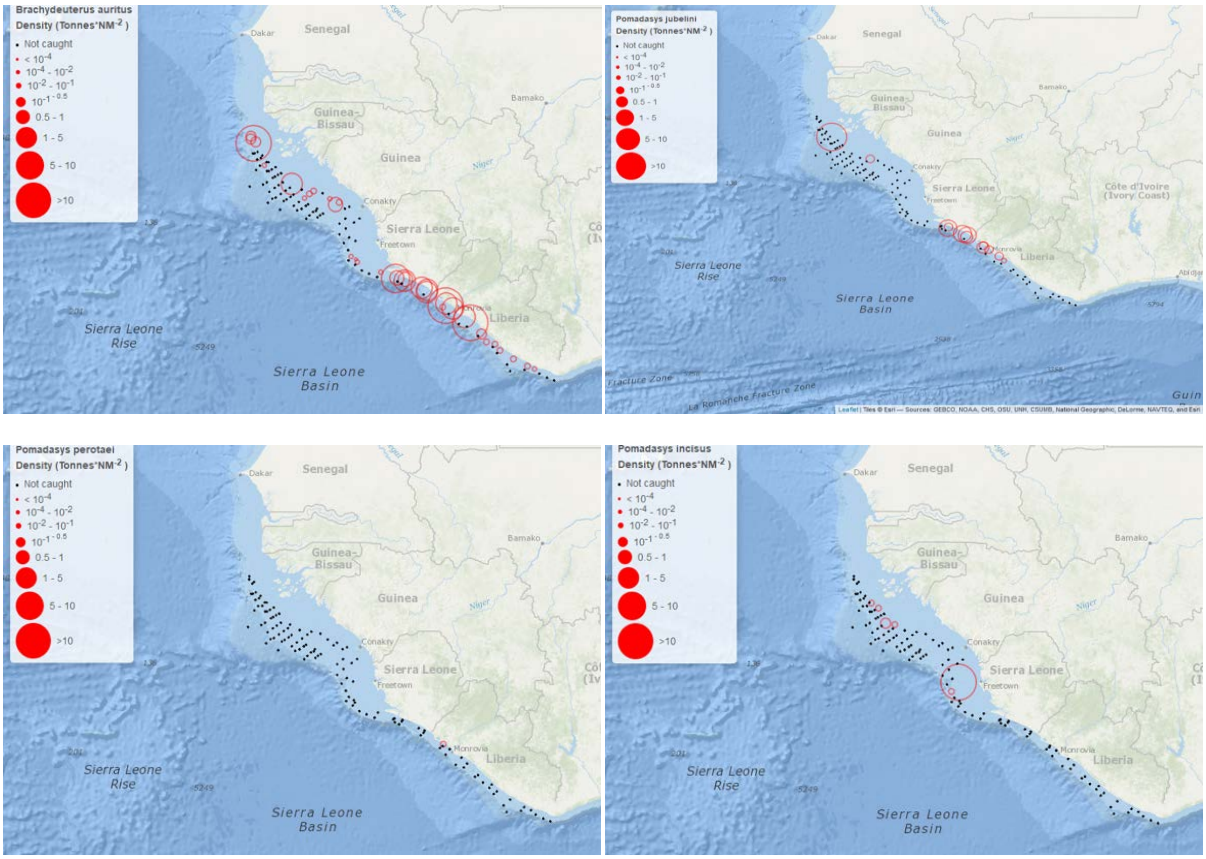


Figure 47. Catch rates (Tonnes NM^{-2}) of the grunts, *Brachydeuterus auritus*, *Pomadasys jubelini*, *P. perotaei* and *P. incisus*

Among the grunts, *Brachydeuterus auritus* was the most abundant species (Figure 47). The highest concentrations were found along the narrow shelf of eastern Sierra Leone and western Liberia. The same pattern was observed for *P. jubelini*. *P. perotaei* was only caught once, and *P. incisus* was caught sporadically in the western part of the survey area. All these grunt species were mainly confined to the inner shelf and might therefore have been underestimated in the eastern part of Liberia.

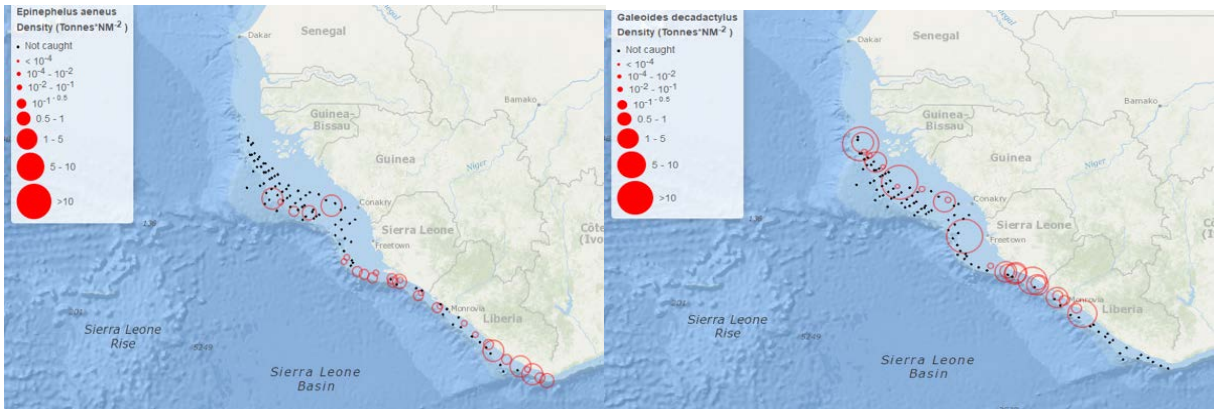


Figure 48. Catch rates (Tonnes NM^{-2}) of the grouper *Epinephelus aeneus* and the lesser African threadfin, *Galeoides decadactylus*

The grouper, *E. aenus* which was captured mainly at the outer shelf (50–100 m), had the highest concentrations at the eastern part of the survey area (Figure 48). The lesser African threadfin (*Galeoides decadactylus*) was caught exclusively at the inner shelf. The species was found all along the coast where the inner shelf was sampled, with the highest frequency of occurrence at the eastern part of the survey area.

3.5.2 Catch rates

The composition of the fish fauna on the continental shelf and slope of the Gulf of Guinea changes with depth (Williams, 1968). The catch-distribution analyses were therefore performed for three depth strata on the shelf, 0–50 m (inner shelf) and 51–100 m (outer shelf) and 101-600 m depth (slope). Among the demersal species, *Brachydeuterus auritus* (big eye grunt) and Boops boops (bogue, seabream) have been included in tables presenting the main fish groups, but excluded in the tables presenting commercially important demersal groups as they tend to have a pelagic behaviour.

3.5.2.1 Liberia

In the eastern part of Liberia, at depths <50 m the bottom is hard and rough and does not offer many areas where bottom trawling is possible. Furthermore, as the survey was also measuring pelagic fish using acoustics which followed a regular pattern of parallel transects perpendicular to the coast, there was limited time for searching for bottom trawl stations. Therefore, most of the bottom trawl stations at depths <50 m were carried out in the northwestern part of Liberia where bottom conditions were better. This makes the result from the inner shelf of Liberia more uncertain than for the outer shelf. Beyond >100 m the bottom slopes steeply to greater depths. Only one bottom trawl haul was carried out along the slope at 488 m (Sta. 9, see Annex IV), which resulted in a catch rate of 1 559 kg/h. Large *Ijimaia loppei* (mean weight of 10.2 kg) dominated the catch (71%).

Results for the main groups from the inner and outer shelf are presented in Table 13. On the inner shelf total catch rates varied from 421 to 1 304 kg/h with a mean catch rate of 734 kg/h. Among the main groups, demersal fish was the most abundant by contributing to 53% of the catch, followed by pelagic fish contributing to 12%. The other main groups were only present in low numbers.

At the outer shelf the catch rates were lower than on the inner shelf with an average catch rate of 487 kg/h, whereas the contribution from the main groups were quite similar to the inner shelf.

Table 13. Catch rates (kg/h) of main groups in swept-area bottom- trawl hauls on the a) inner shelf (0-50 m) and b) outer shelf (51-100 m), Liberia

a) Inner shelf, 0–50 m

Station	Gear depth	Demersal	Pelagic	Rays	Sharks	Shrimps	Squids	Other	Total
23	48.0	668.3	49.9	18.7	0.0	66.0	4.5	496.1	1 303.5
26	27.0	240.8	115.8	8.8	0.0	62.3	0.0	156.7	584.5
30	25.0	202.0	64.5	20.7	0.0	8.0	0.5	125.4	421.0
31	42.5	500.0	41.5	1.4	0.0	0.8	0.0	94.2	637.9
32	25.0	340.5	160.2	18.4	0.0	5.2	1.2	199.0	724.6
Mean	33.5	390.3	86.4	13.6	0.0	28.5	1.2	214.3	734.3
Std dev		193.4	50.4	8.2	0.0	32.7	1.9	162.2	336.9
% catch		53.2	11.8	1.9	0.0	3.9	0.2	29.2	100.0

b) Outer shelf, 51–100 m

Station	Gear depth	Demersal	Pelagic	Rays	Sharks	Shrimps	Squids	Other	Total
1	91	207.2	277.0	0.0	72.8	0.2	31.2	669.7	1 258.1
2	84	178.5	388.6	6.4	1.5	0.0	14.3	64.8	654.0
4	77	99.2	85.7	10.4	19.9	0.0	23.6	158.8	397.6
5	62.5	18.2	3.4	3.9	45.0	0.7	31.8	29.8	132.8
6	62.5	109.3	12.5	0.8	5.7	0.3	37.1	34.0	199.6
7	83.5	179.3	7.5	1.4	5.6	0.0	0.6	21.7	216.2
10	94.5	191.2	3.2	0.8	11.4	0.0	2.8	14.4	223.7
11	62.5	96.7	85.5	1.3	12.2	0.2	18.4	23.4	237.6
13	65	204.1	79.8	0.5	6.1	0.5	13.3	48.0	352.1
14	77	449.0	213.9	0.0	8.8	0.0	13.8	430.7	1 116.3
15	72	64.2	7.5	0.0	0.0	0.0	1.0	64.4	137.2
16	61.5	52.2	145.4	3.3	9.7	1.9	12.9	57.8	283.0
19	71.5	65.9	26.1	3.3	0.0	0.0	10.9	75.8	181.9
20	64.5	31.0	20.6	1.6	0.0	0.9	5.6	36.0	95.7
21	74	221.8	9.1	0.0	0.3	0.0	5.8	39.5	276.6
24	74.5	121.3	35.0	0.2	4.5	0.1	7.5	124.5	293.1
25	76	1 934.1	391.8	0.0	0.0	0.0	0.0	253.5	2 579.4
29	77	68.8	125.4	2.6	0.0	0.0	13.0	217.0	426.9
33	72	53.1	7.4	2.0	0.0	1.7	20.0	97.7	181.9
Mean	73.8	228.7	101.3	2.0	10.7	0.3	13.9	129.6	486.5
Std dev		424.8	127.5	2.7	18.4	0.6	10.9	167.1	597.4
% catch		47.0	20.8	0.4	2.2	0.1	2.9	26.6	100.0

Among the pelagic groups (Table 14), Carangids and hairtails were the most abundant groups on the inner shelf with mean catch rates of 36 and 33 kg/h, respectively. On the outer shelf Carangids were the most abundant group, followed by Clupeoids. It can be noted that the catches varied substantially for the various groups. This is natural as the pelagic groups consist of mainly schooling species.

Table 14. 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), Liberia

a) Inner shelf, 0–50 m

Station	Gear depth	Barracuda	Carangidae	Clupeoids	Hairtails	Scombrids	Other	Total
23	48	0.0	37.1	0.4	12.4	0.0	1 253.7	1 303.5
26	27	11.0	21.0	0.6	83.2	0.0	468.6	584.5
30	25	16.6	29.2	3.0	15.7	0.0	356.5	421.0
31	42.5	0.0	5.4	0.0	36.1	0.0	596.4	637.9
32	25	50.1	89.2	3.8	17.1	0.0	564.3	724.6
Mean	33.5	15.5	36.4	1.6	32.9	0.0	647.9	734.3
Std dev		20.6	31.8	1.7	29.6	0.0	351.3	336.9
% catch		2.1	5.0	0.2	4.5	0.0	88.2	100.0

b) Outer shelf, 51–100 m

Station	Gear depth	Barracuda	Carangidae	Clupeoids	Hairtails	Scombrids	Other	Total
1	91.0	0.0	275.5	0.0	1.4	0.0	981.2	1 258.1
2	84.0	1.5	386.5	0.6	0.0	0.0	265.4	654.0
4	77.0	0.6	46.2	35.6	0.0	3.2	311.9	397.6
5	62.5	0.2	3.1	0.1	0.0	0.0	129.4	132.8
6	62.5	0.0	12.5	0.0	0.0	0.0	187.2	199.6
7	83.5	0.0	4.7	2.4	0.0	0.5	208.7	216.2
10	94.5	0.0	0.0	3.2	0.0	0.0	220.5	223.7
11	62.5	0.1	50.4	35.0	0.0	0.0	152.1	237.6
13	65.0	1.0	77.7	1.1	0.0	0.0	272.3	352.1
14	77.0	5.3	155.5	42.9	0.0	10.2	902.4	1 116.3
15	72.0	0.0	3.3	4.3	0.0	0.0	129.7	137.2
16	61.5	0.0	144.0	0.0	1.4	0.0	137.6	283.0
19	71.5	0.0	11.4	14.7	0.0	0.0	155.8	181.9
20	64.5	0.0	18.6	0.0	2.0	0.0	75.1	95.7
21	74.0	0.0	9.1	0.0	0.0	0.0	267.5	276.6
24	74.5	0.0	10.8	24.2	0.1	0.0	258.1	293.1
25	76.0	3.0	39.4	347.9	0.0	1.5	2 187.7	2 579.4
29	77.0	1.3	76.5	46.9	0.8	0.0	301.5	426.9
33	72.0	0.6	2.6	0.0	4.1	0.0	174.5	181.9
Mean	73.8	0.7	69.9	29.4	0.5	0.8	385.2	486.5
Std dev		1.4	104.5	78.9	1.1	2.4	498.8	597.4
% catch		0.1	14.4	6.0	0.1	0.2	79.2	100.0

Among the commercially important demersal groups (Table 15), croakers dominated on the inner shelf with mean catch rate of 134.1 kg/h, but were caught in low numbers at the outer shelf. The same pattern was also observed in the second most abundant group on the inner shelf, grunts (big eye grunt excluded). The mean catch rate of this species was 240.4 and 1.3 kg/h at the inner and outer shelf, respectively. Seabreams (Boops boops excluded) were the most abundant group at the outer shelf and were caught in all trawl hauls. In contrast, no seabasses were caught on the inner shelf. Groupers were caught occasionally in relatively high numbers at the outer shelf, whereas snappers were only caught in one haul on the outer shelf.

Table 15. 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), Liberia

a) Inner shelf, 0–50 m

Station	Gear depth	Croakers	Groupers	Grunts	Seabreams	Snappers	Other	Total
23	48.0	57.6	0.9	2.3	0.0	0.0	1 242.7	1 303.5
26	27.0	179.6	0.0	6.1	0.0	0.0	398.8	584.5
30	25.0	131.2	0.0	7.7	0.0	0.0	282.2	421.0
31	42.5	74.9	2.5	23.6	0.0	0.0	536.9	637.9
32	25.0	227.5	0.0	13.1	0.0	0.0	484.1	724.7
Mean	33.5	134.1	0.7	10.6	0.0	0.0	588.9	734.3
Std dev		71.0	1.1	8.2	0.0	0.0	377.9	336.9
% catch		18.3	0.1	1.4	0.0	0.0	80.2	100.0

b) Outer shelf, 51–100 m

Station	Gear depth	Croakers	Groupers	Grunts	Seabreams	Snappers	Other	Total
1	91.0	33.4	21.7	0.0	132.7	0.0	1 070.3	1 258.1
2	84.0	21.6	3.4	0.0	134.1	0.0	494.9	654.0
4	77.0	2.1	54.3	0.0	38.7	0.0	302.5	397.6
5	62.5	0.0	2.2	0.0	13.2	0.0	117.4	132.8
6	62.5	0.0	47.7	0.0	56.5	0.0	95.5	199.6
7	83.5	0.0	0.0	0.0	178.3	0.0	37.9	216.2
10	94.5	0.0	0.0	0.0	189.2	0.0	34.5	223.7
11	62.5	0.0	8.0	0.0	88.0	0.0	141.7	237.6
13	65.0	5.1	131.2	0.0	65.3	0.0	150.5	352.1
14	77.0	0.0	0.0	0.0	157.5	0.0	958.8	1 116.3
15	72.0	0.1	0.0	0.0	42.1	0.0	95.0	137.2
16	61.5	2.2	5.3	0.0	43.2	0.0	232.3	283.0
19	71.5	0.0	0.0	0.0	62.1	0.0	119.8	181.9
20	64.5	0.0	0.5	0.0	6.6	0.0	88.6	95.7
21	74.0	2.8	0.0	0.0	37.0	180.1	56.7	276.6
24	74.5	0.0	0.0	0.0	82.3	0.0	210.7	293.1
25	76.0	0.0	0.0	0.0	203.5	0.0	2 376.0	2 579.4
29	77.0	4.5	0.0	0.0	50.0	0.0	372.3	426.9
33	72.0	1.9	14.3	0.0	15.7	0.0	150.0	181.9
Mean	73.8	3.9	15.2	0.0	84.0	9.5	374.0	486.5
Std dev		8.7	32.4	0.0	62.6	41.3	565.3	597.4
% catch		0.8	3.1	0.0	17.3	2.0	76.9	100.0

3.5.2.2 Sierra Leone

The shelf in Sierra Leone is quite narrow along the eastern coast and much wider in western part. The bottom was more suitable for bottom trawling than in Liberia. The slope is steep and no hauls were carried out at depths >100 m.

The mean total catch rate on the inner shelf was substantially higher than on the outer shelf, 652 and 137 kg/h, respectively (Table 16). Among the main groups, demersal fish dominated both on the inner and outer shelf, followed by pelagic fish. Shrimps were only caught on the inner shelf in the eastern part of Sierra Leone (stations 36-45).

Table 16. Catch rates (kg/h) of main groups in swept-area bottom- trawl hauls on the a) inner shelf (0-50 m) and b) outer shelf (51-100 m), Sierra Leone

a) Inner shelf, 0–50 m

Station	Gear depth	Demersal	Pelagic	Rays	Sharks	Shrimps	Squids	Other	Total
36	43	273.6	82.2	26.9	0.0	5.3	2.0	252.6	642.6
37	22.5	436.0	81.6	1.6	0.0	57.5	0.0	442.0	1 018.7
38	33	176.0	53.3	2.8	0.0	10.1	1.3	236.3	479.8
40	23.5	154.7	52.1	6.2	0.4	11.0	2.0	179.0	405.3
41	40	189.1	25.2	2.1	0.0	4.6	0.1	71.2	292.3
44	41.5	345.6	75.6	18.6	0.0	16.2	1.2	77.2	534.4
45	27.5	86.3	237.1	2.4	0.0	7.6	0.0	84.6	418.0
49	29	13.9	6.3	0.0	0.0	0.0	2.6	13.8	36.6
54	25	0.4	73.7	0.7	0.0	0.0	1.4	79.9	156.1
55	46.5	0.0	2.2	6.1	0.0	0.2	14.4	393.9	416.8
58	24.5	12.4	212.6	0.0	0.0	0.0	5.7	92.8	323.6
61	35	2 462.0	548.0	0.0	0.0	0.0	0.0	1 040.9	4 050.9
62	28.5	2.0	13.4	0.0	0.0	0.0	2.4	96.1	113.8
64	39.5	10.3	0.2	0.0	34.7	0.0	1.6	188.0	234.8
Mean	32.8	297.3	104.5	4.8	2.5	8.0	2.5	232.0	651.7
Std dev		638.9	146.7	8.0	9.3	15.2	3.7	264.6	1 008.7
% catch		45.6	16.0	0.7	0.4	1.2	0.4	35.6	100.0

b) Outer shelf, 51–100 m

Station	Gear depth	Demersal	Pelagic	Rays	Sharks	Shrimps	Squids	Other	Total
35	76.5	100.7	8.9	0.0	4.4	0.0	12.2	27.1	153.4
42	81.5	119.9	1.6	4.1	0.0	0.0	2.2	17.1	144.9
43	63	34.2	2.6	0.5	0.0	0.0	9.1	40.7	87.1
48	64.5	21.9	200.9	0.6	0.0	0.0	6.6	43.3	273.3
50	68	23.8	6.1	5.0	0.0	0.0	6.1	32.7	73.7
51	78.5	18.2	0.8	0.0	0.0	0.0	5.6	30.9	55.5
56	80.5	13.9	0.5	0.3	0.0	0.0	1.0	88.4	104.0
57	82.5	43.4	24.0	1.8	0.0	0.0	0.9	187.0	257.2
63	77.5	1.1	0.2	0.4	14.5	0.0	0.8	65.6	82.6
Mean	74.7	41.9	27.3	1.4	2.1	0.0	4.9	59.2	136.9
Std dev		40.8	65.5	1.9	4.9	0.0	4.0	52.6	79.5
% catch		30.6	19.9	1.0	1.5	0.0	3.6	43.3	100.0

In agreement with the general pattern, catch rates of pelagic fish were highest on the inner shelf (Table 17). Carangids were the most abundant group on both the inner and outer shelf, though only caught at one station on the outer shelf. Hairtails were only caught in the eastern part of the inner shelf of Sierra Leone. Scombrids were only caught occasionally and in low numbers.

Table 17. 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), Sierra Leone

a) Inner shelf, 0–50 m

Station	Gear depth	Barracuda	Carangidae	Clupeoids	Hairtails	Scombrids	Other	Total
36	43.0	0.0	8.0	0.0	74.1	0.0	560.4	642.6
37	22.5	16.4	23.4	5.7	36.1	0.0	937.1	1 018.7
38	33.0	7.6	11.9	0.7	33.1	0.0	426.4	479.8
40	23.5	27.4	7.7	0.3	15.4	1.3	353.2	405.3
41	40.0	0.4	0.0	0.0	24.8	0.0	267.1	292.3
44	41.5	0.2	12.0	12.3	51.1	0.0	458.7	534.4
45	27.5	61.5	153.0	16.0	6.6	0.0	180.9	418.0
49	29.0	0.0	5.8	0.2	0.3	0.0	30.3	36.6
54	25.0	0.0	73.3	0.0	0.0	0.4	82.4	156.1
55	46.5	0.0	2.2	0.0	0.0	0.0	414.6	416.8
58	24.5	2.8	202.7	6.6	0.0	0.5	110.9	323.6
61	35.0	0.0	254.9	293.1	0.0	0.0	3 502.9	4 050.9
62	28.5	0.0	11.4	2.0	0.0	0.0	100.4	113.8
64	39.5	0.0	0.2	0.0	0.0	0.0	234.6	234.8
Mean	32.8	8.3	54.8	24.1	17.3	0.2	547.1	651.7
Std dev		17.3	85.0	77.6	23.6	0.4	883.6	1 008.7
% catch		1.3	8.4	3.7	2.6	0.0	84.0	100.0

b) Outer shelf, 51–100 m

Station	Gear depth	Barracuda	Carangidae	Clupeoids	Hairtails	Scombrids	Other	Total
35	76.5	0.3	5.1	2.9	0.7	0.0	144.4	153.4
42	81.5	0.0	0.0	0.0	0.0	1.6	143.3	144.9
43	63.0	0.0	0.0	2.6	0.0	0.0	84.5	87.1
48	64.5	0.8	195.9	4.2	0.0	0.0	72.5	273.3
50	68.0	0.0	0.0	6.1	0.0	0.0	67.6	73.7
51	78.5	0.5	0.1	0.3	0.0	0.0	54.7	55.5
56	80.5	0.3	0.0	0.0	0.0	0.1	103.5	104.0
57	82.5	0.0	2.5	21.1	0.0	0.4	233.1	257.2
63	77.5	0.0	0.2	0.0	0.0	0.0	82.4	82.6
Mean	74.7	0.2	22.6	4.1	0.1	0.2	109.6	136.9
Std dev		0.3	65.0	6.7	0.2	0.5	56.1	79.5
% catch		0.2	16.5	3.0	0.1	0.2	80.1	100.0

Among the demersal groups (Table 18), grunts were the most abundant species on the inner shelf, but were not caught on the outer shelf. It should be noticed that the standard deviation was high and that a major part of the grunts was caught at station 61. In addition, big eye grunt was caught in relatively high numbers on the inner shelf (38.9 kg/h). Similar pattern was observed in the second most abundant group on the inner shelf, the croakers. Seabreams were the most abundant group on the outer shelf, but were caught in low numbers on the inner shelf. Groupers and snappers were caught in low numbers on both the inner and outer shelf.

Table 18. 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), Sierra Leone

a) Inner shelf, 0–50 m

Station	Gear depth	Croakers	Groupers	Grunts	Seabreams	Snappers	Other	Total
36	43.0	151.9	2.0	24.9	2.3	0.0	461.5	642.6
37	22.5	264.8	0.0	68.5	0.0	5.3	680.1	1 018.7
38	33.0	44.3	0.0	96.5	0.0	0.0	338.9	479.8
40	23.5	124.1	3.2	8.9	0.0	0.0	269.1	405.3
41	40.0	70.6	22.5	59.5	0.0	0.0	139.6	292.3
44	41.5	98.1	0.0	0.0	0.0	0.0	436.2	534.4
45	27.5	46.2	6.1	0.0	0.0	0.0	365.6	418.0
49	29.0	0.0	1.9	0.0	11.9	0.0	22.9	36.6
54	25.0	0.0	0.0	0.0	0.4	0.0	155.7	156.1
55	46.5	0.0	0.0	0.0	0.0	0.0	416.8	416.8
58	24.5	0.0	0.6	0.0	11.7	0.0	311.3	323.6
61	35.0	0.0	0.0	2 431.2	30.8	0.0	1 588.9	4 050.9
62	28.5	0.0	0.0	1.2	0.8	0.0	111.9	113.8
64	39.5	0.0	0.4	0.0	9.9	0.0	224.5	234.8
Mean	32.8	57.1	2.6	192.2	4.8	0.4	394.5	651.7
Std dev		79.2	6.0	645.2	8.8	1.4	383.3	1 008.7
% catch		8.8	0.4	29.5	0.7	0.1	60.5	100.0

b) Outer shelf, 51–100 m

Station	Gear depth	Croakers	Groupers	Grunts	Seabreams	Snappers	Other	Total
35	76.5	0.0	6.4	0.0	72.5	0.0	74.5	153.4
42	81.5	17.0	0.0	0.0	98.2	0.0	29.8	144.9
43	63.0	0.0	4.7	0.0	22.8	0.0	59.6	87.1
48	64.5	0.0	6.1	0.0	15.9	0.0	251.4	273.3
50	68.0	0.0	5.6	0.0	18.1	0.0	48.1	71.9
51	78.5	0.0	3.8	0.0	14.3	0.0	37.3	55.5
56	80.5	0.0	0.0	0.0	13.9	0.0	90.2	104.0
57	82.5	0.0	1.0	0.0	41.9	0.0	214.2	257.2
63	77.5	0.0	0.0	0.0	1.1	0.0	81.4	82.6
Mean	74.7	1.9	3.1	0.0	33.2	0.0	98.5	136.6
Std dev		5.7	2.8	0.0	32.1	0.0	79.2	79.7
% catch		1.4	2.3	0.0	24.3	0.0	72.1	100.0

3.5.2.3 Guinea

The shelf along Guinea is quite wide and the slope not so steep and thus allows trawling on the bottom. Hence, four bottom trawl hauls were carried out along the slope.

Total catch rates of the main groups on the inner shelf (Table 19a) were lower in Guinea than in Liberia and Sierra Leone (328 vs. 734 and 652 kg/h). The pelagic group gave the highest catch rate on the inner shelf in Guinea, while demersal species were the most abundant group in Liberia and Sierra Leone. Except for the demersal group, all other main groups were caught in low numbers on the inner shelf. On the outer shelf, only demersal species were caught in appreciable numbers. This was also the case along the slope. The highest total mean catch rate in Guinean waters was obtained along the slope (1 477 kg/h). However, this was mainly due to a large catch at station 113 of fish classified under the group “Other”. The catch was dominated by the small pelagic species, *Antagonia capros* (90% of the catch). Evidence from

the echosounder registrations suggested that there were high concentrations of this and related species along the shelf break.

Table 19. Catch rates (kg/h) of main groups in swept-area bottom- trawl hauls on the a) inner shelf (0-50 m), b) outer shelf (51-100 m) and slope (101-600 m), Guinea

a) Inner shelf, 0–50 m

Station	Gear depth	Demersal	Pelagic	Rays	Sharks	Shrimps	Squids	Other	Total
66	24.5	10.0	5.8	6.4	0.0	0.0	3.7	66.6	92.4
67	28.5	74.1	2.2	4.8	0.0	0.0	5.5	149.1	235.7
68	43.5	17.1	12.1	0.0	21.4	0.0	2.3	134.1	187.0
71	43.0	0.0	0.0	0.0	0.0	0.0	0.4	58.2	58.6
72	36.0	37.3	24.4	0.0	0.0	0.0	5.4	108.8	175.9
73	25.5	103.5	45.1	3.0	0.0	0.0	2.7	108.8	263.1
74	30.0	70.1	216.6	0.0	0.0	0.0	7.4	156.9	451.0
78	46.0	61.9	3.1	0.0	0.0	0.2	0.0	89.6	154.9
79	46.5	57.1	253.9	0.0	0.0	0.0	1.3	587.0	899.3
80	28.5	44.1	576.3	4.5	0.0	0.0	6.1	131.4	762.3
82	29.0	6.5	11.3	2.6	0.0	0.0	1.1	82.3	103.7
83	48.5	0.9	0.0	10.5	0.0	0.0	2.6	45.7	59.6
84	49.5	23.6	5.8	0.0	34.9	0.0	6.5	42.5	113.3
91	45.0	99.3	0.8	0.2	0.0	0.0	6.5	106.8	213.6
92	39.0	3.6	0.0	0.0	17.8	0.0	4.6	111.7	137.7
93	45.0	71.5	1 026.0	0.0	0.0	0.0	8.1	167.2	1 272.8
95	27.0	389.1	540.2	29.7	0.0	0.0	0.0	98.7	1 057.6
96	27.5	11.2	192.3	1.3	0.0	0.0	0.6	7.3	212.7
97	33.0	12.1	7.8	0.0	0.0	0.0	2.7	55.6	78.1
98	43.5	62.1	6.7	0.0	96.7	0.0	17.3	365.6	548.3
103	43.5	6.1	0.8	0.0	88.2	0.0	0.0	81.9	177.0
104	38.0	25.9	77.7	0.0	0.0	0.0	2.1	192.3	298.0
105	28.5	21.3	53.1	0.9	0.0	0.0	0.0	43.5	118.8
108	29.5	128.8	19.9	98.2	0.0	0.0	0.0	504.6	751.5
109	38.5	4.2	21.6	0.0	0.0	0.0	2.9	135.5	164.2
110	41.5	0.0	21.6	0.0	0.0	0.0	0.9	135.2	157.7
118	48.5	2.6	1.8	1.6	0.0	0.0	2.3	107.8	116.1
119	42.5	156.2	10.4	0.0	0.0	0.0	1.4	159.8	327.8
Mean	37.5	53.6	112.0	5.8	9.3	0.0	3.4	144.1	328.2
Std dev		78.1	234.7	19.0	24.9	0.0	3.7	131.6	325.4
% catch		16.3	34.1	1.8	2.8	0.0	1.0	43.9	100.0

b) Outer shelf, 51–100 m

Station	Gear depth	Demersal	Pelagic	Rays	Sharks	Shrimps	Squids	Other	Total
69	58.5	0.3	0.0	0.0	20.5	0.0	0.0	58.9	79.7
76	73.5	0.0	0.0	1.5	15.4	0.0	1.1	27.8	45.8
77	52.5	0.0	2.7	0.0	0.0	0.0	0.6	15.2	18.5
85	53.0	317.2	10.7	0.0	0.0	0.0	0.3	129.3	457.4
86	85.0	16.3	0.0	2.6	0.9	0.0	0.8	32.1	52.8
89	84.5	81.0	0.2	8.6	0.5	0.0	1.4	151.4	243.1
90	56.0	0.0	0.0	0.0	0.0	0.0	0.5	43.2	43.6
99	60.5	0.0	0.0	0.0	0.0	0.0	0.0	71.4	71.5
101	71.5	27.8	0.0	7.4	0.0	0.0	0.9	65.9	102.0
102	52.5	0.0	2.3	0.4	0.0	0.0	0.5	44.0	47.1
111	53.5	0.0	0.3	0.0	0.0	0.0	0.9	285.6	286.8
112	62.5	137.1	3.2	1.2	0.0	0.0	2.4	102.2	246.0
116	71.5	0.0	0.0	9.1	0.0	0.0	0.8	92.6	102.4
117	58.0	3.1	1.4	1.7	1.2	0.0	11.3	383.9	402.5
Mean	63.8	41.6	1.5	2.3	2.8	0.0	1.5	107.4	157.1
Std dev		88.9	2.9	3.4	6.5	0.0	2.9	105.6	143.9
% catch		26.5	0.9	1.5	1.8	0.0	1.0	68.4	100.0

c) Slope, 101–600 m

Station	Gear depth	Demersal	Pelagic	Rays	Sharks	Shrimps	Squids	Other	Total
88	336.0	7.4	0.0	0.0	0.0	35.1	8.1	948.0	998.6
100	460.5	36.3	15.1	0.0	6.2	274.8	7.9	114.9	455.1
113	129.5	152.8	0.0	3.9	15.1	0.0	0.0	3 816.2	3 988.0
114	505.5	112.1	0.0	10.4	0.3	253.5	17.1	73.5	466.8
Mean	357.9	77.2	3.8	3.6	5.4	140.9	8.3	1 238.2	1 477.1
Std dev		67.0	7.6	4.9	7.1	143.4	7.0	1 765.3	1 693.0
% catch		5.2	0.3	0.2	0.4	9.5	0.6	83.8	100.0

Carangids was the dominating group among the pelagic fish (Table 20), and *Chloroscombrus chrysurus* the most abundant species, followed by *Caranx rhoncus.* At the outer shelf, only a few Carangids were caught, whereas there were no catches of the other pelagic groups. Along the slope only hairtails were caught in one haul.

Table 20. Catch rates (kg/h) by main pelagic families in swept-area bottom- trawl hauls on the a) inner shelf (0-50 m), b) outer shelf (51-100 m) and slope (101-600 m), Guinea

a) Inner shelf, 0–50 m

Station	Gear depth	Barracuda	Carangidae	Clupeoids	Hairtails	Scombrids	Other	Total
66	24.5	0.0	5.8	0.0	0.0	0.0	86.6	92.4
67	28.5	0.0	2.2	0.0	0.0	0.0	233.5	235.7
68	43.5	0.0	12.1	0.0	0.0	0.0	174.9	187.0
71	43.0	0.0	0.0	0.0	0.0	0.0	58.6	58.6
72	36.0	0.0	24.4	0.0	0.0	0.0	151.5	175.9
73	25.5	0.0	45.1	0.0	0.0	0.0	218.0	263.1
74	30.0	0.0	216.6	0.0	0.0	0.0	234.4	451.0
78	46.0	0.0	3.1	0.0	0.0	0.0	151.7	154.9
79	46.5	1.8	192.0	37.0	23.1	0.0	645.4	899.3
80	28.5	2.7	567.7	1.4	0.0	4.5	186.0	762.3
82	29.0	0.0	4.5	0.5	0.0	6.2	92.4	103.7
83	48.5	0.0	0.0	0.0	0.0	0.0	59.6	59.6
84	49.5	0.0	5.8	0.0	0.0	0.0	107.5	113.3
91	45.0	0.0	0.8	0.0	0.0	0.0	212.8	213.6
92	39.0	0.0	0.0	0.0	0.0	0.0	137.7	137.7
93	45.0	0.0	916.4	109.6	0.0	0.0	246.8	1 272.8
95	27.0	3.1	515.3	21.7	0.0	0.0	517.4	1 057.6
96	27.5	3.3	170.8	18.2	0.0	0.0	20.4	212.7
97	33.0	0.9	6.3	0.6	0.0	0.0	70.3	78.1
98	43.5	3.4	3.3	0.0	0.0	0.0	541.6	548.3
103	43.5	0.0	0.8	0.0	0.0	0.0	176.3	177.0
104	38.0	0.0	77.7	0.0	0.0	0.0	220.3	298.0
105	28.5	0.0	52.9	0.2	0.0	0.0	65.7	118.8
108	29.5	8.4	4.5	4.3	2.8	0.0	731.6	751.5
109	38.5	0.0	21.3	0.0	0.4	0.0	142.6	164.2
110	41.5	0.0	21.6	0.0	0.0	0.0	136.1	157.7
118	48.5	0.0	0.7	0.0	1.0	0.0	114.3	116.1
119	42.5	0.0	10.4	0.0	0.0	0.0	317.4	327.8
Mean	37.5	0.8	102.9	6.9	1.0	0.4	216.1	328.2
Std dev		1.9	215.7	21.8	4.4	1.4	180.0	325.4
% catch		0.3	31.4	2.1	0.3	0.1	65.9	100.0

b) Outer shelf, 51–100 m

Station	Gear depth	Barracuda	Carangidae	Clupeoids	Hairtails	Scombrids	Other	Total
69	58.5	0.0	0.0	0.0	0.0	0.0	79.7	79.7
76	73.5	0.0	0.0	0.0	0.0	0.0	45.8	45.8
77	52.5	0.0	2.7	0.0	0.0	0.0	15.8	18.5
85	53.0	0.0	10.7	0.0	0.0	0.0	446.8	457.4
86	85.0	0.0	0.0	0.0	0.0	0.0	52.8	52.8
89	84.5	0.0	0.2	0.0	0.0	0.0	242.9	243.1
90	56.0	0.0	0.0	0.0	0.0	0.0	43.6	43.6
99	60.5	0.0	0.0	0.0	0.0	0.0	71.5	71.5
101	71.5	0.0	0.0	0.0	0.0	0.0	102.0	102.0
102	52.5	0.0	1.9	0.0	0.4	0.0	44.9	47.1
111	53.5	0.0	0.3	0.0	0.0	0.0	286.5	286.8
112	62.5	0.0	0.0	0.0	3.2	0.0	242.9	246.0
116	71.5	0.0	0.0	0.0	0.0	0.0	102.4	102.4
117	58.0	0.0	0.7	0.0	0.6	0.0	401.1	402.5
Mean	63.8	0.0	1.2	0.0	0.3	0.0	155.6	157.1
Std dev		0.0	2.9	0.0	0.9	0.0	142.2	143.9
% catch		0.0	0.8	0.0	0.2	0.0	99.1	100.0

c) Slope, 101–600 m

Station	Gear depth	Barracuda	Carangidae	Clupeoids	Hairtails	Scombrids	Other	Total
88	336.0	0.0	0.0	0.0	0.0	0.0	998.6	998.6
100	460.5	0.0	0.0	0.0	15.1	0.0	440.0	455.1
113	129.5	0.0	0.0	0.0	0.0	0.0	3 988.0	3 988.0
114	505.5	0.0	0.0	0.0	0.0	0.0	466.8	466.8
Mean	357.9	0.0	0.0	0.0	3.8	0.0	1 473.4	1 477.1
Std dev		0.0	0.0	0.0	7.6	0.0	1 696.1	1 693.0
% catch		0.0	0.0	0.0	0.3	0.0	99.7	100.0

Seabreams were the most abundant demersal group both on the inner shelf, outer shelf and along the slope (Table 21). In contrast to Sierra Leone and Liberia where croakers and grunts were the most abundant demersal groups on the inner self, these groups were caught in low numbers at all depths in Guinea. Except for a few catches of groupers on the outer shelf, the catch rates for all other demersal groups were insignificant at all depths.

Table 21. 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), b) outer shelf (51-100 m) and c) slope (101-600 m), Guinea

a) Inner shelf, 0–50 m

Station	Gear depth	Croakers	Groupers	Grunts	Seabreams	Snappers	Other	Total
66	24.5	0.0	0.0	0.0	10.0	0.0	82.4	92.4
67	28.5	1.1	0.0	0.0	73.0	0.0	161.6	235.7
68	43.5	0.0	0.0	0.0	17.1	0.0	169.9	187.0
71	43.0	0.0	0.0	0.0	0.0	0.0	58.6	58.6
72	36.0	0.0	0.0	0.0	37.3	0.0	138.6	175.9
73	25.5	0.0	0.0	1.3	101.4	0.8	159.5	263.1
74	30.0	0.0	0.0	0.0	70.1	0.0	380.9	451.0
78	46.0	0.0	0.0	0.0	61.9	0.0	93.0	154.9
79	46.5	0.0	31.0	0.0	1.8	0.0	866.4	899.3
80	28.5	0.0	0.0	0.0	43.7	0.0	718.7	762.3
82	29.0	0.0	0.0	0.0	6.4	0.0	97.3	103.7
83	48.5	0.0	0.0	0.0	0.9	0.0	58.7	59.6
84	49.5	0.0	0.0	0.0	23.6	0.0	89.7	113.3
91	45.0	0.0	0.0	0.0	99.3	0.0	114.3	213.7
92	39.0	0.0	0.0	1.9	1.6	0.0	134.1	137.7
93	45.0	0.0	0.0	3.6	67.9	0.0	1 201.3	1 272.8
95	27.0	0.0	0.0	8.6	33.9	0.0	1 015.1	1 057.6
96	27.5	0.0	0.0	1.6	8.8	0.0	202.3	212.7
97	33.0	0.0	0.0	0.0	8.9	0.0	69.2	78.1
98	43.5	0.0	0.0	0.0	62.1	0.0	486.3	548.4
103	43.5	0.0	0.0	0.0	6.1	0.0	170.9	177.0
104	38.0	0.0	0.0	0.0	25.9	0.0	272.1	298.0
105	28.5	0.0	0.0	1.1	11.4	0.0	106.4	118.8
108	29.5	0.0	0.0	7.9	17.1	0.0	726.6	751.5
109	38.5	0.0	0.0	0.0	4.2	0.0	160.0	164.2
110	41.5	0.0	0.0	0.0	0.0	0.0	157.7	157.7
118	48.5	0.0	0.0	0.0	2.6	0.0	113.4	116.1
119	42.5	0.0	0.0	10.1	146.2	0.0	171.6	327.8
Mean	37.5	0.0	1.1	1.3	33.7	0.0	292.0	328.2
Std dev		0.2	5.9	2.8	38.0	0.2	315.4	325.4
% catch		0.0	0.3	0.4	10.3	0.0	89.0	100.0

b) Outer shelf, 51–100 m

Station	Gear depth	Croakers	Groupers	Grunts	Seabreams	Snappers	Other	Total
69	58.5	0.0	0.0	0.0	0.3	0.0	79.4	79.7
76	73.5	0.0	0.0	0.0	0.0	0.0	45.8	45.8
77	52.5	0.0	0.0	0.0	0.0	0.0	18.5	18.5
85	53.0	0.0	15.1	0.0	302.1	0.0	140.3	457.4
86	85.0	0.0	0.0	0.0	16.3	0.0	36.5	52.8
89	84.5	0.0	17.6	0.0	63.4	0.0	162.1	243.1
90	56.0	0.0	0.0	0.0	0.0	0.0	43.6	43.6
99	60.5	0.0	0.0	0.0	0.0	0.0	71.5	71.5
101	71.5	1.9	3.7	0.0	22.2	0.0	74.2	102.0
102	52.5	0.0	0.0	0.0	0.0	0.0	47.1	47.1
111	53.5	0.0	0.0	0.0	0.0	0.0	286.8	286.8
112	62.5	0.0	137.0	0.0	0.1	0.0	108.9	246.0
116	71.5	0.0	0.0	0.0	0.0	0.0	102.4	102.4
117	58.0	0.0	0.1	0.0	3.0	0.0	399.4	402.5
Mean	63.8	0.1	12.4	0.0	29.1	0.0	115.5	157.1
Std dev		0.5	36.3	0.0	80.5	0.0	106.8	143.9
% catch		0.1	7.9	0.0	18.5	0.0	73.5	100.0

c) Slope, 101–600 m

Station	Gear depth	Croakers	Groupers	Grunts	Seabreams	Snappers	Other	Total
88	336.0	0.0	0.0	0.0	0.0	0.0	998.6	998.6
100	460.5	0.0	0.0	0.0	0.0	0.0	455.1	455.1
113	129.5	0.0	0.0	0.0	152.8	0.0	3 833.3	3 986.0
114	505.5	0.0	0.0	0.0	0.0	0.0	465.4	465.4
Mean	357.9	0.0	0.0	0.0	38.2	0.0	1 438.1	1 476.3
Std dev		0.0	0.0	0.0	76.4	0.0	1 616.8	1 692.3
% catch		0.0	0.0	0.0	2.6	0.0	97.4	100.0

3.5.2.4 Guinea-Bissau

The shelf along Guinea-Bissau is quite wide along the border with Guinea and becomes gradually narrower towards northwest. The slope is not steep and 5 trawl hauls were carried out along the slope.

Among the main groups (Table 22), the demersal group gave the highest mean catch rate on the inner shelf. However, the catch rates varied highly between stations. The second most abundant group was the pelagic fish for which high variability is more commonplace. Of the other main groups, only squids appeared in noticeable numbers. On the outer shelf, the catch rates were low for all main groups. Along the slope, the mean catch rate was highest for the demersal group. However, the vast majority of demersal fish were caught at just one station (141). At the same station there were noticeable catches of sharks, shrimps and squids.

Table 22. Catch rates (kg/h) of main groups in swept-area bottom- trawl hauls on the a) inner shelf (0-50 m), b) outer shelf (51-100 m) and slope (101-600 m), Guinea-Bissau

a) Inner shelf, 0–50 m

Station	Gear depth	Demersal	Pelagic	Rays	Sharks	Shrimps	Squids	Other	Total
122	29.5	95.4	12.4	10.1	0.0	0.0	10.5	77.8	206.2
123	36.5	0.0	1.6	0.0	0.0	0.0	0.0	329.0	330.5
124	46.0	2.6	1.1	0.0	0.0	0.0	3.1	74.0	80.9
131	43.5	90.1	1.3	0.0	0.0	0.0	10.8	83.8	186.0
132	25.5	4.5	150.4	1.0	0.0	0.0	18.2	17.8	191.8
137	25.5	860.5	12.5	0.0	0.0	0.0	49.9	210.8	1133.7
138	40.0	0.0	2.2	0.0	0.0	0.0	0.0	153.9	156.1
144	40.0	7.9	2.2	0.0	0.0	0.0	4.5	18.5	33.0
145	23.0	0.0	133.9	0.0	0.0	0.0	0.0	58.6	192.5
146	27.5	1.7	7.3	0.0	0.0	0.0	14.1	12.4	35.5
147	44.5	0.0	3.2	0.0	0.0	0.0	6.8	52.5	62.4
150	38.0	1 824.6	179.4	0.0	0.0	0.8	5.1	628.9	2 638.9
151	30.0	11.5	10.5	2.8	0.0	0.0	3.3	113.2	141.3
Mean	34.6	223.0	39.8	1.1	0.0	0.1	9.7	140.9	414.5
Std dev		514.5	63.6	2.7	0.0	0.2	12.8	164.6	697.9
% catch		53.8	9.6	0.3	0.0	0.0	2.3	34.0	100.0

b) Outer shelf, 51–100 m

Station	Gear depth	Demersal	Pelagic	Rays	Sharks	Shrimps	Squids	Other	Total
125	57.5	0.0	2.8	2.6	0.0	0.0	15.0	93.5	113.8
129	69.5	0.1	1.9	0.0	0.0	0.0	4.2	55.9	62.1
130	59.0	0.0	0.6	0.9	0.0	0.0	5.5	55.4	62.4
139	67.5	0.8	0.0	0.8	0.0	0.0	5.1	394.7	401.5
143	61.5	0.0	24.6	1.1	0.0	0.0	0.9	52.1	78.8
148	73.0	9.5	3.5	5.6	23.2	0.0	8.6	32.1	82.5
152	57.5	14.6	1.6	1.1	4.6	0.0	8.6	26.6	57.0
153	59.0	53.2	33.6	4.0	7.0	3.7	8.7	23.3	133.5
Mean	63.1	9.8	8.6	2.0	4.4	0.5	7.1	91.7	124.0
Std dev		17.2	12.1	1.8	7.6	1.2	3.9	116.4	107.9
% catch		7.9	6.9	1.6	3.5	0.4	5.7	74.0	100.0

c) Slope, 101–600 m

Station	Gear depth	Demersal	Pelagic	Rays	Sharks	Shrimps	Squids	Other	Total
126	174.5	10.3	1.8	2.6	0.9	3.8	1.7	54.8	76.0
127	213.5	36.1	2.1	2.3	15.4	0.0	3.7	1 347.3	1 406.9
128	510.5	13.7	0.7	0.0	0.0	80.0	6.2	186.9	287.5
140	120.0	90.6	2.0	2.0	0.0	0.0	1.5	84.9	180.9
141	207.0	3215.7	6.3	0.0	41.9	34.3	38.8	230.0	3 566.9
Mean	245.1	673.3	2.6	1.4	11.6	23.6	10.4	380.8	1 103.6
Std dev		1271.5	1.9	1.1	16.2	31.0	14.3	487.5	1 321.6
% catch		61.0	0.2	0.1	1.1	2.1	0.9	34.5	100.0

Among the pelagic groups (Table 23), Carangids gave the highest mean catch rate on the inner shelf. Hairtails were caught in noticeable numbers at only one station (132). On the outer shelf and along the slope, catch rates of all groups were low.

Table 23. Catch rates (kg/h) by main pelagic families in swept-area bottom-trawl hauls on the a) inner shelf (0-50 m), b) outer shelf (51-100 m) and slope (101-600 m), Guinea-Bissau

a) Inner shelf, 0–50 m

Station	Gear depth	Barracuda	Carangideae	Clupeoids	Hairtails	Scombrids	Other	Total
122	29.5	1.7	9.3	0.0	0.0	1.3	193.8	206.2
123	36.5	0.0	1.6	0.0	0.0	0.0	329.0	330.5
124	46.0	0.0	1.1	0.0	0.0	0.0	79.7	80.9
131	43.5	0.0	1.3	0.0	0.0	0.0	184.7	186.0
132	25.5	0.0	8.5	13.3	123.7	4.9	41.4	191.8
137	25.5	0.0	9.4	3.1	0.0	0.0	1 121.2	1 133.7
138	40.0	0.0	2.2	0.0	0.0	0.0	153.9	156.1
144	40.0	0.0	2.2	0.0	0.0	0.0	30.9	33.0
145	23.0	2.3	123.4	7.7	0.4	0.0	58.6	192.5
146	27.5	0.0	7.3	0.0	0.0	0.0	28.2	35.5
147	44.5	0.0	2.3	0.0	0.0	0.9	59.2	62.4
150	38.0	40.0	134.8	2.4	2.4	0.0	2 459.4	2 638.9
151	30.0	0.4	9.1	0.1	0.8	0.0	130.8	141.3
Mean	34.6	3.4	24.0	2.0	9.8	0.5	374.7	414.5
Std dev		10.6	45.0	3.9	32.9	1.3	663.2	697.9
% catch		0.8	5.8	0.5	2.4	0.1	90.4	100.0

b) Outer shelf, 51–100 m

Station	Gear depth	Barracuda	Carangidae	Clupeoisds	Hairtails	Scombrids	Other	Total
125	57.5	0.0	0.0	0.0	2.8	0.0	111.0	113.8
129	69.5	0.0	0.5	0.0	1.3	0.1	60.2	62.1
130	59.0	0.0	0.3	0.0	0.0	0.2	61.8	62.4
139	67.5	0.0	0.0	0.0	0.0	0.0	401.5	401.5
143	61.5	0.0	9.4	0.0	15.2	0.0	54.2	78.8
148	73.0	0.0	3.3	0.0	0.0	0.2	79.0	82.5
152	57.5	0.0	1.6	0.0	0.0	0.0	55.4	57.0
153	59.0	0.0	32.5	1.1	0.0	0.0	99.9	133.5
Mean	63.1	0.0	6.0	0.1	2.4	0.1	115.4	124.0
Std dev		0.0	10.5	0.4	4.9	0.1	109.9	107.9
% catch		0.0	4.8	0.1	1.9	0.1	93.1	100.0

c) Slope, 101–600 m

Stationn	Gear depth	Barracuda	Carangidae	Clupeoids	Hairtails	Scombrisds	Other	Total
126	174.5	0.0	1.8	0.0	0.0	0.0	74.2	76.0
127	213.5	0.0	2.1	0.0	0.0	0.0	1 404.8	1 406.9
128	510.5	0.0	0.0	0.0	0.7	0.0	286.8	287.5
140	120.0	0.0	2.0	0.0	0.0	0.0	179.0	180.9
141	207.0	0.0	0.0	0.0	6.3	0.0	3 560.6	3 566.9
Mean	245.1	0.0	1.2	0.0	1.4	0.0	1 101.1	1 103.6
Std dev		0.0	1.0	0.0	2.5	0.0	1 319.8	1 321.6
% catch		0.0	0.1	0.0	0.1	0.0	99.8	100.0

Among the demersal groups (Table 24), only grunts and seabreams were observed in the catches on the inner shelf. The high catch of grunts at station 137 was dominated by *Pomadasys jubelini* (69% of total catch). On the outer shelf, catch rates of all demersal groups were low. Along the slope, the high catch of croaker at station 151 was dominated by *Galeoides decadactylus* (50%).

Table 24. 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), b) outer shelf (51-100 m) and c) slope (101-600 m), Guinea-Bissau

a) Inner shelf, 0–50 m

Station	Gear depth	Croakers	Groupers	Grunts	Seabreams	Snappers	Other	Total
122	29.5	0.0	0.0	0.0	83.1	0.0	123.1	206.2
123	36.5	0.0	0.0	0.0	0.0	0.0	330.5	330.5
124	46.0	0.0	0.1	0.0	2.6	0.0	78.2	80.9
131	43.5	0.0	0.0	0.0	90.1	0.0	95.8	186.0
132	25.5	0.0	0.0	1.1	2.7	0.0	188.0	191.8
137	25.5	0.0	0.0	783.0	1.2	0.0	349.6	1 133.7
138	40.0	0.0	0.0	0.0	0.0	0.0	156.1	156.1
144	40.0	0.0	0.0	0.0	0.0	0.0	33.0	33.0
145	23.0	0.0	0.0	0.0	0.0	0.0	192.5	192.5
146	27.5	0.0	0.0	0.0	0.0	0.0	35.5	35.5
147	44.5	0.0	0.0	0.0	0.0	0.0	62.4	62.4
150	38.0	0.0	0.0	0.0	154.7	0.0	2 484.1	2 638.9
151	30.0	0.0	0.0	0.0	1.5	0.0	139.9	141.3
Mean	34.6	0.0	0.0	60.3	25.8	0.0	328.4	414.5
Std dev		0.0	0.0	217.1	50.3	0.0	655.3	726.4
% catch		0.0	0.0	14.5	6.2	0.0	79.2	100.0

b) Outer shelf, 51–100 m

Station	Gear depth	Croakers	Groupers	Grunts	Seabreams	Snappers	Other	Total
125	57,5	0,0	0,0	0,0	0,0	0,0	113,8	113,8
129	69,5	0,0	0,0	0,0	0,1	0,0	62,1	62,1
130	59,0	0,0	0,0	0,0	0,0	0,0	62,3	62,3
139	67,5	0,0	0,0	0,0	0,6	0,0	400,9	401,5
143	61,5	0,0	0,0	0,0	0,0	0,0	78,8	78,8
148	73,0	0,0	0,0	0,0	9,5	0,0	73,0	82,5
152	57,5	0,0	0,5	0,0	3,1	0,0	53,3	57,0
153	59,0	38,9	0,0	0,0	5,2	0,0	89,5	133,5
Mean	63,1	4,9	0,1	0,0	2,3	0,0	116,7	123,9
Std dev		13,7	0,2	0,0	3,5	0,0	116,4	115,3
% catch		4,0	0,1	0,0	1,9	0,0	94,2	100,0

c) Slope, 101–600 m

Station	Gear depth	Croakers	Groupers	Grunts	Seabreams	Snappers	Other	Total
126	174,5	0,0	0,0	0,0	1,3	0,0	74,7	76,0
127	213,5	0,0	0,0	0,0	1,3	0,0	1 405,6	1 406,9
128	510,5	0,2	0,0	0,0	0,0	0,0	287,3	287,5
140	120,0	0,0	0,0	0,0	90,6	0,0	90,4	180,9
141	207,0	3184,9	0,0	0,0	0,0	0,0	382,0	3 566,9
Mean	245,1	637,0	0,0	0,0	18,7	0,0	448,0	1 103,6
Std dev		1424,3	0,0	0,0	40,2	0,0	551,0	1 477,6
% catch		57,7	0,0	0,0	1,7	0,0	40,6	100,0

3.5.3 Swept-area biomass estimates

Swept-area biomass estimates are presented for important species/groups by depth strata. It should be noted that for Liberia, the shallow depth stratum is from 0-30 m, in contrast 20-30 m for the other countries. This is in agreement with earlier surveys in this region. Because of the steep slope, no estimates have been carried out for the 100–200 m stratum in Liberia and Sierra Leone. The overall estimates are compared with similar surveys in 2006 and 2007. Information about the size of depth strata per country is presented in Annex XI.

3.5.3.1 Liberia

In Liberia, the total biomass was about the same in the 30–50 m and 50–100 m strata (Table 25). However, the species composition was substantially different, with dominance of the grunt, *B. auritus*, in the 30–50 m interval and seabreams in 50–100 m interval. Croakers dominated at 0-30 m. Compared to surveys in 2006 and 2007 (Figure 49), the biomass in 2019 of seabreams and croakers were quite similar, whereas the *B. auritus* were more abundant in 2019. The total biomass (sum of all species and groups) was higher in 2019 than in 2006 and 2007 (39, 27 and 25 000 tonnes, respectively).

Table 25. Biomass estimates (tonnes) of important species/groups by depth strata

Species/Groups	0–30 m	30–50 m	50–100 m	Total
Seabreams	0	0	8 544	8 544
Grunts[1]	222	370	0	592
Croakers	4 474	1 956	393	6 822
Groupers	0	50	1 542	1 591
Snappers	0	0	1 008	1 008
Brachydeuterus auritus	1 639	15 060	129	16 827
Sharks	0	0	1 090	1 090
Rays	400	310	207	917
Cephalopods	14	70	1 413	1 497
Total	6 747	17 816	14 325	38 888

1) *B. auritus* excluded

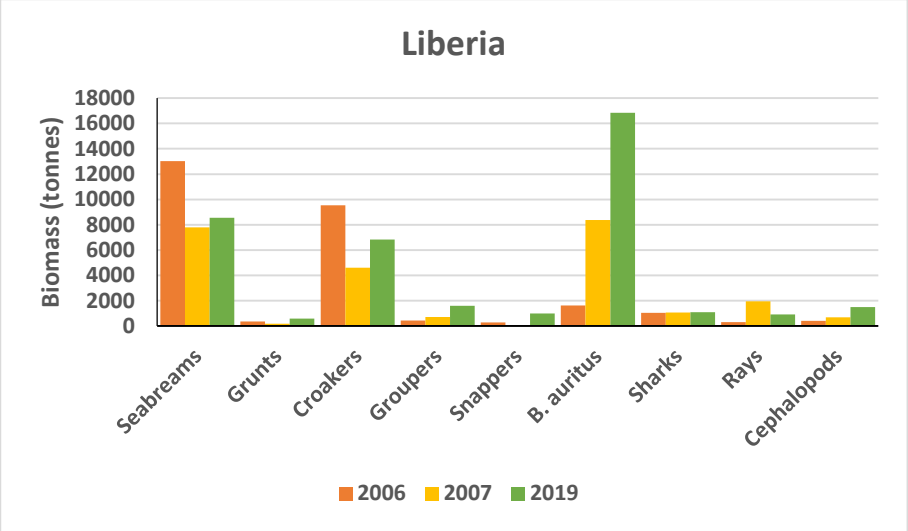


Figure 49. Total swept-area biomass estimates by species/groups in 2006, 2007 and 2019

3.5.3.2 Sierra Leone

In Sierra Leone, a substantial part of the biomass was found in the 30–50 m depth stratum, and grunts was the dominating group (Table 26). The size of the 50–100 m stratum was approximately the same as the 30–50 m stratum, whereas the total biomass in the deeper stratum was only 10% of that at 30–50 m. Compared to 2006 and 2007 (Figure 50), the biomass of seabreams was substantially lower in 2019, whereas the biomass of grunts was substantially higher in 2019. However, it should be noted that the high estimate in 2019 was to a large extent driven by one large catch of *Pomadasys inciscus (sts. 61)* The total biomass in 2006, 2007 and 2019 was 36 000, 24 000 and 41 000 tonnes, respectively.

Table 26. Biomass estimates (tonnes) of important species/groups by depth strata

Species/Groups	20–30 m	30–50 m	50–100 m	Total
Seabreams	161	397	2 302	2 860
Grunts[1]	540	23 700	0	24 239
Croakers	3 047	3 396	133	6 576
Groupers	84	248	213	545
Snappers	36	0	0	36
Brachydeuterus auritus	1 018	3 793	0	4 811
Sharks	3	339	140	482
Rays	79	518	98	695
Cephalopods	93	192	344	630
Total	5 061	32 584	3 230	40 875

1) *B. auritus* excluded

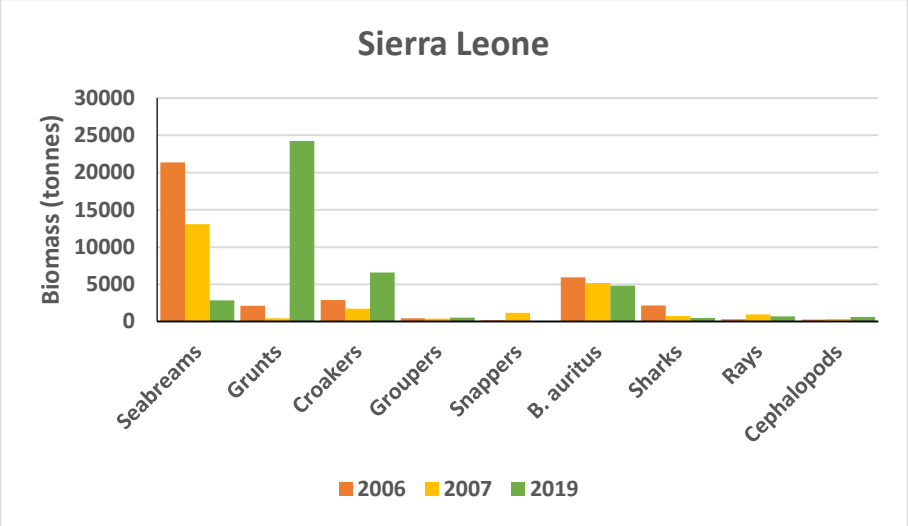


Figure 50. Total swept-area biomass estimates by species/groups in 2006, 2007 and 2019

3.5.3.3 Guinea

The highest biomass in Guinea was found at 30–50 m where seabreams was the most abundant group (Table 27). However, as the shelf is wider in Guinea than in Liberia and Sierra Leone and the total biomass is substantially lower, underlines the low concentrations of demersal fish at all depths in Guinea. The biomass of seabreams in 2019 was about at the same level as in 2006 and 2007 (Figure 51), whereas the biomass of *B. auritus* was substantially lower in 2019. This is also reflected in lower total biomass in 2019 compared to 2006 and 2007 (15, 32 and 28 kT, respectively).

Table 27. Biomass estimates (tonnes) of important species/groups by depth strata

Species/Groups	20–30 m	30–50 m	50–100 m	100–200 m	Total
Seabreams	1 459	4 539	1 071	3 487	10 556
Grunts[1]	85	123	0	0	208
Croakers	5	0	4	0	10
Groupers	0	217	423	0	640
Snappers	4	0	0	0	4
Brachydeuterus auritus	279	168	0	0	448
Sharks	0	1 595	100	344	2 039
Rays	603	94	79	89	865
Cephalopods	99	496	56	0	650
Total	2 535	7 232	1 733	3 920	15 420

1) *B. auritus* excluded

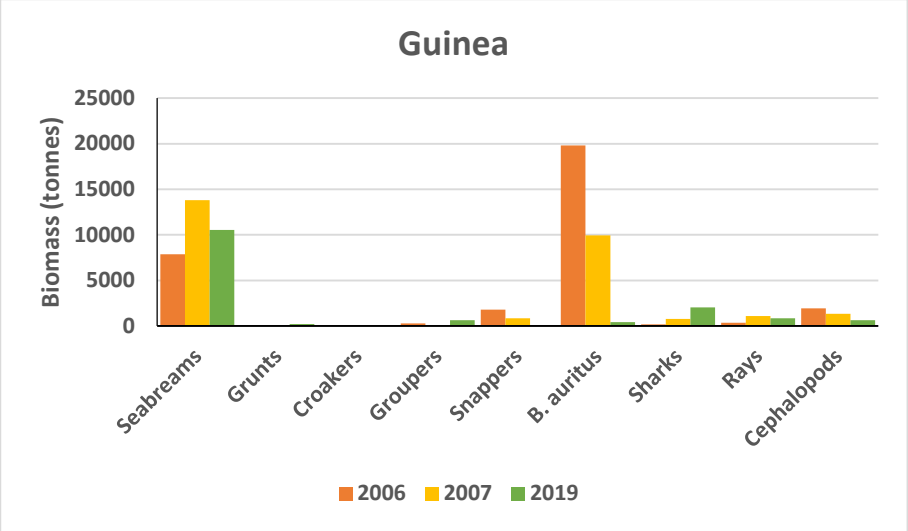


Figure 51. Total swept-area biomass estimates by species/groups in 2006, 2007 and 2019

3.5.3.4 Guinea-Bissau

The highest biomass of demersal species and groups was found at the 30–50 m depth interval where *B. auritus* dominated (Table 28). Grunts was the dominating group at 20–30 m. In deeper waters (>50 m), the biomass was low for all species/groups. The biomass of seabreams and croakers was substantially higher in 2006 than in 2007 and 2019 (Figure 52), whereas the biomass of *B. auritus* was about the same. These differences are also reflected in higher total biomass in 2006 (47 000 tonnes) than in 2007 (19 000 tonnes) and 2019 (19 000 tonnes).

Table 28. Biomass estimates (tonnes) of important species/groups by depth strata

Species/Groups	20–30 m	30–50 m	50–100 m	100–200 m	Total
Seabreams	585	1 434	109	2 013	4 141
Grunts[1]	4 265	0	0	0	4 265
Croakers	0	0	228	0	228
Groupers	0	0	3	0	3
Snappers	0	0	0	0	0
Brachydeuterus auritus	0	8 210	92	0	8 302
Sharks	0	0	203	17	219
Rays	74	16	95	93	278
Cephalopods	556	197	335	65	1 153
Total	5 480	9 856	1 065	2 187	18 588

1) *B. auratus* excluded

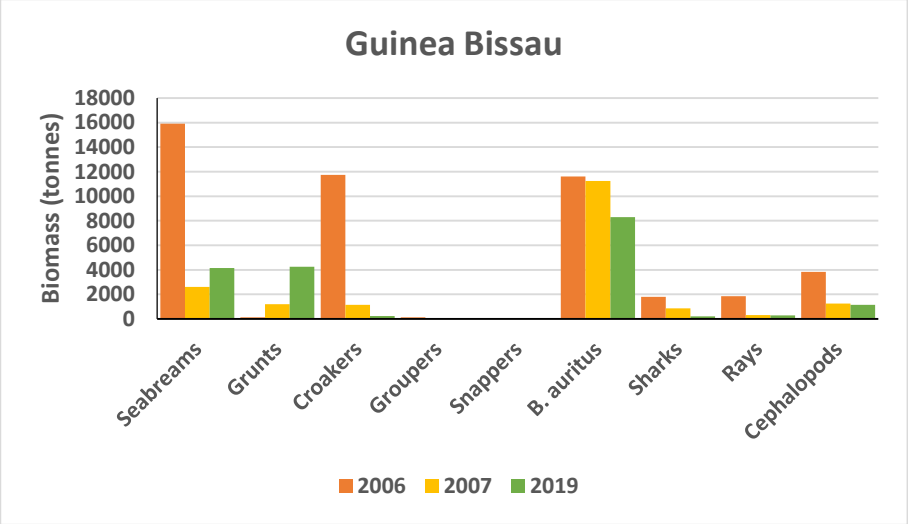


Figure 52. Total swept-area biomass estimates by species/groups in 2006, 2007 and 2019

3.6 Sea mammals

Number of sea mammals per country is presented in Table 29. The short-beaked common dolphin (*D. delphis*) was the most common species, and the highest numbers were observed in Guinea-Bissau. A detailed report of sea mammal observations is presented in Annex XV (in French).

Table 29. Number of observed sea mammal per country and species

Species	Liberia	Sierra Leone	Guinea	Guinea-Bissau	Total
Globicephala macrorhynchus	16	0	0	24	42
Delphinus delphis	50	450	304	720	1524
Dolphins spp.	30	0	0	0	30
Megaptera novaeangliae	3	4	6	5	18
Balaenoptera sp.	5	2	2	3	12
Total	104	456	314	752	1 626

3.7 Sea birds

Few sea birds were observed during the survey and no detailed report is presented.

3.8 Sargassum weed

Drifting mats of *Sargassum* were observed in all countries (Figure 53). Details of observed *Sargassum* are presented in the last section of the sea mammal report (Annex XV).

Figure 53. Sargassum observed in Sierra Leone

CHAPTER 4. CONCLUDING REMARKS

4.1 Hydrographic summary

The atmospheric conditions during the survey were dominated by the persistence of the south-westerly trade winds with variable speeds. Overall, winds were oriented perpendicular to the coast. However, off Harper's Province in Liberia and Freetown in Sierra Leone, winds blowing almost parallel to the coast were measured with low speeds.

Surface water temperatures were warm, reaching 29°C, extending to depths of 40–50 m offshore. The thermoclines were well defined throughout the survey. It was generally located at 20 m at the coast and began to sink as it moved offshore. This was true for all transects except for the initial transect to start the survey where the thermocline was above the maximum salinity layer. This temperature transition zone had a maximum fluorescence layer for all transects with values above 1 mg/m^3, which increase greatly further north with concentrations reaching 5.4 mg/m^3.

Subsurface waters throughout the survey had maximum salinity near 35.75 PSU up to 30 m depth that extended further offshore from Sierra Leone to Guinea-Bissau. In Liberia and on the Campeone transect in Guinea-Bissau, this salinity maximum extended to the edge of the continental shelf.

More oxygenated surface waters generally occupied the top 20 m with dissolved oxygen concentrations greater than 4 ml/l above the thermocline. In deeper layers between 200-300 m, the oxygen minimum zones proved to be hypoxic for a majority of the survey.

These hydrographical features are typical tropical structures, characterized by strong stratification. The stratification can increase in the presence of warm Guinean waters and inflows of continental waters due to the heavy rains observed at certain times during the survey. This stratification has the effect of limiting the vertical exchanges and nutrient inputs into the euphotic layer, making the regions studied so-called permanence zones where the oceanic conditions are very stable during this time of the year.

Surface currents off Liberia and Sierra Leone were generally southerly along the continental shelf. These surface currents could be the eastern (or southern) branch of the NECC that strengthens the Guinea Current at this time of the year. In the subsurface zones off Liberia, a counter current was present at the coast from 35-40 m depth.

pH minimum zones coincided with observed oxygen minimum below 1.1 ml/l indicating possible deoxygenation from microbial respiration and therefore increased plankton concentrations in the 400–500m layer. Further decreasing in pH and dissolved oxygen levels were observed as the survey moved up the coast with survey minima observed in Guinea-Bissau. In this same pattern, chlorophyll a levels increased as the survey moved north, indicating elevated phytoplankton levels in the upper 50 m as well as elevated dissolved oxygen levels consistently above 4 ml/l.

4.2 Pelagic fish

Pelagic fish were present over large parts of the region. The main densities were found on the shelf at depths <100 m. The survey did not cover depths <20 m.

The concentrations of Ssardinella increased substantially from southeast to northwest. As the continental shelf is generally wider in the western part of the region, most of the Sardinella was found in Guinea and Guinea-Bissau. Similar patterns were found in Pelagic 2 species.

Table 30 summarises the estimated biomasses of the main pelagic groups from previous surveys and compares these estimates to the current one. The total biomass of Sardinellas in 2019 was nearly as high as in 2006, and substantially higher than in 2007 and 2017. It has been suggested that the differences between years could be a result of different seasons. However, given that the surveys in 2017 and 2019 were close in time and that the low estimates in 2007 and 2017 were obtained between the high estimates in 2006 and 2019, there is no evidence to support this hypothesis.

There are some noticeable differences between the countries. In 2019, the biomass of sardinellas was the lowest on records in Liberia. Also, Sierra Leone had low biomass of Sardinellas, whereas Guinea-Bissau had the highest biomass observed.

The biomass of Pelagic 2 species was higher in 2019 than in 2007 and 2017, but substantially lower than in 2006. As for the Sardinellas, the biomass of Pelagic 2 species in 2019 was much lower in Liberia when compared to earlier surveys. Also, in Sierra Leone the biomass of Pelagic 2 species was very low in 2019

Table 30 Acoustic biomass estimates of main pelagic groups (tonnes), a) Sardinellas, anchovies and Pelgic 1 species, and b) Pelagic 2 species (carangids, scombrids, barracudas and hairtails) in 2006, 2007, 2017 and 2019

a) Sardinellas, anchovies and Pelagic I species

Survey year	Survey period	Liberia	Sierra Leone	Guinea	Guinea-Bissau	Total
2006	29.4 - 14.5	25 000	97 000	1 083 000	177 000	1 382 000
2007	5.5 - 29.5	48 000	139 000	192 000	197 000	576 000
2017	22.7 – 18.8	16 204	111 068	430 774	35 374	593 420
2019	22.8 - 23.9	5 844	95 507	751 290	352 928	1 205 569

b) Pelagic 2 species (carangids, scombrids, barracudas and hairtails)

Survey year	Survey period	Liberia	Sierra Leone	Guinea	Guinea-Bissau	Total
2006	29.4 - 14.5	566 000	185 000	269 000	127 000	1 147 000
2007	5.5 - 29.5	45 000	63 000	100 000	16 000	224 000
2017	22.7 – 18.8	32 453	138 285	33 989	10 186	214 913
2019	22.8 - 23.9	12 557	21 163	133 487	135 134	302 341

4.3 Demersal fish

Table 31 presents the swept-area biomass per country and species. Total of the region the biomass of seabreams, grunts and *B. auritus* were the highest with approximately the same level of the three species/groups, followed by croakers. However, there were substantial differences in species composition between the countries. Most of the grunts (excluding *B. auritus*) were caught in Liberia and Sierra Leone, croakers mainly in Sierra Leone and seabreams were the only demersal group that was abundant in Guinea. The total biomass was higher in Liberia and Sierra Leone than in Guinea and Guinea-Bissau (it should be noted, though, that both Guinea and Guinea-Bissau have substantial areas shallower the 20 m that were not surveyed).

The total mean densities (sum of all species/groups) varied even more than the biomass. Highest mean densities were found in Liberia and Sierra Leone with 7.8 and 6.8 T NM^{-2}, respectively, whereas the same figures in Guinea and Guinea-Bissau were merely 2.1 and 3.4 T NM^{-2}. Interesting, this is the opposite pattern of pelagic fish, in particular for Sardinella which had substantially higher densities towards the northwest. The total biomass estimate for pelagic fish in the region was 1 508 kT (Sardinella and Pelagic 2), versus 114 000 tonnes for demersal species/groups, i.e. 13.3 times higher biomass of pelagic fish.

Table 31. Swept-area biomass estimates per species/groups and country. Total area is the sum of all strata per country (NM^2), and mean density is given by Total catch/Total area (T NM^{-2}).

Species/Groups	Liberia	Sierra Leone	Guinea	Guinea-Bissau	Total
Seabreams	8 544	2 860	10 556	4 141	26 101
Grunts	592	24 239	208	4 265	29 304
Croakers	6 822	6 576	10	228	13 636
Groupers	1 591	545	640	3	2 780
Snappers	1 008	36	4	0	1 048
B. auritus	16 827	4 811	448	8 302	30 388
Sharks	1 090	482	2 039	219	3 830
Rays	917	695	865	278	2 755
Cephalopods	1 497	630	650	1 153	3 930
Total	38 888	40 875	15 420	18 588	113 772
Total area (NM^2)	4 980	6 020	7 260	5 430	23 690
Mean density (T NM^{-2})	7.8	6.8	2.1	3.4	4.8

In Table 32 the total estimated biomass per species/group in 2019 are compared to the results for surveys in 2006 and 2007 (see survey dates in Table 30), and in Figure 54 the same numbers have been plotted. The highest total biomass was observed in 2006, followed by 2019 and 2007. The biomass of seabreams and croakers were markedly higher the in 2007 and 2019, whereas the biomass of the grunt *B. auratus* was about the same in all years. In 2019 the biomass of grunts (*B. auritus* excluded) was substantially higher than in 2006 and 2007.

Table 32. Estimated biomass (tonnes) of dermersal species/groups in 2006, 2007 and 2019

Year	Seabreams	Grunts	Croakers	Groupers	Snappers	*B. auritus*	Sharks	Rays	Cephalopods	Total
2006	58 173	2 683	24 168	1 295	2 292	39 013	5 198	2 826	6 435	142 083
2007	37 295	1 852	7 491	1 172	2 038	34 713	3 463	4 327	3 629	95 980
2019	26 101	29 304	13 636	2 780	1 048	30 388	3 830	2 755	3 930	113 772

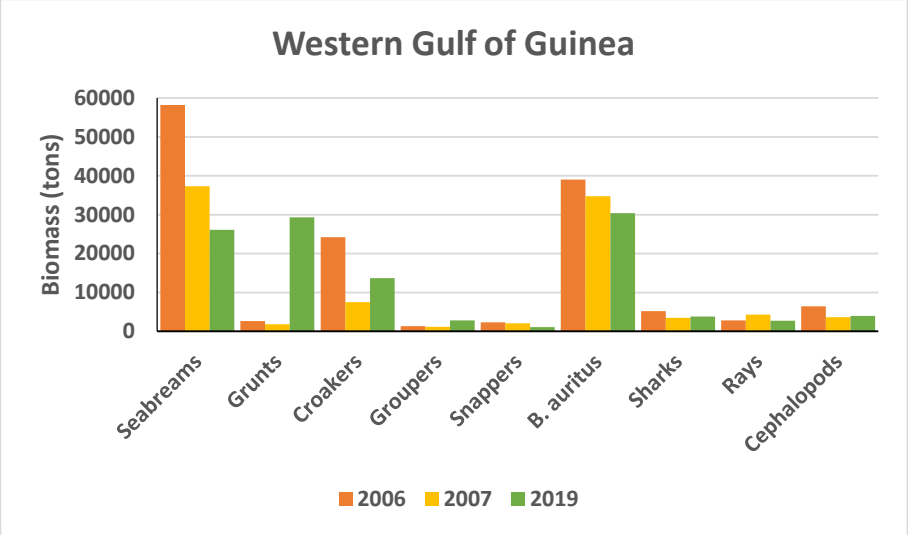


Figure 54. Estimated biomass (tonnes) of dermersal species/groups in 2006, 2007 and 2019

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ANNEX I. HYDROGRAPHY SENSORS AND WATER CHEMISTRY QUALITY ASSURANCE

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 triplicates.

Parameter	Sample count	Average Triplicate* Standard Deviation
pH	241	0.003
Total alkalinity	241	1.57

*Erroneous values removed

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

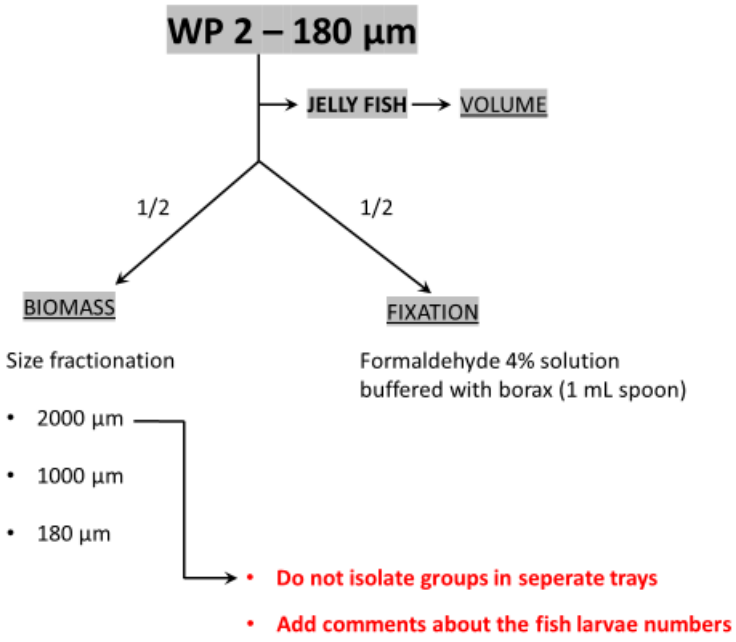
Parameter	Low Standard	High Standard
Standard Average	486	4183
Standard Standard Deviation	6	66
Average Drift	7	82

CTD dissolved oxygen and salinity value validity statistics

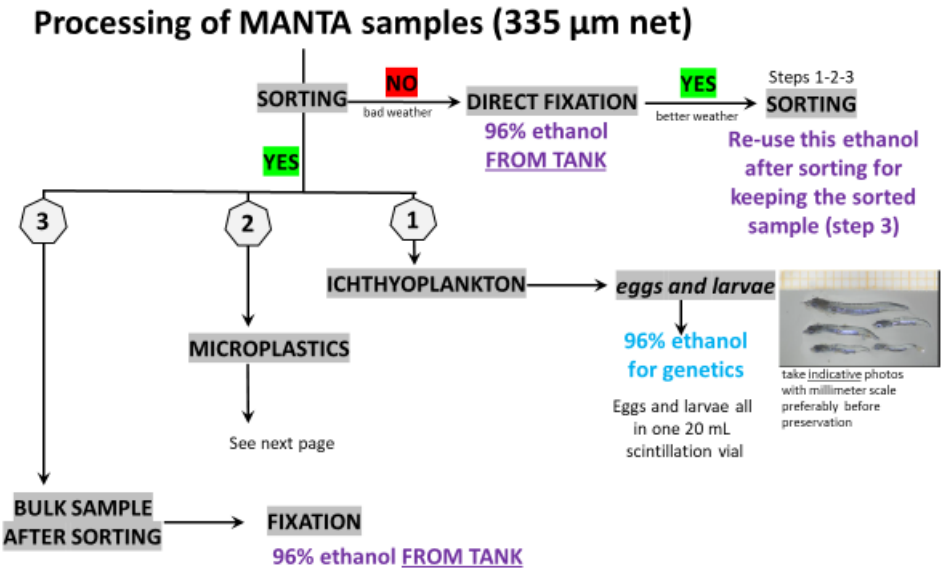
Parameter	Sample Count	Offset from factory calibration
Dissolved Oxygen	18	-1.1%
Salinity	0	N/A

The Portasal salinometer is being repaired. Leg 3.2 salinity values will be validated by the salinity samples collected from the previous and subsequent surveys when the salinometer returns to R/V *Dr Fridtjof Nansen*.

ANNEX II. OVERVIEW OF SAMPLING PROCEDURES IN THE PLANKTON LAB



All manta samples should be sorted on board
Sorting of manta samples can be done even after preservation



ANNEX III. DESCRIPTION OF INSTRUMENTS AND FISHING GEAR

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	6.22º along ship
Bandwidth	2.43 kHz			6.28 athwart ship
Max power	2000 Watt		Alongship offset	0.10º
2way beam angle	20.6dB		Athwardship offset	0.06º
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 III.1, new in 2017) and one 'Gisund super bottom trawl'. All trawls were used during the survey. The smallest pelagic trawl has 8 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^2 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.

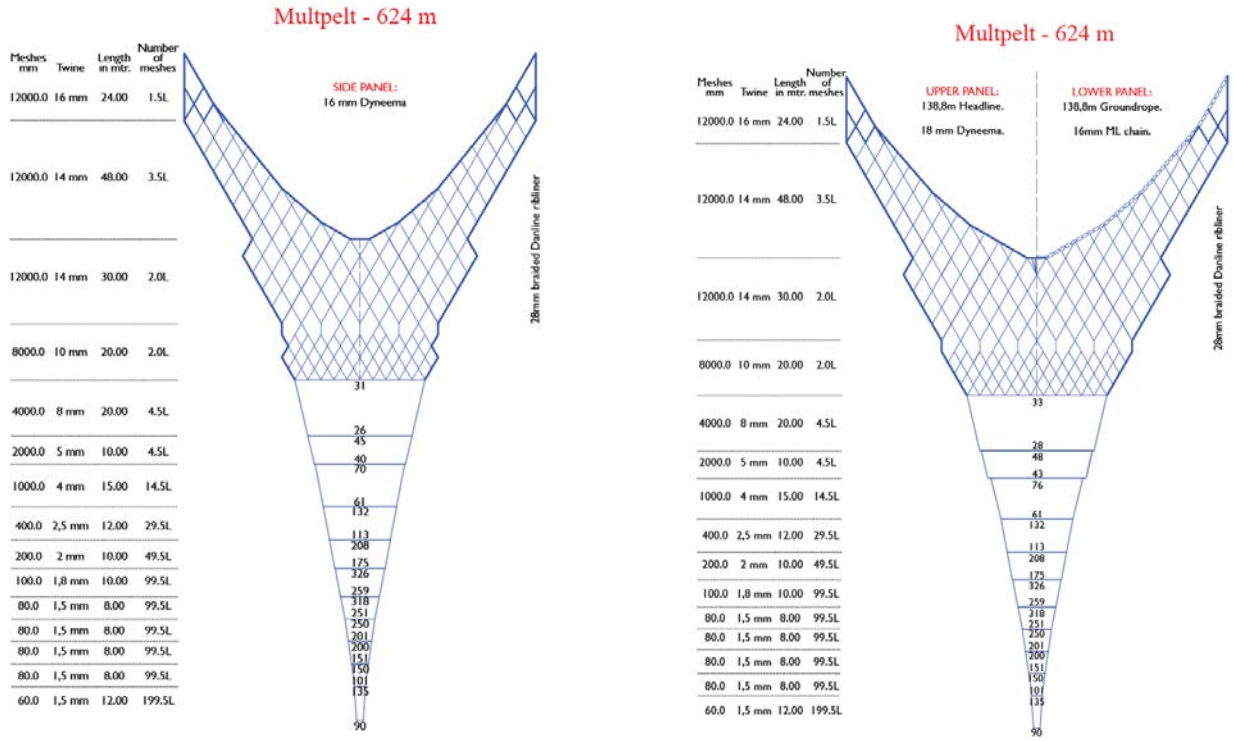


Figure III.1. Schematic drawing of the MultPelt 624

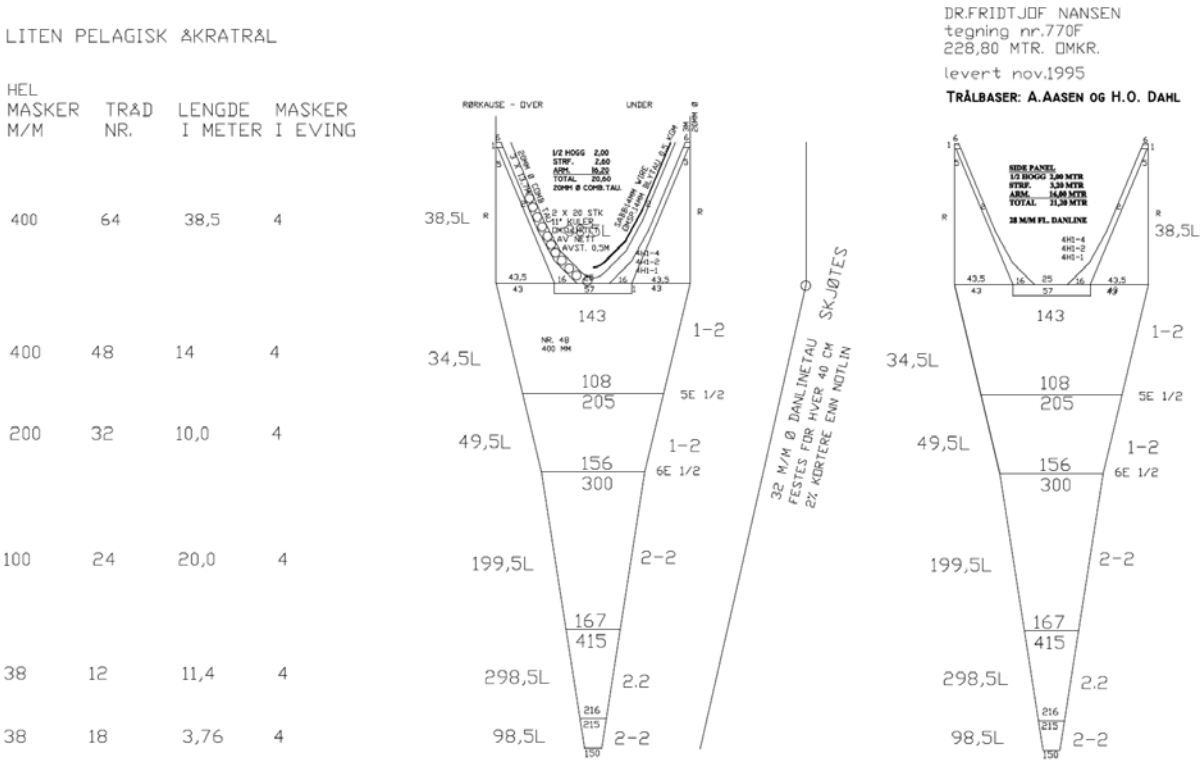


Figure III.2. Schematic drawing of the small pelagic Åkratrawl

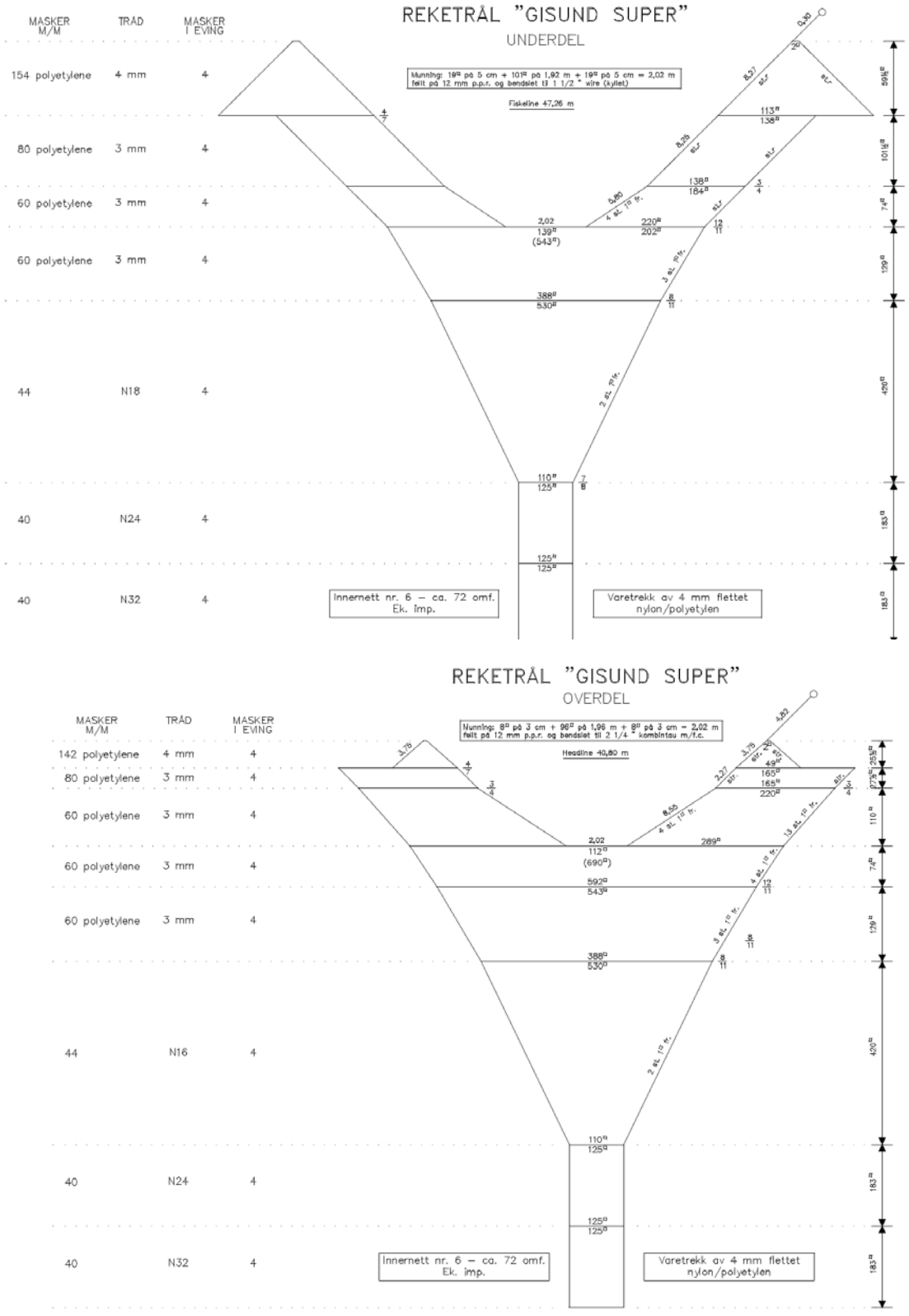


Figure III.3. Schematic drawing of the Super Gisund bottom trawl

ANNEX IV. RECORDS OF FISHING STATIONS

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 1

DATE :26/08/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
4°11.40
start stop duration Lon W
7°44.40
TIME :10:02:49 10:23:42 20.9 (min) Purpose : 3
LOG : 2988.44 2989.53 1.1 Region : 2400
FDEPTH: 91 91 Gear cond.: 0
BDEPTH: 91 91 Validity : 0
Towing dir: 0° Wire out : 250 m Speed : 3.1 kn
Sorted : 438 Total catch: 437.81 Catch/hour: 1258.07

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Ariomma bondi	486.98	25629	38.71
Caranx rhonchus	251.72	7966	20.01
2			
Dentex angolensis	104.31	609	8.29
3			
Uranoscopus albesca	92.82	626	7.38
Squatina oculata	60.29	23	4.79
Pentheroscion mbizi	31.03	603	2.47
1			
Todarodes sagittatus	29.71	216	2.36
Dentex congoensis	28.39	210	2.26
Dicologoglossa cuneata	25.80	216	2.05
Selene dorsalis	23.79	109	1.89
Epinephelus aeneus	21.67	3	1.72
Pelagia noctiluca	16.67	0	1.32
Trigla lyra	14.43	170	1.15
Mustelus mustelus	12.53	3	1.00
Brotula barbata	11.38	23	0.90
Scorpaena stephanica	10.92	20	0.87
Boops boops	8.05	328	0.64
Citharus linguatula	7.13	101	0.57
B I V A L V E S	6.61	307	0.53
Blennius normani	3.28	259	0.26
Priacanthus arenatus	2.47	14	0.20
Umbrina canariensis	2.41	14	0.19
Sphoeroides marmoratus	2.18	132	0.17
Sepia sp.	1.49	3	0.12
Trichiurus lepturus	1.44	40	0.11
Calappa rubroguttata	0.40	9	0.03
Parapenaeus longirostris	0.23	103	0.02
Total	1258.13		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 2
DATE :26/08/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
4°16.55
start stop duration Lon W
7°57.74
TIME :14:16:29 14:46:49 30.3 (min) Purpose : 3
LOG : 3015.97 3017.51 1.5 Region : 2400
FDEPTH: 86 82 Gear cond.: 0
BDEPTH: 86 82 Validity : 0
Towing dir: 0° Wire out : 230 m Speed : 3.0 kn
Sorted : 331 Total catch: 330.73 Catch/hour: 654.05

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Selene dorsalis	339.75	1475	51.95
SPARIDAE	93.18	856	14.25
5			
Caranx rhonchus	46.71	1214	7.14
Umbrina canariensis	21.60	131	3.30
Dentex barnardi	20.25	4	3.10
Ariomma bondi	19.66	405	3.01
Scorpaena normani	17.52	61	2.68
Brotula barbata	16.89	45	2.58
SPARIDAE	11.87	142	1.81
6			
Dentex gibbosus	7.40	10	1.13
Octopus macropus	7.20	6	1.10
Raja miraletus	6.41	16	0.98
Pseudupeneus prayensis	5.02	30	0.77
Sepia sp.	4.94	18	0.76
Epinephelus aeneus	3.44	2	0.53
Priacanthus arenatus	3.24	22	0.50
Boops boops	2.53	40	0.39
Trigla lyra	2.53	42	0.39
Todaropsis eblanae	2.14	119	0.33
Citharus linguatula	2.06	109	0.31
Branchiostegus semifasciatus	1.98	4	0.30
Sphyraena guachancho	1.54	8	0.24
Cyanea	1.54	0	0.24
Squatina oculata	1.46	2	0.22
Pagrus caeruleostictus	1.38	2	0.21
Pegusa triophthalma	1.34	85	0.21
Zeus faber	1.27	4	0.19
Cynoglossus monodi	1.27	8	0.19
Chrysaora sp.	0.95	0	0.15
Pelagia noctiluca	0.95	0	0.15
Sargocentron hastatum	0.95	4	0.15
Sphoeroides marmoratus	0.91	45	0.14
Aurelia sp	0.83	0	0.13
Chrysaora hysoscella	0.75	0	0.11
Sardinella aurita	0.59	14	0.09
4			
Aequorea forskalea	0.55	0	0.08
Centrarchops chapini	0.36	2	0.05
Lophiodes kempi	0.32	6	0.05
Chilomycterus spinosus mauretanicus	0.28	2	0.04
Antennarius striatus	0.24	2	0.04
Prognathodes marcellae	0.20	2	0.03
Fistularia tabacaria	0.04	2	0.01
Pandalus sp.	0.01	4	0.00
B I V A L V E S	0.01	4	0.00
Total	654.05		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 3
DATE :27/08/19 GEAR TYPE: PT NO: 1 POSITION:Lat N
4°23.79
start stop duration Lon W
8°22.15
TIME :01:39:57 02:11:12 31.2 (min) Purpose : 1
LOG : 3093.87 3095.78 1.9 Region : 2400
FDEPTH: 0 0 Gear cond.: 0
BDEPTH: 104 132 Validity : 0
Towing dir: 0° Wire out : 150 m Speed : 3.7 kn
Sorted : 61 Total catch: 61.48 Catch/hour: 118.08

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Scomber colias	101.14	716	85.65
7			
Maurolicus muelleri	8.57	0	7.25
Sargassum spp	5.07	0	4.29
Illex coindetii	0.96	54	0.81
Holocentrus ascensionis	0.85	8	0.72
Aequorea sp.	0.42	17	0.36
Cheilopogon cyanopterus	0.35	2	0.29
Priacanthus arenatus	0.31	4	0.26
Caranx crysos	0.19	2	0.16
Trichiurus lepturus	0.15	13	0.13
Parapenaeus longirostris	0.04	46	0.03
Lepidocybium flavobrunneum	0.04	2	0.03
Total	118.08		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 4
DATE :27/08/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
4°23.94
start stop duration Lon W
8°11.97
TIME :06:38:54 07:09:24 30.5 (min) Purpose : 3
LOG : 3112.25 3113.87 1.6 Region : 2400
FDEPTH: 78 76 Gear cond.: 0
BDEPTH: 78 76 Validity : 0
Towing dir: 0° Wire out : 220 m Speed : 3.2 kn
Sorted : 202 Total catch: 202.10 Catch/hour: 397.57

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Scorpaena stephanica	60.30	189	15.17
Epinephelus aeneus	54.20	6	13.63
Ariomma bondi	40.37	738	10.15
Sardinella aurita	35.61	818	8.96
8			
Caranx rhonchus	29.15	978	7.33
Dentex angolensis	26.01	390	6.54
Miscellaneous	20.62	0	5.19
Mustelus mustelus	19.55	2	4.92
Decapterus punctatus	16.76	529	4.22
Sepia sp.	15.03	37	3.78
Pseudupeneus prayensis	13.10	281	3.30
Pagellus bellottii	11.17	0	2.81
Alloteuthis africana	5.94	0	1.49
Raja miraletus	5.27	18	1.33
Torpedo mackayana	5.15	10	1.30
Waste General	4.45	2	1.12
Brotula barbata	3.74	22	0.94
Scomber colias	3.23	169	0.81
9			
Octopus vulgaris	2.68	2	0.67
Aurelia sp	2.12	8	0.53
Umbrina canariensis	2.09	10	0.52
Arnoglossus imperialis	2.01	498	0.50
Zeus faber	1.89	10	0.48
Sargocentron hastatum	1.73	12	0.44
Priacanthus arenatus	1.65	28	0.42
Uranoscopus albesca	1.57	16	0.40
Pagrus africanus	1.50	2	0.38
Chrysaora hysoscella	1.42	2	0.36
Fistularia tabacaria	1.14	20	0.29
Sphoeroides pachygaster	1.06	37	0.27
Trigla lyra	0.98	37	0.25
Sphyraena guachancho	0.63	4	0.16
Astropecten irregularis	0.55	2	0.14
Lophius budegassa	0.51	8	0.13
Cynoglossus cadenati	0.47	20	0.12
Citharus linguatula	0.43	20	0.11
Dactylopterus volitans	0.43	2	0.11
Boops boops	0.39	14	0.10
Selene dorsalis	0.31	59	0.08
Squatina oculata	0.31	2	0.08
Citharus linguatula	0.28	22	0.07
0			
Saurida brasiliensis	0.28	20	0.07
Branchiostegus semifasciatus	0.24	2	0.06
Scyphozoa	0.24	2	0.06
Ablennes hians	0.20	4	0.05
Bembrops greyi	0.18	8	0.04
Chrysaora sp.	0.16	24	0.04
Dicologoglossa cuneata	0.16	6	0.04
Prognathodes marcellae	0.12	4	0.03
Grapsus grapsus	0.10	2	0.02
Serranus cabrilla	0.08	2	0.02
Cepola pauciradiatus	0.02	2	0.00
Pelagia noctiluca	0.02	2	0.00
Total	397.57		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 5
DATE :27/08/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
4°19.40
start stop duration Lon W
8°20.96
TIME :09:41:49 10:13:41 31.5 (min) Purpose : 3
LOG : 3130.72 3132.33 1.6 Region : 2400
FDEPTH: 62 63 Gear cond.: 0
BDEPTH: 62 63 Validity : 0
Towing dir: 0° Wire out : 220 m Speed : 3.0 kn
Sorted : 70 Total catch: 69.76 Catch/hour: 132.79

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Squatina oculata	38.68	13	29.13
Sepia sp.	16.90	122	12.73
Dentex angolensis	11.80	103	8.89
10			
Octopus macropus	10.20	11	7.68
Chrysaora sp.	6.43	0	4.85
Mustelus mustelus	6.32	4	4.76
Citharus linguatula	4.68	128	3.53
Alloteuthis africana	4.42	169	3.33
0			
Blennius normani	3.88	386	2.92
Raja miraletus	3.88	13	2.92
Bembrops greyi	3.88	91	2.92
Brotula barbata	2.66	8	2.01
Uranoscopus albesca	2.44	30	1.83
Epinephelus aeneus	2.21	2	1.66
Sargassum spp	2.09	0	1.58
Selene dorsalis	1.90	17	1.43
Sphoeroides marmoratus	1.45	27	1.09
Pagrus caeruleostictus	1.22	2	0.92
Caranx rhonchus	1.14	93	0.86
Trigla lyra	1.10	42	0.83
Chrysaora hysoscella	1.07	4	0.80
Squilla mantis	1.07	10	0.80
Zeus faber	0.57	2	0.43

Penaeus notialis	0.53	10	0.40
11			
Fistularia tabacaria	0.49	6	0.37
Aequorea forskalea	0.27	6	0.20
Cubozoa sp	0.23	2	0.17
Parapenaeus longirostris	0.19	4	0.14
Sphyraena guachancho	0.19	2	0.14
Brachydeuterus auritus	0.19	13	0.14
Pagellus bellottii	0.15	4	0.11
Alloteuthis africana	0.15	32	0.11
Sardinella aurita	0.11	4	0.09
Illex coindetii	0.08	2	0.06
Ariomma bondi	0.08	2	0.06
Saurida brasiliensis	0.04	4	0.03
Cynoglossus senegalensis	0.04	4	0.03
Arnoglossus imperialis	0.02	4	0.01
Decapterus punctatus	0.02	2	0.01
Total	132.79		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 6
DATE :27/08/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
4°37.60
start stop duration Lon W
8°33.76
TIME :12:56:09 13:26:18 30.1 (min) Purpose : 3
LOG : 3151.92 3153.43 1.5 Region : 2400
FDEPTH: 62 63 Gear cond.: 0
BDEPTH: 62 63 Validity : 0
Towing dir: 0° Wire out : 220 m Speed : 3.0 kn
Sorted : 100 Total catch: 100.32 Catch/hour: 199.65

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		
	weight numbers	
Epinephelus aeneus	47.72 8	23.90
SPARIDAE	43.38 328	21.73
12		
Octopus vulgaris	25.59 20	12.82
Selene dorsalis	12.06 101	6.04
SPARIDAE	11.94 107	5.98
Citharus linguatula	7.76 179	3.89
Rachycentron canadum	6.29 2	3.15
Sepia sp.	5.81 96	2.91
Illex coindetii	5.73 1102	2.87
Rhizoprionodon acutus	5.65 6	2.83
Sargassum spp	5.65 0	2.83
Brotula barbata	4.30 8	2.15
Saurida brasiliensis	2.83 20	1.42
Chrysaora sp.	2.07 0	1.04
Aurelia sp	1.67 0	0.84
Saurida brasiliensis	1.55 330	0.78
0		
Dactylopterus volitans	1.43 4	0.72
Chilomycterus spinosus mauretanicus	1.27 6	0.64
SPARIDAE	1.15 20	0.58
0		
Raja miraletus	0.80 2	0.40
Brachydeuterus auritus	0.76 30	0.38
Zeus faber	0.64 2	0.32
Sphoeroides marmoratus	0.56 26	0.28
Cynoglossus monodi	0.52 4	0.26
Pseudupeneus prayensis	0.44 4	0.22
Caranx rhonchus	0.40 30	0.20
Penaeus notialis	0.32 10	0.16
B I V A L V E S	0.20 18	0.10
Chrysaora hysoscella	0.20 0	0.10
Chelidonichthys gabonensis	0.16 2	0.08
Dead coral & starfish	0.16 16	0.08
Fistularia petimba	0.12 4	0.06
Conger conger	0.12 4	0.06
Scyllarides herklotsii	0.12 6	0.06
Plastic	0.12 2	0.06
Scorpaena elongata	0.08 4	0.04
Raja miraletus	0.04 4	0.02
0		
Bathynectes piperitus	0.04 2	0.02
RANINIDAE	0.01 2	0.00
Total	199.65	100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 7
DATE :27/08/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
4°30.81
start stop duration Lon W
8°39.62
TIME :15:14:20 15:44:44 30.4 (min) Purpose : 3
LOG : 3165.01 3166.55 1.5 Region : 2400
FDEPTH: 83 84 Gear cond.: 0
BDEPTH: 83 84 Validity : 0
Towing dir: 0° Wire out : 230 m Speed : 3.0 kn
Sorted : 94 Total catch: 109.56 Catch/hour: 216.24

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		
	weight numbers	
SPARIDAE	128.43 0	59.39
14		
SPARIDAE	47.29 0	21.87
Priacanthus arenatus	8.31 112	3.84
Mustelus mustelus	5.63 2	2.60
Caranx rhonchus	4.66 148	2.15
Scorpaena elongata	3.65 10	1.69
Sardinella aurita	2.39 49	1.10
15		
Zeus faber	1.76 4	0.81
Pseudupeneus prayensis	1.72 22	0.79
Trigla lyra	1.62 24	0.75
Sargassum spp	1.56 0	0.72
Raja miraletus	1.42 8	0.66
SPARIDAE	1.38 30	0.64
0		
Dentex barnardi	1.24 2	0.58
Ariomma bondi	0.79 18	0.37
Boops boops	0.69 41	0.32
Cynoglossus monodi	0.65 2	0.30
Citharus linguatula	0.55 32	0.26
Illex coindetii	0.51 43	0.24
Lophius vaillanti	0.51 2	0.24
Scomber colias	0.45 4	0.21
Chilomycterus spinosus mauretanicus	0.38 2	0.17
Brotula barbata	0.32 2	0.15
Sphoeroides marmoratus	0.14 8	0.06
Sepia sp.	0.10 0	0.05
Prognathodes marcellae	0.10 2	0.05
Total	216.24	100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 8
DATE :28/08/19 GEAR TYPE: PT NO: 1 POSITION:Lat N
4°39.27
start stop duration Lon W
8°52.09
TIME :02:39:18 03:09:15 30.0 (min) Purpose : 1
LOG : 3217.75 3219.26 1.5 Region : 2400
FDEPTH: 0 0 Gear cond.: 0
BDEPTH: 78 79 Validity : 0
Towing dir: 0° Wire out : 130 m Speed : 3.0 kn
Sorted : 4 Total catch: 4.10 Catch/hour: 8.21

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		
	weight numbers	
Sardinella aurita	4.57 88	55.61
16		
Sargassum spp	2.40 0	29.27
Dactylopterus volitans	0.80 6	9.76
Sepia sp.	0.24 6	2.93
Illex sp.	0.12 6	1.46
Sphoeroides marmoratus	0.08 6	0.98
Total	8.21	100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 9
DATE :28/08/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
4°28.64
start stop duration Lon W
9°6.51
TIME :06:57:00 07:27:09 30.2 (min) Purpose : 3
LOG : 3244.09 3245.73 1.6 Region : 2400
FDEPTH: 488 478 Gear cond.: 0
BDEPTH: 488 478 Validity : 0
Towing dir: 0° Wire out : 1080 m Speed : 3.3 kn
Sorted : 783 Total catch: 783.39 Catch/hour: 1558.48

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		
	weight numbers	
Ijimaia loppei	1108.85 129	71.15
Nematocarcinus africanus	160.70 29401	10.31
Malacocephalus laevis	93.70 9593	6.01
0		
Nematocarcinus africanus	31.39 24	2.01
0		
Gadella imberbis	18.86 635	1.21
Glyphus marsupialis	17.39 6434	1.12
Aristeus varidens	16.83 812	1.08
Lamprogrammus exutus	16.71 121	1.07
Neoharriotta pinnata	14.88 8	0.95
0		
Lophius budegassa	10.70 12	0.69
Sargassum spp	10.19 0	0.65
Raja clavata	7.60 8	0.49
Yarella blackfordi	7.52 213	0.48
Coelorinchus caelorhincus	7.24 46	0.46
Myxine sp.	5.81 86	0.37
Lamprogrammus exutus	5.29 74	0.34
0		
Malacocephalus laevis	4.36 28	0.28
Merluccius senegalensis	4.10 10	0.26
Neoharriotta pinnata	3.82 6	0.25
Octopus vulgaris	3.30 4	0.21
Etmopterus pusillus	1.59 28	0.10
Ebinania costaecanarie	1.23 2	0.08
Zenion hololepis	1.19 275	0.08
Benthodesmus simonyi	0.92 30	0.06
Bembrops greyi	0.92 127	0.06
Selachophidium guentheri	0.44 5	0.03
Raja miraletus	0.44 2	0.03
Chaceon maritae	0.44 24	0.03
Nemichthys scolopaceus	0.36 22	0.02
Illex coindetii	0.32 2	0.02
Talismania longifilis	0.32 4	0.02
Bathyuroconger vicinus	0.32 10	0.02
Conger conger	0.16 18	0.01
Ariomma melanum	0.12 4	0.01
Stomias boa boa	0.12 4	0.01
Diretmus argenteus	0.09 6	0.01
Polymetme corythaeola	0.07 2	0.00
Argyropelecus gigas	0.06 14	0.00
Ephyrina ombango	0.05 0	0.00
Coloconger cadenati	0.04 2	0.00
Heterocarpus ensifer	0.03 38	0.00
Parapenaeopsis atlantica	0.02 2	0.00
Chaunax pictus	0.01 2	0.00
Chascanopsetta lugubris	0.00 18	0.00
Total	1558.48	100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 10
DATE :28/08/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
4°40.75
start stop duration Lon W
9°12.39
TIME :12:06:32 12:33:07 26.6 (min) Purpose : 3
LOG : 3274.67 3275.98 1.3 Region : 2400
FDEPTH: 94 95 Gear cond.: 0
BDEPTH: 94 95 Validity : 0
Towing dir: 0° Wire out : 255 m Speed : 3.0 kn
Sorted : 99 Total catch: 99.13 Catch/hour: 223.69

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		
	weight numbers	
SPARIDAE	87.42 1767	39.08
SPARIDAE	85.75 1473	38.33
17		
Mustelus mustelus	11.37 2	5.08
Dentex barnardi	6.93 5	3.10
Dentex canariensis	6.00 11	2.68
22		
Scorpaena elongata	4.20 11	1.88
Sea cucumber	3.84 32	1.71
Sardinella aurita	3.20 52	1.43
19		
Pagrus africanus	3.07 5	1.37
Sargassum spp	2.75 0	1.23
Boops boops	2.03 29	0.91
Pseudupeneus prayensis	1.67 14	0.75
Sepia sp.	1.40 23	0.63
Illex coindetii	1.35 11	0.61
Chelidonichthys gabonensis	1.26 23	0.56
Raja straeleni	0.81 2	0.36
Starfish	0.36 14	0.16
Citharus linguatula	0.23 16	0.10
Arnoglossus imperialis	0.05 9	0.02
Total	223.69	100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 11
DATE :28/08/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
4°51.48
start stop duration Lon W
9°0.26
TIME :15:44:56 16:17:17 32.4 (min) Purpose : 3
LOG : 3294.50 3296.08 1.6 Region : 2400
FDEPTH: 61 64 Gear cond.: 0
BDEPTH: 61 64 Validity : 0
Towing dir: 0° Wire out : 180 m Speed : 2.9 kn
Sorted : 128 Total catch: 128.11 Catch/hour: 237.61

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

SPARIDAE	87.45	291	36.80
21			
Caranx rhonchus	45.81	916	19.28
Sardinella aurita	34.98	623	14.72
20			
Octopus vulgaris	12.91	11	5.43
Epinephelus aeneus	7.98	6	3.36
Squatina oculata	6.97	2	2.93
Mustelus mustelus	5.27	2	2.22
Ephippion guttifer	4.41	2	1.86
Sargassum spp	3.71	0	1.56
Alectis alexandrinus	3.52	2	1.48
Sepia sp.	3.38	15	1.42
Chilomycterus spinosus mauretanicus	3.26	19	1.37
Lepidotrigla carolae	2.11	48	0.89
Priacanthus arenatus	1.63	9	0.69
Alloteuthis subulata	1.52	56	0.64
Dactylopterus volitans	1.37	7	0.58
Raja miraletus	1.30	4	0.55
Scorpaena elongata	1.26	2	0.53
Pseudupeneus prayensis	1.04	11	0.44
Selene dorsalis	1.04	11	0.44
Citharus linguatula	0.85	28	0.36
Brachydeuterus auritus	0.74	17	0.31
Perulibatrachus rossignoli	0.70	7	0.30
Illex coindetii	0.56	6	0.23
SPARIDAE	0.52	9	0.22
Arnoglossus imperialis	0.52	15	0.22
Sphoeroides marmoratus	0.48	26	0.20
Cynoglossus senegalensis	0.48	4	0.20
Fistularia petimba	0.41	6	0.17
Sea cucumber	0.41	4	0.17
Saurida brasiliensis	0.22	33	0.09
Penaeus notialis	0.19	4	0.08
Stephanolepis hispidus	0.17	2	0.07
Starfish	0.11	4	0.05
Sphyraena guachancho	0.11	2	0.05
Myxine sp.	0.11	2	0.05
Chrysaora sp.	0.09	2	0.04
Total	237.61		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 12
DATE :28/08/19 GEAR TYPE: PT NO: 1 POSITION:Lat N
4°54.82
start stop duration Lon W
9°17.35
TIME :20:45:00 21:17:00 32.0 (min) Purpose : 1
LOG : 3327.99 3332.49 4.5 Region : 2400
FDEPTH: 70 78 Gear cond.: 0
BDEPTH: 70 78 Validity : 0
Towing dir: 0° Wire out : 0 m Speed : 0.0 kn
Sorted : 11 Total catch: 10.75 Catch/hour: 20.16

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Scomber colias	8.77	77	43.53
23			
Sardinella aurita	5.17	86	25.67
24			
Ariomma bondi	4.72	99	23.44
Decapterus punctatus	0.53	13	2.60
Sargassum spp	0.49	0	2.42
Caranx rhonchus	0.22	22	1.12
Parexocoetus brachypterus	0.15	2	0.74
Selene dorsalis	0.09	2	0.47
Total	20.16		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 13
DATE :29/08/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
5°6.58
start stop duration Lon W
9°25.03
TIME :06:55:57 07:27:29 31.5 (min) Purpose : 3
LOG : 3381.64 3383.27 1.6 Region : 2400
FDEPTH: 66 64 Gear cond.: 0
BDEPTH: 66 64 Validity : 0
Towing dir: 0° Wire out : 190 m Speed : 2.9 kn
Sorted : 185 Total catch: 185.03 Catch/hour: 352.11

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Epinephelus aeneus	131.23	21	37.27
Selene dorsalis	61.66	497	17.51
Dentex angolensis	57.75	386	16.40
26			
Decapterus punctatus	15.83	489	4.50
Waste General	11.80	0	3.35
Pagrus caeruleostictus	6.81	6	1.93
Sepia sp.	6.70	97	1.90
Sargassum spp	5.90	0	1.68
Octopus vulgaris	5.59	8	1.59
Umbrina canariensis	5.10	15	1.45
Citharus linguatula	4.72	118	1.34
Uranoscopus albesca	4.00	44	1.13
Diodon holocanthus	3.88	21	1.10
Mustelus mustelus	3.84	2	1.09
Saurida brasiliensis	3.62	1142	1.03
Bembrops greyi	3.31	72	0.94
Scyliorhinus stellaris	2.25	2	0.64
Cymbium sp.	1.67	158	0.48
Pseudupeneus prayensis	1.52	19	0.43
Brachydeuterus auritus	1.29	70	0.37
Fistularia petimba	1.26	6	0.36
Trigla lyra	1.22	51	0.35
Sardinella aurita	1.14	57	0.32
25			
Brotula barbata	1.14	4	0.32
Sphyraena guachancho	0.95	8	0.27
Scorpaena stephanica	0.91	2	0.26
Arnoglossus imperialis	0.91	158	0.26
Dactylopterus volitans	0.84	6	0.24
Pagellus bellottii	0.72	6	0.21
Sphoeroides marmoratus	0.69	42	0.19
Illex coindetii	0.49	10	0.14
Alloteuthis africana	0.49	219	0.14
Penaeus notialis	0.46	8	0.13
27			
Raja miraletus	0.46	2	0.13
Zeus faber	0.38	2	0.11
Cynoglossus senegalensis	0.38	2	0.11
Chrysaora sp.	0.34	0	0.10
Selar crumenophthalmus	0.19	2	0.05
Balistes capriscus	0.19	2	0.05
Cepola pauciradiatus	0.15	11	0.04
Scorpaena angolensis	0.11	10	0.03
Scyllarides herklotsii	0.08	19	0.02
Plastic	0.08	0	0.02
Penaeus notialis	0.04	4	0.01
0			
RANINIDAE	0.01	6	0.00
Total	352.11		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 14
DATE :29/08/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
5°1.86
start stop duration Lon W
9°30.96
TIME :10:30:21 11:00:58 30.6 (min) Purpose : 3
LOG : 3400.05 3401.72 1.7 Region : 2400
FDEPTH: 79 75 Gear cond.: 0
BDEPTH: 79 75 Validity : 0
Towing dir: 0° Wire out : 0 m Speed : 0.0 kn
Sorted : 217 Total catch: 569.66 Catch/hour: 1116.25

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Ariomma bondi	295.94	2171	26.51
Boops boops	291.53	7470	26.12
Caranx rhonchus	155.47	6909	13.93
Dentex angolensis	115.96	1428	10.39
28			
Priacanthus arenatus	74.36	1164	6.66
Sardinella aurita	42.89	976	3.84
29			
Dentex congoensis	38.05	339	3.41
Sargassum spp	22.85	0	2.05
Sepia sp.	13.36	22	1.20
Scomber colias	10.25	86	0.92
30			
Mustelus mustelus	8.82	2	0.79
Pseudupeneus prayensis	8.09	157	0.72
Scorpaena stephanica	7.98	49	0.71
Waste General	6.37	0	0.57
Sphyraena guachancho	5.29	22	0.47
Trigloporus lastoviza	5.08	167	0.45
Pagellus bellottii	3.45	12	0.31
Sea urchin	2.80	7	0.25
Chilomycterus spinosus mauretanicus	1.41	6	0.13
Sphoeroides pachygaster	1.29	6	0.12
Arnoglossus imperialis	1.08	102	0.10
Lophiodes kempi	0.76	6	0.07
Starfish	0.76	27	0.07
Sargocentron hastatum	0.76	6	0.07
Illex coindetii	0.43	22	0.04
Microchirus frechkopi	0.43	6	0.04
Citharus linguatula	0.43	27	0.04
RANINIDAE	0.22	12	0.02
Prognathodes marcellae	0.12	6	0.01
Total	1116.25		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 15
DATE :29/08/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
5°13.04
start stop duration Lon W
9°39.14
TIME :13:06:50 13:36:55 30.1 (min) Purpose : 3
LOG : 3416.69 3418.22 1.5 Region : 2400
FDEPTH: 72 72 Gear cond.: 0
BDEPTH: 72 72 Validity : 0
Towing dir: 0° Wire out : 185 m Speed : 3.1 kn
Sorted : 69 Total catch: 68.80 Catch/hour: 137.19

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Sargassum spp	38.17	0	27.82
SPARIDAE	22.13	235	16.13
32			
Boops boops	21.93	1380	15.99
SPARIDAE	18.70	359	13.63
Priacanthus arenatus	6.02	88	4.39
Scorpaena stephanica	5.90	50	4.30
Sardinella aurita	4.27	110	3.11
31			
Pseudupeneus prayensis	3.63	80	2.65
Trigloporus lastoviza	3.27	118	2.38
Caranx rhonchus	3.27	112	2.38
Arnoglossus imperialis	1.79	287	1.31
Chilomycterus spinosus mauretanicus	1.64	8	1.19
Citharus linguatula	1.48	295	1.08
Ariomma bondi	1.28	28	0.93
Dentex barnardi	1.24	4	0.90
Sepia sp.	0.76	12	0.55
Sea urchin	0.40	80	0.29
Grammoplites gruveli	0.36	12	0.26
Illex coindetii	0.24	24	0.17
Lophiodes kempi	0.20	4	0.15
Brotula barbata	0.16	2	0.12
Sphoeroides marmoratus	0.16	8	0.12
Saurida brasiliensis	0.08	18	0.06
Micropogonias furnieri	0.08	2	0.06
Blennius normani	0.04	4	0.03
Total	137.19		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 16
DATE :29/08/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
5°19.08
start stop duration Lon W
9°34.78
TIME :15:19:42 15:51:23 31.7 (min) Purpose : 3
LOG : 3428.60 3430.12 1.5 Region : 2400
FDEPTH: 59 64 Gear cond.: 0
BDEPTH: 59 64 Validity : 0
Towing dir: 0° Wire out : 170 m Speed : 2.9 kn
Sorted : 149 Total catch: 149.42 Catch/hour: 282.99

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Seriola rivoliana	141.02	938	49.83
Sargassum spp	43.22	0	15.27
SPARIDAE	21.17	117	7.48
35			
Pagrus caeruleostictus	16.40	17	5.80
Squatina oculata	9.66	2	3.41
Octopus vulgaris	5.42	6	1.91
Epinephelus aeneus	5.34	4	1.89
Dentex canariensis	5.08	4	1.79
Illex coindetii	4.43	1900	1.57
Grammoplites gruveli	3.56	129	1.26
Citharus linguatula	3.11	176	1.10
Caranx rhonchus	2.95	32	1.04
Raja miraletus	2.73	13	0.96
Chilomycterus spinosus mauretanicus	2.69	11	0.95
Sepia sp.	2.58	106	0.91
Pseudotolithus senegalensis	2.20	2	0.78
34			
Branchiostegus semifasciatus	1.44	2	0.51
Trichiurus lepturus	1.40	155	0.50
Priacanthus arenatus	1.29	4	0.46
Penaeus notialis	1.17	36	0.41
33			
Brachydeuterus auritus	1.17	25	0.41
Parapenaeus longirostris	0.72	121	0.25
SPARIDAE	0.53	6	0.19
Dactylopterus volitans	0.53	2	0.19
Trigloporus lastoviza	0.45	8	0.16

Sphoeroides marmoratus	0.45	30	0.16
Loligo vulgaris	0.45	6	0.16
Syacium micrurum	0.34	4	0.12
Cynoglossus senegalensis	0.34	2	0.12
Dasyatis marmorata	0.27	2	0.09
Brotula barbata	0.27	2	0.09
Torpedo torpedo	0.27	2	0.09
Arnoglossus imperialis	0.19	30	0.07
Sea urchin	0.09	2	0.03
C R A B S	0.04	8	0.01
Scyllarides latus	0.02	11	0.01
Total	282.99		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 17
DATE :29/08/19 GEAR TYPE: PT NO: 1 POSITION:Lat N
5°12.29
start stop duration Lon W
9°42.20
TIME :19:45:00 20:10:00 25.0 (min) Purpose : 1
LOG : 3456.00 3457.34 1.3 Region : 2400
FDEPTH: 82 90 Gear cond.: 0
BDEPTH: 82 90 Validity : 0
Towing dir: 0° Wire out : 0 m Speed : 0.0 kn
Sorted : 12 Total catch: 12.28 Catch/hour: 29.47

SPECIES C SAMP	CATCH/HOUR weight	% OF TOT. numbers
Sargassum spp	12.38	0 42.02
Ariomma bondi	9.41	312 31.92
Sardinella aurita	4.75	62 16.13
36		
Lobotes surinamensis	1.34	2 4.56
Trichiurus lepturus	0.96	5 3.26
Decapterus punctatus	0.29	10 0.98
Dactylopterus volitans	0.14	2 0.49
Sepia sp.	0.11	2 0.36
Illex coindetii	0.05	12 0.16
Panulirus regius	0.02	5 0.07
Lagocephalus lagocephalus	0.02	2 0.06
Total	29.47	100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 18
DATE :30/08/19 GEAR TYPE: PT NO: 1 POSITION:Lat N
5°21.78
start stop duration Lon W
9°51.43
TIME :01:14:06 01:44:11 30.1 (min) Purpose : 1
LOG : 3489.61 3491.07 1.5 Region : 2400
FDEPTH: 0 0 Gear cond.: 0
BDEPTH: 72 78 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 2.9 kn
Sorted : 16 Total catch: 16.21 Catch/hour: 32.34

SPECIES C SAMP	CATCH/HOUR weight	% OF TOT. numbers
Caranx rhonchus	17.67	321 54.64
Sargassum spp	4.63	0 14.31
Sardinella aurita	4.19	68 12.95
37		
Ariomma bondi	2.79	72 8.63
Selene dorsalis	1.24	8 3.82
Sphyraena guachancho	0.68	2 2.10
Trichiurus lepturus	0.48	2 1.48
Saurida brasiliensis	0.36	108 1.11
Dactylopterus volitans	0.16	2 0.49
Illex coindetii	0.08	8 0.25
Sepia sp.	0.04	2 0.12
Bathynectes piperitus	0.02	2 0.06
Panulirus regius	0.01	6 0.02
Scyllarides latus	0.00	4 0.01
Total	32.34	100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 19
DATE :30/08/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
5°22.86
start stop duration Lon W
9°51.24
TIME :06:50:39 07:21:29 30.8 (min) Purpose : 3
LOG : 3514.36 3515.98 1.6 Region : 2400
FDEPTH: 72 71 Gear cond.: 0
BDEPTH: 72 71 Validity : 0
Towing dir: 0° Wire out : 200 m Speed : 3.2 kn
Sorted : 93 Total catch: 93.46 Catch/hour: 181.89

SPECIES C SAMP	CATCH/HOUR weight	% OF TOT. numbers
Dentex angolensis	58.48	599 32.15
39		
Sargassum spp	19.27	0 10.59
Ariomma bondi	17.24	366 9.48
Sardinella aurita	14.71	403 8.09
38		
Waste General	11.33	0 6.23
Decapterus punctatus	9.73	222 5.35
Priacanthus arenatus	8.17	72 4.49
Sepia sp.	7.32	19 4.02
Scorpaena stephanica	4.75	37 2.61
Pseudupeneus prayensis	3.81	54 2.10
Raja miraletus	3.27	12 1.80
Diodon holocanthus	2.84	14 1.56
Octopus vulgaris	2.37	4 1.31
Brachydeuterus auritus	2.14	156 1.18
Arnoglossus imperialis	1.91	457 1.05
Dentex canariensis	1.79	2 0.98
Trigla lyra	1.67	47 0.92
Boops boops	1.63	35 0.90
Trachurus trecae	1.48	39 0.81
40		
Pagellus bellottii	1.48	19 0.81
Lophiodes kempi	1.21	6 0.66
Illex coindetii	1.17	62 0.64
Fistularia petimba	0.78	8 0.43
Starfish red A	0.62	8 0.34
Uranoscopus albesca	0.54	8 0.30
Sea urchins (strong spines)	0.39	19 0.21
Sphoeroides marmoratus	0.35	18 0.19
Dentex maroccanus	0.35	4 0.19
Bembrops greyi	0.27	12 0.15
Caranx rhonchus	0.19	2 0.11
Chilomycterus spinosus mauretanicus	0.12	4 0.06
Chrysaora sp.	0.12	0 0.06
Dicologoglossa hexophthalma	0.12	6 0.06
Antennarius pardalis	0.08	2 0.04
Gadella maraldi	0.08	2 0.04
Saurida brasiliensis	0.05	10 0.03
Hermits, mixed	0.04	2 0.02
Citharus linguatula	0.00	6 0.00
Total	181.89	100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 20
DATE :30/08/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
5°36.41
start stop duration Lon W
10°0.45
TIME :12:15:47 12:45:50 30.1 (min) Purpose : 3
LOG : 3554.92 3556.45 1.5 Region : 2400
FDEPTH: 64 65 Gear cond.: 0
BDEPTH: 64 65 Validity : 0
Towing dir: 0° Wire out : 175 m Speed : 3.1 kn
Sorted : 48 Total catch: 47.96 Catch/hour: 95.73

SPECIES C SAMP	CATCH/HOUR weight	% OF TOT. numbers
Selene dorsalis	17.33	140 18.10
Sargassum spp	14.85	0 15.51
Brachydeuterus auritus	14.57	2367 15.22
Brotula barbata	9.34	18 9.76
SPARIDAE	6.63	50 6.92
41		
Citharus linguatula	4.71	194 4.92
Uranoscopus albesca	4.43	52 4.63
Sorsogona prionota	3.39	106 3.54
Scorpaena stephanica	2.71	8 2.84
Sepia sp.	2.55	116 2.67
Trichiurus lepturus	2.04	154 2.13
Saurida brasiliensis	1.72	120 1.79
Raja miraletus	1.56	4 1.63
Illex coindetii	1.48	517 1.54
Dactylopterus volitans	1.44	4 1.50
Octopus macropus	1.44	8 1.50
Caranx rhonchus	1.28	52 1.33
Aluterus heudelotii	0.72	2 0.75
Parapenaeus longirostris	0.56	104 0.58
Epinephelus aeneus	0.48	2 0.50
Branchiostegus semifasciatus	0.40	2 0.42
Penaeus notialis	0.36	10 0.38
43		
Cubozoa sp	0.32	4 0.33
Chilomycterus spinosus mauretanicus	0.32	2 0.33
Sphoeroides marmoratus	0.24	14 0.25
Arnoglossus imperialis	0.16	16 0.17
Bristle worms	0.16	6 0.17
Chrysaora sp.	0.12	14 0.13
Todaropsis eblanae	0.12	6 0.13
C R A B S	0.10	10 0.10
Sea cucumber	0.08	0 0.08
Scyllarides latus	0.08	14 0.08
Actinoptilum	0.04	4 0.04
Calappa pelii	0.02	2 0.02
Total	95.73	100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 21
DATE :30/08/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
5°33.32
start stop duration Lon W
10°6.37
TIME :14:27:16 14:57:22 30.1 (min) Purpose : 3
LOG : 3568.72 3570.20 1.5 Region : 2400
FDEPTH: 74 74 Gear cond.: 0
BDEPTH: 74 74 Validity : 0
Towing dir: 0° Wire out : 190 m Speed : 3.0 kn
Sorted : 139 Total catch: 138.74 Catch/hour: 276.56

SPECIES C SAMP	CATCH/HOUR weight	% OF TOT. numbers
Apsilus fuscus	180.12	3570 65.13
Scorpaena stephanica	19.10	56 6.91
Dentex canariensis	14.79	32 5.35
SPARIDAE	10.76	207 3.89
SPARIDAE	10.56	150 3.82
42		
Caranx crysos	8.77	14 3.17
Sepia sp.	5.70	12 2.06
Fistularia petimba	4.98	48 1.80
Sargassum spp	4.78	0 1.73
Umbrina canariensis	2.83	16 1.02
ECHINOMETRIDAE	2.71	339 0.98
Zeus faber	1.83	2 0.66
Boops boops	1.71	80 0.62
Pseudupeneus prayensis	1.24	28 0.45
Pagrus caeruleostictus	0.84	6 0.30
Sargocentron hastatum	0.76	6 0.27
Lophiodes kempi	0.72	6 0.26
Trigloporus lastoviza	0.68	26 0.25
Citharus linguatula	0.64	98 0.23
Arnoglossus imperialis	0.48	72 0.17
Bembrops heterurus	0.44	16 0.16
Chilomycterus spinosus mauretanicus	0.36	2 0.13
Caranx rhonchus	0.32	10 0.12
Squatina oculata	0.32	2 0.12
Priacanthus arenatus	0.24	2 0.09
Brotula barbata	0.20	2 0.07
Luidia sp	0.16	12 0.06
Starfish	0.16	12 0.06
Uranoscopus albesca	0.16	2 0.06
Illex coindetii	0.12	18 0.04
Sphoeroides marmoratus	0.08	6 0.03
Plastic	0.00	2 0.00
Total	276.56	100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 22
DATE :30/08/19 GEAR TYPE: PT NO: 4 POSITION:Lat N
5°41.17
start stop duration Lon W
10°15.05
TIME :22:12:12 22:42:54 30.7 (min) Purpose : 1
LOG : 3606.65 3607.98 1.3 Region : 2400
FDEPTH: 0 0 Gear cond.: 0
BDEPTH: 73 70 Validity : 0
Towing dir: 0° Wire out : 140 m Speed : 2.6 kn
Sorted : 512 Total catch: 511.82 Catch/hour: 999.97

SPECIES C SAMP	CATCH/HOUR weight	% OF TOT. numbers
Sargassum spp	976.88	0 97.69
Ariomma bondi	8.40	203 0.84
Selene dorsalis	6.10	55 0.61
Scomberomorus tritor	3.17	4 0.32
Alectis alexandrinus	3.05	2 0.30
Rachycentron canadum	0.86	2 0.09
Caranx rhonchus	0.66	25 0.07
Sphyraena guachancho	0.47	2 0.05
Echeneis naucrates	0.39	2 0.04
Total	999.97	100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 23
DATE :31/08/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
5°57.68
start stop duration Lon W
10°21.14
TIME :06:44:42 07:16:28 31.8 (min) Purpose : 3
LOG : 3649.66 3651.35 1.7 Region : 2400
FDEPTH: 48 48 Gear cond.: 0
BDEPTH: 48 48 Validity : 0
Towing dir: 0° Wire out : 150 m Speed : 3.2 kn
Sorted : 202 Total catch: 690.00 Catch/hour: 1303.53

C	SPECIES SAMP	CATCH/HOUR weight	numbers	% OF TOT.
	Brachydeuterus auritus	606.15	13559	46.50
	Galeoides decadactylus	244.55	1723	18.76
46				
	Sargassum spp	112.39	0	8.62
	Penaeus notialis	63.17	3920	4.85
48				
	Waste General	40.82	0	3.13
	Selene dorsalis	37.08	419	2.84
	Pseudotolithus senegalensis	34.36	72	2.64
47				
	Pseudotolithus typus	23.25	32	1.78
	Fishing gears	22.87	0	1.75
	Pterois volitans	20.93	1239	1.61
	Cynoglossus senegalensis	14.73	123	1.13
	Bembrops greyi	13.69	756	1.05
	Raja miraletus	12.92	40	0.99
	Trichiurus lepturus	12.40	816	0.95
	Torpedo torpedo	5.81	13	0.45
	Dicologoglossa cuneata	4.26	64	0.33
	Dicologoglossa hexophthalma	4.01	259	0.31
	Sepia sp.	2.97	13	0.23
	Parapenaeus longirostris	2.84	705	0.22
	Ethusa rugulosa	2.71	272	0.21
	Scyllarides latus	2.71	523	0.21
	Cynoglossus canariensis	2.58	6	0.20
45				
	Pomadasys jubelini	2.33	6	0.18
	Microchirus boscanion	1.55	181	0.12
	Uranoscopus albesca	1.55	59	0.12
	Octopus vulgaris	1.55	19	0.12
	Brotula barbata	1.30	45	0.10
	Calappa rubroguttata	1.29	6	0.10
	ATELECYLIDAE	0.77	83	0.06
	Perulibatrachus elminensis	0.77	72	0.06
	Epinephelus aeneus	0.65	13	0.05
	Macropipus rugosus	0.65	83	0.05
	Eucinostomus melanopterus	0.65	13	0.05
	Citharus linguatula	0.52	19	0.04
	Sardinella maderensis	0.39	13	0.03
44				
	Paraconger notialis	0.39	6	0.03
	Syacium micrurum	0.39	32	0.03
	Pseudupeneus prayensis	0.39	6	0.03
	Plastic	0.39	0	0.03
	Serranus cabrilla	0.26	19	0.02
	Ilisha africana	0.26	6	0.02
	Blennius normani	0.13	19	0.01
	Macropodia gilsoni	0.06	45	0.00
	Prognathodes marcellae	0.06	6	0.00
	Starfish - dark	0.01	45	0.00
	Heterocarpus ensifer	0.01	40	0.00
	Total	1303.53		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 24
DATE :31/08/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
5°50.55
start stop duration Lon W
10°27.42
TIME :09:19:27 09:50:02 30.6 (min) Purpose : 3
LOG : 3665.27 3666.86 1.6 Region : 2400
FDEPTH: 75 74 Gear cond.: 0
BDEPTH: 75 74 Validity : 0
Towing dir: 0° Wire out : 210 m Speed : 3.1 kn
Sorted : 149 Total catch: 149.36 Catch/hour: 293.05

C	SPECIES SAMP	CATCH/HOUR weight	numbers	% OF TOT.
	Sargassum spp	68.59	0	23.41
	Dentex angolensis	62.49	716	21.32
50				
	Boops boops	38.77	1426	13.23
	Sardinella aurita	24.17	573	8.25
49				
	Ariomma bondi	19.74	398	6.74
	Dentex congoensis	16.80	241	5.73
	Priacanthus arenatus	12.13	106	4.14
	Decapterus punctatus	7.42	247	2.53
	Waste General	7.10	0	2.42
	Scorpaena stephanica	5.42	45	1.85
	Sepia sp.	5.42	16	1.85
	Squatina oculata	4.47	4	1.53
	Trigla lyra	3.22	96	1.10
	Pagellus bellottii	3.02	26	1.03
	Trachurus trecae	2.86	73	0.98
	Pseudupeneus prayensis	2.08	29	0.71
	Alloteuthis africana	1.26	14	0.43
	Diodon holocanthus	1.06	4	0.36
	Lophiodes kempi	1.02	6	0.35
	Octopus vulgaris	0.78	2	0.27
	Fistularia petimba	0.78	14	0.27
	Arnoglossus imperialis	0.63	120	0.21
	Cynoglossus senegalensis	0.55	6	0.19
	Caranx rhonchus	0.47	4	0.16
	ECHINOMETRIDAE	0.43	24	0.15
	Bembrops heterurus	0.31	12	0.11
	Conger conger	0.27	2	0.09
	Plastic	0.27	0	0.09
	Raja miraletus	0.24	4	0.08
	Brotula barbata	0.20	2	0.07
	Starfish	0.20	8	0.07
	Zeus faber	0.20	2	0.07
	Hermits, mixed	0.16	10	0.05
	Chilomycterus spinosus mauretanicus	0.16	4	0.05
	Dicologoglossa cuneata	0.12	2	0.04
	Penaeus notialis	0.08	4	0.03
	Trichiurus lepturus	0.08	2	0.03
	Sphoeroides marmoratus	0.04	6	0.01
	Bristle worms	0.04	4	0.01
	Saurida brasiliensis	0.02	4	0.01
	Total	293.05		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 25
DATE :31/08/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
5°55.55
start stop duration Lon W
10°42.40
TIME :13:37:52 13:59:16 21.4 (min) Purpose : 3
LOG : 3698.42 3699.56 1.1 Region : 2400
FDEPTH: 75 77 Gear cond.: 0
BDEPTH: 75 77 Validity : 0
Towing dir: 0° Wire out : 195 m Speed : 3.2 kn
Sorted : 207 Total catch: 920.00 Catch/hour: 2579.44

C	SPECIES SAMP	CATCH/HOUR weight	numbers	% OF TOT.
	Boops boops	1730.67	40248	67.09
51				
	Sardinella aurita	347.93	6662	13.49
53				
	Ariomma bondi	220.91	5750	8.56
52				
	SPARIDAE	150.43	872	5.83
	SPARIDAE	51.06	785	1.98
54				
	Caranx rhonchus	39.35	1096	1.53
	Sargassum spp	12.70	6	0.49
	Scorpaena angolensis	8.22	25	0.32
	Pseudupeneus prayensis	7.22	163	0.28
	Sphyraena guachancho	2.99	11	0.12
	Pagrus caeruleostictus	1.99	11	0.08
	Priacanthus arenatus	1.74	25	0.07
	Scomber colias	1.49	11	0.06
	Citharus linguatula	1.00	25	0.04
	Trigla lyra	1.00	50	0.04
	Scorpaena normani	0.75	25	0.03
	Total	2579.44		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 26
DATE :31/08/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
6°8.79
start stop duration Lon W
10°31.83
TIME :17:07:11 17:29:25 22.2 (min) Purpose : 3
LOG : 3723.45 3724.67 1.2 Region : 2400
FDEPTH: 27 27 Gear cond.: 0
BDEPTH: 27 27 Validity : 0
Towing dir: 0° Wire out : 100 m Speed : 3.3 kn
Sorted : 217 Total catch: 216.64 Catch/hour: 584.46

C	SPECIES SAMP	CATCH/HOUR weight	numbers	% OF TOT.
	Pteroscion peli	94.21	2501	16.12
	Pseudotolithus typus	85.36	715	14.60
56				
	Trichiurus lepturus	83.23	4004	14.24
	Pasiphaea sivado	53.82	73883	9.21
	Brachydeuterus auritus	52.01	1004	8.90
	Drepane africana	44.24	73	7.57
	Cynoponticus ferox	28.60	22	4.89
	Selar crumenophthalmus	17.59	84	3.01
	Sargassum spp	16.62	0	2.84
	Galeoides decadactylus	16.08	65	2.75
55				
	Ilisha africana	12.68	294	2.17
	Sphyraena guachancho	11.01	62	1.88
	Fishing gears	9.55	0	1.63
	Parapenaeus longirostris	8.53	1746	1.46
	chirodropidae sp	8.20	159	1.40
	Dasyatis margarita	6.64	27	1.14
	Pomadasys jubelini	6.10	8	1.04
	Lagocephalus laevigatus	3.51	13	0.60
	Chloroscombrus chrysurus	3.40	46	0.58
	Cynoglossus canariensis	3.40	8	0.58
	Carlarius parkii	3.08	19	0.53
	Callinectes marginatus	2.32	105	0.40
	Portunus validus	2.21	5	0.38
	Pisodonophis semicinctus	2.16	11	0.37
	Ephippion guttifer	1.73	8	0.30
	Raja miraletus	1.19	3	0.20
	Torpedo torpedo	0.97	8	0.17
	Plastic	0.76	0	0.13
	Cymbium glans	0.76	13	0.13
	Elops lacerta	0.70	3	0.12
	Panulirus regius	0.65	5	0.11
	Chrysaora hysoscella	0.65	0	0.11
	Sardinella maderensis	0.59	27	0.10
	Starfish - many arms	0.43	13	0.07
	Perulibatrachus elminensis	0.32	24	0.06
	Maja goltziana	0.27	32	0.05
	Scyphozoa	0.22	5	0.04
	Callinectes pallidus	0.22	35	0.04
	Gadella maraldi	0.16	13	0.03
	Stephanolepis hispidus	0.16	3	0.03
	Cynoglossus senegalensis	0.11	19	0.02
	Catostylus sp	0.06	3	0.01
	Total	584.46		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 27
DATE :31/08/19 GEAR TYPE: PT NO: 4 POSITION:Lat N
6°4.78
start stop duration Lon W
10°50.36
TIME :20:56:19 21:26:44 30.4 (min) Purpose : 1
LOG : 3749.55 3751.06 1.5 Region : 2400
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 89 168 Validity : 0
Towing dir: 0° Wire out : 145 m Speed : 3.0 kn
Sorted : 31 Total catch: 30.71 Catch/hour: 60.54

C	SPECIES SAMP	CATCH/HOUR weight	numbers	% OF TOT.
	Trichiurus lepturus	37.27	381	61.55
	Sargassum spp	5.88	0	9.70
	Ariomma bondi	4.26	110	7.03
	UNIDENTIFIED FISH	3.98	6	6.58
0				
	Lestrolepis intermedia	3.43	1737	5.67
	Diplophos taenia	1.54	410	2.54
	Scomberomorus tritor	1.26	2	2.08
	Saurida brasiliensis	1.10	298	1.82
	Sphyraena guachancho	0.47	2	0.78
	Illex coindetii	0.43	120	0.72
	Sardinella aurita	0.35	4	0.59
57				
	Selene dorsalis	0.28	6	0.46
	Epigonus telescopus	0.12	30	0.20
	Todarodes sagittatus	0.12	4	0.20
	UNIDENTIFIED FISH	0.03	79	0.05
	Trachurus trecae	0.01	12	0.02
	Challengerosergia talismani	0.01	16	0.01
	Scyllarides sp.	0.00	10	0.00
	Panulirus sp.	0.00	2	0.00
	Perulibatrachus elminensis	0.00	2	0.00
	Total	60.54		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 28
DATE :01/09/19 GEAR TYPE: PT NO: 1 POSITION:Lat N
6°13.77
start stop duration Lon W
11°1.92
TIME :03:03:47 03:33:54 30.1 (min) Purpose : 1
LOG : 3779.93 3781.56 1.6 Region : 2400
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 78 74 Validity : 0
Towing dir: 0° Wire out : 140 m Speed : 3.3 kn
Sorted : 48 Total catch: 47.57 Catch/hour: 94.75

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers	
Selene dorsalis	38.53	349	40.66
Ariomma bondi	33.75	1032	35.61
Caranx rhonchus	14.18	384	14.97
Sardinella aurita	4.66	58	4.92
58			
Trichiurus lepturus	1.63	56	1.72
Echeneis naucrates	0.68	2	0.71
Phosichthys argenteus	0.60	139	0.63
Illex coindetii	0.28	16	0.29
Sargassum spp	0.24	0	0.25
Saurida brasiliensis	0.16	50	0.17
Sepia sp.	0.04	12	0.04
Sphoeroides marmoratus	0.01	2	0.01
UNIDENTIFIED FISH	0.00	0	0.00
Total	94.75		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 29
DATE :01/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
6°13.97
start stop duration Lon W
11°1.21
TIME :06:41:42 07:12:27 30.8 (min) Purpose : 3
LOG : 3797.72 3799.41 1.7 Region : 2400
FDEPTH: 78 76 Gear cond.: 0
BDEPTH: 78 76 Validity : 0
Towing dir: 0° Wire out : 210 m Speed : 3.3 kn
Sorted : 219 Total catch: 218.76 Catch/hour: 426.86

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers	
Ariomma bondi	162.83	5292	38.15
Sardinella aurita	46.87	613	10.98
59			
Dentex angolensis	46.05	367	10.79
61			
Decapterus punctatus	38.34	570	8.98
Trachurus trecae	31.53	566	7.39
60			
Scorpaena stephanica	14.48	57	3.39
Priacanthus arenatus	10.54	70	2.47
Sepia sp.	9.60	16	2.25
Boops boops	7.92	252	1.86
Waste General	6.32	0	1.48
Brotula barbata	6.32	23	1.48
Umbrina canariensis	4.53	23	1.06
Sargassum spp	4.49	0	1.05
Selar crumenophthalmus	4.21	45	0.99
Dentex congoensis	3.98	45	0.93
Drepane africana	3.55	4	0.83
Fistularia petimba	3.24	23	0.76
Alloteuthis africana	3.08	490	0.72
Raja miraletus	2.61	16	0.61
Diodon sp.	2.50	10	0.59
Caranx rhonchus	2.38	6	0.56
Pseudupeneus prayensis	2.34	21	0.55
Sphyraena guachancho	1.29	6	0.30
Citharus linguatula	1.13	35	0.27
Trigla lyra	1.09	25	0.26
Lophiodes kempi	1.09	6	0.26
Branchiostegus semifasciatus	0.82	2	0.19
Trichiurus lepturus	0.78	6	0.18
Uranoscopus albesca	0.51	4	0.12
Dactylopterus volitans	0.43	2	0.10
Zeus faber	0.39	4	0.09
Arnoglossus imperialis	0.39	43	0.09
Callinectes amnicola	0.27	8	0.06
Sphoeroides marmoratus	0.23	18	0.05
Octopus vulgaris	0.20	2	0.05
Illex coindetii	0.16	2	0.04
Starfish red	0.16	4	0.04
Prognathodes marcellae	0.12	2	0.03
Plastic	0.04	0	0.01
Saurida brasiliensis	0.04	6	0.01
Starfish - dark	0.01	2	0.00
Starfish yellow	0.00	2	0.00
Total	426.86		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 30
DATE :01/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
6°23.96
start stop duration Lon W
10°53.76
TIME :08:59:56 09:30:19 30.4 (min) Purpose : 3
LOG : 3813.43 3815.10 1.7 Region : 2400
FDEPTH: 26 24 Gear cond.: 0
BDEPTH: 26 24 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.3 kn
Sorted : 213 Total catch: 213.25 Catch/hour: 421.03

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers	
Pseudotolithus senegalensis	76.11	511	18.08
67			
Brachydeuterus auritus	63.18	2269	15.01
Pseudotolithus typus	42.21	205	10.03
66			
Ilisha africana	39.13	1248	9.29
Drepane africana	27.25	47	6.47
Chloroscombrus chrysurus	19.39	357	4.60
Dasyatis marmorata	18.52	32	4.40
Sphyraena guachancho	16.62	83	3.95
Trichiurus lepturus	15.68	823	3.72
Cynoglossus canariensis	13.07	51	3.10
Pteroscion peli	12.83	286	3.05
Galeoides decadactylus	12.20	63	2.90
65			
Waste General	10.27	0	2.44
Selene dorsalis	8.88	67	2.11
Parapenaeus longirostris	7.82	1037	1.86
Pomadasys jubelini	7.70	12	1.83
62			
Cynoponticus ferox	5.53	2	1.31
Sargassum spp	4.86	0	1.15
Plastic	4.07	0	0.97
Ephippion guttifer	3.51	8	0.83
Sardinella maderensis	3.01	168	0.71
63			
Pisodonophis semicinctus	1.97	6	0.47
Caranx fischeri	0.95	4	0.23
Torpedo marmorata	0.91	6	0.22
Raja miraletus	0.87	2	0.21
Gadella maraldi	0.67	63	0.16
chirodropidae sp	0.59	6	0.14
Perulibatrachus elminensis	0.47	36	0.11
Callinectes marginatus	0.47	24	0.11
Cymbium cymbium	0.36	22	0.08
Torpedo torpedo	0.36	2	0.08
Calappa rubroguttata	0.36	2	0.08
Alloteuthis africana	0.32	39	0.08
Starfish - dark	0.24	6	0.06
Cynoglossus senegalensis	0.16	4	0.04
Penaeus notialis	0.16	2	0.04
64			
Sepia sp.	0.16	14	0.04
Pentanemus quinquarius	0.12	2	0.03
Portunus validus	0.08	2	0.02
Total	421.03		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 31
DATE :01/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
6°29.83
start stop duration Lon W
11°7.01
TIME :12:43:45 13:13:51 30.1 (min) Purpose : 3
LOG : 3834.32 3836.07 1.8 Region : 2400
FDEPTH: 43 42 Gear cond.: 0
BDEPTH: 43 42 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.5 kn
Sorted : 199 Total catch: 320.00 Catch/hour: 637.87

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers	
Brachydeuterus auritus	399.02	6102	62.55
70			
Galeoides decadactylus	53.19	251	8.34
68			
Trichiurus lepturus	36.10	153	5.66
Pseudotolithus senegalensis	35.59	136	5.58
69			
Pteroscion peli	33.21	949	5.21
Pomadasys jubelini	23.58	12	3.70
Cynoponticus ferox	11.95	10	1.87
Cynoglossus cadenati	7.97	30	1.25
Pseudotolithus typus	6.10	84	0.96
71			
Selene dorsalis	5.40	62	0.85
Waste General	3.66	0	0.57
Plastic	3.66	0	0.57
Grammoplites gruveli	3.47	157	0.54
Epinephelus aeneus	2.51	6	0.39
Ilisha africana	2.12	42	0.33
Sphoeroides marmoratus	1.54	52	0.24
Sargassum spp	1.41	0	0.22
Raja miraletus	1.35	4	0.21
chirodropidae sp	1.03	6	0.16
Calappa pelii	0.95	6	0.15
Parapenaeus longirostris	0.71	153	0.11
Pisodonophis semicinctus	0.64	4	0.10
Snail	0.58	10	0.09
Rhizostoma sp	0.53	4	0.08
Pennatulacea	0.45	6	0.07
Pegusa triophthalma	0.38	6	0.06
Goniopsis pelii	0.22	64	0.03
Antennarius pardalis	0.10	4	0.02
Penaeus notialis	0.06	6	0.01
SCYLLARIDAE	0.06	42	0.01
Starfish	0.06	6	0.01
Scyphozoa	0.05	12	0.01
G A S T R O P O D S	0.05	22	0.01
GRAPSIDAE	0.05	30	0.01
RANINIDAE	0.03	6	0.00
Batrachoides liberiensis	0.03	4	0.00
RANINIDAE	0.02	10	0.00
0			
Raja miraletus	0.02	4	0.00
0			
Aphroditae indetCV1	0.02	4	0.00
Antennarius striatus	0.01	4	0.00
PENAEIDAE	0.01	4	0.00
Total	637.87		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 32
DATE :01/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
6°32.82
start stop duration Lon W
11°5.76
TIME :14:51:47 15:21:31 29.7 (min) Purpose : 3
LOG : 3844.23 3846.01 1.8 Region : 2400
FDEPTH: 25 25 Gear cond.: 0
BDEPTH: 25 25 Validity : 0
Towing dir: 0° Wire out : 85 m Speed : 3.6 kn
Sorted : 239 Total catch: 359.02 Catch/hour: 724.56

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers	
Pseudotolithus senegalensis	146.50	180	20.22
75			
Brachydeuterus auritus	81.74	1822	11.28
Chloroscombrus chrysurus	81.19	2115	11.21
Drepane africana	69.08	182	9.53
Sphyraena guachancho	50.07	182	6.91
Ilisha africana	43.17	276	5.96
Polydactylus quadrifilis	34.06	4	4.70
Pseudotolithus senegalensis	34.06	4	4.70
Pseudotolithus elongatus	21.61	28	2.98
Trichiurus lepturus	17.11	283	2.36
Galeoides decadactylus	14.47	83	2.00
73			
Waste General	14.05	0	1.94
Pseudotolithus typus	13.44	113	1.86
76			
Ephippion guttifer	13.44	10	1.86
Pomadasys jubelini	12.47	12	1.72
Pteroscion peli	11.87	283	1.64
Carlarius parkii	11.20	65	1.55
Raja miraletus	10.41	24	1.44
Dasyatis margarita	7.99	22	1.10
Selene dorsalis	7.69	218	1.06
Carlarius latiscutatus	6.96	16	0.96
Cynoglossus monodi	6.84	24	0.94
Parapenaeus longirostris	5.21	236	0.72
Sardinella maderensis	3.81	224	0.53
74			
Pentanemus quinquarius	1.09	16	0.15
Octopus vulgaris	1.09	4	0.15
chirodropidae sp	0.67	4	0.09
Pomadasys perotaei	0.61	24	0.08
Plastic	0.54	0	0.08
Grammoplites gruveli	0.48	10	0.07
Pisodonophis semicinctus	0.48	24	0.07
Panulirus regius	0.42	4	0.06
Trachinotus ovatus	0.36	4	0.05
Lophiodes kempi	0.18	12	0.03

Sepia sp.	0.12	4	0.02
Squilla acuelata calmani	0.06	4	0.01
Total	724.56		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 33
DATE :01/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
6°26.23
start stop duration Lon W
11°12.02
TIME :17:27:56 17:57:08 29.2 (min) Purpose : 3
LOG : 3860.63 3862.16 1.5 Region : 2400
FDEPTH: 72 72 Gear cond.: 0
BDEPTH: 72 72 Validity : 0
Towing dir: 0° Wire out : 210 m Speed : 3.1 kn
Sorted : 89 Total catch: 88.50 Catch/hour: 181.85

SPECIES C SAMP	CATCH/HOUR weight	numbers	% OF TOT.
Waste General	24.82	0	13.65
Uranoscopus albesca	23.63	345	12.99
Scorpaena stephanica	22.85	74	12.56
Dentex angolensis	15.66	8	8.61
77			
Brotula barbata	15.25	37	8.38
Epinephelus aeneus	14.30	8	7.86
Sepia sp.	10.40	8	5.72
Octopus vulgaris	9.04	18	4.97
Citharus linguatula	6.49	337	3.57
Priacanthus arenatus	4.56	27	2.51
Trichiurus lepturus	4.11	2	2.26
Saurida brasiliensis	3.86	1048	2.12
Trigla lyra	3.08	66	1.69
Carlarius latiscutatus	3.08	10	1.69
Brachydeuterus auritus	2.92	45	1.60
Selene dorsalis	2.63	29	1.45
Raja miraletus	2.01	8	1.11
Umbrina canariensis	1.93	45	1.06
Branchiostegus semifasciatus	1.85	4	1.02
Parapenaeus longirostris	1.68	337	0.93
Cepola sp.	1.27	14	0.70
Sargassum spp	1.07	0	0.59
Arnoglossus imperialis	1.07	173	0.59
Sphyraena guachancho	0.62	2	0.34
Pseudupeneus prayensis	0.62	12	0.34
Sea urchin	0.58	21	0.32
Sphoeroides marmoratus	0.58	74	0.32
Alloteuthis africana	0.53	148	0.29
Cynoglossus canariensis	0.41	2	0.23
78			
Fistularia petimba	0.29	2	0.16
Plastic	0.16	0	0.09
Dicologoglossa hexophthalma	0.12	2	0.07
Ariomma bondi	0.12	6	0.07
Callinectes marginatus	0.12	6	0.07
Diodon holocanthus	0.08	2	0.05
Lophiodes kempi	0.04	2	0.02
Scyllarides herklotsii	0.00	2	0.00
Total	181.85		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 34
DATE :02/09/19 GEAR TYPE: PT NO: 1 POSITION:Lat N
6°42.40
start stop duration Lon W
11°34.39
TIME :01:50:29 02:20:37 30.1 (min) Purpose : 1
LOG : 3927.65 3929.19 1.5 Region : 2400
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 80 85 Validity : 0
Towing dir: 0° Wire out : 135 m Speed : 3.1 kn
Sorted : 32 Total catch: 32.37 Catch/hour: 64.45

SPECIES C SAMP	CATCH/HOUR weight	numbers	% OF TOT.
Ariomma bondi	30.27	1195	46.96
Trichiurus lepturus	24.53	195	38.07
Selene dorsalis	5.66	36	8.77
SALPS	1.67	30	2.60
Caranx rhonchus	1.19	4	1.85
Sardinella aurita	0.48	12	0.74
79			
Sphyraena guachancho	0.28	2	0.43
Saurida brasiliensis	0.16	56	0.25
Illex coindetii	0.08	32	0.12
Phosichthys argenteus	0.07	2	0.11
Sepia sp.	0.04	4	0.06
Sphoeroides marmoratus	0.02	16	0.03
Total	64.45		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 35
DATE :02/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
6°49.61
start stop duration Lon W
11°48.16
TIME :10:42:40 11:14:01 31.3 (min) Purpose : 3
LOG : 3970.77 3972.47 1.7 Region : 2300
FDEPTH: 76 77 Gear cond.: 0
BDEPTH: 76 77 Validity : 0
Towing dir: 0° Wire out : 210 m Speed : 3.3 kn
Sorted : 80 Total catch: 80.08 Catch/hour: 153.36

SPECIES C SAMP	CATCH/HOUR weight	numbers	% OF TOT.
Dentex angolensis	43.40	326	28.30
81			
Dentex maroccanus	26.05	182	16.98
Boops boops	21.56	498	14.06
Waste General	7.55	0	4.92
Epinephelus aeneus	6.36	2	4.15
Sepia sp.	5.78	19	3.77
Priacanthus arenatus	5.36	29	3.50
Illex sp.	4.98	1132	3.25
Squatina oculata	4.40	2	2.87
Ariomma bondi	3.29	48	2.15
Dentex canariensis	3.06	33	2.00
Sardinella aurita	2.95	57	1.92
80			
Lepidotrigla cadmani	2.60	69	1.70
Trachurus trecae	2.34	21	1.52
82			
Scorpaena normani	2.18	10	1.42
Selene dorsalis	1.76	17	1.15
Octopus vulgaris	1.19	6	0.77
Chilomycterus spinosus mauretanicus	1.15	8	0.75
Decapterus punctatus	0.96	15	0.62
Pseudupeneus prayensis	0.96	10	0.62
Zeus faber	0.92	8	0.60
Fistularia petimba	0.92	11	0.60
Sargassum spp	0.80	0	0.52
Trichiurus lepturus	0.65	4	0.42
Citharus linguatula	0.50	19	0.32
Cynoglossus monodi	0.31	2	0.20
Illex coindetii	0.27	4	0.17
Sphyraena guachancho	0.27	2	0.17
Brotula barbata	0.27	2	0.17
Starfish	0.23	10	0.15
Arnoglossus imperialis	0.11	11	0.07
Sphoeroides marmoratus	0.08	8	0.05
Saurida brasiliensis	0.04	6	0.02
Lophiodes kempi	0.04	2	0.02
Microchirus frechkopi	0.04	2	0.02
Uranoscopus polli	0.04	2	0.02
Total	153.36		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 36
DATE :02/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
6°54.57
start stop duration Lon W
11°42.90
TIME :12:54:29 13:24:36 30.1 (min) Purpose : 3
LOG : 3984.76 3986.48 1.7 Region : 2300
FDEPTH: 43 43 Gear cond.: 0
BDEPTH: 43 43 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.4 kn
Sorted : 323 Total catch: 322.57 Catch/hour: 642.56

SPECIES C SAMP	CATCH/HOUR weight	numbers	% OF TOT.
Galeoides decadactylus	152.91	518	23.80
83			
Brachydeuterus auritus	92.53	1297	14.40
85			
Pseudotolithus senegalensis	89.64	311	13.95
84			
Trichiurus lepturus	74.14	2036	11.54
Pteroscion peli	62.25	1127	9.69
Waste General	25.54	0	3.97
Pomadasys jubelini	24.90	18	3.88
Pisodonophis semicinctus	19.24	20	2.99
Raja miraletus	18.92	74	2.95
Cynoglossus monodi	17.97	66	2.80
Sargassum spp	16.89	0	2.63
Selene dorsalis	8.01	60	1.25
Torpedo torpedo	8.01	96	1.25
Ilisha africana	4.46	90	0.69
Stenorhynchus lanceolatus	4.01	28	0.62
Parapenaeus longirostris	3.94	679	0.61
Grammoplites gruveli	3.15	116	0.49
SPARIDAE	2.31	0	0.36
Sepia sp.	1.99	2	0.31
Scyllarides aeqinoctialis	1.95	257	0.30
Epinephelus aeneus	1.95	10	0.30
Penaeus notialis	1.39	46	0.22
86			
Portunus validus	1.35	2	0.21
Calappa pelii	1.20	8	0.19
0			
Paromola cuvieri	1.00	90	0.16
Calappa pelii	0.80	10	0.12
Plastic	0.60	0	0.09
Chrysaora hysoscella	0.44	2	0.07
G A S T R O P O D S	0.36	56	0.06
Sphoeroides marmoratus	0.20	6	0.03
Batrachoides liberiensis	0.20	18	0.03
Snail	0.12	2	0.02
Snail	0.11	2	0.02
0			
Waste General	0.04	2	0.01
0			
C R A B S	0.02	2	0.00
0			
Small crabs	0.01	2	0.00
0			
Pseudomyra mbizi	0.01	8	0.00
Starfish	0.01	2	0.00
Total	642.56		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 37
DATE :02/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
6°58.57
start stop duration Lon W
11°41.09
TIME :15:33:22 16:03:27 30.1 (min) Purpose : 3
LOG : 3996.73 3998.46 1.7 Region : 2300
FDEPTH: 22 23 Gear cond.: 0
BDEPTH: 22 23 Validity : 0
Towing dir: 0° Wire out : 85 m Speed : 3.4 kn
Sorted : 297 Total catch: 510.88 Catch/hour: 1018.70

SPECIES C SAMP	CATCH/HOUR weight	numbers	% OF TOT.
Pseudotolithus typus	208.46	1021	20.46
92			
Drepane africana	122.79	215	12.05
Ilisha africana	114.58	2199	11.25
Cynoponticus ferox	106.37	72	10.44
Brachydeuterus auritus	96.52	1155	9.47
Pomadasys jubelini	68.54	148	6.73
89			
Parapandalus narval	44.60	80281	4.38
Pseudotolithus senegalensis	38.79	167	3.81
93			
Trichiurus lepturus	36.08	602	3.54
Cynoglossus canariensis	27.50	102	2.70
90			
Galeoides decadactylus	20.86	92	2.05
87			
Pteroscion peli	17.51	235	1.72
Sphyraena guachancho	16.42	44	1.61
Pentanemus quinquarius	14.23	148	1.40
96			
Parapenaeus longirostris	12.86	1408	1.26
Sargassum spp	12.11	0	1.19
Chloroscombrus chrysurus	10.67	66	1.05
Cynoglossus senegalensis	10.19	42	1.00
94			
Selene dorsalis	7.39	140	0.73
Sardinella maderensis	5.75	588	0.56
91			
Lutjanus goreensis	5.34	4	0.52
95			
Caranx fischeri	5.34	4	0.52
Ephippion guttifer	4.51	52	0.44
Pisodonophis semicinctus	2.91	18	0.29
Starfish - dark	1.85	48	0.18
Dardanus arrosor	1.60	2	0.16
Perulibatrachus elminensis	0.89	62	0.09
Carlarius parkii	0.82	4	0.08
Raja miraletus	0.75	4	0.07
Portunus validus	0.68	4	0.07
Torpedo torpedo	0.34	4	0.03
Lagocephalus laevigatus	0.27	6	0.03
Dasyatis margarita	0.27	4	0.03
Gadella maraldi	0.21	20	0.02
Torpedo marmorata	0.21	10	0.02
Plastic	0.21	0	0.02

Rhizostoma sp	0.16	2	0.02
Cymbium cymbium	0.14	6	0.01
Total	1018.70		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 38
DATE :02/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
7°2.70
start stop duration Lon W
11°52.09
TIME :18:21:15 18:52:27 31.2 (min) Purpose : 3
LOG : 4014.65 4016.38 1.7 Region : 2300
FDEPTH: 33 33 Gear cond.: 0
BDEPTH: 33 33 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.3 kn
Sorted : 103 Total catch: 249.48 Catch/hour: 479.76

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP	weight	numbers
Galeoides decadactylus	180.23	831 37.57
101		
Pomadasys jubelini	96.50	152 20.11
97		
Brachydeuterus auritus	35.17	721 7.33
104		
Trichiurus lepturus	33.13	377 6.91
Pseudotolithus senegalensis	22.31	202 4.65
99		
Ilisha africana	19.73	546 4.11
Drepane africana	15.15	23 3.16
Pteroscion peli	12.40	265 2.59
Selene dorsalis	11.58	123 2.41
Parapenaeus longirostris	10.10	2488 2.10
Pseudotolithus typus	9.63	73 2.01
98		
Sphyraena guachancho	7.62	50 1.59
Sargassum spp	4.60	0 0.96
Portunus validus	4.50	10 0.94
Cynoponticus ferox	4.19	6 0.87
Raja miraletus	2.75	10 0.57
Ephippion guttifer	2.12	46 0.44
Cynoglossus canariensis	1.29	4 0.27
103		
Octopus macropus	1.27	2 0.26
Macropipus rugosus	1.19	175 0.25
Waste General	1.10	0 0.23
Cynoglossus senegalensis	1.10	10 0.23
102		
Sardinella maderensis	0.73	23 0.15
100		
Cymbium cymbium	0.63	10 0.13
Lagocephalus laevigatus	0.28	19 0.06
Chloroscombrus chrysurus	0.28	4 0.06
Pythonichthys microphthalmus	0.10	4 0.02
Gadella maraldi	0.10	10 0.02
Total	479.76	100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 39
DATE :03/09/19 GEAR TYPE: PT NO: 1 POSITION:Lat N
7°2.74
start stop duration Lon W
12°13.30
TIME :00:34:44 01:04:49 30.1 (min) Purpose : 1
LOG : 4060.09 4061.73 1.6 Region : 2300
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 79 65 Validity : 0
Towing dir: 0° Wire out : 130 m Speed : 3.3 kn
Sorted : 32 Total catch: 32.19 Catch/hour: 64.19

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP	weight	numbers
Ariomma bondi	38.56	1043 60.08
Selar crumenophthalmus	10.05	42 15.66
Sardinella aurita	5.50	52 8.57
105		
Sphyraena guachancho	3.67	10 5.72
Sardinella maderensis	2.63	22 4.10
106		
Trichiurus lepturus	1.36	14 2.11
Rhizostoma sp	1.32	2 2.05
Euthynnus alletteratus	0.72	2 1.12
Illex coindetii	0.16	52 0.25
Cynoglossus monodi	0.12	2 0.19
Saurida brasiliensis	0.08	18 0.12
Polymetme corythaeola	0.02	6 0.03
Total	64.19	100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 40
DATE :03/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
7°17.66
start stop duration Lon W
12°22.55
TIME :06:54:26 07:26:43 32.3 (min) Purpose : 3
LOG : 4096.53 4098.27 1.7 Region : 2300
FDEPTH: 23 24 Gear cond.: 0
BDEPTH: 23 24 Validity : 0
Towing dir: 0° Wire out : 85 m Speed : 3.2 kn
Sorted : 218 Total catch: 218.18 Catch/hour: 405.29

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP	weight	numbers
Pseudotolithus senegalensis	97.82	342 24.14
110		
Galeoides decadactylus	36.11	271 8.91
108		
Ilisha africana	31.73	1326 7.83
Pentanemus quinquarius	27.46	799 6.77
127		
Sphyraena guachancho	27.38	100 6.76
Brachydeuterus auritus	18.20	321 4.49
111		
Waste General	16.57	0 4.09
Trichiurus lepturus	15.42	219 3.80
Pteroscion peli	14.97	316 3.69
Pseudotolithus typus	11.33	41 2.80
109		
Ephippion guttifer	10.44	20 2.58
Parapenaeus longirostris	10.03	206 2.48
Pomadasys jubelini	8.92	52 2.20
107		
Cynoglossus canariensis	8.73	52 2.15
112		
Drepane africana	7.36	102 1.82
Portunus validus	6.95	28 1.71
Chloroscombrus chrysurus	6.06	95 1.49
Sargassum spp	5.46	0 1.35
Cymbium cymbium	5.35	6 1.32
Cynoglossus senegalensis	3.86	39 0.95
114		
Callinectes marginatus	3.75	128 0.93
Raja miraletus	3.23	7 0.80
Epinephelus aeneus	3.20	2 0.79
Callinectes amnicola	2.75	98 0.68
Psettodes bennettii	2.41	4 0.60
Callinectes pallidus	2.04	67 0.50
Sepia sp.	1.97	6 0.49
Eucinostomus melanopterus	1.89	30 0.47
Pisodonophis semicinctus	1.71	4 0.42
Selene dorsalis	1.63	32 0.40
Panulirus regius	1.56	6 0.39
Torpedo torpedo	1.52	2 0.38
Dasyatis margarita	1.45	4 0.36
Scomberomorus tritor	1.26	2 0.31
Calappa rubroguttata	0.74	6 0.18
Penaeus notialis	0.71	15 0.17
115		
Plastic	0.52	0 0.13
Perulibatrachus elminensis	0.48	20 0.12
Squalus mahia	0.45	19 0.11
Diodon holocanthus	0.41	2 0.10
Sardinella maderensis	0.33	19 0.08
113		
Lagocephalus laevigatus	0.30	2 0.07
Mugil cephalus	0.26	2 0.06
Carlarius parkii	0.22	2 0.06
Penaeus kerathurus	0.22	7 0.06
Gadella maraldi	0.11	11 0.03
Total	405.29	100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 41
DATE :03/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
7°15.24
start stop duration Lon W
12°24.21
TIME :08:35:46 09:06:00 30.2 (min) Purpose : 3
LOG : 4104.19 4105.74 1.6 Region : 2300
FDEPTH: 39 41 Gear cond.: 0
BDEPTH: 39 41 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.1 kn
Sorted : 147 Total catch: 147.28 Catch/hour: 292.32

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP	weight	numbers
Pomadasys jubelini	59.54	48 20.37
116		
Brachydeuterus auritus	36.44	848 12.47
117		
Galeoides decadactylus	36.36	145 12.44
118		
Pteroscion peli	36.04	611 12.33
Pseudotolithus senegalensis	34.46	137 11.79
119		
Trichiurus lepturus	24.77	1473 8.47
Epinephelus aeneus	22.55	4 7.71
Ilisha africana	6.31	137 2.16
Sargassum spp	5.20	0 1.78
Portunus validus	5.08	14 1.74
Bembrops greyi	3.69	139 1.26
Parapenaeus longirostris	3.45	748 1.18
Cynoponticus ferox	3.29	4 1.13
Cynoglossus canariensis	2.86	12 0.98
120		
Waste General	2.22	0 0.76
Raja miraletus	1.87	6 0.64
Perulibatrachus elminensis	1.71	24 0.58
Penaeus notialis	1.19	38 0.41
122		
Plastic	0.79	0 0.27
Scyllarides latus	0.60	73 0.20
Ephippion guttifer	0.60	8 0.20
Cynoglossus senegalensis	0.56	4 0.19
121		
Diodon holocanthus	0.52	2 0.18
Dicologoglossa cuneata	0.48	4 0.16
Sphyraena guachancho	0.44	4 0.15
Balistes capriscus	0.44	2 0.15
Callinectes pallidus	0.32	12 0.11
Torpedo marmorata	0.20	6 0.07
Sepia sp.	0.12	4 0.04
Antennarius pardalis	0.08	2 0.03
Umbrina canariensis	0.08	2 0.03
Gadella maraldi	0.08	10 0.03
Total	292.32	100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 42
DATE :03/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
7°9.79
start stop duration Lon W
12°28.99
TIME :10:48:21 11:18:26 30.1 (min) Purpose : 3
LOG : 4116.78 4118.36 1.6 Region : 2300
FDEPTH: 81 82 Gear cond.: 0
BDEPTH: 81 82 Validity : 0
Towing dir: 0° Wire out : 220 m Speed : 3.1 kn
Sorted : 73 Total catch: 72.66 Catch/hour: 144.93

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP	weight	numbers
Dentex maroccanus	64.91	471 44.79
Dentex congoensis	32.79	311 22.63
Sciaena bathytatos	16.08	58 11.09
Sargassum spp	8.66	0 5.97
Brotula barbata	4.79	10 3.30
Raja miraletus	4.07	16 2.81
Trigloporus lastoviza	2.15	30 1.49
Uranoscopus albesca	2.03	16 1.40
Citharus linguatula	1.88	54 1.29
Sarda sarda	1.60	2 1.10
Sepia sp.	1.40	16 0.96
Pentheroscion mbizi	0.88	6 0.61
Lophiodes caulinaris	0.76	6 0.52
Octopus vulgaris	0.52	4 0.36
Zeus faber	0.48	2 0.33
Pagellus bellottii	0.48	2 0.33
123		
Ariomma bondi	0.36	10 0.25
Illex coindetii	0.28	38 0.19
Fistularia petimba	0.24	2 0.17
Saurida brasiliensis	0.20	40 0.14
Pseudupeneus prayensis	0.16	2 0.11
Grammoplites gruveli	0.12	6 0.08
Plastic	0.08	0 0.06
Scyllarides latus	0.02	2 0.01
Hermits, mixed	0.01	2 0.01
Maja goltziana	0.01	4 0.00
Total	144.93	100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 43
DATE :03/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
7°13.65
start stop duration Lon W
12°36.98
TIME :13:09:04 13:39:10 30.1 (min) Purpose : 3
LOG : 4132.63 4134.22 1.6 Region : 2300
FDEPTH: 63 63 Gear cond.: 0
BDEPTH: 63 63 Validity : 0
Towing dir: 0° Wire out : 170 m Speed : 3.2 kn
Sorted : 44 Total catch: 43.68 Catch/hour: 87.08

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
SPARIDAE	17.58	126	20.19
125			
Scorpaena stephanica	7.77	48	8.93
Brotula barbata	6.74	28	7.74
Octopus vulgaris	6.70	10	7.69
Waste General	6.38	0	7.33
SPARIDAE	4.82	72	5.54
126			
Epinephelus aeneus	4.19	8	4.81
Pseudupeneus prayensis	3.63	34	4.17
Uranoscopus albesca	3.59	36	4.12
Sardinella aurita	2.59	30	2.98
124			
Cymbium cymbium	2.43	2	2.79
Citharus linguatula	2.39	106	2.75
Sargassum spp	2.27	0	2.61
Trigloporus lastoviza	2.15	62	2.47
Chilomycterus spinosus mauretanicus	2.11	12	2.43
Grammoplites gruveli	1.99	56	2.29
Sepia sp.	1.40	28	1.60
JELLYFISH	1.20	4	1.37
Illex coindetii	1.04	347	1.19
Fistularia petimba	0.92	8	1.05
Priacanthus arenatus	0.84	6	0.96
Dactylopterus volitans	0.64	4	0.73
Serranus accraensis	0.52	14	0.60
Ariomma bondi	0.52	12	0.60
Raja miraletus	0.48	2	0.55
Arnoglossus imperialis	0.40	38	0.46
Pagrus caeruleostictus	0.36	2	0.41
Dicologoglossa cuneata	0.20	2	0.23
Microchirus frechkopi	0.20	4	0.23
Lophiodes kempi	0.20	2	0.23
Starfish	0.19	8	0.21
Sea cucumber	0.13	2	0.14
Sphoeroides marmoratus	0.12	14	0.14
Batrachoides liberiensis	0.08	2	0.09
P O L Y C H A E T A	0.07	32	0.08
Cepola pauciradiatus	0.06	2	0.07
Calappa pelii	0.04	4	0.05
Saurida brasiliensis	0.04	12	0.05
Plastic	0.04	0	0.05
Hermits, mixed	0.04	4	0.04
SEA URCHINS	0.02	2	0.02
B I V A L V E S	0.01	2	0.01
Scyllarides latus	0.01	2	0.01
G A S T R O P O D S	0.01	0	0.01
Pseudomyra mbizi	0.00	2	0.00
'Spider crab'	0.00	2	0.00
Total	87.08		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 44
DATE :03/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
7°19.07
start stop duration Lon W
12°40.14
TIME :15:14:29 15:44:38 30.1 (min) Purpose : 3
LOG : 4144.15 4145.84 1.7 Region : 2300
FDEPTH: 40 43 Gear cond.: 0
BDEPTH: 40 43 Validity : 0
Towing dir: 0° Wire out : 125 m Speed : 3.4 kn
Sorted : 269 Total catch: 268.51 Catch/hour: 534.35

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Brachydeuterus auritus	246.71	7477	46.17
129			
Pseudotolithus senegalensis	55.62	350	10.41
134			
Trichiurus lepturus	51.14	1998	9.57
Pteroscion peli	42.51	1453	7.95
Galeoides decadactylus	33.91	382	6.35
Sargassum spp	12.70	0	2.38
Scyllarides latus	11.98	1407	2.24
Selene dorsalis	11.98	239	2.24
Raja miraletus	11.58	30	2.17
Penaeus notialis	11.54	247	2.16
132			
Sardinella maderensis	11.22	135	2.10
128			
Torpedo torpedo	7.00	34	1.31
Drepane africana	5.05	6	0.95
Grammoplites gruveli	4.86	32	0.91
Parapenaeus longirostris	4.66	728	0.87
Cymbium pepo	2.19	2	0.41
Ilisha africana	1.91	38	0.36
Cynoglossus senegalensis	1.59	6	0.30
Octopus vulgaris	1.19	2	0.22
Sardinella aurita	1.03	6	0.19
130			
Pisodonophis semicinctus	0.96	4	0.18
Brotula barbata	0.76	18	0.14
Maja squinado	0.70	64	0.13
Medorippe lanata	0.52	44	0.10
Pseudupeneus prayensis	0.28	2	0.05
Sphyraena guachancho	0.24	2	0.04
Sphoeroides marmoratus	0.20	14	0.04
Plastic	0.08	0	0.01
Calappa rubroguttata	0.07	2	0.01
Sternodromia spinirostrus	0.05	2	0.01
Stenorhynchus lanceolatus	0.04	12	0.01
Liocarcinus marmoreus	0.03	6	0.01
Calappa pelii	0.03	2	0.01
RANINIDAE	0.03	4	0.00
Macropodia rostrata	0.01	4	0.00
Ilia spinosa	0.00	2	0.00
Total	534.35		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 45
DATE :03/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
7°20.55
start stop duration Lon W
12°37.62
TIME :16:51:10 17:22:45 31.6 (min) Purpose : 3
LOG : 4151.38 4153.06 1.7 Region : 2300
FDEPTH: 26 29 Gear cond.: 0
BDEPTH: 26 29 Validity : 0
Towing dir: 0° Wire out : 90 m Speed : 3.2 kn
Sorted : 220 Total catch: 220.07 Catch/hour: 417.99

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Chloroscombrus chrysurus	140.74	3829	33.67
Sphyraena guachancho	61.54	249	14.72
Pseudotolithus senegalensis	37.51	310	8.97
141			
Brachydeuterus auritus	30.69	811	7.34
136			
Galeoides decadactylus	25.41	158	6.08
142			
Drepane africana	18.08	49	4.33
Sardinella maderensis	15.95	598	3.82
135			
Ilisha africana	12.35	479	2.95
Sargassum spp	9.53	0	2.28
Parapenaeus longirostris	7.64	931	1.83
Selene dorsalis	6.99	85	1.67
Trichiurus lepturus	6.57	169	1.57
Epinephelus aeneus	6.12	2	1.46
Pseudotolithus typus	5.77	47	1.38
139			
Selar crumenophthalmus	4.41	23	1.05
Portunus validus	3.68	13	0.88
Cynoponticus ferox	3.46	4	0.83
Carlarius parkii	3.23	17	0.77
Cynoglossus senegalensis	3.00	30	0.72
138			
Pteroscion peli	2.96	76	0.71
Cynoglossus canariensis	2.47	11	0.59
137			
Raja miraletus	2.36	6	0.56
Waste General	2.05	0	0.49
Pisodonophis semicinctus	0.99	6	0.24
Caranx senegallus	0.87	6	0.21
Pentanemus quinquarius	0.87	15	0.21
Callinectes amnicola	0.46	42	0.11
Callinectes pallidus	0.38	17	0.09
Panulirus regius	0.38	2	0.09
Cymbium cymbium	0.30	2	0.07
Chrysaora sp.	0.27	2	0.06
Callinectes marginatus	0.27	6	0.06
Plastic	0.19	0	0.05
Ephippion guttifer	0.15	4	0.04
Gadella maraldi	0.08	6	0.02
Citharus linguatula	0.08	2	0.02
Perulibatrachus elminensis	0.08	4	0.02
Scyllarides latus	0.08	8	0.02
Squilla mantis	0.04	4	0.01
Total	417.99		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 46
DATE :04/09/19 GEAR TYPE: PT NO: 1 POSITION:Lat N
7°19.64
start stop duration Lon W
12°55.71
TIME :01:38:12 02:09:07 30.9 (min) Purpose : 1
LOG : 4197.19 4198.77 1.6 Region : 2300
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 59 62 Validity : 0
Towing dir: 0° Wire out : 130 m Speed : 3.1 kn
Sorted : 11 Total catch: 11.34 Catch/hour: 22.01

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Sardinella maderensis	10.21	113	46.38
140			
Saurida brasiliensis	8.00	1788	36.33
Sphyraena guachancho	1.67	6	7.58
Illex coindetii	0.70	31	3.17
Caranx rhonchus	0.50	8	2.29
Echeneis naucrates	0.43	2	1.94
Sardinella aurita	0.16	2	0.71
Ariomma bondi	0.16	2	0.71
Sargassum spp	0.12	0	0.53
Plastic	0.08	0	0.35
Total	22.01		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 47
DATE :04/09/19 GEAR TYPE: PT NO: 1 POSITION:Lat N
7°17.28
start stop duration Lon W
13°15.02
TIME :04:56:30 05:26:33 30.1 (min) Purpose : 1
LOG : 4221.89 4223.58 1.7 Region : 2300
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 96 77 Validity : 0
Towing dir: 0° Wire out : 130 m Speed : 3.4 kn
Sorted : 10 Total catch: 10.05 Catch/hour: 20.07

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Sardinella aurita	13.26	128	66.07
144			
Ariomma bondi	4.27	126	21.29
Sardinella maderensis	1.08	12	5.37
143			
Saurida brasiliensis	0.88	224	4.38
Illex illecebrosus	0.26	14	1.29
Sargassum spp	0.12	0	0.60
Sphoeroides marmoratus	0.09	6	0.44
Diplophos taenia	0.06	0	0.32
Plastic	0.04	0	0.20
Selene dorsalis	0.01	4	0.03
Caranx rhonchus	0.00	6	0.01
Total	20.07		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 48
DATE :04/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
7°21.99
start stop duration Lon W
13°15.05
TIME :06:57:36 07:28:07 30.5 (min) Purpose : 3
LOG : 4229.33 4230.90 1.6 Region : 2300
FDEPTH: 64 65 Gear cond.: 0
BDEPTH: 64 65 Validity : 0
Towing dir: 0° Wire out : 185 m Speed : 3.1 kn
Sorted : 139 Total catch: 138.99 Catch/hour: 273.33

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Selene dorsalis	156.42	1186	57.23
Selar crumenophthalmus	27.89	138	10.20
Waste General	13.18	0	4.82
Decapterus punctatus	11.37	336	4.16
Dentex angolensis	10.15	90	3.71
147			
Pseudupeneus prayensis	6.69	88	2.45
Sepia sp.	6.45	49	2.36
Epinephelus aeneus	6.06	10	2.22
Ariomma bondi	4.21	71	1.54

Sardinella aurita	4.17	120	1.53
145			
Dactylopterus volitans	2.95	16	1.08
Priacanthus arenatus	2.91	35	1.06
Bembrops greyi	2.36	79	0.86
Diodon holocanthus	2.16	12	0.79
Pagrus caeruleostictus	2.12	10	0.78
Pagellus bellottii	2.08	45	0.76
146			
Trigla lyra	1.57	59	0.58
Dentex congoensis	1.53	20	0.56
Arnoglossus imperialis	1.34	214	0.49
Lophiodes kempi	1.22	2	0.45
Sea urchin	1.22	39	0.45
Scorpaena stephanica	1.10	10	0.40
Sargassum spp	0.94	0	0.35
Sphyraena guachancho	0.83	10	0.30
Raja miraletus	0.59	2	0.22
Citharus linguatula	0.59	20	0.22
Rhizostoma sp	0.43	2	0.16
Fistularia petimba	0.31	2	0.12
Trachinotus ovatus	0.20	2	0.07
Alloteuthis africana	0.16	61	0.06
Starfish - red D	0.08	4	0.03
Plastic	0.04	0	0.01
Dicologoglossa cuneata	0.02	2	0.01
Total	273.33		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 49
DATE :04/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
7°31.38
start stop duration Lon W
13°8.90
TIME :09:18:59 09:49:33 30.6 (min) Purpose : 3
LOG : 4245.49 4247.41 1.9 Region : 2300
FDEPTH: 28 30 Gear cond.: 0
BDEPTH: 28 30 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.8 kn
Sorted : 19 Total catch: 18.66 Catch/hour: 36.62

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers	
Pagrus caeruleostictus	11.85	35	32.37
Alectis alexandrinus	3.81	10	10.40
Sargassum spp	3.61	0	9.86
Eucinostomus melanopterus	2.98	49	8.15
Waste General	2.94	0	8.04
Sepia sp.	2.24	2	6.11
Epinephelus aeneus	1.88	4	5.15
Catostylus sp	1.41	63	3.86
Decapterus punctatus	1.06	26	2.89
Galeoides decadactylus	1.02	2	2.79
148			
Selene dorsalis	0.90	4	2.47
Balistes capriscus	0.71	2	1.93
Dactylopterus volitans	0.59	4	1.61
Alloteuthis africana	0.31	738	0.86
Trichiurus lepturus	0.31	251	0.86
Sardinella aurita	0.20	4	0.54
149			
Brachydeuterus auritus	0.16	165	0.43
Squilla mantis	0.16	4	0.43
Arnoglossus imperialis	0.12	16	0.32
Citharus linguatula	0.08	2	0.21
Sphoeroides marmoratus	0.08	2	0.21
Starfish red	0.05	2	0.13
Bothus podas	0.04	6	0.11
Callinectes marginatus	0.02	8	0.05
Penaeus kerathurus	0.02	4	0.05
Parapenaeus longirostris	0.02	10	0.05
Sphyraena guachancho	0.02	2	0.05
Cynoglossus canariensis	0.02	2	0.05
Starfish - dark	0.00	2	0.01
Plastic	0.00	0	0.01
Total	36.62		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 50
DATE :04/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
7°27.92
start stop duration Lon W
13°30.19
TIME :13:38:00 14:08:03 30.1 (min) Purpose : 3
LOG : 4278.10 4279.68 1.6 Region : 2300
FDEPTH: 68 68 Gear cond.: 0
BDEPTH: 68 68 Validity : 0
Towing dir: 0° Wire out : 180 m Speed : 3.2 kn
Sorted : 36 Total catch: 36.00 Catch/hour: 71.88

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers	
SPARIDAE	16.17	178	22.50
151			
Waste General	12.22	0	17.00
Sardinella aurita	6.11	50	8.50
150			
Pseudupeneus prayensis	5.63	62	7.83
Epinephelus aeneus	5.43	4	7.56
Raja miraletus	4.99	12	6.94
Sepia sp.	4.15	50	5.78
Priacanthus arenatus	1.96	16	2.72
Trigloporus lastoviza	1.72	90	2.39
Sargassum spp	1.60	0	2.22
Octopus vulgaris	1.56	4	2.17
Pagrus caeruleostictus	1.52	6	2.11
Citharus linguatula	1.08	96	1.50
Zeus faber	1.04	4	1.44
Grammoplites gruveli	1.04	34	1.44
Lophiodes kempi	0.84	4	1.17
Chilomycterus spinosus mauretanicus	0.80	6	1.11
Arnoglossus imperialis	0.68	46	0.94
SPARIDAE	0.44	16	0.61
Uranoscopus albesca	0.44	4	0.61
Dactylopterus volitans	0.40	2	0.56
Illex coindetii	0.40	230	0.56
Sea urchins (strong spines)	0.35	18	0.49
Fistularia petimba	0.24	2	0.33
Scorpaena stephanica	0.24	8	0.33
Serranus accraensis	0.20	4	0.28
Starfish	0.17	14	0.23
Fistularia tabacaria	0.16	2	0.22
Hermits, mixed	0.09	6	0.13
Sygnathus acus	0.04	4	0.06
Sphoeroides marmoratus	0.04	2	0.06
Microchirus frechkopi	0.04	2	0.06
Plastic	0.04	0	0.06
Maja squinado	0.03	2	0.04
Pennatulacea	0.02	2	0.02
Sea urchin	0.01	2	0.02
B I V A L V E S	0.01	2	0.01
Pycnogonid	0.00	2	0.00
Total	71.88		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 51
DATE :04/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
7°33.99
start stop duration Lon W
13°43.62
TIME :17:31:49 18:06:07 34.3 (min) Purpose : 3
LOG : 4305.00 4306.87 1.9 Region : 2300
FDEPTH: 81 76 Gear cond.: 0
BDEPTH: 81 76 Validity : 0
Towing dir: 0° Wire out : 230 m Speed : 3.3 kn
Sorted : 32 Total catch: 31.72 Catch/hour: 55.50

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers	
Waste General	12.77	0	23.01
Dentex angolensis	8.05	65	14.50
152			
Trigla lyra	5.07	194	9.14
Dentex maroccanus	3.95	17	7.12
Epinephelus aeneus	3.71	4	6.68
Sepia sp.	3.36	44	6.05
Citharus linguatula	2.59	65	4.67
Octopus vulgaris	2.17	7	3.91
Uranoscopus albesca	1.78	16	3.22
Priacanthus arenatus	1.71	12	3.09
Sargassum spp	1.36	0	2.46
Dentex congoensis	1.33	19	2.40
Scorpaena stephanica	1.22	12	2.21
Arnoglossus imperialis	0.94	119	1.70
Diodon holocanthus	0.91	5	1.64
Pagrus caeruleostictus	0.80	2	1.45
Ariomma bondi	0.63	17	1.13
Bembrops greyi	0.59	16	1.07
Sphyraena guachancho	0.45	2	0.82
Fistularia petimba	0.42	2	0.76
Sardinella aurita	0.28	10	0.50
154			
Pseudupeneus prayensis	0.24	2	0.44
Dactylopterus volitans	0.24	2	0.44
Pagellus bellottii	0.17	2	0.32
153			
Zeus faber	0.14	2	0.25
Saurida brasiliensis	0.14	17	0.25
Serranus cabrilla	0.14	2	0.25
Decapterus punctatus	0.10	3	0.19
Alloteuthis africana	0.07	44	0.13
Parapenaeus longirostris	0.03	9	0.06
Plastic	0.03	0	0.06
Sphoeroides maculatus	0.03	2	0.06
Total	55.50		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 52
DATE :04/09/19 GEAR TYPE: PT NO: 4 POSITION:Lat N
7°34.37
start stop duration Lon W
13°44.06
TIME :23:49:26 00:19:34 30.1 (min) Purpose : 1
LOG : 4332.40 4334.06 1.7 Region : 2300
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 83 75 Validity : 0
Towing dir: 0° Wire out : 140 m Speed : 3.3 kn
Sorted : 25 Total catch: 25.20 Catch/hour: 50.18

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers	
Ariomma bondi	43.97	1709	87.62
Caranx crysos	2.63	2	5.24
Sargassum spp	0.96	0	1.90
Selene dorsalis	0.60	4	1.19
Caranx rhonchus	0.48	4	0.95
Dactylopterus volitans	0.44	2	0.87
Sphyraena guachancho	0.36	2	0.71
Sardinella aurita	0.28	4	0.56
155			
Saurida brasiliensis	0.24	44	0.48
Sepia sp.	0.16	2	0.32
Rhizostoma sp	0.08	2	0.16
Total	50.18		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 53
DATE :05/09/19 GEAR TYPE: PT NO: 1 POSITION:Lat N
7°46.56
start stop duration Lon W
13°49.24
TIME :04:22:45 04:52:35 29.8 (min) Purpose : 1
LOG : 4361.30 4362.83 1.5 Region : 2300
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 52 51 Validity : 0
Towing dir: 0° Wire out : 140 m Speed : 3.1 kn
Sorted : 21 Total catch: 20.78 Catch/hour: 41.78

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers	
Saurida brasiliensis	20.11	5027	48.12
Caranx crysos	10.21	8	24.45
Illex illecebrosus	3.22	4826	7.70
Rhizostoma sp	2.69	2	6.45
Echeneis naucrates	1.81	2	4.33
Ariomma bondi	0.88	30	2.12
Dactylopterus volitans	0.84	2	2.02
Sargassum spp	0.76	0	1.83
Unid. juvenile fishes	0.40	241	0.96
Sepia sp.	0.24	2	0.58
Brachydeuterus auritus	0.16	24	0.38
Caranx rhonchus	0.16	8	0.38
Plastic	0.16	0	0.38
Trichiurus lepturus	0.12	40	0.29
Total	41.78		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 54
DATE :05/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
7°54.01
start stop duration Lon W
13°54.04
TIME :06:53:37 07:22:32 28.9 (min) Purpose : 3
LOG : 4372.70 4374.42 1.7 Region : 2300
FDEPTH: 26 24 Gear cond.: 0
BDEPTH: 26 24 Validity : 0
Towing dir: 0° Wire out : 90 m Speed : 3.6 kn
Sorted : 75 Total catch: 75.27 Catch/hour: 156.12

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers	
Decapterus punctatus	73.31	975	46.96
Dactylopterus volitans	66.08	212	42.33
Diodon holocanthus	4.56	10	2.92
Balistes capriscus	3.15	4	2.02
Sargassum spp	2.36	0	1.51
Illex illecebrosus	1.29	4	0.82
Waste General	1.24	0	0.80

Bothus podas	0.79	15	0.50
Raja miraletus	0.75	2	0.48
Trachinocephalus myops	0.41	6	0.27
Scomber colias	0.40	2	0.26
156			
Pagrus caeruleostictus	0.37	2	0.24
Saurida brasiliensis	0.37	81	0.24
Dicologoglossa hexophthalma	0.25	2	0.16
Stephanolepis hispidus	0.17	2	0.11
Xyrichtys novacula	0.17	2	0.11
Scorpaena stephanica	0.12	2	0.08
Sepia sp.	0.12	2	0.08
Echeneis naucrates	0.08	2	0.05
Bembrops greyi	0.08	2	0.05
Pisa armata	0.01	4	0.01
Spinolambrus notialis	0.00	2	0.00
Brachydeuterus auritus	0.00	10	0.00
Total	156.12		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 55
DATE :05/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
7°49.75
start stop duration Lon W
13°52.26
TIME :09:20:51 09:41:10 20.3 (min) Purpose : 3
LOG : 4387.68 4388.81 1.1 Region : 2300
FDEPTH: 44 49 Gear cond.: 0
BDEPTH: 44 49 Validity : 0
Towing dir: 0° Wire out : 135 m Speed : 3.3 kn
Sorted : 141 Total catch: 141.17 Catch/hour: 416.83

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers	
Dactylopterus volitans	195.86	393	46.99
Padina spp.	135.30	0	32.46
Sargassum spp	50.20	0	12.04
Bembrops greyi	7.97	644	1.91
Octopus vulgaris	7.68	6	1.84
Rhinobatos rhinobatos	5.37	9	1.29
Alloteuthis africana	3.60	59	0.86
Caranx crysos	1.95	3	0.47
Loligo vulgaris	1.71	679	0.41
Arnoglossus imperialis	1.54	269	0.37
Sepia sp.	1.42	94	0.34
Sphoeroides marmoratus	1.30	53	0.31
Syacium micrurum	0.71	9	0.17
Raja miraletus	0.71	3	0.17
Plastic	0.30	0	0.07
Scyllarides latus	0.24	74	0.06
Penaeus notialis	0.24	3	0.06
157			
Decapterus punctatus	0.24	3	0.06
Saurida brasiliensis	0.18	41	0.04
Dicologoglossa hexophthalma	0.06	9	0.01
Starfish	0.06	18	0.01
Spinolambrus notialis	0.06	12	0.01
Stenorhynchus lanceolatus	0.06	6	0.01
Brachydeuterus auritus	0.03	24	0.01
Rhizostoma sp	0.03	3	0.01
Sternodromia spinirostrus	0.03	3	0.01
Serranus cabrilla	0.01	6	0.00
Ilia spinosa	0.00	3	0.00
Starfish red	0.00	3	0.00
Macropodia rostrata	0.00	3	0.00
Total	416.83		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 56
DATE :05/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
7°44.26
start stop duration Lon W
13°56.02
TIME :11:15:08 11:46:03 30.9 (min) Purpose : 3
LOG : 4397.76 4399.41 1.6 Region : 2300
FDEPTH: 81 80 Gear cond.: 0
BDEPTH: 81 80 Validity : 0
Towing dir: 0° Wire out : 220 m Speed : 3.2 kn
Sorted : 54 Total catch: 53.60 Catch/hour: 104.05

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers	
Sargassum spp	39.60	0	38.06
Ariomma bondi	19.49	429	18.73
Waste General	13.90	0	13.36
SPARIDAE	10.87	89	10.45
158			
Dactylopterus volitans	3.80	10	3.66
Pagrus caeruleostictus	1.82	6	1.75
Citharus linguatula	1.48	93	1.42
Trigla lyra	1.44	37	1.38
Pseudupeneus prayensis	1.32	12	1.27
SPARIDAE	1.16	19	1.12
159			
Fistularia petimba	1.01	8	0.97
Scorpaena stephanica	0.93	12	0.90
0			
Zeus faber	0.85	10	0.82
Rhizostoma sp	0.74	2	0.71
Arnoglossus imperialis	0.70	76	0.67
Sepia sp.	0.66	17	0.63
Sea pens	0.62	49	0.60
Balanomorpha	0.43	93	0.41
Plastic	0.43	0	0.41
Grammoplites gruveli	0.43	14	0.41
Sphyraena guachancho	0.35	2	0.34
Illex coindetii	0.31	4	0.30
Raja miraletus	0.27	2	0.26
Sea cucumber	0.27	6	0.26
Scorpaena stephanica	0.27	2	0.26
Sea urchin, weak spines	0.23	2	0.22
Starfish	0.19	6	0.19
Scomber colias	0.12	2	0.11
Sphoeroides marmoratus	0.08	2	0.07
Sea urchins (strong spines)	0.08	6	0.07
Priacanthus arenatus	0.08	2	0.07
Bristle worms	0.04	10	0.04
Decapterus punctatus	0.04	2	0.04
Penaeus notialis	0.02	2	0.02
Saurida brasiliensis	0.01	2	0.01
Pisa armata	0.01	2	0.01
Stenorhynchus lanceolatus	0.00	4	0.00
Hermits, mixed	0.00	2	0.00
Total	104.05		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 57
DATE :05/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
7°52.38
start stop duration Lon W
14°8.47
TIME :16:30:21 17:00:57 30.6 (min) Purpose : 3
LOG : 4438.05 4439.75 1.7 Region : 2300
FDEPTH: 83 82 Gear cond.: 0
BDEPTH: 83 82 Validity : 0
Towing dir: 0° Wire out : 230 m Speed : 3.3 kn
Sorted : 131 Total catch: 131.10 Catch/hour: 257.15

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers	
Ariomma bondi	124.63	2875	48.46
Waste General	22.40	0	8.71
Sardinella aurita	21.07	847	8.19
160			
SPARIDAE	16.87	237	6.56
164			
Sargassum spp	14.28	0	5.55
SPARIDAE	10.59	139	4.12
163			
SPARIDAE	6.20	175	2.41
Pseudupeneus prayensis	5.14	65	2.00
Arnoglossus imperialis	4.67	616	1.82
Pagrus caeruleostictus	3.22	12	1.25
Dentex canariensis	3.18	8	1.24
161			
Grammoplites gruveli	3.06	118	1.19
Scorpaena stephanica	2.98	47	1.16
Fistularia petimba	2.59	16	1.01
Decapterus punctatus	2.55	102	0.99
Dentex maroccanus	1.88	10	0.73
Raja miraletus	1.77	6	0.69
Dactylopterus volitans	1.65	6	0.64
Citharus linguatula	1.22	39	0.47
Epinephelus aeneus	1.02	2	0.40
Sea cucumber	0.90	12	0.35
Zeus faber	0.82	6	0.32
Diodon holocanthus	0.63	2	0.24
Paraconger notialis	0.63	2	0.24
Sepia sp.	0.55	12	0.21
Trigla lyra	0.51	27	0.20
Priacanthus arenatus	0.47	4	0.18
Brotula barbata	0.47	2	0.18
Scomber colias	0.43	10	0.17
162			
Illex coindetii	0.35	4	0.14
Branchiostegus semifasciatus	0.20	2	0.08
Lophiodes kempi	0.16	4	0.06
Starfish red	0.04	6	0.02
Starfish - yellow A	0.04	8	0.02
Blennius normani	0.01	2	0.00
Antennarius pardalis	0.00	2	0.00
Total	257.15		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 58
DATE :05/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
7°59.99
start stop duration Lon W
14°3.48
TIME :18:27:48 18:58:37 30.8 (min) Purpose : 3
LOG : 4449.25 4451.01 1.8 Region : 2300
FDEPTH: 25 24 Gear cond.: 0
BDEPTH: 25 24 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.4 kn
Sorted : 166 Total catch: 166.21 Catch/hour: 323.57

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers	
Decapterus punctatus	171.80	2159	53.10
Dactylopterus volitans	30.99	125	9.58
Pseudupeneus prayensis	26.79	179	8.28
Selene dorsalis	19.94	290	6.16
Balistes capriscus	10.63	21	3.29
Caranx rhonchus	7.98	60	2.47
Pagrus caeruleostictus	6.27	35	1.94
Sepia sp.	5.68	12	1.76
Sargassum spp	5.61	0	1.73
Balistes punctatus	5.22	6	1.61
Pagellus bellottii	4.71	43	1.46
167			
Diodon holocanthus	4.28	14	1.32
Sardinella aurita	3.47	35	1.07
165			
Trachinocephalus myops	3.19	19	0.99
Sardinella maderensis	3.11	43	0.96
168			
Sphyraena guachancho	2.80	27	0.87
Priacanthus arenatus	2.41	12	0.75
Waste General	2.10	0	0.65
Chloroscombrus chrysurus	1.28	18	0.40
Caranx crysos	0.97	4	0.30
Dentex canariensis	0.74	2	0.23
169			
Selar crumenophthalmus	0.74	4	0.23
Bothus podas	0.70	14	0.22
Epinephelus aeneus	0.58	2	0.18
Scomber colias	0.55	2	0.17
166			
Syacium micrurum	0.23	2	0.07
Eucinostomus melanopterus	0.19	2	0.06
Sea cucumber	0.16	4	0.05
Fistularia petimba	0.12	2	0.04
Xyrichtys novacula	0.12	2	0.04
Brachydeuterus auritus	0.11	2	0.03
170			
Plastic	0.08	0	0.02
Blennius normani	0.00	2	0.00
Total	323.57		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 59
DATE :05/09/19 GEAR TYPE: PT NO: 7 POSITION:Lat N
8°20.77
start stop duration Lon W
13°43.12
TIME :22:06:45 22:36:53 30.1 (min) Purpose : 1
LOG : 4478.23 4480.02 1.8 Region : 2300
FDEPTH: 5 5 Gear cond.: 0
BDEPTH: 40 30 Validity : 0
Towing dir: 0° Wire out : 140 m Speed : 3.6 kn
Sorted : 48 Total catch: 48.02 Catch/hour: 95.63

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers	
Decapterus punctatus	21.77	671	22.76
Brachydeuterus auritus	20.35	601	21.28
173			
Chloroscombrus chrysurus	17.01	323	17.78
Sardinella aurita	15.45	189	16.16
171			
Sargassum spp	13.70	0	14.33
Sardinella maderensis	3.11	241	3.25
172			
Dactylopterus volitans	2.83	10	2.96
Selene dorsalis	0.76	12	0.79
Fistularia petimba	0.44	2	0.46
Scyphozoa	0.14	2	0.15
Plastic	0.08	0	0.08
Total	95.63		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 60
DATE :06/09/19 GEAR TYPE: PT NO: 7 POSITION:Lat N
8°29.68
start stop duration Lon W
13°52.03
TIME :03:07:21 03:37:28 30.1 (min) Purpose : 1
LOG : 4520.48 4522.41 1.9 Region : 2300
FDEPTH: 5 5 Gear cond.: 0
BDEPTH: 33 33 Validity : 0
Towing dir: 0° Wire out : 130 m Speed : 3.8 kn
Sorted : 13 Total catch: 12.50 Catch/hour: 24.90

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP	weight	numbers
Brachydeuterus auritus	11.91	189	47.84
176			
Sargassum spp	9.16	0	36.80
Sardinella maderensis	1.55	20	6.24
175			
Decapterus punctatus	1.04	22	4.16
Sardinella aurita	0.52	6	2.08
174			
Chloroscombrus chrysurus	0.20	4	0.80
Galeoides decadactylus	0.20	2	0.80
Plastic	0.20	0	0.80
Selene dorsalis	0.12	2	0.48
Total	24.90		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 61
DATE :06/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
8°28.21
start stop duration Lon W
13°55.44
TIME :06:47:59 07:08:54 20.9 (min) Purpose : 3
LOG : 4538.44 4539.63 1.2 Region : 2300
FDEPTH: 34 36 Gear cond.: 0
BDEPTH: 34 36 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.4 kn
Sorted : 197 Total catch: 1412.41 Catch/hour: 4050.90

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP	weight	numbers
Pomadasys incisus	2431.18	40288	60.02
Galeoides decadactylus	418.90	3886	10.34
178			
Pseudupeneus prayensis	385.60	6207	9.52
Sardinella aurita	293.11	2877	7.24
177			
Decapterus punctatus	167.31	2406	4.13
Lagocephalus laevigatus	83.86	83	2.07
Priacanthus arenatus	55.91	267	1.38
Seriola rivoliana	45.63	83	1.13
Waste General	25.90	0	0.64
Pagrus caeruleostictus	24.26	207	0.60
Caranx crysos	20.97	163	0.52
Chloroscombrus chrysurus	18.50	163	0.46
Stephanolepis hispidus	15.21	63	0.38
Dactylopterus volitans	14.39	20	0.36
Sargassum spp	13.98	0	0.35
Trachinocephalus myops	8.63	40	0.21
Diodon holocanthus	6.58	20	0.16
Pagellus bellottii	6.58	63	0.16
179			
Bothus podas	5.34	123	0.13
Diodon hystrix	4.93	20	0.12
Selar crumenophthalmus	2.47	20	0.06
Grammoplites gruveli	0.82	40	0.02
Syacium micrurum	0.82	20	0.02
Plastic	0.02	0	0.00
Total	4050.90		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 62
DATE :06/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
8°11.28
start stop duration Lon W
14°9.18
TIME :10:32:46 11:02:48 30.0 (min) Purpose : 3
LOG : 4566.81 4568.65 1.9 Region : 2300
FDEPTH: 27 30 Gear cond.: 0
BDEPTH: 27 30 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.7 kn
Sorted : 57 Total catch: 56.98 Catch/hour: 113.81

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP	weight	numbers
Lagocephalus laevigatus	17.26	20	15.16
Sargassum spp	13.82	0	12.14
Balistes capriscus	12.06	28	10.60
Trachinocephalus myops	12.02	44	10.57
Diodon hystrix	12.02	16	10.57
Caranx crysos	9.27	44	8.14
Stephanolepis hispidus	8.15	20	7.16
PARAPAGURIDAE	5.39	0	4.74
Dactylopterus volitans	5.15	14	4.53
Pseudupeneus prayensis	4.99	26	4.39
Xyrichtys novacula	2.84	46	2.49
Sepia sp.	2.36	6	2.07
Sardinella aurita	2.00	22	1.76
181			
Chloroscombrus chrysurus	1.68	16	1.47
Pomadasys incisus	1.16	20	1.02
180			
Waste General	0.96	0	0.84
Pagellus bellottii	0.80	6	0.70
182			
B I V A L V E S	0.60	0	0.53
Bothus podas	0.44	6	0.39
Decapterus punctatus	0.44	6	0.39
Syacium micrurum	0.32	2	0.28
Plastic	0.08	0	0.07
Total	113.81		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 63
DATE :06/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
8°24.23
start stop duration Lon W
14°17.34
TIME :15:07:41 15:37:34 29.9 (min) Purpose : 3
LOG : 4601.88 4603.54 1.7 Region : 2300
FDEPTH: 79 76 Gear cond.: 0
BDEPTH: 79 76 Validity : 0
Towing dir: 0° Wire out : 230 m Speed : 3.3 kn
Sorted : 41 Total catch: 41.13 Catch/hour: 82.56

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP	weight	numbers
Sargassum spp	21.72	0	26.31
Pseudupeneus prayensis	17.54	48	21.25
Dactylopterus volitans	12.61	44	15.27
Mustelus mustelus	10.68	6	12.94
Lagocephalus laevigatus	4.38	6	5.30
Squatina oculata	3.81	2	4.62
Waste General	2.81	0	3.40
Trigloporus lastoviza	2.41	32	2.92
Trachinus lineolatus	1.12	12	1.36
SPARIDAE	1.12	16	1.36
Sepia sp.	0.80	10	0.97
Fistularia petimba	0.76	4	0.92
Starfish	0.58	4	0.71
Balistes capriscus	0.52	2	0.63
Bothus podas	0.36	14	0.44
Raja miraletus	0.36	4	0.44
Hermits, mixed	0.20	6	0.25
Chloroscombrus chrysurus	0.20	2	0.24
Arnoglossus imperialis	0.16	14	0.19
Ariomma bondi	0.12	2	0.15
P O L Y C H A E T A	0.08	8	0.10
Sea urchins (strong spines)	0.04	4	0.05
Citharus linguatula	0.04	6	0.05
Grammoplites gruveli	0.04	2	0.05
Synaptura lusitanica	0.04	4	0.05
PARAPAGURIDAE	0.02	12	0.02
Spinolambrus notialis	0.01	2	0.01
Total	82.56		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 64
DATE :06/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
8°34.41
start stop duration Lon W
14°7.24
TIME :18:21:07 18:51:08 30.0 (min) Purpose : 3
LOG : 4621.65 4623.23 1.6 Region : 2300
FDEPTH: 39 40 Gear cond.: 0
BDEPTH: 39 40 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.2 kn
Sorted : 117 Total catch: 117.48 Catch/hour: 234.80

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP	weight	numbers
Dactylopterus volitans	62.92	142	26.80
Waste General	35.66	0	15.19
Mustelus mustelus	34.70	8	14.78
Lagocephalus laevigatus	19.19	20	8.17
Pseudupeneus prayensis	17.99	86	7.66
Sargassum spp	11.15	0	4.75
Balistes capriscus	10.59	16	4.51
Fistularia petimba	9.47	68	4.03
Trachinocephalus myops	8.79	36	3.75
Chilomycterus spinosus mauretanicus	6.08	12	2.59
Pagrus caeruleostictus	5.88	32	2.50
Pagellus bellottii	4.04	26	1.72
183			
Sepia sp.	1.56	12	0.66
Aluterus heudelotii	1.08	6	0.46
Diodon holocanthus	0.96	2	0.41
Trachinus radiatus	0.84	2	0.36
Stephanolepis hispidus	0.80	4	0.34
Bothus podas	0.64	12	0.27
Priacanthus arenatus	0.44	2	0.19
Rypticus saponaceus	0.40	4	0.17
B I V A L V E S	0.32	4	0.14
Chelidonichthys gabonensis	0.32	2	0.14
Caranx rhonchus	0.20	2	0.09
PARAPAGURIDAE	0.20	0	0.09
Starfish - dark	0.12	2	0.05
Tosia sp.	0.12	10	0.05
Plastic	0.08	0	0.03
Starfish - spiky	0.08	2	0.03
Trigla lyra	0.08	2	0.03
Xyrichtys novacula	0.08	2	0.03
Perulibatrachus elminensis	0.04	2	0.02
Total	234.80		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 65
DATE :07/09/19 GEAR TYPE: PT NO: 7 POSITION:Lat N
8°27.12
start stop duration Lon W
14°16.53
TIME :01:52:04 02:22:25 30.3 (min) Purpose : 1
LOG : 4659.08 4660.45 1.4 Region : 2300
FDEPTH: 5 5 Gear cond.: 0
BDEPTH: 57 49 Validity : 0
Towing dir: 0° Wire out : 140 m Speed : 2.7 kn
Sorted : 7 Total catch: 6.84 Catch/hour: 13.53

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP	weight	numbers
Sargassum spp	7.75	0	57.31
Scomber colias	2.57	18	19.01
186			
Sardinella aurita	1.78	18	13.16
184			
Sardinella maderensis	1.03	12	7.60
185			
Fistularia petimba	0.32	2	2.34
Decapterus punctatus	0.08	2	0.58
Total	13.53		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 66
DATE :07/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
9°9.15
start stop duration Lon W
13°47.90
TIME :10:05:53 10:36:16 30.4 (min) Purpose : 3
LOG : 4720.21 4721.72 1.5 Region : 2200
FDEPTH: 24 25 Gear cond.: 0
BDEPTH: 24 25 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.0 kn
Sorted : 47 Total catch: 46.80 Catch/hour: 92.40

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP	weight	numbers
Ephippion guttifer	16.15	14	17.48
Cymbium pepo	11.33	2	12.26
Lagocephalus laevigatus	9.71	32	10.51
Waste General	8.69	0	9.40
Pseudupeneus prayensis	7.70	79	8.33
Pagrus caeruleostictus	7.62	71	8.25
Aluterus heudelotii	7.34	20	7.95
Dasyatis centroura	6.40	4	6.92
Sepia hierredda	3.71	12	4.02
187			
Sargassum spp	3.55	0	3.85
Caranx senegallus	2.69	16	2.91
Pagellus bellottii	2.33	30	2.52
188			
Alectis alexandrinus	1.97	4	2.14
Portunus validus	1.50	2	1.62
Chloroscombrus chrysurus	0.67	12	0.73
Trachinotus ovatus	0.43	2	0.47
Plastic	0.20	0	0.21

Cynoglossus senegalensis	0.20	2	0.21
Eucinostomus melanopterus	0.20	2	0.21
Total	92.40		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 67
DATE :07/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
9°1.94
start stop duration Lon W
13°58.09
TIME :12:17:33 12:47:36 30.1 (min) Purpose : 3
LOG : 4732.82 4734.24 1.4 Region : 2200
FDEPTH: 28 29 Gear cond.: 0
BDEPTH: 28 29 Validity : 0
Towing dir: 0° Wire out : 105 m Speed : 2.8 kn
Sorted : 118 Total catch: 118.06 Catch/hour: 235.73

C SAMP SPECIES	CATCH/HOUR weight	% OF TOT. numbers
Pseudupeneus prayensis	52.81	349	22.40
Pagrus caeruleostictus	48.40	345	20.53
Lagocephalus laevigatus	44.45	58	18.85
Waste General	31.39	0	13.32
SPARIDAE	24.64	200	10.45
189			
Chilomycterus spinosus mauretanicus	6.03	8	2.56
Sepia hierredda	5.51	8	2.34
190			
Balistes punctatus	3.23	6	1.37
Sea urchin, weak spines	2.76	240	1.17
Dasyatis margarita	2.52	2	1.07
Aluterus heudelotii	2.40	30	1.02
Rhinobatos rhinobatos	2.28	2	0.97
Balistes capriscus	2.24	2	0.95
Alectis alexandrinus	1.92	4	0.81
Sargassum spp	1.32	0	0.56
Sciaena bathytatos	1.08	2	0.46
Trachinocephalus myops	0.72	6	0.30
Citharus linguatula	0.36	4	0.15
Decapterus punctatus	0.32	2	0.14
Scarus hoefleri	0.28	2	0.12
Plastic	0.20	0	0.08
Starfish	0.20	2	0.08
Balanomorpha	0.16	4	0.07
Bothus podas	0.16	4	0.07
Sphoeroides marmoratus	0.16	6	0.07
Thalassoma pavo	0.12	6	0.05
B I V A L V E S	0.08	8	0.03
PARAPAGURIDAE	0.02	2	0.01
Total	235.73		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 68
DATE :07/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
8°50.98
start stop duration Lon W
14°13.67
TIME :15:12:17 15:43:05 30.8 (min) Purpose : 3
LOG : 4754.19 4755.89 1.7 Region : 2200
FDEPTH: 41 46 Gear cond.: 0
BDEPTH: 41 46 Validity : 0
Towing dir: 0° Wire out : 130 m Speed : 3.3 kn
Sorted : 96 Total catch: 95.94 Catch/hour: 186.96

C SAMP SPECIES	CATCH/HOUR weight	% OF TOT. numbers
Lagocephalus laevigatus	52.42	55	28.04
Balistes capriscus	25.41	49	13.59
Mustelus mustelus	21.44	4	11.47
Waste General	19.84	0	10.61
Pagrus caeruleostictus	15.63	109	8.36
Pseudupeneus prayensis	12.74	70	6.82
Dactylopterus volitans	12.16	21	6.50
Seriola rivoliana	6.47	14	3.46
Sargassum spp	6.39	0	3.42
Alectis alexandrinus	4.68	2	2.50
Sepia hierredda	2.30	4	1.23
Trachinus armatus	1.79	10	0.96
SPARIDAE	1.44	10	0.77
191			
Sea urchins (strong spines)	1.21	12	0.65
Xyrichtys novacula	0.90	14	0.48
Fistularia petimba	0.74	6	0.40
Selene dorsalis	0.58	4	0.31
Decapterus punctatus	0.35	2	0.19
Uranoscopus polli	0.23	2	0.13
Grammoplites gruveli	0.12	4	0.06
Clypeaster spCV1	0.08	14	0.04
PARAPAGURIDAE	0.04	4	0.02
Total	186.96		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 69
DATE :07/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
8°40.25
start stop duration Lon W
14°25.61
TIME :17:56:34 18:27:09 30.6 (min) Purpose : 3
LOG : 4773.74 4775.28 1.5 Region : 2200
FDEPTH: 59 58 Gear cond.: 0
BDEPTH: 59 58 Validity : 0
Towing dir: 0° Wire out : 170 m Speed : 3.0 kn
Sorted : 41 Total catch: 40.61 Catch/hour: 79.69

C SAMP SPECIES	CATCH/HOUR weight	% OF TOT. numbers
Lagocephalus laevigatus	24.02	29	30.14
Balistes capriscus	14.79	22	18.57
Mustelus mustelus	13.22	2	16.60
Chelidonichthys gabonensis	8.24	82	10.34
Squatina oculata	7.26	2	9.11
Sargassum spp	5.34	0	6.70
Dactylopterus volitans	2.63	4	3.30
Waste General	1.53	0	1.92
Bothus podas	0.94	18	1.18
Sea urchins (strong spines)	0.71	8	0.89
Pagrus caeruleostictus	0.31	2	0.39
Trachinocephalus myops	0.24	2	0.30
Solitas gruveli	0.24	16	0.30
Syacium micrurum	0.16	2	0.20
RANINIDAE	0.04	6	0.05
Sepia hierredda	0.03	2	0.03
192			
Plastic	0.00	0	0.00
Total	79.69		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 70
DATE :07/09/19 GEAR TYPE: PT NO: 4 POSITION:Lat N
8°55.52
start stop duration Lon W
14°30.96
TIME :23:37:53 00:11:40 33.8 (min) Purpose : 1
LOG : 4812.86 4814.90 2.0 Region : 2200
FDEPTH: 5 5 Gear cond.: 0
BDEPTH: 69 54 Validity : 0
Towing dir: 0° Wire out : 140 m Speed : 3.6 kn
Sorted : 16 Total catch: 15.89 Catch/hour: 28.22

C SAMP SPECIES	CATCH/HOUR weight	% OF TOT. numbers
Decapterus punctatus	16.27	328	57.64
Sardinella aurita	11.15	190	39.52
193			
Ariomma bondi	0.53	9	1.89
Polymetme corythaeola	0.11	32	0.38
Illex coindetii	0.07	2	0.25
Promethichthys prometheus	0.04	2	0.13
Saurida brasiliensis	0.04	4	0.13
Plastic	0.02	0	0.06
Selene dorsalis	0.00	2	0.01
Lagocephalus laevigatus	0.00	4	0.01
Total	28.22		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 71
DATE :08/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
8°59.74
start stop duration Lon W
14°25.59
TIME :07:11:00 07:31:06 20.1 (min) Purpose : 3
LOG : 4851.64 4852.73 1.1 Region : 2200
FDEPTH: 43 43 Gear cond.: 0
BDEPTH: 43 43 Validity : 0
Towing dir: 0° Wire out : 130 m Speed : 3.3 kn
Sorted : 20 Total catch: 19.64 Catch/hour: 58.61

C SAMP SPECIES	CATCH/HOUR weight	% OF TOT. numbers
Lagocephalus laevigatus	24.94	21	42.56
Sargassum spp	9.79	0	16.70
Balistes capriscus	7.64	18	13.03
Aluterus heudelotii	4.30	12	7.33
Waste General	4.06	0	6.92
Trachinocephalus myops	2.92	9	4.99
Rhizostoma sp	2.21	3	3.77
Fistularia petimba	0.78	3	1.32
Sea urchins (strong spines)	0.66	9	1.12
Trachinus draco	0.66	6	1.12
Sepia hierredda	0.37	3	0.64
194			
Bothus podas	0.30	6	0.51
Total	58.61		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 72
DATE :08/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
9°9.00
start stop duration Lon W
14°14.44
TIME :09:53:54 10:20:09 26.3 (min) Purpose : 3
LOG : 4870.56 4871.82 1.3 Region : 2200
FDEPTH: 35 37 Gear cond.: 0
BDEPTH: 35 37 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 2.9 kn
Sorted : 77 Total catch: 77.00 Catch/hour: 175.94

C SAMP SPECIES	CATCH/HOUR weight	% OF TOT. numbers
Lagocephalus laevigatus	38.89	39	22.10
Pagrus caeruleostictus	35.55	231	20.21
Sargassum spp	26.55	0	15.09
Decapterus punctatus	24.40	254	13.87
Aluterus heudelotii	12.80	37	7.27
Waste General	9.60	0	5.45
Sepia hierredda	5.44	16	3.09
195			
Pseudupeneus prayensis	4.84	21	2.75
Balistes capriscus	3.20	2	1.82
Fistularia petimba	2.74	18	1.56
Trachinocephalus myops	2.65	16	1.51
Stephanolepis hispidus	1.96	9	1.12
Sea urchins (strong spines)	1.83	16	1.04
Pagellus bellottii	1.74	9	0.99
196			
Bothus podas	1.23	30	0.70
Fistularia tabacaria	0.91	2	0.52
Plastic	0.55	0	0.31
Xyrichtys novacula	0.37	5	0.21
Tosia sp.	0.27	9	0.16
Starfish red	0.23	9	0.13
Citharichthys stampflii	0.18	2	0.10
PARAPAGURIDAE	0.00	7	0.00
Serranus africanus	0.00	2	0.00
Total	175.94		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 73
DATE :08/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
9°30.75
start stop duration Lon W
14°6.94
TIME :14:39:47 15:10:22 30.6 (min) Purpose : 3
LOG : 4908.50 4910.12 1.6 Region : 2200
FDEPTH: 26 25 Gear cond.: 0
BDEPTH: 26 25 Validity : 0
Towing dir: 0° Wire out : 90 m Speed : 3.2 kn
Sorted : 134 Total catch: 134.12 Catch/hour: 263.07

C SAMP SPECIES	CATCH/HOUR weight	% OF TOT. numbers
Pagrus caeruleostictus	92.68	416	35.23
198			
Chloroscombrus chrysurus	43.11	775	16.39
Pseudupeneus prayensis	30.60	798	11.63
Ephippion guttifer	27.93	25	10.62
Waste General	14.32	0	5.44
Balistes capriscus	9.34	8	3.55
SPARIDAE	8.75	131	3.33
197			
Aluterus heudelotii	8.08	31	3.07
Sargassum spp	7.30	0	2.77
Balistes punctatus	6.20	10	2.36
Lagocephalus laevigatus	3.14	12	1.19
Dasyatis margarita	2.98	2	1.13
Sepia hierredda	2.67	8	1.01
Decapterus punctatus	1.37	151	0.52
Pomadasys rogeri	1.29	2	0.49
199			
Lutjanus agennes	0.82	2	0.31
Alectis alexandrinus	0.59	2	0.22
PORIFERA (Sponges)	0.43	10	0.16
Plastic	0.31	0	0.12
Sea urchins (waek spines)	0.31	29	0.12
Hermits, mixed	0.20	4	0.07
Citharus linguatula	0.16	2	0.06

Eucinostomus melanopterus	0.16	2	0.06
Echeneis naucrates	0.12	4	0.04
Trachinocephalus myops	0.10	2	0.04
Coris julis	0.08	2	0.03
PARAPAGURIDAE	0.04	2	0.01
Luidia sp	0.00	2	0.00
Total	263.07		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 74
DATE :08/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
9°27.11
start stop duration Lon W
14°15.28
TIME :17:31:18 18:01:22 30.1 (min) Purpose : 3
LOG : 4928.26 4929.77 1.5 Region : 2200
FDEPTH: 30 30 Gear cond.: 0
BDEPTH: 30 30 Validity : 0
Towing dir: 0° Wire out : 105 m Speed : 3.0 kn
Sorted : 226 Total catch: 225.90 Catch/hour: 451.05

SPECIES C SAMP	CATCH/HOUR weight	numbers	% OF TOT.
Chloroscombrus chrysurus	213.52	3145	47.34
Lagocephalus laevigatus	69.96	156	15.51
Pseudupeneus prayensis	69.92	681	15.50
Pagrus caeruleostictus	59.34	579	13.16
Pagellus bellottii	10.78	98	2.39
200			
Sepia hierredda	7.43	18	1.65
201			
Waste General	3.63	0	0.81
Caranx rhonchus	3.11	12	0.69
Portunus validus	2.88	4	0.64
Balistes capriscus	2.56	2	0.57
Aluterus heudelotii	2.52	8	0.56
Sargassum spp	2.00	0	0.44
Sea urchins (strong spines)	1.44	18	0.32
Nicholsina usta	0.76	4	0.17
Plastic	0.36	0	0.08
Trachinocephalus myops	0.32	2	0.07
Stephanolepis hispidus	0.24	2	0.05
Bothus podas	0.20	14	0.04
Xyrichtys novacula	0.08	2	0.02
Total	451.05		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 75
DATE :08/09/19 GEAR TYPE: PT NO: 4 POSITION:Lat N
9°20.85
start stop duration Lon W
14°23.41
TIME :20:18:27 20:25:49 7.4 (min) Purpose : 1
LOG : 4943.87 4944.29 0.4 Region : 2200
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 37 38 Validity : 0
Towing dir: 0° Wire out : 130 m Speed : 3.4 kn
Sorted : 13 Total catch: 12.63 Catch/hour: 102.96

SPECIES C SAMP	CATCH/HOUR weight	numbers	% OF TOT.
Sphyraena guachancho	25.11	41	24.39
Lagocephalus laevigatus	23.56	196	22.88
Sardinella maderensis	23.15	188	22.49
203			
Caranx rhonchus	10.76	57	10.45
Chloroscombrus chrysurus	9.13	98	8.87
Sardinella aurita	7.83	65	7.60
202			
Caranx rhonchus	2.12	73	2.06
0			
Brachydeuterus auritus	0.49	8	0.48
204			
Selene dorsalis	0.49	8	0.48
Sepia hierredda	0.33	8	0.32
205			
Total	102.96		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 76
DATE :09/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
9°11.20
start stop duration Lon W
15°6.26
TIME :08:24:38 08:54:42 30.1 (min) Purpose : 3
LOG : 5025.44 5026.99 1.6 Region : 2200
FDEPTH: 73 74 Gear cond.: 0
BDEPTH: 73 74 Validity : 0
Towing dir: 0° Wire out : 210 m Speed : 3.1 kn
Sorted : 23 Total catch: 22.96 Catch/hour: 45.83

SPECIES C SAMP	CATCH/HOUR weight	numbers	% OF TOT.
Squatina oculata	15.41	2	33.62
Dactylopterus volitans	7.78	20	16.99
Pseudupeneus prayensis	4.95	56	10.80
Waste General	4.63	0	10.10
Trigla lyra	2.75	28	6.01
Sargassum spp	1.64	0	3.57
Bothus podas	1.48	72	3.22
Torpedo torpedo	1.48	2	3.22
Uranoscopus albesca	1.16	2	2.53
PORIFERA (Sponges)	0.96	0	2.09
Trachinocephalus myops	0.64	4	1.39
Illex coindetii	0.64	4	1.39
Starfish red	0.52	36	1.13
Sepia hierredda	0.48	6	1.05
206			
Trachinus armatus	0.48	8	1.05
Syacium micrurum	0.24	2	0.52
Grammoplites gruveli	0.24	8	0.52
Ariomma bondi	0.20	2	0.44
Sphoeroides marmoratus	0.08	2	0.17
Plastic	0.08	0	0.17
Total	45.83		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 77
DATE :09/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
9°15.12
start stop duration Lon W
15°1.56
TIME :10:28:02 10:58:17 30.3 (min) Purpose : 3
LOG : 5036.13 5037.65 1.5 Region : 2200
FDEPTH: 52 53 Gear cond.: 0
BDEPTH: 52 53 Validity : 0
Towing dir: 0° Wire out : 140 m Speed : 3.0 kn
Sorted : 9 Total catch: 9.34 Catch/hour: 18.53

SPECIES C SAMP	CATCH/HOUR weight	numbers	% OF TOT.
Waste General	6.31	0	34.04
Lagocephalus laevigatus	3.85	4	20.76
Aluterus heudelotii	2.74	6	14.77
Seriola rivoliana	2.70	4	14.56
Sargassum spp	1.74	0	9.42
Sepia hierredda	0.64	22	3.44
207			
Bothus podas	0.28	12	1.50
B I V A L V E S	0.12	18	0.64
Grammoplites gruveli	0.08	2	0.43
Starfish - dark	0.08	12	0.43
Chelidonichthys gabonensis	0.00	2	0.01
Hermits, mixed	0.00	2	0.01
Total	18.53		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 78
DATE :09/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
9°18.24
start stop duration Lon W
14°56.06
TIME :12:27:47 12:43:25 15.6 (min) Purpose : 3
LOG : 5046.93 5047.64 0.7 Region : 2200
FDEPTH: 46 46 Gear cond.: 0
BDEPTH: 46 46 Validity : 0
Towing dir: 0° Wire out : 140 m Speed : 2.7 kn
Sorted : 40 Total catch: 40.37 Catch/hour: 154.89

SPECIES C SAMP	CATCH/HOUR weight	numbers	% OF TOT.
Pagrus caeruleostictus	61.92	261	39.98
Lagocephalus laevigatus	56.16	61	36.26
Balistes capriscus	19.34	31	12.48
Aluterus heudelotii	4.99	12	3.22
Seriola rivoliana	3.15	8	2.03
Sargassum spp	3.07	0	1.98
Waste General	2.15	0	1.39
Trachinocephalus myops	1.00	8	0.64
Fistularia petimba	0.77	4	0.50
Trigloporus lastoviza	0.61	4	0.40
Snail	0.61	8	0.40
Bothus podas	0.38	8	0.25
JELLYFISH	0.31	4	0.20
Plesionika heterocarpus	0.15	38	0.10
Starfish	0.08	4	0.05
PARAPAGURIDAE	0.08	8	0.05
B I V A L V E S	0.06	8	0.04
Illex coindetii	0.05	69	0.03
Bathynectes piperitus	0.02	4	0.01
Trachinus lineolatus	0.00	4	0.00
Total	154.89		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 79
DATE :09/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
9°34.26
start stop duration Lon W
14°32.14
TIME :16:13:08 16:43:08 30.0 (min) Purpose : 3
LOG : 5078.28 5079.82 1.6 Region : 2200
FDEPTH: 43 50 Gear cond.: 0
BDEPTH: 43 50 Validity : 0
Towing dir: 0° Wire out : 140 m Speed : 3.1 kn
Sorted : 267 Total catch: 449.62 Catch/hour: 899.25

SPECIES C SAMP	CATCH/HOUR weight	numbers	% OF TOT.
Lagocephalus laevigatus	243.78	244	27.11
Decapterus punctatus	192.04	6970	21.36
Pseudupeneus prayensis	182.98	2420	20.35
Galeoides decadactylus	139.62	1304	15.53
209			
Sardinella aurita	36.99	1294	4.11
208			
Epinephelus aeneus	31.04	2	3.45
Brachydeuterus auritus	24.25	438	2.70
210			
Trichiurus lepturus	23.08	6	2.57
Waste General	10.01	0	1.11
Lagocephalus lagocephalus	4.36	4	0.48
Trachinocephalus myops	3.38	26	0.38
Sphyraena guachancho	1.76	6	0.20
Pagrus caeruleostictus	1.50	14	0.17
Aluterus heudelotii	1.30	4	0.14
Sepia hierredda	1.30	4	0.14
Bothus podas	0.78	16	0.09
SPARIDAE	0.33	4	0.04
211			
Starfish	0.33	6	0.04
Pegusa lascaris	0.26	4	0.03
PARAPAGURIDAE	0.20	30	0.02
Total	899.25		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 80
DATE :09/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
9°38.86
start stop duration Lon W
14°25.85
TIME :18:14:49 18:45:42 30.9 (min) Purpose : 3
LOG : 5090.30 5091.85 1.6 Region : 2200
FDEPTH: 29 28 Gear cond.: 0
BDEPTH: 29 28 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.0 kn
Sorted : 160 Total catch: 392.34 Catch/hour: 762.31

SPECIES C SAMP	CATCH/HOUR weight	numbers	% OF TOT.
Caranx rhonchus	237.82	1352	31.20
Chloroscombrus chrysurus	201.65	2038	26.45
Decapterus punctatus	128.24	1819	16.82
Pseudupeneus prayensis	69.48	556	9.11
Pagrus caeruleostictus	27.14	392	3.56
Pagellus bellottii	16.52	159	2.17
212			
Lagocephalus laevigatus	12.78	43	1.68
Cymbium pepo	11.02	2	1.45
Waste General	10.92	0	1.43
Ephippion guttifer	7.09	10	0.93
Sepia hierredda	6.06	19	0.80
214			
Rhinobatos rhinobatos	4.47	4	0.59
Scomber colias	4.47	23	0.59
213			
Aluterus heudelotii	3.73	10	0.49
Sea urchin	2.70	233	0.35
Sphyraena guachancho	2.70	4	0.35
Psettodes belcheri	2.33	4	0.31
0			
Psettodes belcheri	2.25	2	0.30
Portunus validus	2.22	4	0.29
Eucinostomus melanopterus	1.96	19	0.26
Stephanolepis hispidus	1.67	14	0.22
Sea urchins (strong spines)	1.59	27	0.21

Sardinella aurita	1.03	10	0.14
217			
Trachinocephalus myops	0.84	10	0.11
Galeoides decadactylus	0.66	10	0.09
218			
Brachydeuterus auritus	0.47	10	0.06
215			
Sardinella maderensis	0.37	4	0.05
216			
Plastic	0.09	0	0.01
Grammoplites gruveli	0.04	4	0.01
Total	762.31		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 81
DATE :10/09/19 GEAR TYPE: PT NO: 7 POSITION:Lat N
9°47.53
start stop duration Lon W
14°39.63
TIME :02:41:03 03:11:06 30.1 (min) Purpose : 1
LOG : 5126.24 5128.11 1.9 Region : 2200
FDEPTH: 5 5 Gear cond.: 0
BDEPTH: 26 27 Validity : 0
Towing dir: 0° Wire out : 105 m Speed : 3.7 kn
Sorted : 8 Total catch: 7.94 Catch/hour: 15.86

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Sardinella maderensis	4.87	64	30.72
220			
Caranx rhonchus	3.95	86	24.92
Decapterus punctatus	2.28	112	14.35
Brachydeuterus auritus	1.96	34	12.34
Sardinella aurita	1.52	30	9.57
219			
Waste General	0.44	0	2.77
Caranx fischeri	0.40	6	2.52
Caranx crysos	0.12	2	0.76
Rhizostoma sp	0.12	4	0.73
Sepia hierredda	0.08	2	0.50
Parexocoetus brachypterus	0.06	2	0.38
Plastic	0.04	0	0.25
Carybea sp.	0.03	4	0.20
Total	15.86		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 82
DATE :10/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
9°44.80
start stop duration Lon W
14°43.25
TIME :06:49:23 07:21:42 32.3 (min) Purpose : 3
LOG : 5141.25 5142.97 1.7 Region : 2200
FDEPTH: 30 28 Gear cond.: 0
BDEPTH: 30 28 Validity : 0
Towing dir: 0° Wire out : 100 m Speed : 3.2 kn
Sorted : 56 Total catch: 55.84 Catch/hour: 103.69

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Lagocephalus laevigatus	57.08	108	55.06
Rachycentron canadum	13.41	7	12.93
Scomberomorus tritor	6.20	4	5.98
Aluterus heudelotii	5.61	15	5.41
Pagrus caeruleostictus	5.46	46	5.27
Pseudupeneus prayensis	4.64	37	4.48
Dasyatis centroura	2.56	2	2.47
Caranx crysos	2.19	6	2.11
Caranx rhonchus	1.41	13	1.36
Sepia hierredda	1.14	6	1.10
223			
Pagellus bellottii	0.93	7	0.90
222			
Waste General	0.89	0	0.86
Alectis alexandrinus	0.56	2	0.54
Sardinella maderensis	0.52	9	0.50
221			
Decapterus punctatus	0.37	15	0.36
Syacium micrurum	0.22	2	0.21
B I V A L V E S	0.19	4	0.18
Bothus podas	0.11	2	0.11
Sargassum spp	0.07	0	0.07
Brachydeuterus auritus	0.07	2	0.07
224			
Plastic	0.04	0	0.04
Trachinocephalus myops	0.00	2	0.00
Total	103.69		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 83
DATE :10/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
9°27.12
start stop duration Lon W
15°7.27
TIME :11:18:44 11:35:46 17.0 (min) Purpose : 3
LOG : 5178.03 5178.82 0.8 Region : 2200
FDEPTH: 49 48 Gear cond.: 0
BDEPTH: 49 48 Validity : 0
Towing dir: 0° Wire out : 135 m Speed : 2.8 kn
Sorted : 17 Total catch: 16.93 Catch/hour: 59.64

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Balistes capriscus	23.11	28	38.75
Lagocephalus laevigatus	10.85	11	18.20
Dasyatis centroura	10.50	4	17.61
Trachinocephalus myops	4.44	21	7.44
Sepia hierredda	2.56	7	4.29
225			
Waste General	2.33	0	3.90
Bothus podas	1.48	18	2.48
Trachinus pellegrini	1.27	4	2.13
Trigla lyra	1.06	7	1.77
Pagrus caeruleostictus	0.92	4	1.54
Xyrichtys novacula	0.85	7	1.42
Starfish	0.21	11	0.35
Sargassum spp	0.07	0	0.12
Total	59.64		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 84
DATE :10/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
9°23.16
start stop duration Lon W
15°9.30
TIME :13:06:05 13:36:18 30.2 (min) Purpose : 3
LOG : 5187.94 5189.77 1.8 Region : 2200
FDEPTH: 49 50 Gear cond.: 0
BDEPTH: 49 50 Validity : 0
Towing dir: 0° Wire out : 135 m Speed : 3.6 kn
Sorted : 57 Total catch: 57.06 Catch/hour: 113.33

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Mustelus mustelus	34.88	6	30.77
Pagrus caeruleostictus	22.40	101	19.77
Lagocephalus laevigatus	20.89	20	18.44
Waste General	6.55	0	5.78
Sepia hierredda	6.51	14	5.75
Seriola rivoliana	5.84	10	5.15
Balistes capriscus	4.65	6	4.10
Fistularia petimba	3.65	14	3.22
Aluterus heudelotii	1.63	4	1.44
Trigloporus lastoviza	1.59	12	1.40
Trachinocephalus myops	1.35	8	1.19
SPARIDAE	1.19	6	1.05
226			
Pseudupeneus prayensis	0.99	4	0.88
Sea urchins (strong spines)	0.71	12	0.63
Prognathodes marcellae	0.20	2	0.18
Snail	0.08	4	0.07
B I V A L V E S	0.06	4	0.05
Starfish	0.06	4	0.05
Hermits, mixed	0.06	4	0.05
PARAPAGURIDAE	0.02	8	0.02
Total	113.33		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 85
DATE :10/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
9°21.15
start stop duration Lon W
15°14.70
TIME :15:17:50 15:48:27 30.6 (min) Purpose : 3
LOG : 5200.93 5202.43 1.5 Region : 2200
FDEPTH: 52 54 Gear cond.: 0
BDEPTH: 52 54 Validity : 0
Towing dir: 0° Wire out : 150 m Speed : 2.9 kn
Sorted : 233 Total catch: 233.36 Catch/hour: 457.42

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Pagrus caeruleostictus	230.22	684	50.33
SPARIDAE	67.82	380	14.83
227			
Acanthurus monroviae	55.86	51	12.21
Pseudupeneus prayensis	18.66	137	4.08
Fistularia petimba	16.84	67	3.68
Epinephelus aeneus	15.09	8	3.30
Seriola rivoliana	10.66	14	2.33
Aluterus heudelotii	10.39	20	2.27
Dactylopterus volitans	5.45	14	1.19
Lagocephalus laevigatus	4.86	6	1.06
Dentex barnardi	4.04	10	0.88
Cavernularia sp.	3.18	274	0.69
Zeus faber	2.86	2	0.63
Waste General	2.67	0	0.58
Chromis cadenati	2.04	16	0.45
Fistularia tabacaria	1.76	2	0.39
Trachinocephalus myops	1.33	4	0.29
PARAPAGURIDAE	0.86	76	0.19
Bodianus speciosus	0.47	4	0.10
Bothus podas	0.35	6	0.08
Chaetodon robustus	0.31	4	0.07
Hermits, mixed	0.31	10	0.07
Sepia sp.	0.27	6	0.06
Trigla lyra	0.27	2	0.06
Antennarius striatus	0.16	2	0.03
Xyrichtys novacula	0.16	2	0.03
Trachinus armatus	0.16	2	0.03
P O L Y C H A E T A	0.12	20	0.03
Starfish	0.12	6	0.03
Sargassum spp	0.08	0	0.02
Sphoeroides marmoratus	0.04	2	0.01
B I V A L V E S	0.00	2	0.00
Total	457.42		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 86
DATE :10/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
9°14.86
start stop duration Lon W
15°21.45
TIME :17:50:44 18:20:53 30.2 (min) Purpose : 3
LOG : 5216.62 5218.22 1.6 Region : 2200
FDEPTH: 83 87 Gear cond.: 0
BDEPTH: 83 87 Validity : 0
Towing dir: 0° Wire out : 230 m Speed : 3.2 kn
Sorted : 27 Total catch: 26.53 Catch/hour: 52.77

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Pagellus bellottii	13.09	177	24.80
228			
Waste General	6.96	0	13.19
Trigla lyra	6.41	163	12.14
Cavernularia sp.	4.93	575	9.35
Acanthurus monroviae	3.62	4	6.86
Dentex maroccanus	3.22	60	6.11
Torpedo torpedo	2.59	6	4.90
Diodon holocanthus	1.75	4	3.32
Sea urchin	1.75	267	3.32
Dactylopterus volitans	1.51	10	2.87
Sea urchins (strong spines)	1.19	199	2.26
Priacanthus arenatus	1.03	4	1.96
Mustelus mustelus	0.92	2	1.73
Sepia hierredda	0.76	28	1.43
229			
Pseudupeneus prayensis	0.68	8	1.28
Chelidonichthys gabonensis	0.48	6	0.90
Scorpaena stephanica	0.36	8	0.68
Grammoplites gruveli	0.36	12	0.68
Trachinus armatus	0.32	6	0.60
Sphoeroides marmoratus	0.28	6	0.53
Ariomma bondi	0.16	2	0.30
PARAPAGURIDAE	0.12	22	0.23
Blennius normani	0.08	2	0.15
Syacium micrurum	0.08	8	0.15
Octopus vulgaris	0.08	2	0.15
Bothus podas	0.04	2	0.08
Arnoglossus imperialis	0.00	8	0.00
Bristle worms	0.00	30	0.00
Starfish - yellow A	0.00	10	0.00
Starfish red	0.00	2	0.00
Pennatulacea	0.00	12	0.00
Octocoral	0.00	16	0.00
Sargassum spp	0.00	0	0.00
Total	52.77		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 87
DATE :10/09/19 GEAR TYPE: PT NO: 4 POSITION:Lat N
9°14.69
start stop duration Lon W
15°23.95
TIME :20:01:46 20:32:12 30.4 (min) Purpose : 1
LOG : 5226.02 5227.53 1.5 Region : 2200
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 87 81 Validity : 0
Towing dir: 0° Wire out : 140 m Speed : 3.0 kn
Sorted : 17 Total catch: 16.57 Catch/hour: 32.67

C	SPECIES SAMP	CATCH/HOUR weight	% OF TOT. numbers
	Dactylopterus volitans	23.86	89 73.04
	Caranx crysos	7.37	10 22.57
	Trichiurus lepturus	0.99	2 3.02
	Ariomma bondi	0.43	8 1.33
	Plastic	0.01	0 0.03
	Lagocephalus lagocephalus	0.00	0 0.01
	Total	32.67	100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 88
DATE :10/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
9°8.74
start stop duration Lon W
15°27.36
TIME :22:25:47 22:56:31 30.7 (min) Purpose : 3
LOG : 5241.10 5242.71 1.6 Region : 2200
FDEPTH: 331 341 Gear cond.: 0
BDEPTH: 331 341 Validity : 0
Towing dir: 0° Wire out : 860 m Speed : 3.1 kn
Sorted : 114 Total catch: 511.45 Catch/hour: 998.61

C	SPECIES SAMP	CATCH/HOUR weight	% OF TOT. numbers
	Chlorophthalmus atlanticus	638.93	19480 63.98
	Synagrops microlepis	130.91	5746 13.11
	Zenion hololepis	81.89	7837 8.20
	Chlorophthalmus agassizi	31.28	449 3.13
	Parapenaeus longirostris	23.37	2435 2.34
	Parasudis fraserbrunneri	15.82	238 1.58
	Pterothrissus belloci	14.06	88 1.41
	Illex coindetii	8.08	35 0.81
	Sea urchins (waek spines)	7.38	80 0.74
	Merluccius polli	7.38	35 0.74
	Munida rutllanti	6.33	562 0.63
	Snail	5.97	98 0.60
	Heterocarpus ensifer	5.45	1240 0.55
	Ariomma bondi	4.57	193 0.46
	Epigonus telescopus	3.34	62 0.33
	Starfish	2.11	10 0.21
	SALPS	1.93	45 0.19
	Gadella maraldi	1.76	35 0.18
	Peristedion cataphractum	1.58	70 0.16
	Malacocephalus occidentalis	1.41	158 0.14
	Gigantura indica	1.23	439 0.12
	Cavernularia sp.	1.23	105 0.12
	Waste General	0.70	0 0.07
	Lophiodes kempi	0.53	18 0.05
	Phosichthys argenteus	0.47	35 0.05
	Hermits, mixed	0.35	62 0.04
	Sea urchins (strong spines)	0.35	98 0.04
	Macroparalepis brevis	0.18	10 0.02
	RANINIDAE	0.01	18 0.00
	PARAPAGURIDAE	0.01	45 0.00
	Chaunax pictus	0.01	10 0.00
	Total	998.61	100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 89
DATE :11/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
9°24.13
start stop duration Lon W
15°44.51
TIME :06:56:27 07:26:31 30.1 (min) Purpose : 3
LOG : 5297.88 5299.55 1.7 Region : 2200
FDEPTH: 86 83 Gear cond.: 0
BDEPTH: 86 83 Validity : 0
Towing dir: 0° Wire out : 250 m Speed : 3.3 kn
Sorted : 122 Total catch: 121.82 Catch/hour: 243.08

C	SPECIES SAMP	CATCH/HOUR weight	% OF TOT. numbers
	Sponges	99.47	0 40.92
	Pagellus bellottii	49.01	371 20.16
230			
	Anthias anthias	12.77	259 5.25
	Antennarius pardalis	12.25	2 5.04
	Waste General	10.26	0 4.22
	Dentex congoensis	8.42	86 3.46
	Scorpaena elongata	7.62	10 3.14
	Torpedo torpedo	5.95	8 2.45
	Epinephelus aeneus	4.83	2 1.99
231			
	Trigla lyra	4.23	68 1.74
	Pagrus caeruleostictus	3.99	12 1.64
	Dactylopterus volitans	3.43	20 1.41
	Pseudupeneus prayensis	3.03	40 1.25
	Raja miraletus	2.67	6 1.10
	Dentex canariensis	1.96	2 0.80
232			
	Sea urchins (strong spines)	1.64	0 0.67
	Fistularia petimba	1.28	6 0.53
	Zeus faber	1.20	2 0.49
	Trachinus pellegrini	1.12	2 0.46
	Sepia hierredda	1.04	8 0.43
233			
	Starfish red	0.64	8 0.26
	Peristedion cataphractum	0.60	22 0.25
	Sargocentron hastatum	0.56	2 0.23
	Grammoplites gruveli	0.52	14 0.21
	Rhizoprionodon acutus	0.48	2 0.20
	Sea urchin	0.44	88 0.18
	Priacanthus arenatus	0.44	2 0.18
	Octopus vulgaris	0.36	2 0.15
	Uranoscopus albesca	0.32	2 0.13
	Lophiodes kempi	0.32	2 0.13
	Ariomma bondi	0.32	6 0.13
	Scorpaena stephanica	0.28	6 0.11
	Trachinus armatus	0.24	6 0.10
	Chromis cadenati	0.24	2 0.10
	GORGONOCEPHALIDAE	0.24	2 0.10
	Arnoglossus imperialis	0.20	46 0.08
	Trachurus trecae	0.20	2 0.08
234			
	Blennius normani	0.16	6 0.07
	Maja goltziana	0.08	4 0.03
	Sargassum spp	0.08	0 0.03
	Homola barbata	0.04	2 0.02
	Synchiropus phaeton	0.04	2 0.02
	Alloteuthis africana	0.04	8 0.02
	Starfish yellow	0.04	8 0.01
	Algaes	0.03	0 0.01
	Spinolambrus notialis	0.02	2 0.01
	Octocoral	0.01	0 0.00
0			
	Bristle worms	0.00	2 0.00
	Dibranchus atlanticus	0.00	4 0.00
	Saurida brasiliensis	0.00	2 0.00
	Bryozoa spp.	0.00	6 0.00
	Total	243.08	100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 90
DATE :11/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
9°26.88
start stop duration Lon W
15°36.23
TIME :09:18:50 09:49:35 30.8 (min) Purpose : 3
LOG : 5312.58 5314.08 1.5 Region : 2200
FDEPTH: 57 55 Gear cond.: 0
BDEPTH: 57 55 Validity : 0
Towing dir: 0° Wire out : 160 m Speed : 2.9 kn
Sorted : 22 Total catch: 22.37 Catch/hour: 43.64

C	SPECIES SAMP	CATCH/HOUR weight	% OF TOT. numbers
	Rhizostoma sp	21.93	10 50.25
	Waste General	6.44	0 14.75
	Lagocephalus laevigatus	3.86	6 8.85
	Trigla lyra	3.71	37 8.49
	Aluterus heudelotii	2.85	6 6.53
	Trachinocephalus myops	2.38	27 5.45
	Dactylopterus volitans	1.09	2 2.50
	Sepia hierredda	0.47	12 1.07
235			
	Bothus podas	0.23	4 0.54
	Grammoplites gruveli	0.16	6 0.36
	GORGONOCEPHALIDAE	0.16	8 0.36
	Cavernularia sp.	0.12	27 0.27
	Sargassum spp	0.08	0 0.18
	Starfish - purple	0.08	12 0.18
	B I V A L V E S	0.02	4 0.05
	Dibranchus atlanticus	0.02	2 0.04
	Alloteuthis africana	0.01	2 0.02
	Pisa armata	0.01	2 0.02
	Starfish - spiky	0.01	2 0.02
	C R A B S	0.01	2 0.02
	Bristle worms	0.00	2 0.01
	Algaes	0.00	6 0.01
	Spinolambrus notialis	0.00	2 0.01
	Octocoral	0.00	6 0.01
	Starfish red	0.00	6 0.00
	Starfish - yellow A	0.00	4 0.00
	Arnoglossus imperialis	0.00	6 0.00
	Total	43.65	100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 91
DATE :11/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
9°32.39
start stop duration Lon W
15°28.10
TIME :11:34:01 12:04:03 30.0 (min) Purpose : 3
LOG : 5325.34 5327.02 1.7 Region : 2200
FDEPTH: 44 46 Gear cond.: 0
BDEPTH: 44 46 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.4 kn
Sorted : 107 Total catch: 106.90 Catch/hour: 213.66

C	SPECIES SAMP	CATCH/HOUR weight	% OF TOT. numbers
	SPARIDAE	50.89	312 23.82
236			
	Pagrus caeruleostictus	48.45	240 22.68
	Pseudupeneus prayensis	46.21	230 21.63
	Lagocephalus laevigatus	26.06	22 12.20
	Padina spp.	12.79	0 5.99
	Dactylopterus volitans	6.76	18 3.16
	Sepia hierredda	6.48	12 3.03
237			
	Fistularia tabacaria	2.56	4 1.20
	Balistes capriscus	2.28	2 1.07
	PARAPAGURIDAE	2.04	238 0.95
	Trachinocephalus myops	1.80	8 0.84
	Fistularia petimba	1.72	8 0.80
	Aluterus heudelotii	1.68	4 0.79
	Priacanthus arenatus	1.16	2 0.54
	Trigloporus lastoviza	0.92	6 0.43
	Caranx rhonchus	0.80	2 0.37
	Xyrichtys novacula	0.28	4 0.13
	Raja miraletus	0.20	2 0.09
	Bothus podas	0.20	6 0.09
	Starfish	0.12	4 0.06
	Sphoeroides marmoratus	0.08	4 0.04
	Tosia sp.	0.08	2 0.04
	Waste General	0.04	0 0.02
	Hermits, mixed	0.04	2 0.02
	Sargassum spp	0.04	0 0.02
	Grammoplites gruveli	0.00	2 0.00
	Total	213.66	100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 92
DATE :11/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
9°35.27
start stop duration Lon W
15°23.88
TIME :13:37:24 14:07:40 30.3 (min) Purpose : 3
LOG : 5335.79 5337.29 1.5 Region : 2200
FDEPTH: 38 40 Gear cond.: 0
BDEPTH: 38 40 Validity : 0
Towing dir: 0° Wire out : 125 m Speed : 3.0 kn
Sorted : 69 Total catch: 69.45 Catch/hour: 137.66

C	SPECIES SAMP	CATCH/HOUR weight	% OF TOT. numbers
	Lagocephalus laevigatus	54.01	54 39.24
	Balistes capriscus	23.15	26 16.82
	Mustelus mustelus	17.76	6 12.90
	Dactylopterus volitans	13.24	34 9.62
	Trachinocephalus myops	5.07	24 3.69
	Sepia hierredda	4.60	10 3.34
239			
	Fistularia petimba	3.96	12 2.88
	Pseudupeneus prayensis	2.89	16 2.10
	Aluterus heudelotii	2.54	6 1.84
	PARAPAGURIDAE	2.50	99 1.81
	Waste General	2.22	0 1.61
	Pomadasys rogeri	1.94	2 1.41
240			
	Trigloporus lastoviza	1.07	6 0.78
	Pagrus caeruleostictus	0.87	4 0.63
	SPARIDAE	0.75	4 0.55
238			
	Xyrichtys novacula	0.48	6 0.35
	Bothus podas	0.44	6 0.32

Sargassum spp	0.04	0	0.03
Snail	0.04	2	0.03
Starfish	0.04	2	0.03
Ophiuroidae	0.04	0	0.03
Total	137.66		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 93
DATE :11/09/19 GEAR TYPE: BT NO: 1 POSITION:Lat N
9°55.41
start stop duration Lon W
14°56.82
TIME :17:56:40 18:27:50 31.2 (min) Purpose : 3
LOG : 5372.29 5374.17 1.9 Region : 2200
FDEPTH: 44 46 Gear cond.: 0
BDEPTH: 44 46 Validity : 0
Towing dir: 0° Wire out : 140 m Speed : 3.6 kn
Sorted : 150 Total catch: 661.23 Catch/hour: 1272.82

C SPECIES / SAMP	weight	numbers	% OF TOT.
Chloroscombrus chrysurus	860.52	19	67.61
Sardinella aurita	108.92	822	8.56
242			
Pagrus caeruleostictus	59.46	526	4.67
Caranx rhonchus	52.51	289	4.13
Balistes capriscus	43.20	35	3.39
Dactylopterus volitans	43.20	314	3.39
PARAPAGURIDAE	31.51	1211	2.48
Lagocephalus laevigatus	29.31	77	2.30
Pagellus bellottii	8.47	60	0.67
244			
Sepia hierredda	8.13	35	0.64
243			
Pseudupeneus prayensis	6.10	42	0.48
Waste General	4.57	0	0.36
Stephanolepis hispidus	4.23	35	0.33
Pomadasys rogeri	3.56	8	0.28
245			
Decapterus punctatus	3.39	60	0.27
Diodon holocanthus	2.88	8	0.23
Trachinocephalus myops	1.69	8	0.13
Sardinella maderensis	0.68	8	0.05
241			
Bothus podas	0.34	8	0.03
Sea urchin, weak spines	0.17	8	0.01
Total	1272.82		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 94
DATE :12/09/19 GEAR TYPE: PT NO: 7 POSITION:Lat N
10°8.19
start stop duration Lon W
15°0.48
TIME :01:17:09 01:48:41 31.5 (min) Purpose : 1
LOG : 5406.64 5408.44 1.8 Region : 2200
FDEPTH: 5 5 Gear cond.: 0
BDEPTH: 26 27 Validity : 0
Towing dir: 0° Wire out : 130 m Speed : 3.4 kn
Sorted : 45 Total catch: 45.12 Catch/hour: 85.86

C SPECIES / SAMP	weight	numbers	% OF TOT.
Chloroscombrus chrysurus	45.77	1115	53.30
Sardinella maderensis	16.59	443	19.33
246			
Brachydeuterus auritus	16.44	567	19.15
Sardinella aurita	2.91	59	3.39
247			
Sphyraena guachancho	1.94	13	2.26
Decapterus punctatus	0.99	86	1.15
Caranx rhonchus	0.76	27	0.89
Ilisha africana	0.23	6	0.27
SPARIDAE	0.08	2	0.09
Waste General	0.04	0	0.04
Echeneis naucrates	0.04	2	0.04
J E L L Y F I S H	0.04	2	0.04
Sargassum spp	0.04	0	0.04
Total	85.86		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 95
DATE :12/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
9°58.95
start stop duration Lon W
15°13.90
TIME :06:47:59 07:18:14 30.2 (min) Purpose : 3
LOG : 5430.83 5432.57 1.7 Region : 2200
FDEPTH: 27 27 Gear cond.: 0
BDEPTH: 27 27 Validity : 0
Towing dir: 0° Wire out : 90 m Speed : 3.5 kn
Sorted : 157 Total catch: 533.02 Catch/hour: 1057.58

C SPECIES / SAMP	weight	numbers	% OF TOT.
Chloroscombrus chrysurus	512.77	2274	48.49
Carlarius latiscutatus	280.43	0	26.52
Carlarius parkii	63.68	89	6.02
Dasyatis centroura	29.68	2	2.81
Cymbium pepo	28.20	2	2.67
Pseudupeneus prayensis	26.58	54	2.51
Sardinella maderensis	21.72	298	2.05
248			
Pagellus bellottii	18.35	54	1.74
249			
Pagrus caeruleostictus	15.52	32	1.47
Lagocephalus lagocephalus	13.49	2	1.28
Stephanolepis hispidus	12.82	20	1.21
Scorpaena laevis	7.56	2	0.71
Pomadasys jubelini	5.26	6	0.50
251			
Lagocephalus laevigatus	4.32	6	0.41
Pomadasys rogeri	3.37	2	0.32
252			
Sphyraena guachancho	3.10	4	0.29
Caranx rhonchus	2.56	4	0.24
Brachydeuterus auritus	2.43	10	0.23
253			
Albula vulpes	2.16	2	0.20
Galeoides decadactylus	1.89	4	0.18
250			
Eucinostomus melanopterus	1.35	4	0.13
Hermits, mixed	0.27	2	0.03
Arius sp.	0.04	6	0.00
RANINIDAE	0.03	2	0.00
Total	1057.58		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 96
DATE :12/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
9°53.66
start stop duration Lon W
15°21.56
TIME :09:10:46 09:41:04 30.3 (min) Purpose : 3
LOG : 5446.03 5447.51 1.5 Region : 2200
FDEPTH: 28 27 Gear cond.: 0
BDEPTH: 28 27 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 2.9 kn
Sorted : 107 Total catch: 107.43 Catch/hour: 212.73

C SPECIES / SAMP	weight	numbers	% OF TOT.
Chloroscombrus chrysurus	170.20	2055	80.00
Sardinella maderensis	18.18	224	8.55
254			
Pagrus caeruleostictus	7.05	44	3.31
Sphyraena afra	3.33	2	1.56
Lagocephalus laevigatus	2.97	6	1.40
Pagellus bellottii	1.78	14	0.84
256			
Pomadasys rogeri	1.58	2	0.74
258			
Ephippion guttifer	1.54	2	0.73
Zanobatus shoenleinii	1.31	2	0.61
Aluterus heudelotii	0.91	2	0.43
Brachydeuterus auritus	0.83	10	0.39
257			
Pseudupeneus prayensis	0.75	4	0.35
Trachinocephalus myops	0.59	4	0.28
Caranx crysos	0.59	2	0.28
Sepia hierredda	0.55	4	0.26
255			
Albula vulpes	0.51	2	0.24
Alloteuthis africana	0.04	81	0.02
Callinectes marginatus	0.00	2	0.00
Total	212.73		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 97
DATE :12/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
9°46.66
start stop duration Lon W
15°31.33
TIME :11:40:13 12:10:18 30.1 (min) Purpose : 3
LOG : 5463.09 5464.38 1.3 Region : 2200
FDEPTH: 34 32 Gear cond.: 0
BDEPTH: 34 32 Validity : 0
Towing dir: 0° Wire out : 107 m Speed : 2.6 kn
Sorted : 39 Total catch: 39.18 Catch/hour: 78.13

C SPECIES / SAMP	weight	numbers	% OF TOT.
Pseudupeneus prayensis	27.24	171	34.86
Balistes capriscus	15.43	16	19.75
Chloroscombrus chrysurus	6.30	72	8.07
SPARIDAE	6.02	44	7.71
259			
Trachinocephalus myops	4.71	30	6.02
Lestrolepis intermedia	3.03	1101	3.88
Pagrus caeruleostictus	2.91	18	3.73
Sepia hierredda	2.59	8	3.32
261			
Carlarius latiscutatus	2.31	14	2.96
Lagocephalus laevigatus	1.28	4	1.63
PARAPAGURIDAE	1.08	42	1.38
Psettodes belcheri	0.88	2	1.12
Sphyraena guachancho	0.88	4	1.12
Carlarius parkii	0.76	6	0.97
Fistularia petimba	0.72	2	0.92
Aluterus heudelotii	0.64	2	0.82
Sardinella maderensis	0.60	8	0.77
260			
Bothus podas	0.24	8	0.31
Xyrichtys novacula	0.16	2	0.20
Sargassum spp	0.08	0	0.10
Illex coindetii	0.08	90	0.10
Brachydeuterus auritus	0.08	2	0.10
B I V A L V E S	0.08	6	0.10
Hermits, mixed	0.04	6	0.05
Total	78.13		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 98
DATE :12/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
9°39.45
start stop duration Lon W
15°41.30
TIME :14:30:11 15:00:38 30.4 (min) Purpose : 3
LOG : 5479.91 5481.75 1.8 Region : 2200
FDEPTH: 45 42 Gear cond.: 0
BDEPTH: 45 42 Validity : 0
Towing dir: 0° Wire out : 140 m Speed : 3.6 kn
Sorted : 278 Total catch: 278.30 Catch/hour: 548.37

C SPECIES / SAMP	weight	numbers	% OF TOT.
Lagocephalus laevigatus	165.10	225	30.11
Mustelus mustelus	96.67	20	17.63
Dactylopterus volitans	86.11	266	15.70
SPARIDAE	62.11	246	11.33
262			
Padina spp.	40.39	0	7.37
Pseudupeneus prayensis	24.87	122	4.53
Rachycentron canadum	21.95	2	4.00
Sepia hierredda	17.26	33	3.15
263			
Balistes capriscus	10.40	10	1.90
Fistularia petimba	5.04	26	0.92
Aluterus heudelotii	4.41	10	0.80
Trigloporus lastoviza	3.70	26	0.68
Sphyraena guachancho	3.39	4	0.62
Caranx crysos	1.62	4	0.29
Lagocephalus laevigatus	1.34	2	0.24
0			
Trachinocephalus myops	1.10	6	0.20
Seriola rivoliana	0.99	2	0.18
PARAPAGURIDAE	0.71	55	0.13
Chloroscombrus chrysurus	0.71	6	0.13
Bothus podas	0.24	4	0.04
Grammoplites gruveli	0.20	8	0.04
Starfish	0.04	2	0.01
Snail	0.01	2	0.00
Total	548.37		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 99
DATE :12/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
9°32.46
start stop duration Lon W
15°50.76
TIME :17:06:54 17:37:34 30.7 (min) Purpose : 3
LOG : 5498.18 5500.11 1.9 Region : 2200
FDEPTH: 63 58 Gear cond.: 0
BDEPTH: 63 58 Validity : 0
Towing dir: 0° Wire out : 180 m Speed : 3.8 kn
Sorted : 37 Total catch: 36.53 Catch/hour: 71.47

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Dactylopterus volitans	52.35	190	73.25
Fistularia petimba	5.56	14	7.77
Lagocephalus laevigatus	5.32	6	7.45
Waste General	2.27	0	3.18
Trigla lyra	2.11	20	2.96
Uranoscopus albesca	1.21	2	1.70
Aluterus heudelotii	1.17	2	1.64
Bothus podas	0.39	6	0.55
Trachinocephalus myops	0.35	2	0.49
PARAPAGURIDAE	0.16	18	0.22
Starfish - dark	0.16	18	0.22
Sternodromia spinirostrus	0.12	6	0.16
Sargassum spp	0.08	0	0.11
Cymbium cymbium	0.08	2	0.11
Liocarcinus marmoreus	0.04	6	0.05
Calappa rubroguttata	0.04	4	0.05
Sepia hierredda	0.02	2	0.03
264			
B I V A L V E S	0.02	2	0.03
Alloteuthis africana	0.01	20	0.01
Hermits, mixed	0.01	2	0.01
Bristle worms	0.00	2	0.01
Total	71.47		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 100
DATE :12/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
9°25.12
start stop duration Lon W
16°16.34
TIME :23:03:14 23:34:59 31.8 (min) Purpose : 3
LOG : 5537.40 5539.15 1.7 Region : 2200
FDEPTH: 459 462 Gear cond.: 0
BDEPTH: 459 462 Validity : 0
Towing dir: 0° Wire out : 1100 m Speed : 3.3 kn
Sorted : 60 Total catch: 240.89 Catch/hour: 455.08

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Nematocarcinus africanus	259.95	650063	57.12
Yarella blackfordi	66.50	2418	14.61
Merluccius polli	35.97	121	7.90
Chlorophthalmus agassizi	20.10	219	4.42
Benthodesmus tenuis	15.11	302	3.32
0			
Heterocarpus ensifer	12.09	2690	2.66
Photonectes parvimanus	11.64	196	2.56
0			
Hymenocephalus italicus	8.77	1315	1.93
Heptranchias perlo	5.89	15	1.30
Opisthoteuthis sp.	4.99	45	1.10
Polycheles typhlops	3.32	234	0.73
0			
Malacocephalus laevis	1.81	23	0.40
Histioteuthis bonnellii	1.81	23	0.40
0			
Plesionika martia	1.51	181	0.33
Illex coindetii	1.06	8	0.23
Polymetme corythaeola	0.60	166	0.13
SERGESTIDAE	0.60	98	0.13
Ariomma bondi	0.60	15	0.13
Penaeus notialis	0.60	53	0.13
Zenion hololepis	0.45	60	0.10
Gadella maraldi	0.45	23	0.10
0			
Monomitopus metriostoma	0.30	45	0.07
0			
Etmopterus spinax	0.30	8	0.07
Diretmoides pauciradiatus	0.15	23	0.03
Stomias boa boa	0.15	15	0.03
0			
Chascanopsetta lugubris	0.15	8	0.03
0			
Nemichthys scolopaceus	0.15	8	0.03
Bathyuroconger vicinus	0.01	8	0.00
0			
Setarches guentheri	0.01	8	0.00
0			
Total	455.08		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 101
DATE :13/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
9°41.13
start stop duration Lon W
16°9.55
TIME :08:03:11 08:34:01 30.8 (min) Purpose : 3
LOG : 5578.51 5580.13 1.6 Region : 2200
FDEPTH: 69 74 Gear cond.: 0
BDEPTH: 69 74 Validity : 0
Towing dir: 0° Wire out : 210 m Speed : 3.1 kn
Sorted : 52 Total catch: 52.41 Catch/hour: 101.99

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Pagellus bellottii	22.19	185	21.75
265			
Pseudupeneus prayensis	16.78	208	16.45
Dactylopterus volitans	12.65	43	12.40
Waste General	12.07	0	11.83
Trachinus armatus	10.08	160	9.88
Trigla lyra	7.08	68	6.95
Raja clavata	3.89	2	3.82
Epinephelus aeneus	2.70	2	2.64
267			
Zeus faber	2.53	4	2.48
Torpedo torpedo	1.91	4	1.87
Umbrina steindachneri	1.87	6	1.83
Raja miraletus	1.60	4	1.56
Fistularia petimba	1.01	4	0.99
Trachinocephalus myops	0.90	4	0.88
Anthias anthias	0.90	21	0.88
Sepia hierredda	0.86	4	0.84
266			
Scorpaena stephanica	0.74	8	0.73
Chromis cadenati	0.58	4	0.57
Sphoeroides marmoratus	0.58	16	0.57
Sea urchins (strong spines)	0.51	12	0.50
Chaetodon hoefleri	0.31	2	0.31
Serranus africanus	0.16	4	0.15
Starfish - dark	0.04	2	0.04
Shark eggs	0.04	2	0.04
Ariomma bondi	0.02	2	0.02
Bryozoa spp.	0.02	0	0.02
Total	101.99		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 102
DATE :13/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
9°44.03
start stop duration Lon W
16°4.41
TIME :10:08:55 10:39:08 30.2 (min) Purpose : 3
LOG : 5589.68 5591.38 1.7 Region : 2200
FDEPTH: 52 53 Gear cond.: 0
BDEPTH: 52 53 Validity : 0
Towing dir: 0° Wire out : 145 m Speed : 3.4 kn
Sorted : 24 Total catch: 23.74 Catch/hour: 47.13

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Dactylopterus volitans	22.28	79	47.27
Lagocephalus laevigatus	8.34	12	17.69
Trigla lyra	5.40	48	11.46
Waste General	4.53	0	9.61
Seriola rivoliana	1.11	2	2.36
Trachinocephalus myops	1.03	8	2.19
Xyrichtys novacula	0.83	8	1.77
Caranx rhonchus	0.75	2	1.60
Sepia hierredda	0.52	4	1.10
268			
Fistularia petimba	0.48	2	1.01
Pseudupeneus prayensis	0.40	2	0.84
Bryozoa spp.	0.40	0	0.84
Trichiurus lepturus	0.40	2	0.84
Raja miraletus	0.36	2	0.76
Chelidonichthys gabonensis	0.24	2	0.51
Sargassum spp	0.04	0	0.08
Calappa rubroguttata	0.02	2	0.03
RANINIDAE	0.01	2	0.02
Hermits, mixed	0.01	2	0.01
Bristle worms	0.00	2	0.00
Total	47.13		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 103
DATE :13/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
9°48.68
start stop duration Lon W
15°56.71
TIME :12:44:21 13:14:30 30.2 (min) Purpose : 3
LOG : 5603.75 5605.52 1.8 Region : 2200
FDEPTH: 43 44 Gear cond.: 0
BDEPTH: 43 44 Validity : 0
Towing dir: 0° Wire out : 135 m Speed : 3.5 kn
Sorted : 89 Total catch: 88.99 Catch/hour: 177.04

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Mustelus mustelus	88.21	14	49.83
Lagocephalus laevigatus	70.32	74	39.72
Pagrus caeruleostictus	6.13	20	3.46
Dactylopterus volitans	2.94	6	1.66
Trigloporus lastoviza	2.55	18	1.44
Balistes capriscus	1.79	2	1.01
Waste General	1.47	0	0.83
Xyrichtys novacula	0.64	6	0.36
Caranx rhonchus	0.60	4	0.34
PORIFERA (Sponges)	0.60	4	0.34
Trachinocephalus myops	0.56	4	0.31
Pseudupeneus prayensis	0.40	2	0.22
PARAPAGURIDAE	0.32	30	0.18
B I V A L V E S	0.20	12	0.11
Decapterus punctatus	0.16	2	0.09
Starfish	0.08	4	0.04
Bryozoa spp.	0.04	0	0.02
Snail	0.04	2	0.02
Bothus podas	0.00	2	0.00
Total	177.04		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 104
DATE :13/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
9°52.87
start stop duration Lon W
15°51.40
TIME :15:00:02 15:30:04 30.0 (min) Purpose : 3
LOG : 5616.45 5618.01 1.6 Region : 2200
FDEPTH: 38 38 Gear cond.: 0
BDEPTH: 38 38 Validity : 0
Towing dir: 0° Wire out : 130 m Speed : 3.1 kn
Sorted : 149 Total catch: 149.08 Catch/hour: 297.97

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Lagocephalus laevigatus	122.72	100	41.19
Chloroscombrus chrysurus	65.76	562	22.07
Pseudupeneus prayensis	27.38	132	9.19
SPARIDAE	18.91	104	6.35
269			
Dactylopterus volitans	9.59	24	3.22
Aluterus heudelotii	9.47	18	3.18
Selene dorsalis	8.43	26	2.83
Pagrus caeruleostictus	6.96	32	2.33
Balistes capriscus	6.72	8	2.25
Trachinocephalus myops	4.44	22	1.49
Fistularia petimba	4.24	36	1.42
Waste General	2.88	0	0.97
Sepia hierredda	2.12	4	0.71
270			
Seriola rivoliana	1.56	2	0.52
Caranx crysos	1.36	6	0.46
Echeneis naucrates	1.04	2	0.35
Trigloporus lastoviza	0.92	6	0.31
Xyrichtys novacula	0.92	14	0.31
PORIFERA (Sponges)	0.64	28	0.21
Stephanolepis hispidus	0.64	2	0.21
Selar crumenophthalmus	0.60	2	0.20
PARAPAGURIDAE	0.36	32	0.12
Bothus podas	0.16	2	0.05
Starfish	0.08	2	0.03
Snail	0.08	8	0.03
LEUCOSIIDAE	0.00	2	0.00
Bryozoa spp.	0.00	0	0.00
Total	297.97		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 105
DATE :13/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
10°1.89
start stop duration Lon W
15°35.90
TIME :18:08:38 18:38:45 30.1 (min) Purpose : 3
LOG : 5636.47 5638.39 1.9 Region : 2200
FDEPTH: 28 29 Gear cond.: 0
BDEPTH: 28 29 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.8 kn
Sorted : 60 Total catch: 59.65 Catch/hour: 118.78

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		

	weight	numbers	
Chloroscombrus chrysurus	40.15	440	33.80
Trachinotus teraia	11.39	2	9.59
Pseudupeneus prayensis	11.15	64	9.39
Pagellus bellottii	10.51	74	8.85
271			
Carlarius latiscutatus	8.84	10	7.44
Sea urchins (waek spines)	7.73	227	6.51
Waste General	6.89	0	5.80
Dactylopterus volitans	5.22	10	4.39
Fishing gears	4.02	2	3.39
Scorpaena angolensis	1.79	4	1.51
Eucinostomus melanopterus	1.79	12	1.51
Caranx rhonchus	1.27	4	1.07
Lagocephalus laevigatus	1.23	2	1.04
Aluterus heudelotii	1.23	2	1.04
Pomadasys rogeri	1.08	2	0.91
273			
Zanobatus shoenleinii	0.92	2	0.77
Pagrus caeruleostictus	0.84	12	0.70
Stephanolepis hispidus	0.52	4	0.44
Echeneis naucrates	0.48	2	0.40
Hermits, mixed	0.32	12	0.27
Trachinocephalus myops	0.28	4	0.23
Sardinella maderensis	0.24	2	0.20
272			
Sea anemone sp	0.16	16	0.13
PARAPAGURIDAE	0.12	4	0.10
Starfish red	0.12	8	0.10
Stenorhynchus lanceolatus	0.12	34	0.10
Maja squinado	0.08	8	0.07
Calappa rubroguttata	0.08	8	0.07
Nudibranch sp	0.07	6	0.06
Sargassum spp	0.04	0	0.03
Decapterus punctatus	0.04	4	0.03
B I V A L V E S	0.02	2	0.02
G A S T R O P O D S	0.02	2	0.01
0			
Sternodromia spinirostrus	0.01	2	0.01
G A S T R O P O D S	0.01	2	0.01
Total	118.78		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 106
DATE :13/09/19 GEAR TYPE: PT NO: 7 POSITION:Lat N
10°23.14
start stop duration Lon W
15°31.22
TIME :22:51:14 23:23:20 32.1 (min) Purpose : 1
LOG : 5673.66 5675.26 1.6 Region : 2200
FDEPTH: 0 0 Gear cond.: 0
BDEPTH: 29 32 Validity : 0
Towing dir: 0° Wire out : 140 m Speed : 3.0 kn
Sorted : 6 Total catch: 6.04 Catch/hour: 11.29

SPECIES CATCH/HOUR % OF TOT.
C SAMP

	weight	numbers	
Sardinella maderensis	7.29	107	64.60
274			
Decapterus punctatus	1.23	110	10.93
Psettodes belcheri	0.82	2	7.29
Caranx rhonchus	0.49	13	4.31
PORIFERA (Sponges)	0.41	0	3.64
Sardinella aurita	0.41	4	3.64
275			
Waste General	0.30	0	2.65
Chloroscombrus chrysurus	0.26	4	2.32
Alloteuthis africana	0.04	19	0.33
Maja squinado	0.03	6	0.25
Plastic	0.00	0	0.02
Sargassum spp	0.00	0	0.02
Total	11.29		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 107
DATE :14/09/19 GEAR TYPE: PT NO: 1 POSITION:Lat N
10°15.42
start stop duration Lon W
15°42.77
TIME :01:12:06 01:42:09 30.1 (min) Purpose : 1
LOG : 5687.95 5690.18 2.2 Region : 2200
FDEPTH: 0 0 Gear cond.: 0
BDEPTH: 39 34 Validity : 0
Towing dir: 0° Wire out : 130 m Speed : 4.4 kn
Sorted : 5 Total catch: 4.93 Catch/hour: 9.84

SPECIES CATCH/HOUR % OF TOT.
C SAMP

	weight	numbers	
Caranx crysos	3.31	6	33.67
Sardinella maderensis	2.16	20	21.91
276			
Chloroscombrus chrysurus	1.64	18	16.63
Brachydeuterus auritus	0.96	12	9.74
Decapterus punctatus	0.80	60	8.11
Caranx rhonchus	0.48	10	4.87
Illex coindetii	0.48	240	4.87
Sepia sp.	0.02	2	0.20
Total	9.84		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 108
DATE :14/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
10°11.91
start stop duration Lon W
15°53.96
TIME :06:51:36 07:22:09 30.6 (min) Purpose : 3
LOG : 5714.07 5716.16 2.1 Region : 2200
FDEPTH: 29 30 Gear cond.: 0
BDEPTH: 29 30 Validity : 0
Towing dir: 0° Wire out : 100 m Speed : 4.1 kn
Sorted : 126 Total catch: 382.66 Catch/hour: 751.54

SPECIES CATCH/HOUR % OF TOT.
C SAMP

	weight	numbers	
Galeoides decadactylus	446.91	7730	59.47
280			
Dasyatis centroura	93.17	8	12.40
Brachydeuterus auritus	71.69	766	9.54
281			
Pseudupeneus prayensis	24.51	163	3.26
Carlarius parkii	22.37	35	2.98
Eucinostomus melanopterus	18.49	143	2.46
Pagellus bellottii	17.06	112	2.27
279			
Psettodes belcheri	13.28	6	1.77
Carlarius latiscutatus	9.82	2	1.31
Sphyraena guachancho	8.37	20	1.11
Pomadasys rogeri	4.80	6	0.64
277			
Caranx crysos	3.98	10	0.53
Sardinella aurita	3.78	41	0.50
282			
Pomadasys incisus	3.06	20	0.41
278			
Trichiurus lepturus	2.76	10	0.37
Dasyatis marmorata	2.67	4	0.36
Dasyatis marmorata	2.35	6	0.31
0			
Sea urchins (waek spines)	1.12	108	0.15
Caranx rhonchus	0.51	10	0.07
Sardinella maderensis	0.51	6	0.07
PARAPAGURIDAE	0.21	26	0.03
Trachinocephalus myops	0.08	10	0.01
B I V A L V E S	0.04	6	0.00
Total	751.54		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 109
DATE :14/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
10°5.27
start stop duration Lon W
15°58.12
TIME :09:05:14 09:35:53 30.7 (min) Purpose : 3
LOG : 5728.68 5730.26 1.6 Region : 2200
FDEPTH: 38 39 Gear cond.: 0
BDEPTH: 38 39 Validity : 0
Towing dir: 0° Wire out : 125 m Speed : 3.1 kn
Sorted : 84 Total catch: 83.93 Catch/hour: 164.25

SPECIES CATCH/HOUR % OF TOT.
C SAMP

	weight	numbers	
Lagocephalus laevigatus	55.87	74	34.02
Pseudupeneus prayensis	33.35	221	20.30
Balistes capriscus	19.37	14	11.80
PARAPAGURIDAE	8.10	215	4.93
Dactylopterus volitans	7.67	14	4.67
Chloroscombrus chrysurus	7.16	57	4.36
Selene dorsalis	7.08	63	4.31
Caranx rhonchus	5.13	20	3.12
Trachinocephalus myops	3.84	25	2.34
Sepia hierredda	2.90	6	1.76
283			
Xyrichtys novacula	2.78	31	1.69
Pagellus bellottii	2.43	12	1.48
285			
Pagrus caeruleostictus	1.80	12	1.10
Echeneis naucrates	1.80	4	1.10
Selar crumenophthalmus	1.45	8	0.88
Waste General	1.10	0	0.67
Aluterus heudelotii	0.78	2	0.48
Decapterus punctatus	0.43	22	0.26
Trichiurus lepturus	0.35	2	0.21
Fistularia petimba	0.23	2	0.14
Bothus podas	0.23	4	0.14
Galeoides decadactylus	0.20	2	0.12
284			
Sargassum spp	0.12	0	0.07
PECTINIDAE	0.06	6	0.04
B I V A L V E S	0.01	12	0.01
G A S T R O P O D S	0.00	4	0.00
Total	164.25		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 110
DATE :15/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
10°0.19
start stop duration Lon W
16°5.85
TIME :11:06:40 11:37:29 30.8 (min) Purpose : 3
LOG : 5965.48 5966.78 1.3 Region : 2200
FDEPTH: 42 41 Gear cond.: 0
BDEPTH: 42 41 Validity : 0
Towing dir: 0° Wire out : 125 m Speed : 2.5 kn
Sorted : 81 Total catch: 80.98 Catch/hour: 157.70

SPECIES CATCH/HOUR % OF TOT.
C SAMP

	weight	numbers	
Lagocephalus laevigatus	115.21	138	73.06
Selene dorsalis	19.36	16	12.27
Pseudupeneus prayensis	8.10	39	5.14
Trigloporus lastoviza	4.17	27	2.64
Trachinocephalus myops	2.30	10	1.46
PARAPAGURIDAE	1.52	45	0.96
Echeneis naucrates	1.32	2	0.84
Aluterus heudelotii	1.17	2	0.74
Chloroscombrus chrysurus	1.17	8	0.74
Caranx crysos	1.09	2	0.69
Sepia hierredda	0.86	4	0.54
286			
Dactylopterus volitans	0.74	2	0.47
Xyrichtys novacula	0.66	6	0.42
B I V A L V E S	0.04	2	0.02
Total	157.70		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 111
DATE :15/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
9°53.97
start stop duration Lon W
16°15.01
TIME :13:37:22 14:07:51 30.5 (min) Purpose : 3
LOG : 5980.90 5982.29 1.4 Region : 2200
FDEPTH: 55 52 Gear cond.: 0
BDEPTH: 55 52 Validity : 0
Towing dir: 0° Wire out : 160 m Speed : 2.7 kn
Sorted : 146 Total catch: 145.70 Catch/hour: 286.81

SPECIES CATCH/HOUR % OF TOT.
C SAMP

	weight	numbers	
Dactylopterus volitans	223.98	860	78.09
Lagocephalus laevigatus	39.61	37	13.81
Zeus faber	7.32	4	2.55
Pseudupeneus prayensis	6.06	30	2.11
Aluterus heudelotii	2.87	4	1.00
Trigloporus lastoviza	2.44	22	0.85
Trachinocephalus myops	1.81	10	0.63
Sepia hierredda	0.87	2	0.30
PARAPAGURIDAE	0.55	28	0.19
Selene dorsalis	0.31	2	0.11
Trachinus arenatus	0.31	4	0.11
Waste General	0.31	0	0.11
Bothus podas	0.24	6	0.08
Starfish	0.04	2	0.01
Snail	0.04	2	0.01
Unidentified	0.02	4	0.01
Sargassum spp	0.02	0	0.01
Total	286.81		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 112
DATE :15/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
9°47.40
start stop duration Lon W
16°24.49
TIME :16:17:23 16:48:34 31.2 (min) Purpose : 3
LOG : 5997.55 5999.27 1.7 Region : 2200
FDEPTH: 65 60 Gear cond.: 0

BDEPTH: 65 60 Validity : 0
Towing dir: 0° Wire out : 190 m Speed : 3.3 kn
Sorted : 128 Total catch: 127.85 Catch/hour: 246.03

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Epinephelus aeneus	137.03	12	55.70
Dactylopterus volitans	91.40	589	37.15
Trichiurus lepturus	3.16	8	1.28
Trachinus arenatus	2.04	2	0.83
Sepia hierredda	2.04	8	0.83
287			
Waste General	1.77	0	0.72
Scorpaena stephanica	1.65	15	0.67
Pseudupeneus prayensis	1.35	8	0.55
Torpedo torpedo	1.15	2	0.47
Trigloporus lastoviza	1.08	12	0.44
Sphoeroides pachygaster	0.96	2	0.39
Sphoeroides marmoratus	0.81	19	0.33
Fistularia petimba	0.58	2	0.23
Sepia bertheloti	0.35	2	0.14
Trachinocephalus myops	0.27	2	0.11
Bothus podas	0.15	2	0.06
Hermits, mixed	0.08	13	0.03
SPARIDAE	0.08	2	0.03
288			
Starfish	0.04	6	0.02
Sea urchins (strong spines)	0.02	2	0.01
PARAPAGURIDAE	0.02	2	0.01
B I V A L V E S	0.00	2	0.00
Snail	0.00	2	0.00
Total	246.03		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 113
DATE :15/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
9°45.32
start stop duration Lon W
16°30.59
TIME :18:32:47 19:02:54 30.1 (min) Purpose : 3
LOG : 6011.19 6012.73 1.5 Region : 2200
FDEPTH: 132 127 Gear cond.: 0
BDEPTH: 132 127 Validity : 0
Towing dir: 0° Wire out : 365 m Speed : 3.1 kn
Sorted : 125 Total catch: 2001.64 Catch/hour: 3986.02

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Antigonia capros	3569.70	100461	89.56
Priacanthus arenatus	162.35	924	4.07
Dentex maroccanus	152.76	1438	3.83
Spicara alta	65.76	753	1.65
Squalus mitsukurii	14.54	10	0.36
Trigla lyra	5.48	137	0.14
Zenopsis conchifer	3.43	34	0.09
Scorpaena stephanica	3.43	34	0.09
Torpedo torpedo	3.03	6	0.08
Ariomma bondi	2.06	34	0.05
Aulopus cadenati	2.06	34	0.05
Raja miraletus	0.88	2	0.02
Mustelus mustelus	0.56	2	0.01
Total	3986.02		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 114
DATE :15/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
9°37.92
start stop duration Lon W
16°39.03
TIME :22:08:58 22:39:48 30.8 (min) Purpose : 3
LOG : 6030.95 6032.54 1.6 Region : 2200
FDEPTH: 507 504 Gear cond.: 0
BDEPTH: 507 504 Validity : 0
Towing dir: 0° Wire out : 1250 m Speed : 3.1 kn
Sorted : 96 Total catch: 239.85 Catch/hour: 466.79

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Nematocarcinus africanus	241.03	44067	51.64
Merluccius polli	112.10	272	24.02
Lophius vaillanti	23.35	6	5.00
Yarella blackfordi	20.43	921	4.38
Illex coindetii	16.25	117	3.48
Dipturus doutrei	10.41	6	2.23
Heterocarpus ensifer	6.52	1246	1.40
Laemonema laureysi	5.16	127	1.10
Photonectes braueri	4.57	93	0.98
Polycheles typhlops	4.18	370	0.90
Sea anemone sp	3.89	25	0.83
Polymetme corythaeola	3.50	2014	0.75
Plesiopenaeus edwardsianus	3.21	103	0.69
Aristeus varidens	2.53	210	0.54
Chaunax pictus	2.04	16	0.44
Malacocephalus occidentalis	1.65	45	0.35
Bathygadus macrops	1.65	64	0.35
Coelorinchus caelorhincus	1.56	68	0.33
Opisthoteuthis sp.	0.88	16	0.19
Nettastoma melanurum	0.68	6	0.15
Diretmoides pauciradiatus	0.29	19	0.06
Bathynectes piperitus	0.19	6	0.04
SERGESTIDAE	0.19	35	0.04
Galeus polli	0.19	6	0.04
Starfish	0.10	6	0.02
Aldrovandia phalacra	0.10	29	0.02
Metal waste	0.10	0	0.02
Total	466.79		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 115
DATE :16/09/19 GEAR TYPE: PT NO: 1 POSITION:Lat N
9°55.40
start stop duration Lon W
16°40.98
TIME :02:54:43 03:25:13 30.5 (min) Purpose : 1
LOG : 6060.03 6061.75 1.7 Region : 2200
FDEPTH: 0 0 Gear cond.: 0
BDEPTH: 188 125 Validity : 0
Towing dir: 0° Wire out : 150 m Speed : 3.4 kn
Sorted : 1 Total catch: 0.95 Catch/hour: 1.86

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Ariomma bondi	0.94	14	50.77
SALPS	0.91	301	48.65
Small crabs	0.01	2	0.42
Unid. juvenile fishes	0.00	2	0.16
Total	1.86		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 116
DATE :16/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
9°57.87
start stop duration Lon W
16°36.15
TIME :06:55:50 07:26:57 31.1 (min) Purpose : 3
LOG : 6077.97 6079.70 1.7 Region : 2200
FDEPTH: 76 67 Gear cond.: 0
BDEPTH: 76 67 Validity : 0
Towing dir: 0° Wire out : 220 m Speed : 3.3 kn
Sorted : 53 Total catch: 53.13 Catch/hour: 102.40

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Dactylopterus volitans	30.30	191	29.59
Ariomma bondi	18.77	303	18.33
Antigonia capros	11.80	150	11.52
Priacanthus arenatus	8.17	37	7.98
Torpedo torpedo	7.56	15	7.38
Pseudupeneus prayensis	7.40	94	7.23
Scorpaena stephanica	5.67	79	5.53
Waste General	4.32	0	4.22
Trigla lyra	2.00	29	1.96
Raja miraletus	1.50	4	1.47
Sphoeroides pachygaster	1.27	2	1.24
Sepia bertheloti	0.77	6	0.75
Paraconger notialis	0.69	2	0.68
Trachinocephalus myops	0.58	4	0.56
Trachinus armatus	0.46	6	0.45
Echinocardium sp.	0.42	2	0.41
Fistularia petimba	0.39	2	0.38
Lagocephalus laevigatus	0.27	4	0.26
Plastic	0.04	0	0.04
CORAL	0.01	2	0.01
PECTINIDAE	0.01	2	0.01
Total	102.40		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 117
DATE :16/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
10°5.14
start stop duration Lon W
16°26.46
TIME :09:18:23 09:48:33 30.2 (min) Purpose : 3
LOG : 6093.11 6094.60 1.5 Region : 2200
FDEPTH: 58 58 Gear cond.: 0
BDEPTH: 58 58 Validity : 0
Towing dir: 0° Wire out : 166 m Speed : 3.0 kn
Sorted : 202 Total catch: 202.38 Catch/hour: 402.48

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Priacanthus arenatus	283.04	1398	70.32
Waste General	44.79	0	11.13
Dactylopterus volitans	38.54	147	9.58
Scorpaena stephanica	7.08	50	1.76
Trigla lyra	6.44	56	1.60
Sepia bertheloti	6.01	10	1.49
Sepia hierredda	5.25	12	1.30
289			
Pagellus bellottii	2.98	18	0.74
290			
Lagocephalus laevigatus	2.07	2	0.51
Raja miraletus	1.67	6	0.42
Mustelus mustelus	1.19	2	0.30
Fistularia petimba	0.76	4	0.19
Trachurus trecae	0.72	2	0.18
291			
Trichiurus lepturus	0.64	2	0.16
Trachinocephalus myops	0.32	2	0.08
Syacium micrurum	0.24	2	0.06
Sea urchins (waek spines)	0.20	40	0.05
Bothus podas	0.16	4	0.04
Sphoeroides marmoratus	0.16	4	0.04
Rypticus saponaceus	0.12	2	0.03
Sea urchins (strong spines)	0.08	2	0.02
Hermits, mixed	0.04	4	0.01
Total	402.48		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 118
DATE :16/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
10°10.16
start stop duration Lon W
16°18.99
TIME :13:33:31 14:03:37 30.1 (min) Purpose : 3
LOG : 6111.53 6113.37 1.8 Region : 2200
FDEPTH: 47 50 Gear cond.: 0
BDEPTH: 47 50 Validity : 0
Towing dir: 0° Wire out : 150 m Speed : 3.7 kn
Sorted : 58 Total catch: 58.22 Catch/hour: 116.05

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Lagocephalus laevigatus	77.04	86	66.39
Dactylopterus volitans	16.31	40	14.05
Trigloporus lastoviza	4.90	36	4.23
SPARIDAE	2.63	12	2.27
293			
Sepia hierredda	2.27	4	1.96
292			
Pseudupeneus prayensis	2.23	8	1.92
Trachinocephalus myops	2.11	8	1.82
Waste General	1.75	0	1.51
Raja miraletus	1.63	6	1.41
Fistularia petimba	1.36	6	1.17
Trichiurus lepturus	1.04	2	0.89
Xyrichtys novacula	0.76	8	0.65
Seriola rivoliana	0.72	2	0.62
PORIFERA (Sponges)	0.56	6	0.48
Priacanthus arenatus	0.32	2	0.27
Bothus podas	0.24	2	0.21
PARAPAGURIDAE	0.12	8	0.10
Snail	0.02	4	0.02
Sternodromia spinirostrus	0.02	2	0.02
Hermits, mixed	0.02	4	0.02
Total	116.05		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 119
DATE :16/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
10°15.28
start stop duration Lon W
16°11.31
TIME :17:53:48 18:24:43 30.9 (min) Purpose : 3
LOG : 6130.62 6131.94 1.3 Region : 2200
FDEPTH: 44 41 Gear cond.: 0
BDEPTH: 44 41 Validity : 0
Towing dir: 0° Wire out : 140 m Speed : 2.6 kn
Sorted : 169 Total catch: 168.94 Catch/hour: 327.82

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

Pagellus bellottii	137.21	611	41.86
294			
Pseudupeneus prayensis	84.47	419	25.77
Lagocephalus laevigatus	41.10	45	12.54
Pomadasys incisus	10.05	39	3.07
295			
Fistularia petimba	9.86	43	3.01
Selene dorsalis	9.70	60	2.96
Pagrus caeruleostictus	8.97	27	2.73
Dactylopterus volitans	7.22	27	2.20
Balistes capriscus	3.22	2	0.98
Prognathodes marcellae	2.02	19	0.62
Fistularia tabacaria	1.79	2	0.54
Priacanthus arenatus	1.71	6	0.52
Chaetodon hoefleri	1.51	8	0.46
Stephanolepis hispidus	1.47	4	0.45
Aluterus heudelotii	1.44	2	0.44
PARAPAGURIDAE	1.28	60	0.39
Zeus faber	0.93	2	0.28
Sepia hierredda	0.85	2	0.26
296			
Waste General	0.78	0	0.24
Chloroscombrus chrysurus	0.58	4	0.18
Trachinocephalus myops	0.50	4	0.15
Sepia bertheloti	0.50	2	0.15
Sea anemone sp	0.35	29	0.11
Decapterus punctatus	0.16	6	0.05
Pennatulacea	0.08	60	0.02
B I V A L V E S	0.07	0	0.02
Bothus podas	0.00	2	0.00
Total	327.82		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 120
DATE :16/09/19 GEAR TYPE: PT NO: 7 POSITION:Lat N
10°30.17
start stop duration Lon W
15°48.19
TIME :23:41:25 00:11:29 30.1 (min) Purpose : 1
LOG : 6178.42 6180.07 1.6 Region : 2200
FDEPTH: 5 5 Gear cond.: 0
BDEPTH: 32 35 Validity : 0
Towing dir: 0° Wire out : 140 m Speed : 3.3 kn
Sorted : 45 Total catch: 45.17 Catch/hour: 90.13

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Sardinella maderensis	42.90	519	47.60
297			
Chloroscombrus chrysurus	24.46	297	27.14
Decapterus punctatus	7.58	682	8.41
Caranx rhonchus	7.10	106	7.88
Brachydeuterus auritus	2.83	36	3.14
Trichiurus lepturus	1.36	6	1.51
SPARIDAE	1.36	6	1.51
298			
Scomberomorus tritor	0.88	2	0.97
Dactylopterus volitans	0.48	2	0.53
Sargassum spp	0.44	0	0.49
PARAPAGURIDAE	0.40	26	0.44
Pennatulacea	0.20	22	0.22
Sea anemone sp	0.08	6	0.09
Illex coindetii	0.05	28	0.05
Unidentified	0.01	2	0.02
OCTOPODIDAE	0.00	14	0.00
Total	90.13		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 121
DATE :17/09/19 GEAR TYPE: PT NO: 7 POSITION:Lat N
10°29.68
start stop duration Lon W
16°12.24
TIME :03:04:28 03:34:41 30.2 (min) Purpose : 1
LOG : 6204.19 6206.26 2.1 Region : 2100
FDEPTH: 5 5 Gear cond.: 0
BDEPTH: 29 29 Validity : 0
Towing dir: 0° Wire out : 140 m Speed : 4.1 kn
Sorted : 4 Total catch: 3.55 Catch/hour: 7.04

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
J E L L Y F I S H	6.00	0	85.17
Trichiurus lepturus	0.36	2	5.08
Caranx rhonchus	0.16	2	2.26
Brachydeuterus auritus	0.16	2	2.26
Chloroscombrus chrysurus	0.16	2	2.26
Sardinella maderensis	0.12	16	1.69
299			
Decapterus punctatus	0.08	6	1.13
OCTOPODIDAE	0.01	6	0.11
Illex coindetii	0.00	4	0.06
Total	7.04		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 122
DATE :17/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
10°31.67
start stop duration Lon W
16°14.49
TIME :06:50:58 07:21:14 30.3 (min) Purpose : 3
LOG : 6222.52 6224.01 1.5 Region : 2100
FDEPTH: 29 30 Gear cond.: 0
BDEPTH: 29 30 Validity : 0
Towing dir: 0° Wire out : 105 m Speed : 3.0 kn
Sorted : 104 Total catch: 104.05 Catch/hour: 206.18

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Pagrus caeruleostictus	44.94	61	21.80
Pagellus bellottii	38.16	174	18.51
301			
Balistes punctatus	17.79	12	8.63
Fistularia petimba	13.83	54	6.71
Lethrinus atlanticus	12.25	22	5.94
Pseudupeneus prayensis	11.77	54	5.71
Rhinobatos rhinobatos	7.57	6	3.67
Eucinostomus melanopterus	7.01	40	3.40
Seriola rivoliana	5.94	8	2.88
Sea anemone sp	5.35	803	2.59
Lagocephalus laevigatus	5.23	6	2.54
Octopus vulgaris	5.03	2	2.44
Balistes capriscus	3.88	22	1.88
Ephippion guttifer	3.69	2	1.79
Caranx crysos	3.21	8	1.56
Sepia bertheloti	3.01	8	1.46
Torpedo bauchotae	2.54	2	1.23
Sepia hierredda	2.50	4	1.21
300			
Sphyraena afra	1.74	2	0.85
Dactylopterus volitans	1.62	6	0.79
Aluterus heudelotii	1.55	2	0.75
Stephanolepis hispidus	1.39	4	0.67
Scomberomorus tritor	1.35	2	0.65
Waste General	1.31	0	0.63
Fistularia tabacaria	1.19	4	0.58
Albula vulpes	1.15	2	0.56
Syacium micrurum	0.48	4	0.23
Sea urchin, weak spines	0.15	8	0.07
Decapterus punctatus	0.12	8	0.06
Ascidans	0.12	4	0.06
PARAPAGURIDAE	0.12	6	0.06
Sipunculida	0.08	2	0.04
Sargassum spp	0.04	0	0.02
Coral - small	0.03	2	0.02
Hermits, mixed	0.02	2	0.01
Coral - hard pink-red	0.01	2	0.00
Alloteuthis africana	0.00	28	0.00
Total	206.18		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 123
DATE :17/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
10°28.88
start stop duration Lon W
16°20.31
TIME :08:50:03 09:20:59 30.9 (min) Purpose : 3
LOG : 6234.17 6236.13 2.0 Region : 2100
FDEPTH: 38 35 Gear cond.: 0
BDEPTH: 38 35 Validity : 0
Towing dir: 0° Wire out : 130 m Speed : 3.8 kn
Sorted : 170 Total catch: 170.44 Catch/hour: 330.51

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Lagocephalus laevigatus	224.76	275	68.00
Pseudupeneus prayensis	69.31	367	20.97
Balistes punctatus	6.55	4	1.98
Xyrichtys novacula	5.74	56	1.74
Priacanthus arenatus	4.85	19	1.47
Aluterus heudelotii	4.73	6	1.43
Dactylopterus volitans	4.15	10	1.26
Waste General	3.14	0	0.95
PARAPAGURIDAE	2.25	116	0.68
Caranx crysos	1.55	4	0.47
Fistularia petimba	1.16	6	0.35
Trachinocephalus myops	0.81	6	0.25
Alcyonacea	0.66	19	0.20
Echeneis naucrates	0.58	4	0.18
Sea anemone sp	0.12	45	0.04
Sargassum spp	0.09	0	0.03
PECTINIDAE	0.02	2	0.01
B I V A L V E S	0.02	21	0.01
Hermits, mixed	0.01	2	0.00
Ophiuroidea	0.00	2	0.00
Total	330.51		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 124
DATE :17/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
10°25.78
start stop duration Lon W
16°25.79
TIME :11:00:30 11:30:56 30.4 (min) Purpose : 3
LOG : 6247.07 6248.65 1.6 Region : 2100
FDEPTH: 47 45 Gear cond.: 0
BDEPTH: 47 45 Validity : 0
Towing dir: 0° Wire out : 140 m Speed : 3.1 kn
Sorted : 41 Total catch: 41.01 Catch/hour: 80.86

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Lagocephalus laevigatus	35.49	39	43.89
Pseudupeneus prayensis	13.13	79	16.24
Priacanthus arenatus	6.19	30	7.66
Trachinocephalus myops	5.28	28	6.54
Sepia bertheloti	3.12	8	3.85
PARAPAGURIDAE	2.64	91	3.27
Pagellus bellottii	2.56	14	3.17
Waste General	2.41	0	2.98
Dactylopterus volitans	1.97	8	2.44
Trigla lyra	1.58	12	1.95
Xyrichtys novacula	1.50	16	1.85
Seriola rivoliana	1.14	2	1.41
Alcyonacea	0.99	20	1.22
Scarus hoefleri	0.75	2	0.93
Bothus podas	0.67	10	0.83
Stephanolepis hispidus	0.55	2	0.68
Uranoscopus albesca	0.32	2	0.39
Trachinus armatus	0.28	2	0.34
Sargassum spp	0.14	0	0.17
Rypticus saponaceus	0.08	2	0.10
Sea urchins (strong spines)	0.07	2	0.09
Hermits, mixed	0.00	2	0.00
Total	80.86		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 125
DATE :17/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
10°23.25
start stop duration Lon W
16°29.89
TIME :13:07:56 13:38:28 30.5 (min) Purpose : 3
LOG : 6257.72 6259.30 1.6 Region : 2100
FDEPTH: 58 57 Gear cond.: 0
BDEPTH: 58 57 Validity : 0
Towing dir: 0° Wire out : 167 m Speed : 3.1 kn
Sorted : 58 Total catch: 57.90 Catch/hour: 113.79

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Dactylopterus volitans	75.03	554	65.94
Sepia hierredda	14.94	47	13.13
302			
Lagocephalus laevigatus	7.31	10	6.42
Waste General	3.42	0	3.01
Trigloporus lastoviza	3.07	29	2.69
Trichiurus lepturus	2.79	4	2.45
Raja miraletus	2.55	6	2.25
Fistularia petimba	1.65	4	1.45
Alcyonacea	1.57	35	1.38
Trachinocephalus myops	0.75	4	0.66
PARAPAGURIDAE	0.31	24	0.28
Trachinus armatus	0.20	2	0.17
Grammoplites gruveli	0.08	2	0.07
Starfish	0.08	8	0.07
Illex coindetii	0.04	10	0.03
Total	113.79		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 126
DATE :17/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
10°15.34
start stop duration Lon W
16°41.13
TIME :16:13:44 16:44:38 30.9 (min) Purpose : 3
LOG : 6277.48 6279.22 1.7 Region : 2100
FDEPTH: 178 171 Gear cond.: 0
BDEPTH: 178 171 Validity : 0
Towing dir: 0° Wire out : 460 m Speed : 3.4 kn
Sorted : 39 Total catch: 39.12 Catch/hour: 75.98

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Scorpaena elongata	13.75	95	18.10
Saurida brasiliensis	11.11	1554	14.62
Merluccius polli	9.01	171	11.86
Priacanthus arenatus	6.25	19	8.23
Bembrops heterurus	4.86	206	6.39
Trigloporus lastoviza	4.43	128	5.83
Penaeus notialis	3.81	97	5.01
Pontinus accraensis	3.46	35	4.55
Caranx rhonchus	1.79	2	2.35
Chlorophthalmus atlanticus	1.79	21	2.35
Illex coindetii	1.71	84	2.25
Dactylopterus volitans	1.52	12	1.99
Citharus linguatula	1.44	47	1.89
Raja miraletus	1.36	4	1.79
SPARIDAE	1.32	12	1.74
303			
Uranoscopus polli	1.32	4	1.74
Pterothrissus belloci	1.24	8	1.64
Raja straeleni	1.24	2	1.64
Scorpaena normani	0.70	23	0.92
Waste General	0.47	0	0.61
Squatina oculata	0.43	2	0.56
Mustelus mustelus	0.43	2	0.56
Antigonia capros	0.43	27	0.56
Sea urchins (waek spines)	0.39	17	0.51
Peristedion cataphractum	0.27	35	0.36
Ariomma bondi	0.27	6	0.36
Hermits, mixed	0.23	21	0.31
Lophiodes kempi	0.23	4	0.31
Macropipus rugosus	0.16	21	0.20
Sea cucumber	0.16	2	0.20
G A S T R O P O D S	0.09	14	0.12
Synagrops microlepis	0.08	4	0.10
Xyrias guineensis	0.08	2	0.10
Ophiuroidea	0.07	17	0.09
Zenopsis conchifer	0.04	2	0.05
Sepia bertheloti	0.03	2	0.05
Sargassum spp	0.02	0	0.03
Plastic	0.02	2	0.02
Total	75.98		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 127
DATE :17/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
10°11.20
start stop duration Lon W
16°48.17
TIME :18:39:41 19:08:14 28.6 (min) Purpose : 3
LOG : 6293.08 6294.53 1.4 Region : 2100
FDEPTH: 214 213 Gear cond.: 0
BDEPTH: 214 213 Validity : 0
Towing dir: 0° Wire out : 565 m Speed : 3.0 kn
Sorted : 124 Total catch: 669.45 Catch/hour: 1406.90

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Chlorophthalmus atlanticus	1010.76	83887	71.84
Synagrops microlepis	244.50	19927	17.38
Brotula barbata	34.10	34	2.42
0			
Antigonia capros	26.48	773	1.88
Squalus megalops	15.38	19	1.09
Aulopus cadenati	13.02	88	0.93
0			
Scorpaena stephanica	9.39	34	0.67
Aulopus cadenati	7.57	53	0.54
Bembrops heterurus	7.50	122	0.53
0			
Peristedion cataphractum	6.40	210	0.45
Pterothrissus belloci	6.14	38	0.44
Pterothrissus belloci	5.52	34	0.39
0			
Illex coindetii	3.09	156	0.22
0			
Raja miraletus	2.27	4	0.16
Ariomma melanum	2.21	55	0.16
Ariomma bondi	2.21	34	0.16
Trachurus trecae	2.14	2	0.15
304			
Trigla lyra	1.99	23	0.14
Dentex angolensis	1.35	11	0.10
305			
Bembrops heterurus	1.01	15	0.07
Zenopsis conchifer	0.88	11	0.06
0			
Chascanopsetta lugubris	0.88	67	0.06
Brotula barbata	0.63	2	0.04
Plastic	0.40	0	0.03
Illex coindetii	0.38	6	0.03
Todarodes sagittatus	0.22	11	0.02
Hermits, mixed	0.21	23	0.01
Zenopsis conchifer	0.21	4	0.01
Macropodia rostrata	0.07	11	0.00
Plastic	0.01	0	0.00
0			
Total	1406.90		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 128
DATE :17/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
10°7.48
start stop duration Lon W
17°13.09
TIME :23:50:48 00:21:10 30.4 (min) Purpose : 3
LOG : 6330.74 6332.35 1.6 Region : 2100
FDEPTH: 511 510 Gear cond.: 0
BDEPTH: 511 510 Validity : 0
Towing dir: 0° Wire out : 1200 m Speed : 3.2 kn
Sorted : 73 Total catch: 145.47 Catch/hour: 287.49

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Nematocarcinus africanus	77.08	17514	26.81
Lophius vaillanti	57.31	12	19.94
Yarrella blackfordi	50.51	2273	17.57
Laemonema compressicauda	34.62	308	12.04
Merluccius polli	13.52	32	4.70
Cynoponticus ferox	8.54	83	2.97
Sea anemone sp	7.91	71	2.75
Chaunax pictus	6.72	20	2.34
Photonectes braueri	6.48	103	2.25
Illex coindetii	5.61	43	1.95
Coelorinchus caelorhincus	4.28	28	1.49
Plesiopenaeus edwardsianus	1.26	28	0.44
Nezumia aequalis	1.26	55	0.44
Stereomastis sculpta	1.19	103	0.41
Polycheles typhlops	1.11	55	0.38
Aristeus varidens	1.03	63	0.36
Xenodermichthys copei	0.95	79	0.33
Stenorhynchus debilis	0.87	67	0.30
Benthodesmus simonyi	0.71	12	0.25
Peristedion cataphractum	0.63	20	0.22
Hoplostethus cadenati	0.63	8	0.22
OCTOPODIDAE	0.55	8	0.19
Chlorophthalmus agassizi	0.55	47	0.19
Sea urchins (waek spines)	0.55	16	0.19
Melanonus zugmayeri	0.47	12	0.16
Phosichthys argenteus	0.40	146	0.14
Synagrops bellus	0.40	8	0.14
Diretmus argenteus	0.32	12	0.11
Acanthocarpus brevipinnis	0.32	4	0.11
Heterocarpus ensifer	0.32	103	0.11
Pteroscion peli	0.16	12	0.05
Zenopsis conchifer	0.16	4	0.05
J E L L Y F I S H	0.16	12	0.05
Antigonia capros	0.16	8	0.05
Aristeus antennatus	0.16	12	0.05
SERGESTIDAE	0.15	55	0.05
Halosaurus ovenii	0.08	4	0.03
Goneplax sp.	0.08	12	0.03
Zenion hololepis	0.08	8	0.03
Citharus linguatula	0.08	8	0.03
P O L Y C H A E T A	0.08	20	0.03
Plesionika williamsi	0.05	2	0.02
Polyipnus polli	0.02	8	0.01
Total	287.50		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 129
DATE :18/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
10°35.58
start stop duration Lon W
16°40.63
TIME :10:30:16 11:01:05 30.8 (min) Purpose : 3
LOG : 6396.35 6398.02 1.7 Region : 2100
FDEPTH: 69 70 Gear cond.: 0
BDEPTH: 69 70 Validity : 0
Towing dir: 0° Wire out : 199 m Speed : 3.3 kn
Sorted : 32 Total catch: 31.90 Catch/hour: 62.13

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Ariomma bondi	23.14	312	37.24
Waste General	11.06	0	17.80
Dactylopterus volitans	5.53	27	8.90
Trigla lyra	4.60	53	7.40
Pseudupeneus prayensis	4.25	35	6.83
Sepia bertheloti	2.92	10	4.70
Trichiurus lepturus	1.32	4	2.13
Fistularia petimba	1.29	4	2.07
Lophiodes kempi	1.25	2	2.01
Scorpaena angolensis	1.13	14	1.82
Zeus faber	1.05	2	1.69
Illex coindetii	0.70	6	1.13
Starfish red	0.51	35	0.81
Trachinocephalus myops	0.47	2	0.75
Trachurus trecae	0.47	4	0.75
309			
Lagocephalus laevigatus	0.35	2	0.56
Alloteuthis africana	0.35	119	0.56
Trachinus armatus	0.31	4	0.50
Scorpaena stephanica	0.31	2	0.50
Coral - hard pink-red	0.31	8	0.50
Sepia hierredda	0.23	4	0.38
306			
Sphoeroides marmoratus	0.16	4	0.25
Sea urchins (strong spines)	0.16	6	0.25
Scomber colias	0.12	2	0.19
307			
Pagellus bellottii	0.08	2	0.13
308			
Grammoplites gruveli	0.04	4	0.06
B I V A L V E S	0.04	8	0.06
Plastic	0.01	0	0.01
Total	62.13		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 130
DATE :18/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
10°35.79
start stop duration Lon W
16°37.17
TIME :12:06:32 12:36:44 30.2 (min) Purpose : 3
LOG : 6403.41 6405.26 1.9 Region : 2100
FDEPTH: 56 62 Gear cond.: 0
BDEPTH: 56 62 Validity : 0
Towing dir: 0° Wire out : 185 m Speed : 3.7 kn
Sorted : 31 Total catch: 31.35 Catch/hour: 62.28

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Waste General	25.19	0	40.45
Lagocephalus laevigatus	8.15	8	13.08
Dactylopterus volitans	7.91	40	12.70
Ariomma bondi	3.58	46	5.74
Priacanthus arenatus	3.18	16	5.10
Sepia hierredda	3.06	8	4.91
310			
Octopus vulgaris	2.46	2	3.96
Trigloporus lastoviza	1.99	20	3.19
Starfish	1.71	141	2.74
Fistularia petimba	1.31	4	2.11
Alcyonacea	1.31	32	2.11
Raja miraletus	0.87	2	1.40
Scorpaena stephanica	0.56	6	0.89
Caranx rhonchus	0.24	2	0.38
Scomber colias	0.24	2	0.38
311			
Sphoeroides marmoratus	0.24	4	0.38
Bothus podas	0.20	2	0.32
Sea urchins (strong spines)	0.08	6	0.13
Hermits, mixed	0.02	2	0.03
Total	62.28		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 131
DATE :18/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
10°38.79
start stop duration Lon W
16°31.89
TIME :14:33:38 15:03:59 30.3 (min) Purpose : 3
LOG : 6416.11 6418.00 1.9 Region : 2100
FDEPTH: 42 45 Gear cond.: 0
BDEPTH: 42 45 Validity : 0
Towing dir: 0° Wire out : 145 m Speed : 3.7 kn
Sorted : 94 Total catch: 94.03 Catch/hour: 185.96

C	SPECIES / SAMP	CATCH/HOUR weight	numbers	% OF TOT.
	SPARIDAE	90.14	570	48.47
312				
	Lagocephalus laevigatus	32.23	32	17.33
	Pseudupeneus prayensis	19.18	121	10.32
	Sepia hierredda	10.76	30	5.79
313				
	Dactylopterus volitans	10.44	45	5.62
	Waste General	8.82	0	4.74
	Alcyonacea	5.77	115	3.11
	Priacanthus arenatus	2.06	8	1.11
	Caranx crysos	1.31	2	0.70
	Zeus faber	1.03	2	0.55
	Fistularia petimba	0.71	4	0.38
	PARAPAGURIDAE	0.67	63	0.36
	Xyrichtys novacula	0.63	6	0.34
	Trachinocephalus myops	0.59	4	0.32
	Plastic	0.55	0	0.30
	Starfish	0.28	42	0.15
	Trigloporus lastoviza	0.24	2	0.13
	Grammoplites gruveli	0.20	4	0.11
	Hermits, mixed	0.19	18	0.10
	Sargassum spp	0.08	0	0.04
	Sea urchin	0.04	2	0.02
	Snail	0.02	2	0.01
	Scyllarides latus	0.01	4	0.00
	Sternodromia spinirostrus	0.00	2	0.00
	Spinolambrus notialis	0.00	2	0.00
	Stenorhynchus lanceolatus	0.00	2	0.00
	Total	185.96		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 132
DATE :18/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
10°42.86

start	stop	duration		Lon W
16°24.75				
TIME :17:31:57	18:04:12	32.2 (min)	Purpose	: 3
LOG : 6431.00	6432.79	1.8	Region	: 2100
FDEPTH: 23	28		Gear cond.:	0
BDEPTH: 23	28		Validity	: 0
Towing dir: 0°	Wire out	: 100 m	Speed	: 3.3 kn
Sorted : 103	Total catch:	103.06	Catch/hour:	191.80

C	SPECIES / SAMP	CATCH/HOUR weight	numbers	% OF TOT.
	Trichiurus lepturus	123.68	288	64.48
	Sardinella maderensis	13.33	95	6.95
314				
	Octopus vulgaris	8.37	6	4.37
	Sepia bertheloti	7.63	11	3.98
	Caranx crysos	6.70	15	3.49
	Scomberomorus tritor	4.88	4	2.54
	Lagocephalus laevigatus	3.57	9	1.86
	Pseudupeneus prayensis	2.98	15	1.55
	Mugil cephalus	2.83	13	1.47
	Pagellus bellottii	2.61	13	1.36
317				
	Sepia hierredda	2.16	4	1.13
318				
	Albula vulpes	2.12	4	1.11
	Ephippion guttifer	2.01	2	1.05
	Dactylopterus volitans	1.97	2	1.03
	Selene dorsalis	1.19	11	0.62
	Pomadasys incisus	1.08	6	0.56
315				
	Rhinobatos rhinobatos	0.97	2	0.50
	Carlarius parkii	0.74	2	0.39
	Caranx rhonchus	0.63	4	0.33
	Scorpaena scrofa	0.48	2	0.25
	Sea urchin, weak spines	0.41	33	0.21
	Waste General	0.37	0	0.19
	Fistularia petimba	0.30	2	0.16
	Eucinostomus melanopterus	0.26	2	0.14
	Galeoides decadactylus	0.19	2	0.10
316				
	PARAPAGURIDAE	0.11	7	0.06
	Sea anemone sp	0.07	13	0.04
	Pagrus caeruleostictus	0.07	2	0.04
	Alcyonacea	0.04	2	0.02
	Ascidians	0.02	2	0.01
	Rhizostoma sp	0.01	2	0.01
	Stenorhynchus lanceolatus	0.01	2	0.00
	Alloteuthis africana	0.00	26	0.00
	Starfish red	0.00	2	0.00
	Total	191.80		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 133
DATE :18/09/19 GEAR TYPE: PT NO: 4 POSITION:Lat N
10°40.67

start	stop	duration		Lon W
16°29.14				
TIME :19:45:30	21:02:04	76.6 (min)	Purpose	: 1
LOG : 6437.59	6441.48	3.9	Region	: 2100
FDEPTH: 5	5		Gear cond.:	0
BDEPTH: 35	43		Validity	: 0
Towing dir: 0°	Wire out	: 150 m	Speed	: 3.0 kn
Sorted : 47	Total catch:	47.32	Catch/hour:	37.07

C	SPECIES / SAMP	CATCH/HOUR weight	numbers	% OF TOT.
	Trichiurus lepturus	9.95	20	26.84
	Lagocephalus laevigatus	9.48	10	25.57
	Selene dorsalis	6.39	67	17.24
	Sardinella maderensis	6.10	52	16.44
319				
	Caranx crysos	2.44	5	6.59
	Caranx rhonchus	0.97	4	2.62
	Trachinotus ovatus	0.55	4	1.48
	Galeoides decadactylus	0.31	1	0.85
320				
	Echeneis naucrates	0.30	1	0.80
	Cheilopogon milleri	0.22	1	0.59
	Dactylopterus volitans	0.17	1	0.46
	Mugil cephalus	0.09	1	0.25
	Decapterus punctatus	0.09	4	0.25
	Total	37.07		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 134
DATE :18/09/19 GEAR TYPE: PT NO: 1 POSITION:Lat N
10°41.91

start	stop	duration		Lon W
16°35.67				
TIME :22:28:25	23:05:35	37.2 (min)	Purpose	: 1
LOG : 6448.00	6450.21	2.2	Region	: 2100
FDEPTH: 18	35		Gear cond.:	0
BDEPTH: 46	47		Validity	: 0
Towing dir: 0°	Wire out	: 110 m	Speed	: 3.6 kn
Sorted : 31	Total catch:	30.90	Catch/hour:	49.88

C	SPECIES / SAMP	CATCH/HOUR weight	numbers	% OF TOT.
	Sardinella maderensis	19.37	166	38.83
321				
	Carlarius parkii	12.20	11	24.47
	Carlarius latiscutatus	5.81	5	11.65
	Trichiurus lepturus	3.71	8	7.44
	Selene dorsalis	2.65	15	5.31
	Sardinella aurita	1.81	10	3.62
323				
	Dactylopterus volitans	1.07	5	2.14
	Lagocephalus laevigatus	0.94	3	1.88
	Caranx crysos	0.77	2	1.55
	Echeneis naucrates	0.65	2	1.29
	Caranx rhonchus	0.61	2	1.23
	Scomber colias	0.23	2	0.45
322				
	Sargassum spp	0.06	0	0.13
	Total	49.88		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 135
DATE :19/09/19 GEAR TYPE: PT NO: 1 POSITION:Lat N
10°48.22

start	stop	duration		Lon W
16°39.34				
TIME :00:36:42	01:36:41	60.0 (min)	Purpose	: 1
LOG : 6459.14	6462.78	3.6	Region	: 2100
FDEPTH: 5	5		Gear cond.:	0
BDEPTH: 42	47		Validity	: 0
Towing dir: 0°	Wire out	: 145 m	Speed	: 3.6 kn
Sorted : 73	Total catch:	73.14	Catch/hour:	73.16

C	SPECIES / SAMP	CATCH/HOUR weight	numbers	% OF TOT.
	Sardinella aurita	37.61	718	51.41
324				
	Sardinella maderensis	12.06	113	16.49
325				
	Euthynnus alletteratus	6.56	16	8.97
	Caranx crysos	5.44	13	7.44
	Carlarius heudelotii	3.48	3	4.76
	Caranx rhonchus	2.62	9	3.58
	Brachydeuterus auritus	2.40	19	3.28
	Galeoides decadactylus	0.76	2	1.04
	Trichiurus lepturus	0.72	2	0.98
	Selene dorsalis	0.62	5	0.85
	Decapterus punctatus	0.26	2	0.36
	Mugil cephalus	0.20	1	0.27
	Trachinotus ovatus	0.16	1	0.22
	Echeneis naucrates	0.16	1	0.22
	Hemiramphus balao	0.10	1	0.14
	Total	73.16		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 136
DATE :19/09/19 GEAR TYPE: PT NO: 1 POSITION:Lat N
10°51.08

start	stop	duration		Lon W
16°41.37				
TIME :02:35:41	03:20:07	44.4 (min)	Purpose	: 1
LOG : 6467.06	6469.70	2.6	Region	: 2100
FDEPTH: 10	10		Gear cond.:	0
BDEPTH: 41	41		Validity	: 0
Towing dir: 0°	Wire out	: 140 m	Speed	: 3.6 kn
Sorted : 25	Total catch:	25.17	Catch/hour:	33.99

C	SPECIES / SAMP	CATCH/HOUR weight	numbers	% OF TOT.
	Sardinella maderensis	9.18	90	27.01
326				
	Caranx crysos	5.78	15	17.00
	Carlarius heudelotii	3.86	3	11.36
	Selene dorsalis	3.65	32	10.73
	Sardinella aurita	3.08	15	9.06
327				
	Euthynnus alletteratus	2.21	7	6.51
	Galeoides decadactylus	2.19	5	6.44
	Caranx rhonchus	2.16	7	6.36
	Lagocephalus laevigatus	1.35	1	3.97
	Echeneis naucrates	0.32	1	0.95
	Scomber colias	0.19	1	0.56
328				
	Sargassum spp	0.01	0	0.04
	Illex coindetii	0.00	7	0.01
	Total	33.99		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 137
DATE :19/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
10°51.78

start	stop	duration		Lon W
16°38.04				
TIME :06:51:00	07:22:49	31.8 (min)	Purpose	: 3
LOG : 6482.25	6484.19	1.9	Region	: 2100
FDEPTH: 25	26		Gear cond.:	0
BDEPTH: 25	26		Validity	: 0
Towing dir: 0°	Wire out	: 100 m	Speed	: 3.7 kn
Sorted : 154	Total catch:	601.24	Catch/hour:	1133.70

C	SPECIES / SAMP	CATCH/HOUR weight	numbers	% OF TOT.
	Pomadasys jubelini	781.35	2478	68.92
330				
	Lagocephalus laevigatus	126.85	190	11.19
	Carlarius parkii	68.69	170	6.06
	Galeoides decadactylus	45.01	96	3.97
329				
	Sepia sp.	26.62	58	2.35
	Pseudupeneus prayensis	18.09	104	1.60
	Sepia bertheloti	16.91	30	1.49
	Eucinostomus melanopterus	10.74	74	0.95
	Caranx rhonchus	9.41	38	0.83
	Carlarius latiscutatus	7.65	30	0.67
	Paraconger notialis	5.29	8	0.47
	Octopus vulgaris	4.00	2	0.35
	Syacium micrurum	3.82	15	0.34
	Sardinella maderensis	3.09	15	0.27
333				
	Sepia hierredda	2.35	8	0.21
332				
	Pomadasys incisus	1.62	8	0.14
331				
	Pagellus bellottii	1.18	8	0.10
334				
	Sargassum spp	0.74	0	0.06
	Bothus podas	0.29	8	0.03
	Total	1133.70		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 138
DATE :19/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
10°52.11
start stop duration Lon W
16°41.56
TIME :08:36:09 09:06:20 30.2 (min) Purpose : 3
LOG : 6492.08 6493.68 1.6 Region : 2100
FDEPTH: 40 40 Gear cond.: 0
BDEPTH: 40 40 Validity : 0
Towing dir: 0° Wire out : 145 m Speed : 3.2 kn
Sorted : 79 Total catch: 78.53 Catch/hour: 156.13

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Lagocephalus laevigatus	150.80	157	96.59
Caranx rhonchus	1.31	2	0.84
Syacium micrurum	1.07	6	0.69
Ascidans	0.91	14	0.59
Caranx crysos	0.83	2	0.53
Bothus podas	0.48	8	0.31
Sargassum spp	0.24	0	0.15
Trachinocephalus myops	0.20	2	0.13
Xyrichtys novacula	0.12	2	0.08
Hermits, mixed	0.08	12	0.05
Grammoplites gruveli	0.04	2	0.03
Decapterus punctatus	0.04	2	0.03
Alloteuthis africana	0.00	6	0.00
Total	156.13		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 139
DATE :19/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
10°45.99
start stop duration Lon W
16°46.21
TIME :10:50:54 11:22:04 31.2 (min) Purpose : 3
LOG : 6504.80 6506.49 1.7 Region : 2100
FDEPTH: 69 66 Gear cond.: 0
BDEPTH: 69 66 Validity : 0
Towing dir: 0° Wire out : 200 m Speed : 3.3 kn
Sorted : 209 Total catch: 208.56 Catch/hour: 401.47

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Lagocephalus laevigatus	374.21	1790	93.21
Waste General	13.28	0	3.31
Sepia sp.	2.62	13	0.65
Sepia bertheloti	2.39	6	0.59
Trigla lyra	2.31	25	0.58
Dactylopterus volitans	1.69	8	0.42
Scorpaena scrofa	1.50	25	0.37
Sea anemone sp	1.00	27	0.25
Raja miraletus	0.81	2	0.20
Pagrus caeruleostictus	0.62	2	0.15
Brachydeuterus auritus	0.23	2	0.06
335			
Sargassum spp	0.19	0	0.05
Syacium micrurum	0.19	2	0.05
Grammoplites gruveli	0.12	4	0.03
Alloteuthis africana	0.12	96	0.03
Hermits, mixed	0.08	13	0.02
Sea urchins (waek spines)	0.08	10	0.02
Starfish red A	0.04	4	0.01
Arnoglossus imperialis	0.00	4	0.00
Sternodromia spinirostrus	0.00	2	0.00
PORIFERA (Sponges)	0.00	2	0.00
Total	401.47		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 140
DATE :19/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
10°45.58
start stop duration Lon W
16°54.03
TIME :13:17:10 13:47:14 30.1 (min) Purpose : 3
LOG : 6517.55 6519.00 1.4 Region : 2100
FDEPTH: 120 120 Gear cond.: 0
BDEPTH: 120 120 Validity : 0
Towing dir: 0° Wire out : 300 m Speed : 2.9 kn
Sorted : 91 Total catch: 90.68 Catch/hour: 180.94

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
SPARIDAE	88.15	7979	48.72
Spicara alta	22.03	577	12.17
Scorpaena stephanica	20.67	128	11.42
Ariomma bondi	13.33	212	7.37
Waste General	13.25	0	7.32
Zeus faber	6.07	18	3.35
Sea urchins (waek spines)	3.07	371	1.70
SPARIDAE	2.43	62	1.35
337			
Raja miraletus	2.00	4	1.10
Caranx rhonchus	1.96	66	1.08
Sphoeroides pachygaster	1.96	4	1.08
Sepia hierredda	1.16	8	0.64
338			
Antigonia capros	1.12	24	0.62
Priacanthus arenatus	1.00	4	0.55
Trigloporus lastoviza	0.96	32	0.53
Trachinocephalus myops	0.32	4	0.18
Illex coindetii	0.32	8	0.18
Lagocephalus laevigatus	0.32	2	0.18
Sea cucumber	0.28	6	0.15
Scorpaena scrofa	0.12	4	0.07
Microchirus boscanion	0.12	12	0.07
Peristedion cataphractum	0.08	2	0.04
B I V A L V E S	0.04	14	0.02
Sargassum spp	0.04	0	0.02
Citharus linguatula	0.04	10	0.02
Arnoglossus imperialis	0.04	2	0.02
Grammoplites gruveli	0.04	2	0.02
Hermits, mixed	0.02	12	0.01
PARAPAGURIDAE	0.02	2	0.01
Sea anemone sp	0.00	2	0.00
Total	180.94		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 141
DATE :19/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
10°37.67
start stop duration Lon W
17°1.08
TIME :15:35:43 16:05:59 30.3 (min) Purpose : 3
LOG : 6532.04 6533.72 1.7 Region : 2100
FDEPTH: 207 207 Gear cond.: 0
BDEPTH: 207 207 Validity : 0
Towing dir: 0° Wire out : 530 m Speed : 3.3 kn
Sorted : 225 Total catch: 1798.92 Catch/hour: 3566.93

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Pteroscion peli	3184.88	906464	89.29
Ariomma bondi	169.73	5853	4.76
Chlorophthalmus atlanticus	43.46	5124	1.22
Mustelus mustelus	41.88	16	1.17
Penaeus notialis	34.26	3902	0.96
Octopus vulgaris	32.68	16	0.92
Merluccius polli	30.77	619	0.86
Trichiurus lepturus	6.35	16	0.18
Illex coindetii	6.03	0	0.17
Antigonia capros	5.39	238	0.15
Bembrops heterurus	3.49	95	0.10
Trachinocephalus myops	3.17	32	0.09
Scorpaena normani	1.90	16	0.05
Waste General	1.59	0	0.04
Trigla lyra	0.63	32	0.02
Trigloporus lastoviza	0.32	16	0.01
Citharus linguatula	0.32	32	0.01
Sepia sp.	0.06	16	0.00
Ophiuroidae	0.02	79	0.00
Total	3566.93		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 142
DATE :20/09/19 GEAR TYPE: PT NO: 1 POSITION:Lat N
10°59.25
start stop duration Lon W
16°55.27
TIME :01:42:26 02:43:12 60.8 (min) Purpose : 1
LOG : 6614.37 6617.55 3.2 Region : 2100
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 48 52 Validity : 0
Towing dir: 0° Wire out : 140 m Speed : 3.1 kn
Sorted : 37 Total catch: 36.52 Catch/hour: 36.06

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Sardinella aurita	22.18	161	61.50
339			
Caranx crysos	5.86	11	16.27
Trachinotus ovatus	3.18	13	8.82
Sardinella maderensis	2.69	21	7.45
340			
Carlarius heudelotii	1.54	1	4.27
Lagocephalus laevigatus	0.49	2	1.37
Decapterus punctatus	0.08	1	0.22
Echeneis naucrates	0.04	1	0.11
Total	36.06		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 143
DATE :20/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
10°56.74
start stop duration Lon W
16°59.11
TIME :06:52:48 07:23:09 30.4 (min) Purpose : 3
LOG : 6630.84 6632.49 1.6 Region : 2100
FDEPTH: 63 60 Gear cond.: 0
BDEPTH: 63 60 Validity : 0
Towing dir: 0° Wire out : 190 m Speed : 3.3 kn
Sorted : 40 Total catch: 39.86 Catch/hour: 78.77

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Dactylopterus volitans	20.87	99	26.49
Trichiurus lepturus	15.18	45	19.27
Lagocephalus laevigatus	14.43	59	18.31
Caranx rhonchus	9.41	16	11.94
Trigla lyra	6.13	63	7.78
Waste General	2.89	0	3.66
Priacanthus arenatus	2.21	10	2.81
Bothus podas	1.30	18	1.66
Raja miraletus	1.15	6	1.46
Ascidans	0.99	16	1.25
Pseudupeneus prayensis	0.99	6	1.25
Trachinocephalus myops	0.95	4	1.20
Sepia bertheloti	0.59	4	0.75
Dicologoglossa cuneata	0.43	4	0.55
Uranoscopus albesca	0.32	2	0.40
Sepia sp.	0.20	2	0.25
Synchiropus phaeton	0.20	18	0.25
Sphoeroides maculatus	0.16	4	0.20
Hermits, mixed	0.13	32	0.17
Sepia hierredda	0.12	4	0.15
341			
Sea urchins (waek spines)	0.04	10	0.05
Cynoglossus senegalensis	0.04	6	0.05
342			
Macropipus rugosus	0.03	6	0.04
Arnoglossus imperialis	0.02	2	0.03
Scyllarides latus	0.01	2	0.01
Total	78.77		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 144
DATE :20/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
10°59.66
start stop duration Lon W
16°52.23
TIME :08:58:12 09:29:29 31.3 (min) Purpose : 3
LOG : 6643.84 6645.51 1.7 Region : 2100
FDEPTH: 41 39 Gear cond.: 0
BDEPTH: 41 39 Validity : 0
Towing dir: 0° Wire out : 135 m Speed : 3.2 kn
Sorted : 17 Total catch: 17.23 Catch/hour: 33.04

SPECIES	CATCH/HOUR		% OF TOT.
C SAMP			
	weight	numbers	
Carlarius parkii	7.86	8	23.79
Lagocephalus laevigatus	7.48	17	22.63
Dactylopterus volitans	3.57	13	10.79
Waste General	3.26	0	9.86
Ascidans	2.68	58	8.12
Sepia bertheloti	2.65	4	8.01
Sepia hierredda	1.11	4	3.37
343			
Seriola rivoliana	1.00	2	3.02
Fistularia petimba	0.92	6	2.79
Caranx crysos	0.81	2	2.44
Octopus vulgaris	0.77	2	2.32
Selene dorsalis	0.38	2	1.16
Priacanthus arenatus	0.35	2	1.04
Antennarius "biocellatus"	0.08	2	0.23
Pennatulacea	0.04	6	0.12
Starfish - dark	0.03	2	0.09
Hermits, mixed	0.02	4	0.06
RANINIDAE	0.02	2	0.05
PARAPAGURIDAE	0.01	2	0.04
Stenorhynchus lanceolatus	0.01	8	0.03
Sargassum spp	0.01	0	0.03
Plastic	0.01	0	0.02
Total	33.04		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 145
DATE :20/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
11°4.01
start stop duration Lon W
16°49.57
TIME :10:49:26 11:20:39 31.2 (min) Purpose : 3
LOG : 6653.92 6655.78 1.9 Region : 2100
FDEPTH: 23 23 Gear cond.: 0
BDEPTH: 23 23 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.6 kn
Sorted : 100 Total catch: 100.16 Catch/hour: 192.49

C	SPECIES SAMP	CATCH/HOUR weight	% OF TOT. numbers
	Caranx rhonchus	112.72	413 58.56
	Lagocephalus laevigatus	51.43	102 26.72
	Sardinella maderensis	7.69	40 3.99
344			
	Balistes capriscus	3.84	4 2.00
	Chloroscombrus chrysurus	3.42	19 1.78
	Caranx crysos	3.38	10 1.76
	Sphyraena guachancho	2.34	2 1.22
	Alectis alexandrinus	2.11	6 1.10
	Caranx senegallus	1.35	4 0.70
	Galeoides decadactylus	1.19	4 0.62
345			
	Pseudupeneus prayensis	0.50	2 0.26
	Selene dorsalis	0.46	4 0.24
	Trichiurus lepturus	0.38	2 0.20
	Sipunculida	0.31	83 0.16
	Trachinocephalus myops	0.31	2 0.16
	Pennatulacea	0.27	37 0.14
	Sargassum spp	0.23	0 0.12
	PARAPAGURIDAE	0.23	10 0.12
	Waste General	0.19	0 0.10
	Ascidans	0.12	2 0.06
	Hermits, mixed	0.02	4 0.01
	Total	192.49	100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 146
DATE :20/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
11°10.63
start stop duration Lon W
16°58.48
TIME :13:08:10 13:38:12 30.1 (min) Purpose : 3
LOG : 6666.22 6667.57 1.4 Region : 2100
FDEPTH: 28 27 Gear cond.: 0
BDEPTH: 28 27 Validity : 0
Towing dir: 0° Wire out : 85 m Speed : 2.7 kn
Sorted : 18 Total catch: 17.76 Catch/hour: 35.46

C	SPECIES SAMP	CATCH/HOUR weight	% OF TOT. numbers
	Caranx rhonchus	7.27	24 20.50
	Sepia hierredda	6.43	10 18.13
347			
	Sepia bertheloti	5.15	4 14.53
	Diodon holocanthus	4.59	6 12.95
	Lagocephalus laevigatus	2.84	4 8.00
	Octopus vulgaris	2.52	2 7.09
	Carlarius parkii	1.68	6 4.73
	Trachinocephalus myops	0.96	2 2.70
	Fistularia tabacaria	0.84	2 2.36
	Nicholsina usta	0.72	2 2.03
	Galeoides decadactylus	0.68	2 1.91
346			
	Pterois cf. volitans	0.64	2 1.80
	Chilomycterus spinosus mauretanicus	0.36	2 1.01
	Fistularia petimba	0.28	2 0.79
	Sargassum spp	0.20	0 0.56
	Bothus podas	0.20	2 0.56
	Actinoptilum	0.12	2 0.34
	Total	35.46	100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 147
DATE :20/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
11°8.02
start stop duration Lon W
17°3.95
TIME :15:54:47 16:25:16 30.5 (min) Purpose : 3
LOG : 6684.97 6686.63 1.6 Region : 2100
FDEPTH: 44 45 Gear cond.: 0
BDEPTH: 44 45 Validity : 0
Towing dir: 0° Wire out : 140 m Speed : 3.3 kn
Sorted : 32 Total catch: 31.68 Catch/hour: 62.37

C	SPECIES SAMP	CATCH/HOUR weight	% OF TOT. numbers
	Waste General	24.54	0 39.34
	Pseudupeneus prayensis	14.77	98 23.68
	Sepia hierredda	5.40	14 8.65
348			
	Alcyonacea	4.37	98 7.01
	Seriola rivoliana	2.28	2 3.66
	Lagocephalus laevigatus	2.17	8 3.47
	Octopus vulgaris	1.38	4 2.21
	Trigloporus lastoviza	1.26	12 2.02
	Dactylopterus volitans	1.26	6 2.02
	Scorpaena stephanica	0.98	10 1.58
	Auxis thazard	0.87	2 1.39
	Sphoeroides marmoratus	0.87	14 1.39
	Bassanago albescens	0.43	2 0.69
	Citharus linguatula	0.39	4 0.63
	Zeus faber	0.35	2 0.57
	Fistularia petimba	0.32	6 0.51
	Trachinocephalus myops	0.32	2 0.51
	Grammoplites gruveli	0.12	6 0.19
	Starfish	0.12	8 0.19
	Sea urchins (strong spines)	0.08	6 0.13
	Actinoptilum	0.04	2 0.06
	Sargassum spp	0.04	0 0.06
	Plastic	0.02	0 0.03
	P O L Y C H A E T A	0.00	49 0.01
	Sea urchins (waek spines)	0.00	2 0.00
	Stenorhynchus lanceolatus	0.00	2 0.00
	Hermits, mixed	0.00	12 0.00
	Calappa sp.	0.00	6 0.00
	Total	62.37	100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 148
DATE :20/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
11°7.73
start stop duration Lon W
17°7.10
TIME :17:51:09 18:22:04 30.9 (min) Purpose : 3
LOG : 6695.00 6696.72 1.7 Region : 2100
FDEPTH: 72 74 Gear cond.: 0
BDEPTH: 72 74 Validity : 0
Towing dir: 0° Wire out : 220 m Speed : 3.3 kn
Sorted : 43 Total catch: 42.55 Catch/hour: 82.53

C	SPECIES SAMP	CATCH/HOUR weight	% OF TOT. numbers
	Squatina oculata	23.16	4 28.06
	Trigla lyra	10.24	165 12.41
	Pagellus bellottii	9.54	182 11.56
349			
	Raja miraletus	5.59	12 6.77
	Waste General	4.35	0 5.26
	Loligo vulgaris	3.49	1179 4.23
	Caranx crysos	3.26	6 3.95
	Zeus faber	2.91	25 3.53
	Scorpaena stephanica	2.68	16 3.24
	Alloteuthis africana	1.98	2017 2.40
	Sepia bertheloti	1.98	16 2.40
	Sea urchins (waek spines)	1.90	557 2.30
	Fistularia petimba	1.59	4 1.93
	Citharus linguatula	1.59	43 1.93
	Pseudupeneus prayensis	1.13	8 1.36
	Priacanthus arenatus	0.97	4 1.18
	Grammoplites gruveli	0.93	29 1.13
	Ascidans	0.93	14 1.13
	Dactylopterus volitans	0.89	4 1.08
	Octopus macropus	0.62	4 0.75
	Sepia hierredda	0.50	4 0.61
350			
	Saurida brasiliensis	0.39	64 0.47
	Plastic	0.31	0 0.38
	Starfish - dark	0.29	21 0.35
	Scomber colias	0.23	2 0.28
351			
	Uranoscopus albesca	0.23	2 0.28
	Arnoglossus imperialis	0.16	23 0.19
	Blennius normani	0.16	6 0.19
	Sargassum spp	0.12	0 0.14
	Sphoeroides marmoratus	0.12	2 0.14
	Antennarius "biocellatus"	0.12	2 0.14
	Lophiodes kempi	0.08	2 0.09
	Shark eggs	0.03	2 0.04
	Pennatulacea	0.03	4 0.04
	Bryozoa spp.	0.02	6 0.02
	G A S T R O P O D S	0.01	2 0.01
	Callinectes pallidus	0.01	2 0.01
	Liocarcinus marmoreus	0.01	2 0.01
	Starfish red A	0.00	12 0.00
	Total	82.53	100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 149
DATE :21/09/19 GEAR TYPE: PT NO: 1 POSITION:Lat N
11°24.36
start stop duration Lon W
17°11.20
TIME :02:54:05 03:54:15 60.2 (min) Purpose : 1
LOG : 6746.04 6749.18 3.1 Region : 2100
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 52 44 Validity : 0
Towing dir: 0° Wire out : 140 m Speed : 3.1 kn
Sorted : 52 Total catch: 52.43 Catch/hour: 52.28

C	SPECIES SAMP	CATCH/HOUR weight	% OF TOT. numbers
	Lagocephalus laevigatus	24.77	92 47.38
	Caranx crysos	9.55	22 18.27
	Trachinotus ovatus	8.40	37 16.06
	Auxis thazard	6.54	14 12.51
	Euthynnus alletteratus	1.02	2 1.95
	Caranx rhonchus	0.72	2 1.37
	Sardinella maderensis	0.62	3 1.18
353			
	Scomber colias	0.28	2 0.53
352			
	Sardinella aurita	0.18	1 0.34
354			
	Echeneis naucrates	0.12	1 0.23
	Illex coindetii	0.08	66 0.15
	Decapterus punctatus	0.01	2 0.02
	Calappa sp.	0.00	1 0.00
	Total	52.28	100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 150
DATE :21/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
11°26.30
start stop duration Lon W
17°5.10
TIME :06:55:51 07:27:02 31.2 (min) Purpose : 3
LOG : 6765.08 6766.82 1.7 Region : 2100
FDEPTH: 38 38 Gear cond.: 0
BDEPTH: 38 38 Validity : 0
Towing dir: 0° Wire out : 130 m Speed : 3.3 kn
Sorted : 156 Total catch: 1371.77 Catch/hour: 2638.86

C	SPECIES SAMP	CATCH/HOUR weight	% OF TOT. numbers
	Brachydeuterus auritus	1364.44	18131 51.71
357			
	Galeoides decadactylus	488.39	4080 18.51
358			
	Carlarius parkii	305.39	694 11.57
	Pagellus bellottii	154.73	2624 5.86
356			
	Eucinostomus melanopterus	116.47	1100 4.41
	Caranx rhonchus	89.72	1591 3.40
	Sphyraena guachancho	39.95	169 1.51
	Selene dorsalis	39.61	458 1.50
	Waste General	11.85	0 0.45
0			
	Paraconger notialis	7.45	17 0.28
	Caranx crysos	5.42	17 0.21
	Octopus vulgaris	4.96	2 0.19
	Pseudupeneus prayensis	2.71	17 0.10
	Trichiurus lepturus	2.37	17 0.09
	Sardinella aurita	2.37	67 0.09
355			
	Syacium micrurum	1.02	17 0.04
	Waste General	0.92	2 0.03
	Penaeus notialis	0.85	17 0.03
359			
	Loligo vulgaris	0.15	67 0.01
	Sipunculida	0.08	17 0.00
	Blennius normani	0.02	17 0.00
	Total	2638.86	100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 151
DATE :21/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
11°29.17
start stop duration Lon W
17°1.86
TIME :08:30:49 09:01:54 31.1 (min) Purpose : 3
LOG : 6770.79 6772.60 1.8 Region : 2100
FDEPTH: 30 30 Gear cond.: 0
BDEPTH: 30 30 Validity : 0
Towing dir: 0° Wire out : 125 m Speed : 3.5 kn

Sorted : 73 Total catch: 73.21 Catch/hour: 141.33

C	SPECIES SAMP	CATCH/HOUR weight	numbers	% OF TOT.
	Galeoides decadactylus	71.12	753	50.32
361				
	Eucinostomus melanopterus	31.12	342	22.02
	Brachydeuterus auritus	10.00	114	7.08
360				
	Chloroscombrus chrysurus	4.13	31	2.92
	Octopus vulgaris	3.01	2	2.13
	Rhinobatos rhinobatos	2.82	2	1.99
	Waste General	2.55	0	1.80
	Syacium micrurum	2.39	31	1.69
	Lagocephalus laevigatus	2.16	2	1.53
	Caranx crysos	2.05	6	1.45
	Caranx rhonchus	1.81	27	1.28
	Echeneis naucrates	1.58	4	1.12
	Pagellus bellottii	1.47	21	1.04
362				
	Decapterus punctatus	1.12	62	0.79
	Paraconger notialis	0.93	2	0.66
	Trichiurus lepturus	0.85	4	0.60
	Sargassum spp	0.58	0	0.41
	Sphyraena guachancho	0.42	2	0.30
	Sepia bertheloti	0.31	2	0.22
	Ascidans	0.23	2	0.16
	Pseudupeneus prayensis	0.19	2	0.14
	Cynoglossus senegalensis	0.15	2	0.11
364				
	Sardinella aurita	0.12	12	0.08
363				
	Cronius ruber	0.12	2	0.08
	Sea anemone sp	0.04	8	0.03
	Sea urchins (waek spines)	0.02	2	0.01
	Callinectes pallidus	0.02	6	0.01
	Hermits, mixed	0.02	2	0.01
	Loligo vulgaris	0.01	4	0.00
	Scyllarides latus	0.01	2	0.00
	Spinolambrus notialis	0.00	2	0.00
	Total	141.33		100.00

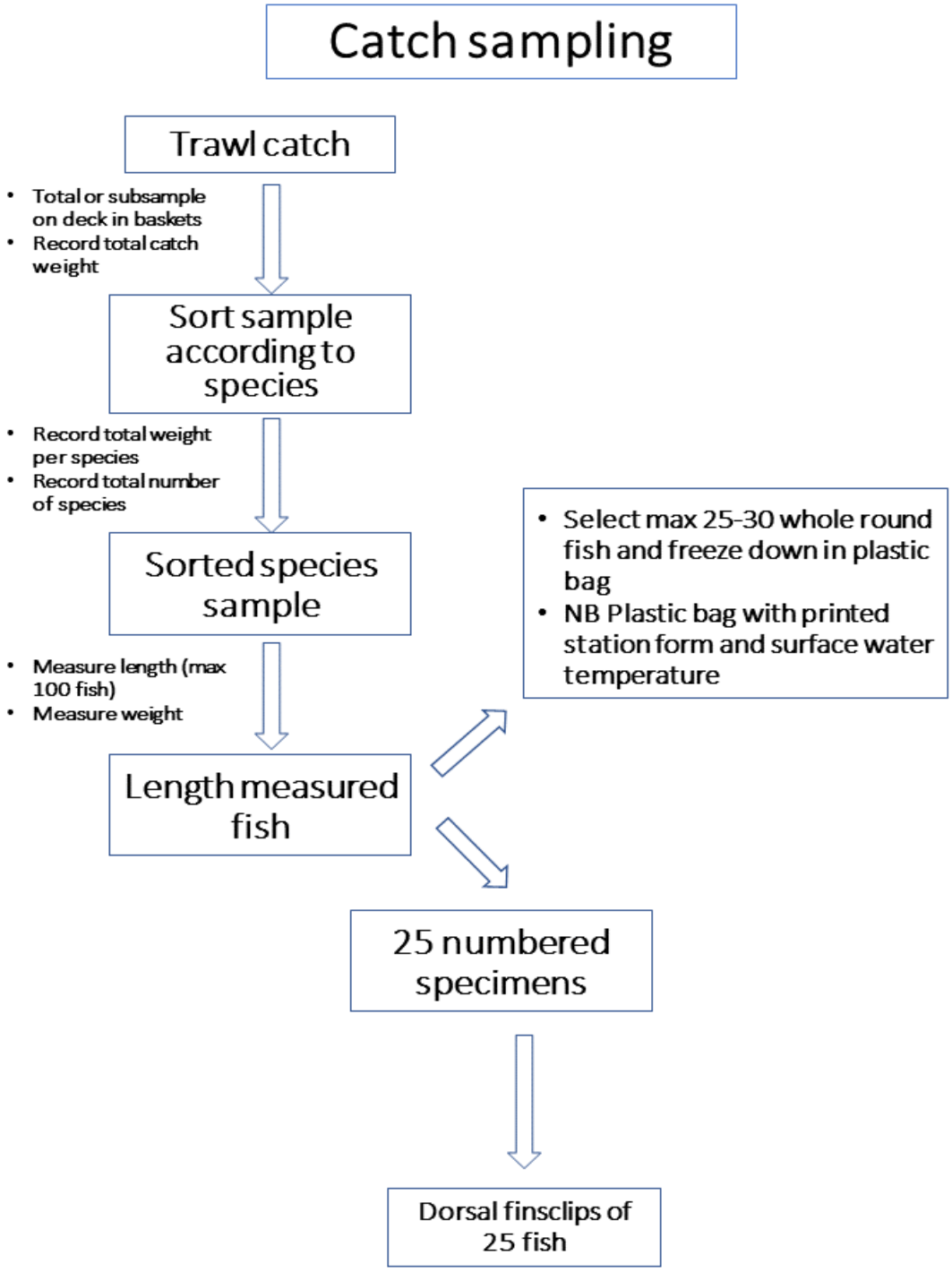
R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 152
DATE :21/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
11°34.02
start stop duration Lon W
17°10.98
TIME :10:39:13 11:09:41 30.5 (min) Purpose : 3
LOG : 6784.23 6785.94 1.7 Region : 2100
FDEPTH: 57 58 Gear cond.: 0
BDEPTH: 57 58 Validity : 0
Towing dir: 0° Wire out : 170 m Speed : 3.4 kn
Sorted : 29 Total catch: 28.94 Catch/hour: 56.97

C	SPECIES SAMP	CATCH/HOUR weight	numbers	% OF TOT.
	Brachydeuterus auritus	10.71	89	18.80
	Sea urchins (waek spines)	8.86	974	15.55
	Pseudupeneus prayensis	5.63	37	9.88
	Octopus vulgaris	5.16	8	9.05
	Mustelus mustelus	4.57	2	8.02
	Grammoplites gruveli	3.74	108	6.56
	Pagellus bellottii	2.91	59	5.11
	Waste General	2.24	0	3.94
	Scorpaena normani	1.81	28	3.18
	Lagocephalus laevigatus	1.65	8	2.90
	Loligo vulgaris	1.57	616	2.76
	Raja miraletus	1.06	8	1.87
	Caranx crysos	0.91	2	1.59
	Alloteuthis africana	0.87	1169	1.52
	Sargassum spp	0.63	0	1.11
	Octopus macropus	0.55	4	0.97
	Fistularia petimba	0.55	4	0.97
	Serranus cabrilla	0.51	6	0.90
	Arnoglossus imperialis	0.51	41	0.90
	Sepia bertheloti	0.31	22	0.55
	Decapterus punctatus	0.31	16	0.55
	Citharus linguatula	0.24	20	0.41
	Dentex congoensis	0.24	12	0.41
	Brotula barbata	0.20	4	0.35
	Hermits, mixed	0.20	55	0.35
	Selene dorsalis	0.20	6	0.35
	Sea cucumber	0.20	8	0.35
	Caranx rhonchus	0.16	4	0.28
	Sepia hierredda	0.12	8	0.21
	Saurida brasiliensis	0.12	20	0.21
	Scyllarides latus	0.08	26	0.14
	Snail	0.06	10	0.10
	Blennius normani	0.04	4	0.07
	Penaeus notialis	0.04	2	0.07
366				
	Calappa pelii	0.02	6	0.03
	Starfish - dark	0.00	4	0.01
	Ilia spinosa	0.00	2	0.00
	RANINIDAE	0.00	6	0.00
	Small crabs	0.00	4	0.00
	Total	56.98		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019409 STATION: 153
DATE :21/09/19 GEAR TYPE: BT NO: 2 POSITION:Lat N
11°39.59
start stop duration Lon W
17°10.46
TIME :13:47:16 14:04:02 16.8 (min) Purpose : 3
LOG : 6805.74 6806.68 0.9 Region : 2100
FDEPTH: 59 59 Gear cond.: 0
BDEPTH: 59 59 Validity : 0
Towing dir: 0° Wire out : 165 m Speed : 3.3 kn
Sorted : 37 Total catch: 37.32 Catch/hour: 133.53

C	SPECIES SAMP	CATCH/HOUR weight	numbers	% OF TOT.
	Pteroscion peli	35.85	333	26.85
	Caranx rhonchus	30.84	2776	23.10
	Citharus linguatula	8.09	394	6.06
	Dicologoglossa cuneata	7.16	75	5.36
	Mustelus mustelus	7.01	4	5.25
	Pagellus bellottii	5.22	343	3.91
370				
	Brachydeuterus auritus	4.87	1996	3.64
	Octopus vulgaris	4.29	18	3.22
	Brotula barbata	4.22	43	3.16
	Raja miraletus	4.01	7	3.00
	Penaeus notialis	3.72	222	2.79
368				
	Pseudotolithus senegalensis	3.01	4	2.25
369				
	Bassanago albescens	2.86	18	2.14
	Trachinocephalus myops	2.79	79	2.09
	Sepia sp	2.65	7	1.98
	Illex coindetii	1.79	1342	1.34
	Caranx crysos	1.65	4	1.23
	Engraulis encrasicolus	0.57	68	0.43
	Sardinella aurita	0.57	61	0.43
367				
	Nudibranchs	0.54	7	0.40
	Sargassum spp	0.43	0	0.32
	Pseudupeneus prayensis	0.36	4	0.27
	Arnoglossus imperialis	0.36	4	0.27
	Ilia spinosa	0.29	336	0.21
	Snail	0.21	29	0.16
	Gobioides sagitta	0.14	0	0.11
	Plastic	0.04	0	0.03
	Spinolambrus notialis	0.00	7	0.00
	Unidentified	0.00	4	0.00
	Total	133.53		100.00
	Uranoscopus polli	0.06	30	0.00
	Total	2270.58		100.00

ANNEX V. OVERVIEW OF SAMPLING PROCEDURES IN THE FISH LAB



ANNEX VI. BIOLOGICAL SCALES AND STAGES

Sexual maturity

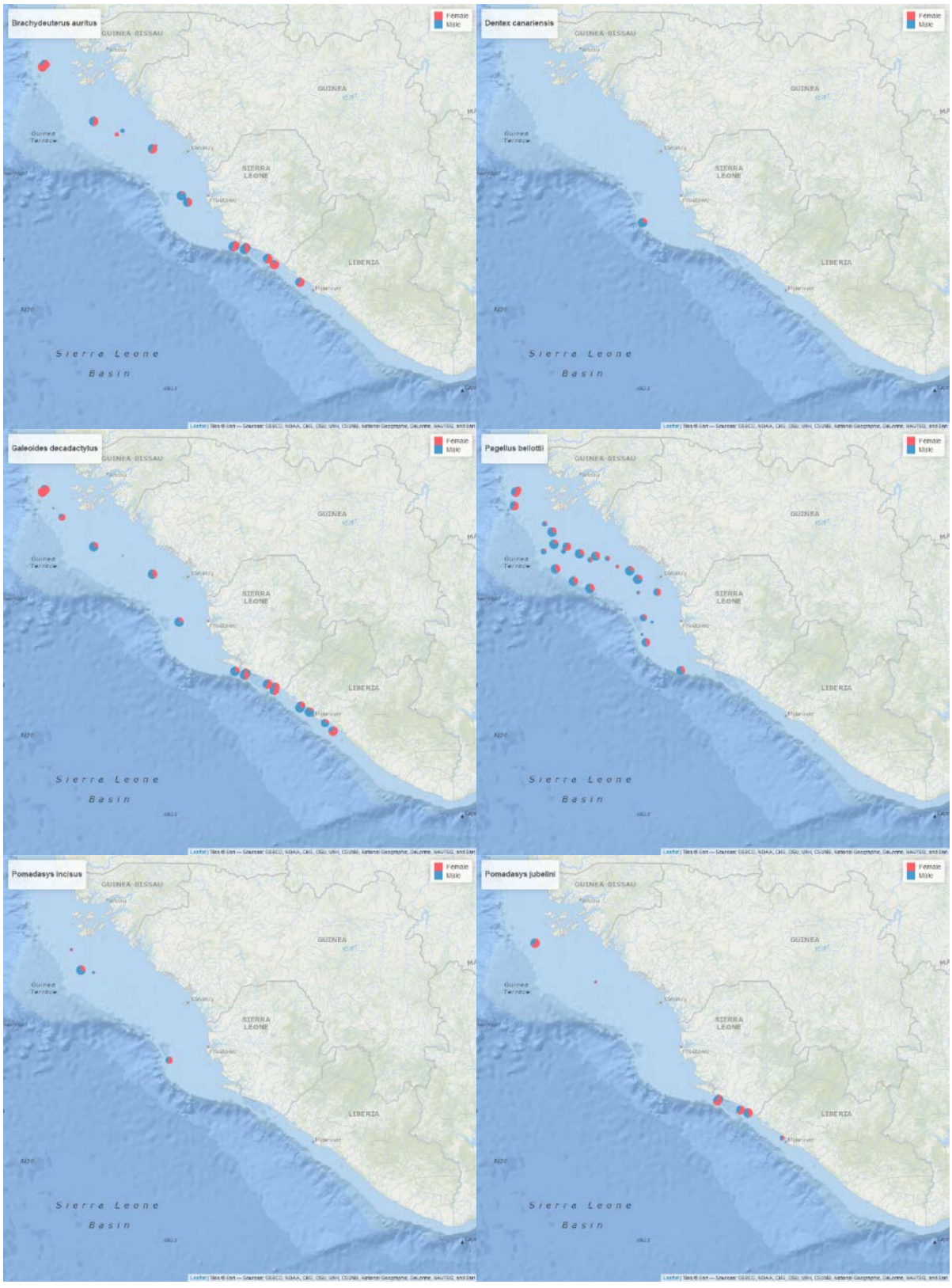
Stage	State	Description
I	Immature	Ovary and testis about 1/3rd length of body cavity. Ovaries pinkish, translucent, testis whitish. Ova not visible to naked eye.
II	Maturing virgin and recovering spent	Ovary and testis about ½ length of body cavity. Ovary pinkish, translucent, testis whitish, symmetrical. 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

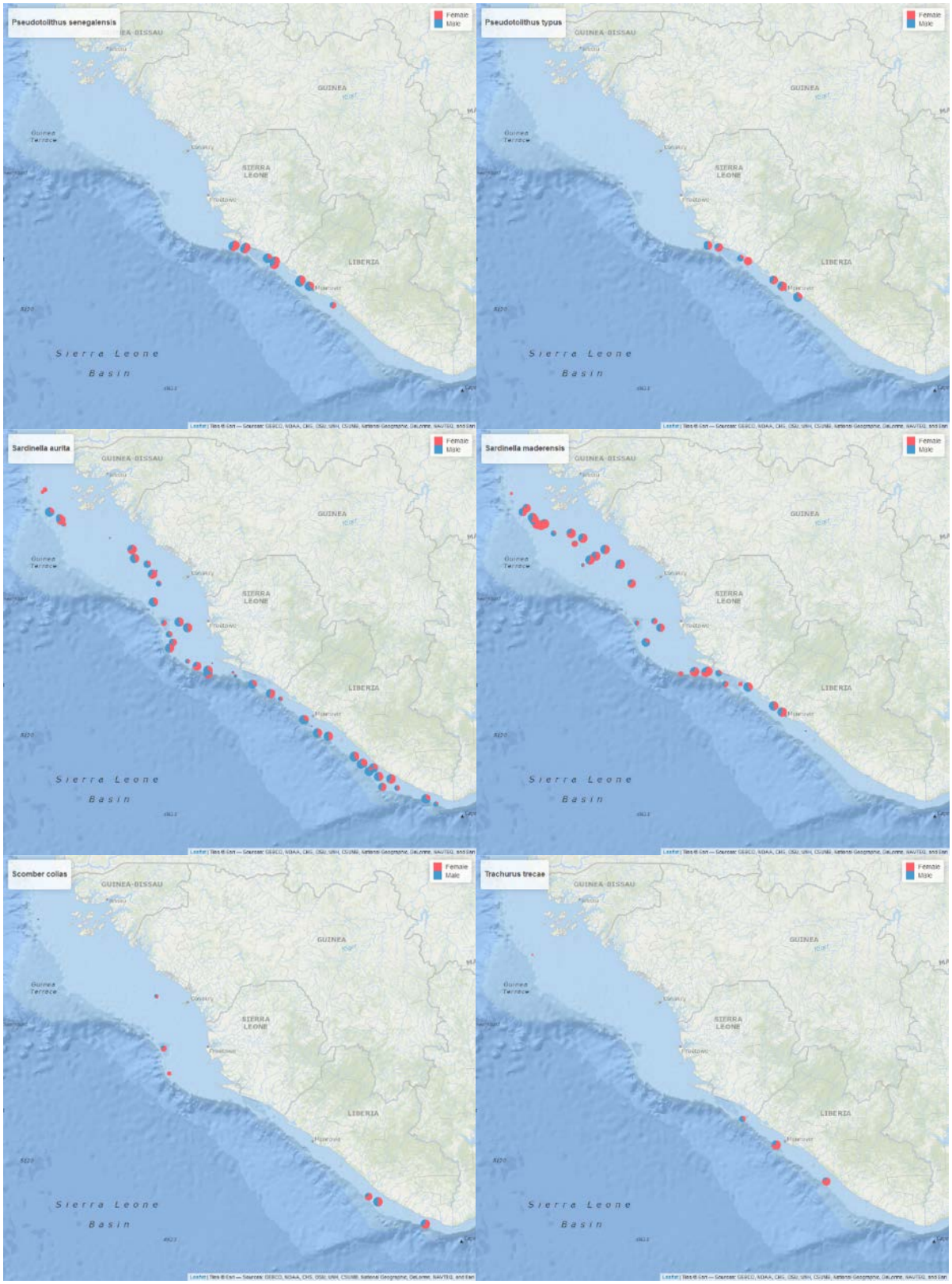
Stomach content

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.

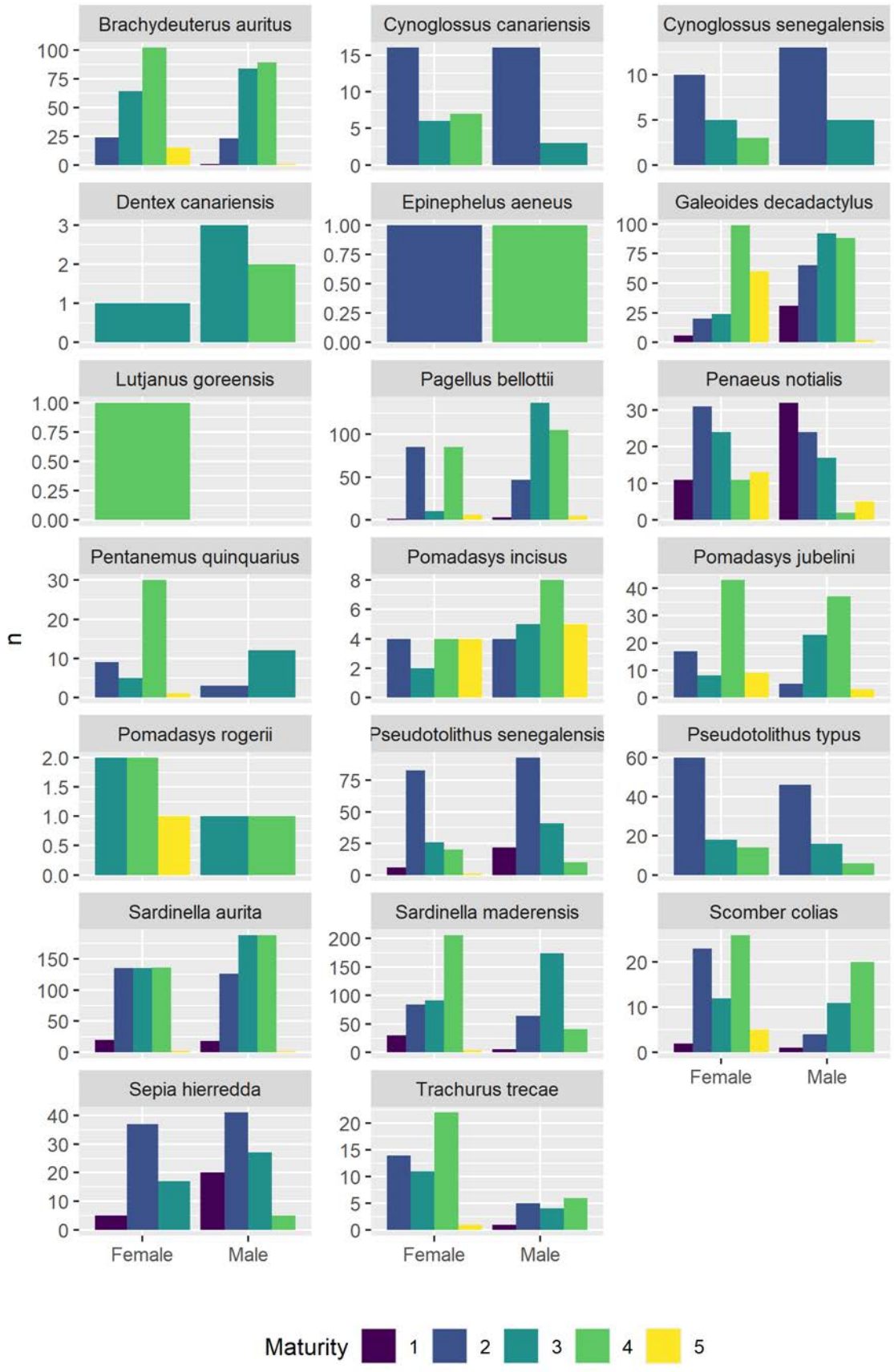
ANNEX VII. PROPORTION OF MALE FEMALES AND SEXUAL MATURITY

Proportion of males and females for priority species



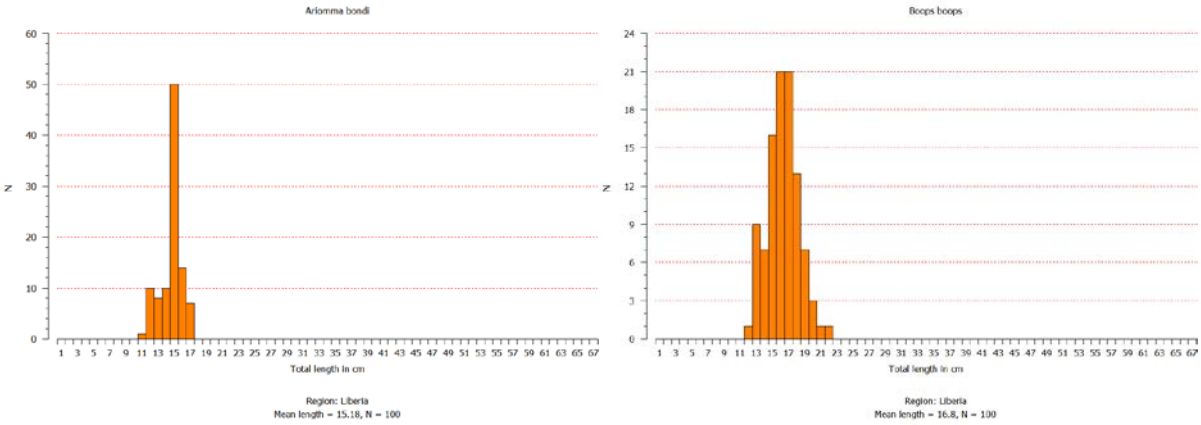

Pseudotolithus senegalensis
Female
Male
GUINEA-BISSAU
GUINEA
SIERRA LEONE
LIBERIA
Sierra Leone Basin
Pseudotolithus typus
Female
Male
GUINEA-BISSAU
GUINEA
SIERRA LEONE
LIBERIA
Sierra Leone Basin
Sardinella aurita
Female
Male
GUINEA-BISSAU
GUINEA
SIERRA LEONE
LIBERIA
Sierra Leone Basin
Sardinella maderensis
Female
Male
GUINEA-BISSAU
GUINEA
SIERRA LEONE
LIBERIA
Sierra Leone Basin
Scomber colias
Female
Male
GUINEA-BISSAU
GUINEA
SIERRA LEONE
LIBERIA
Sierra Leone Basin
Trachurus trecae
Female
Male
GUINEA-BISSAU
GUINEA
SIERRA LEONE
LIBERIA
Sierra Leone Basin

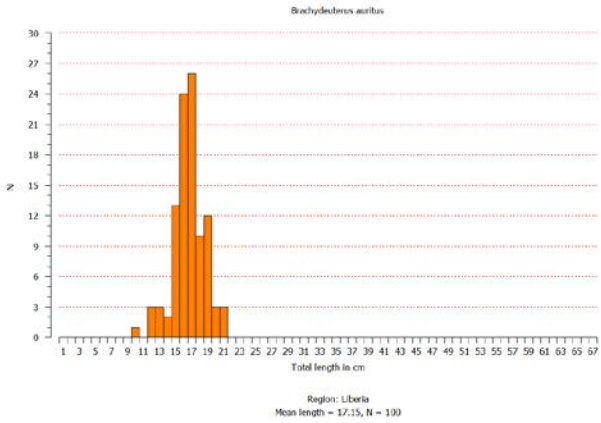
Sexual maturity for priority species

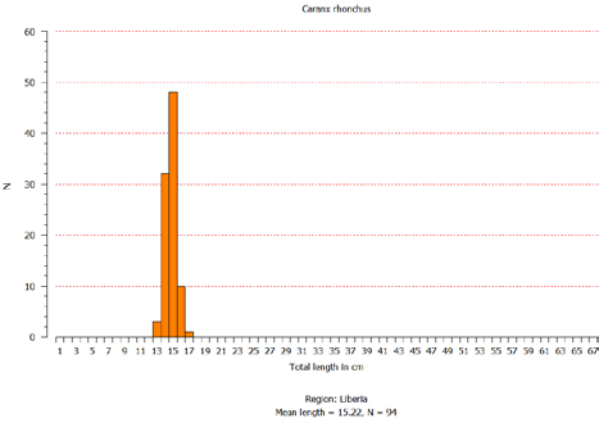


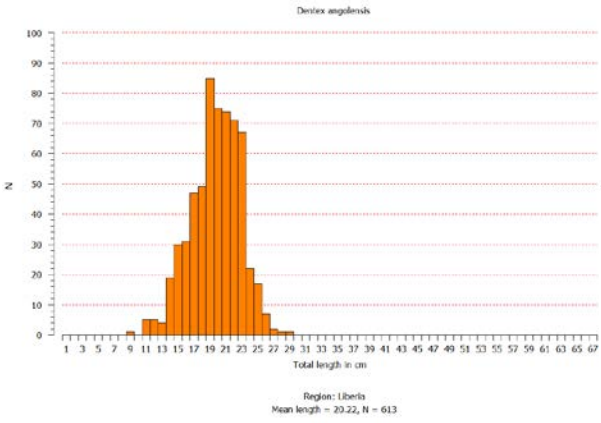
ANNEX VIII. LENGTH FREQUENCY DISTRIBUTIONS

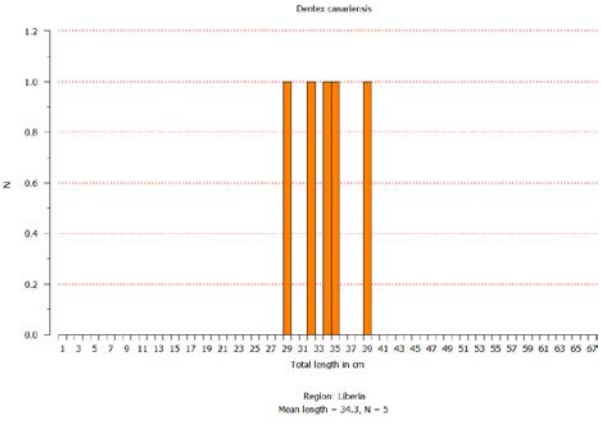
Liberia



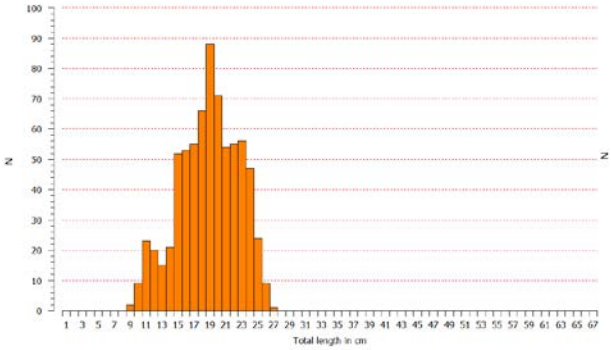






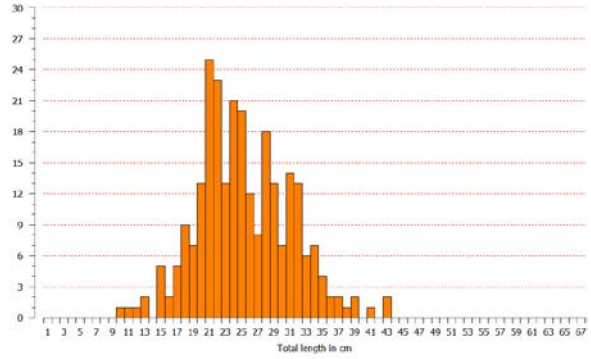


SPARIDAE



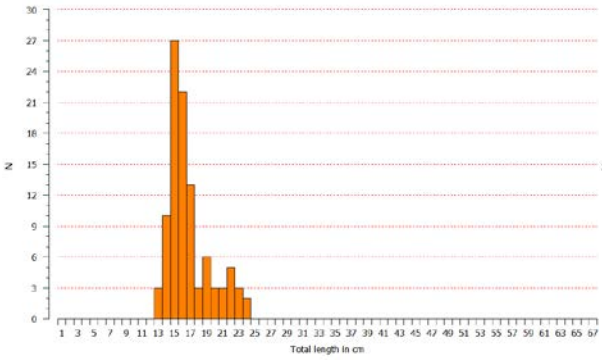
Region: Liberia
Mean length = 19.3, N = 721

Galeoides decadactylus



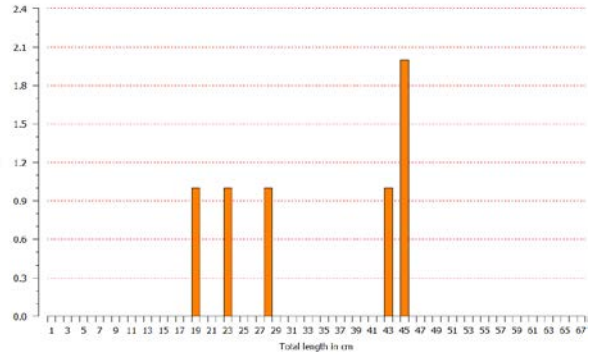
Region: Liberia
Mean length = 25.78, N = 260

Pentherosdon mbizi



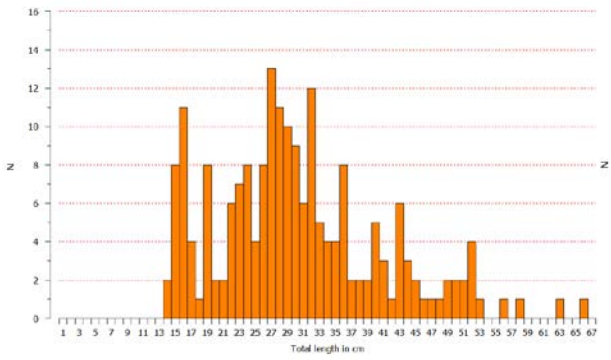
Region: Liberia
Mean length = 17.25, N = 100

Pomadasys jubelini



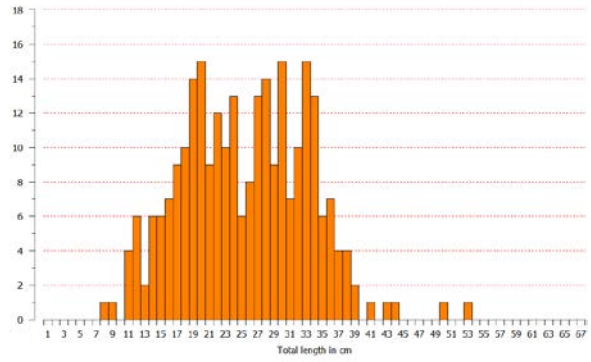
Region: Liberia
Mean length = 34.33, N = 6

Pseudotolithus senegalensis



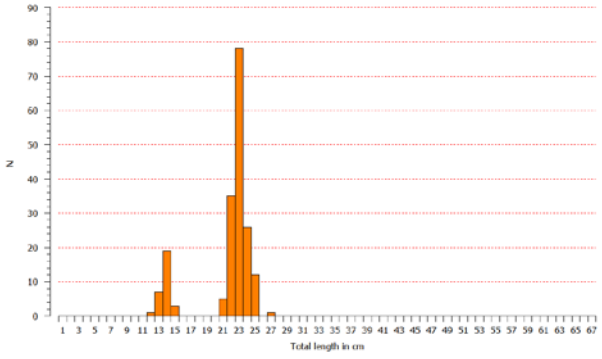
Region: Liberia
Mean length = 30.82, N = 197

Pseudotolithus typus



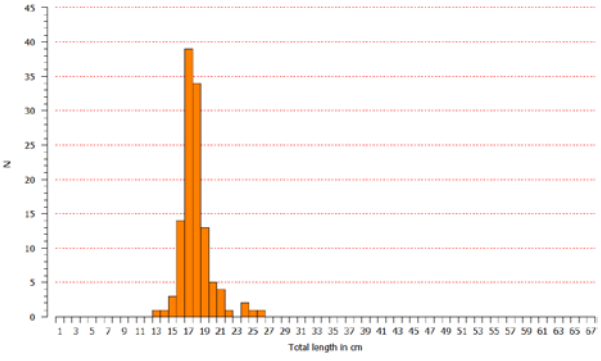
Region: Liberia
Mean length = 25.96, N = 263

Scomber colias



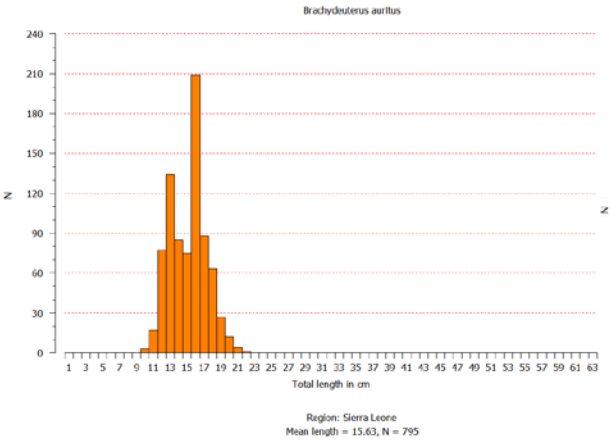
Region: Liberia
Mean length = 22.07, N = 187

Trachurus trecae

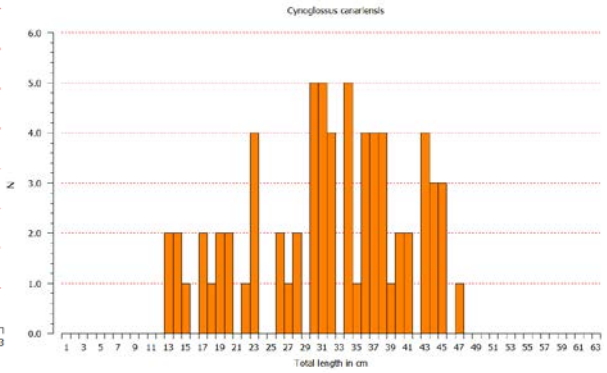


Region: Liberia
Mean length = 18.34, N = 119

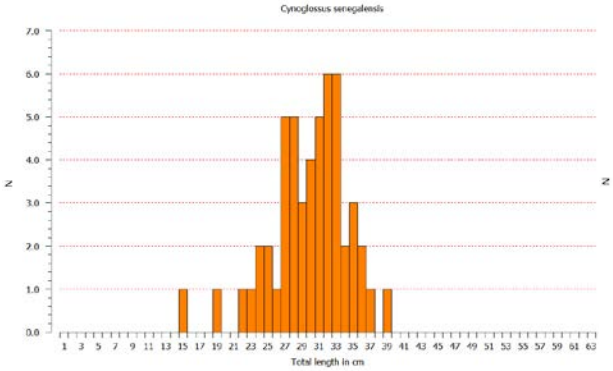
Sierra Leone



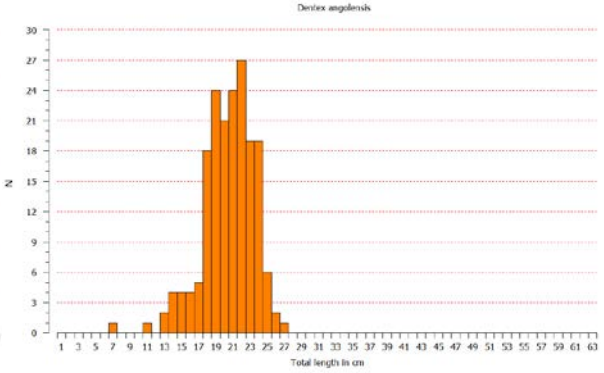
Region: Sierra Leone
Mean length = 15.63, N = 795



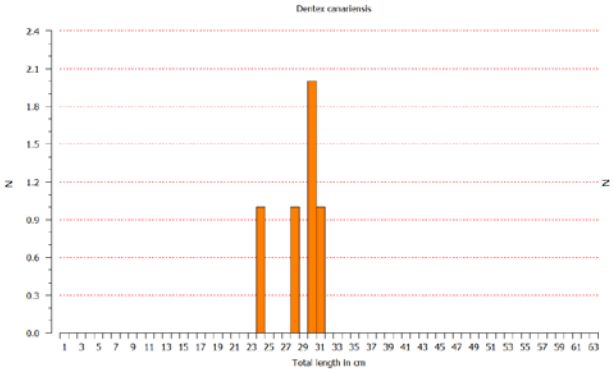
Region: Sierra Leone
Mean length = 32.17, N = 70



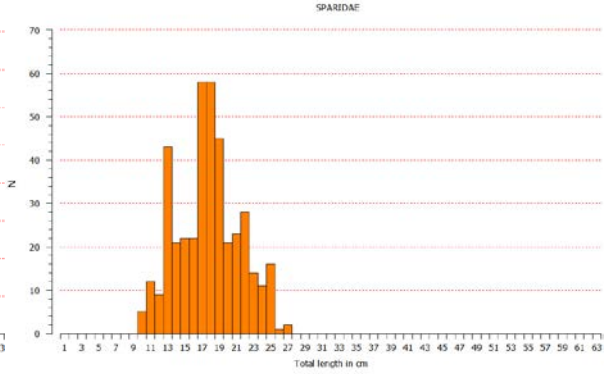
Region: Sierra Leone
Mean length = 30.33, N = 52



Region: Sierra Leone
Mean length = 20.99, N = 182

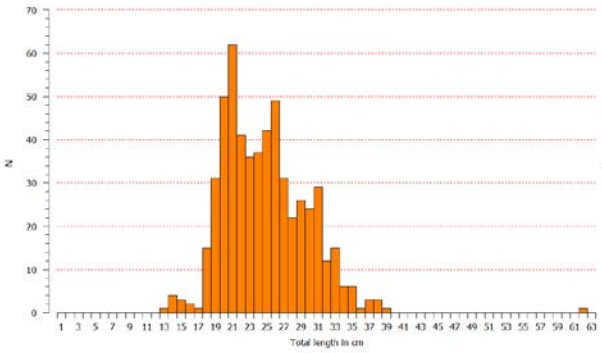


Region: Sierra Leone
Mean length = 29.1, N = 5



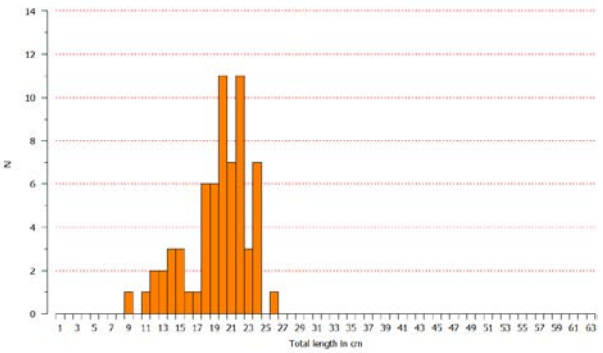
Region: Sierra Leone
Mean length = 18.25, N = 411

Galeoides decadactylus



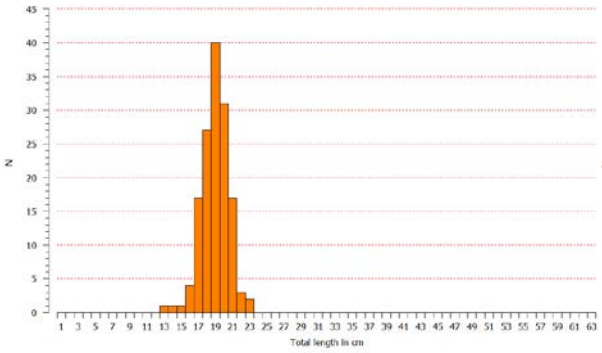
Region: Sierra Leone
Mean length = 23.31, N = 554

Pagellus bellottii



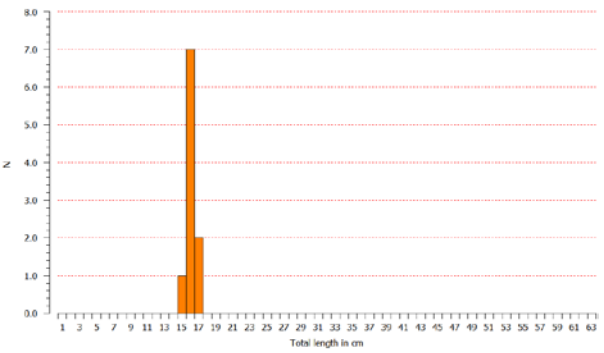
Region: Sierra Leone
Mean length = 19.95, N = 66

Pentanemus quinquarius



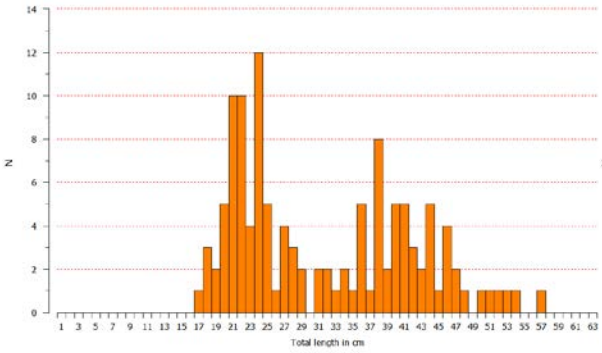
Region: Sierra Leone
Mean length = 19.46, N = 144

Pomadasys incisus



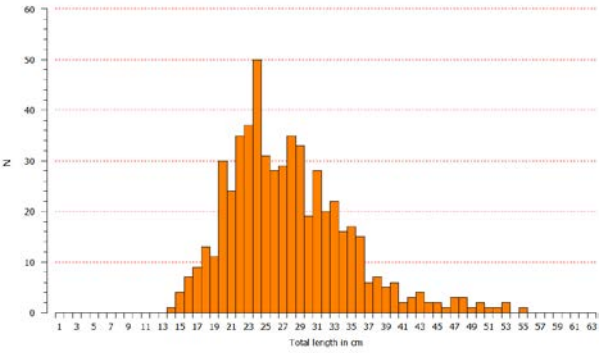
Region: Sierra Leone
Mean length = 16.6, N = 10

Pomadasys jubelini



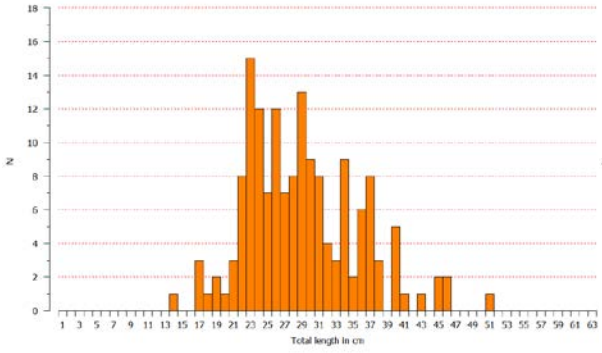
Region: Sierra Leone
Mean length = 32.22, N = 120

Pseudotolithus senegalensis



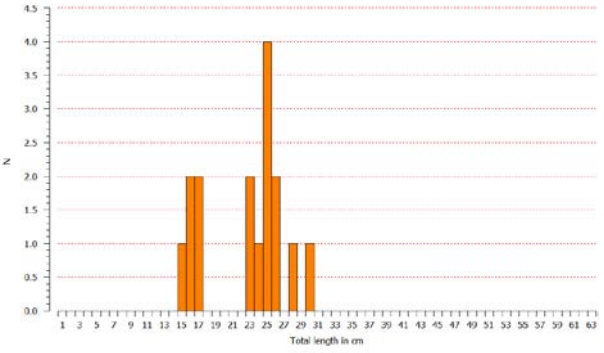
Region: Sierra Leone
Mean length = 28.13, N = 566

Pseudotolithus typus

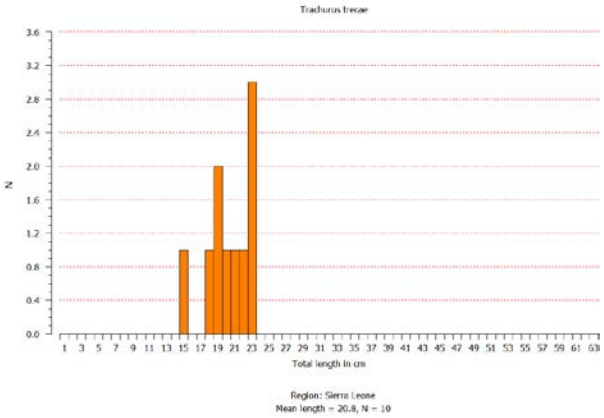


Region: Sierra Leone
Mean length = 29.51, N = 157

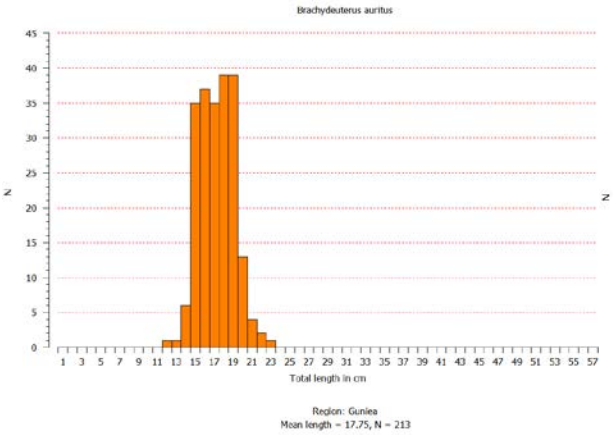
Scomber colias

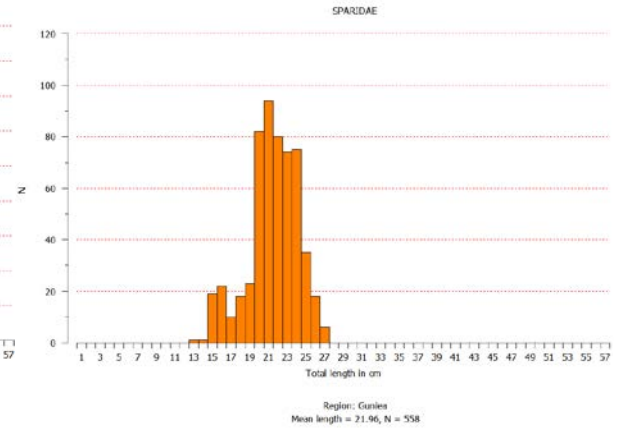


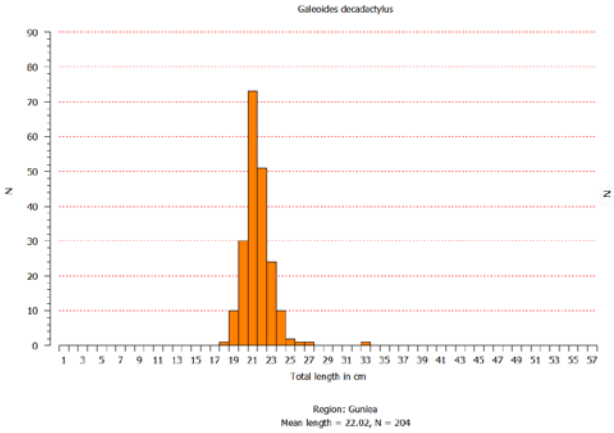
Region: Sierra Leone
Mean length = 23.06, N = 16

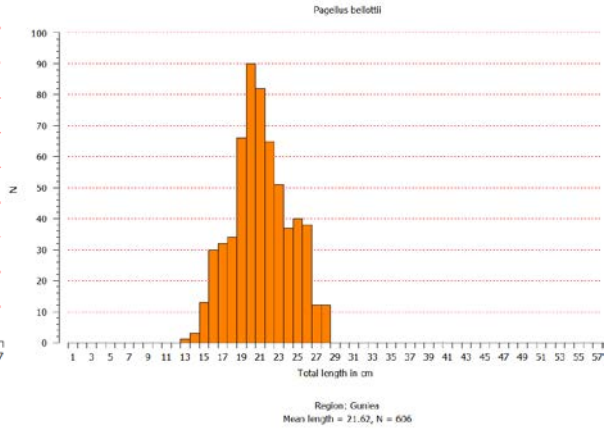

Trachurus trecae
N
Total length in cm
Region: Sierra Leone
Mean length = 20.8, N = 10

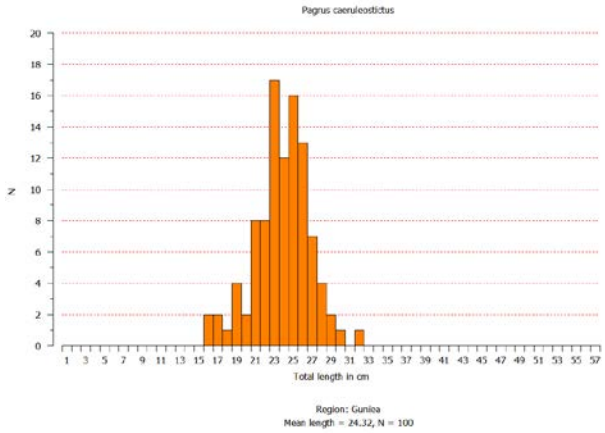
Guinea


Brachydeuterus auritus
N
Total length in cm
Region: Guniea
Mean length = 17.75, N = 213

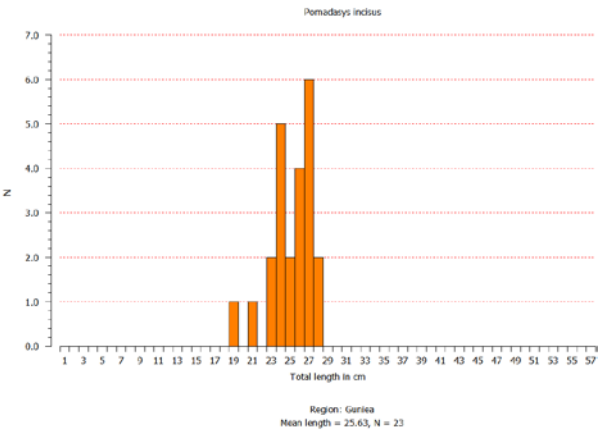

SPARIDAE
N
Total length in cm
Region: Guniea
Mean length = 21.96, N = 558


Galeoides decadactylus
N
Total length in cm
Region: Guniea
Mean length = 22.02, N = 204

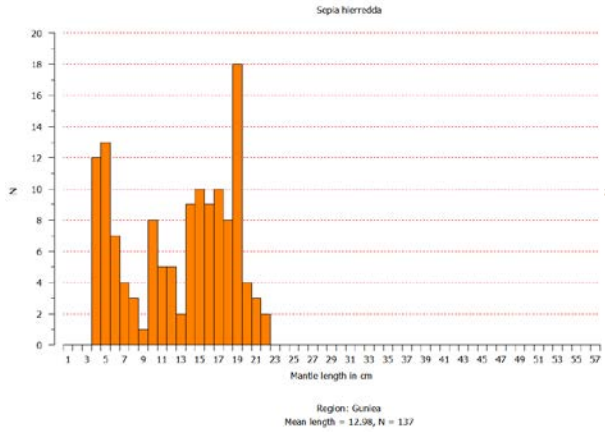

Pagellus bellottii
N
Total length in cm
Region: Guniea
Mean length = 21.62, N = 606



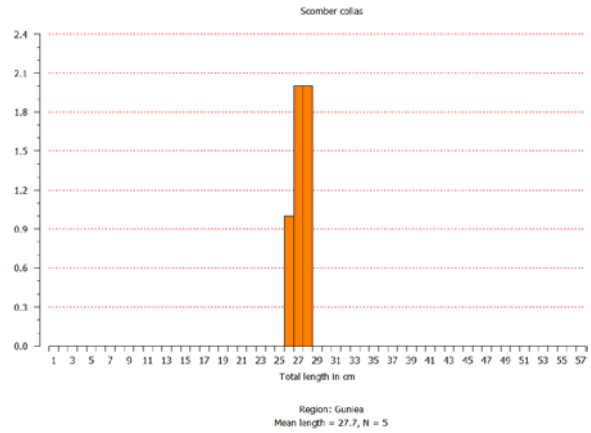
Region: Guniea
Mean length = 24.32, N = 100



Region: Guniea
Mean length = 25.63, N = 23

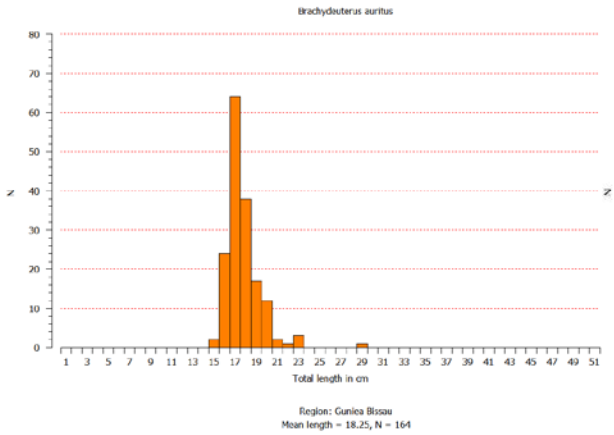


Region: Guniea
Mean length = 12.98, N = 137

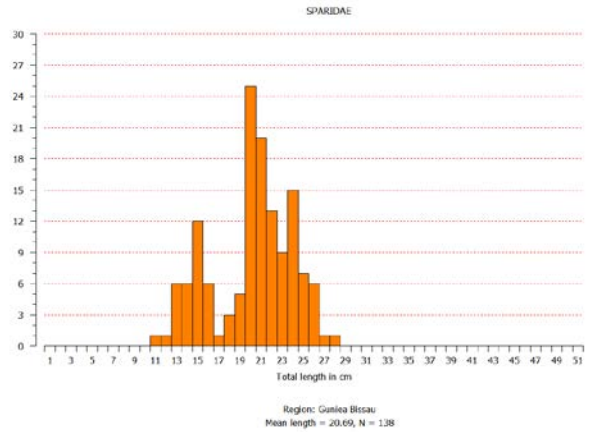


Region: Guniea
Mean length = 27.7, N = 5

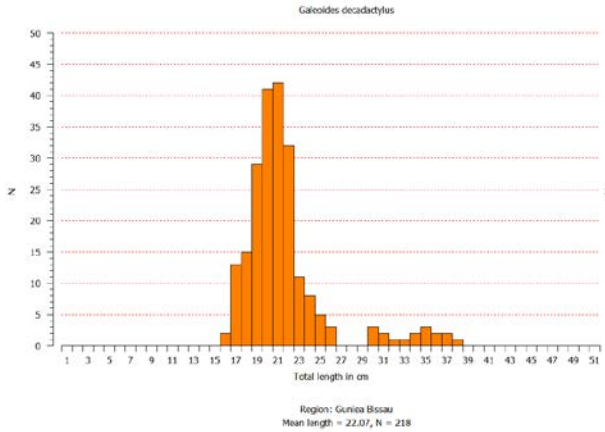
Guinea-Bissau



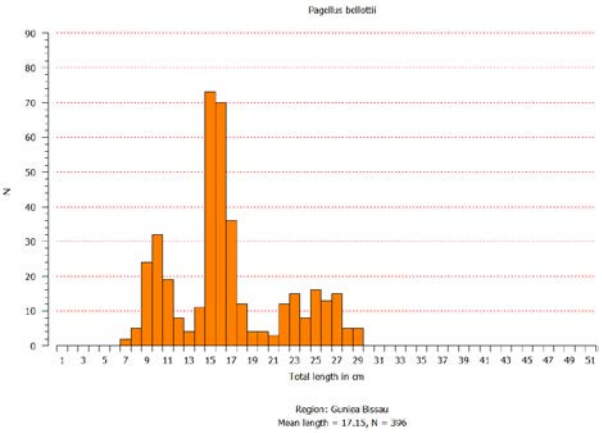
Region: Guniea Bissau
Mean length = 18.25, N = 164



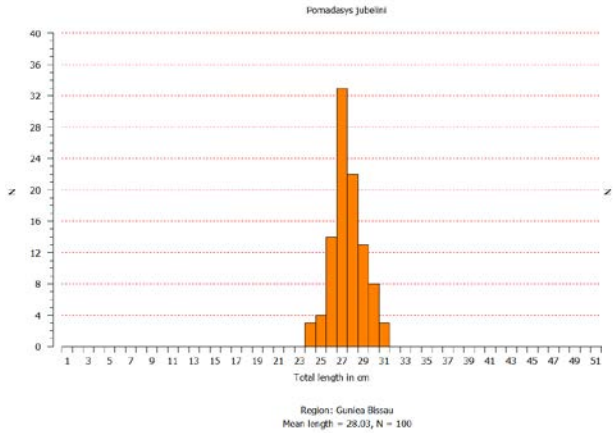
Region: Guniea Bissau
Mean length = 20.69, N = 138



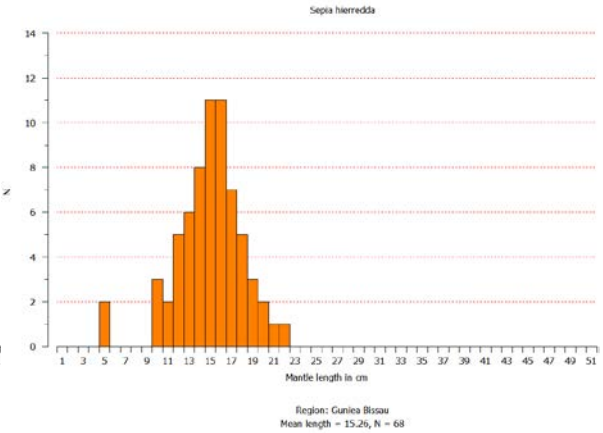
Region: Guniea Bissau
Mean length = 22.07, N = 218



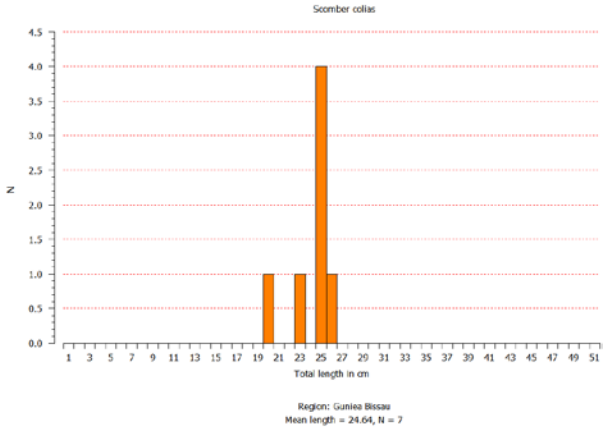
Region: Guniea Bissau
Mean length = 17.15, N = 396



Region: Guniea Bissau
Mean length = 28.03, N = 100



Region: Guniea Bissau
Mean length = 15.26, N = 68



Region: Guniea Bissau
Mean length = 24.64, N = 7

ANNEX IX. ESTIMATED NUMBERS AND BIOMASS OF SARDINELLAS BY LENGTH-GROUP AND COUNTRY

Liberia

Length	Numbers in millions		Biomass in 1 000 tonnes	
(cm)	*S. aurita*	*S. maderensis*	*S. aurita*	*S. maderensis*
5	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0
7	0.0	0.2	0.0	0.0
8	0.0	2.1	0.0	0.0
9	0.2	2.5	0.0	0.0
10	0.7	3.8	0.0	0.1
11	2.7	2.2	0.0	0.0
12	2.1	1.2	0.0	0.0
13	3.8	0.1	0.1	0.0
14	3.7	0.0	0.1	0.0
15	3.8	0.0	0.1	0.0
16	9.7	0.0	0.4	0.0
17	17.2	0.0	0.9	0.0
18	19.9	0.1	1.3	0.0
19	13.7	0.1	1.0	0.0
20	5.7	0.2	0.5	0.0
21	4.5	0.0	0.4	0.0
22	2.5	0.0	0.3	0.0
23	2.0	0.1	0.2	0.0
24	0.7	0.0	0.1	0.0
25	0.0	0.0	0.0	0.0
26	0.2	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0
31	0.0	0.0	0.0	0.0
32	0.0	0.0	0.0	0.0
33	0.0	0.0	0.0	0.0
34	0.0	0.0	0.0	0.0
35	0.0	0.0	0.0	0.0
36	0.0	0.0	0.0	0.0
37	0.0	0.0	0.0	0.0
38	0.0	0.0	0.0	0.0
39	0.0	0.0	0.0	0.0
40	0.0	0.0	0.0	0.0
Total	**93.1**	**12.4**	**5.6**	**0.2**

Sierra Leone

Length	Numbers in millions		Biomass in 1 000 tonnes	
(cm)	*S. aurita*	*S. maderensis*	*S. aurita*	*S. maderensis*
5	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0
7	0.0	1.9	0.0	0.0
8	0.0	10.6	0.0	0.1
9	0.0	24.5	0.0	0.2
10	0.0	21.4	0.0	0.2
11	0.0	9.5	0.0	0.1
12	2.7	9.2	0.0	0.2
13	12.4	6.7	0.3	0.2
14	36.9	14.6	0.9	0.4
15	48.4	30.2	1.5	1.0
16	27.4	13.9	1.0	0.6
17	23.9	9.1	1.1	0.4
18	26.8	19.6	1.4	1.1
19	65.9	26.5	4.1	1.7
20	77.2	62.9	5.6	4.7
21	132.9	85.0	11.2	7.3
22	183.5	42.7	17.7	4.2
23	59.2	32.2	6.5	3.6
24	71.8	6.4	9.0	0.8
25	28.2	7.8	4.0	1.1
26	14.8	2.2	2.3	0.3
27	2.0	1.3	0.4	0.2
28	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0
31	0.0	0.0	0.0	0.0
32	0.0	0.0	0.0	0.0
33	0.0	0.0	0.0	0.0
34	0.0	0.0	0.0	0.0
35	0.0	0.0	0.0	0.0
36	0.0	0.0	0.0	0.0
37	0.0	0.0	0.0	0.0
38	0.0	0.0	0.0	0.0
39	0.0	0.0	0.0	0.0
40	0.0	0.0	0.0	0.0
Total	**814.1**	**438.3**	**67.2**	**28.3**

Guinea

Length	Numbers in millions		Biomass in 1 000 tonnes	
(cm)	*S. aurita*	*S. maderensis*	*S. aurita*	*S. maderensis*
5	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0
7	0.0	1.0	0.0	0.0
8	0.0	5.6	0.0	0.0
9	0.6	12.9	0.0	0.1
10	2.3	11.3	0.0	0.1
11	69.3	19.1	0.9	0.3
12	73.7	89.6	1.2	1.6
13	319.0	74.2	6.5	1.7
14	21.1	113.7	0.5	3.2
15	816.1	212.7	25.4	7.2
16	32.7	92.1	1.2	3.7
17	304.6	145.7	13.7	6.9
18	248.8	428.2	13.2	23.9
19	404.5	694.9	25.2	45.2
20	201.4	875.7	14.6	65.7
21	298.8	1059.1	25.0	91.1
22	194.9	627.7	18.8	61.5
23	197.6	655.5	21.6	72.8
24	259.1	395.2	32.1	49.5
25	207.4	217.9	29.0	30.6
26	126.8	44.0	19.9	6.9
27	9.5	42.4	1.7	7.4
28	1.2	62.8	0.2	12.1
29	1.1	40.7	0.2	8.7
30	0.1	0.5	0.0	0.1
31	0.0	0.0	0.0	0.0
32	0.0	0.0	0.0	0.0
33	0.0	0.0	0.0	0.0
34	0.0	0.0	0.0	0.0
35	0.0	0.0	0.0	0.0
36	0.0	0.0	0.0	0.0
37	0.0	0.0	0.0	0.0
38	0.0	0.0	0.0	0.0
39	0.0	0.0	0.0	0.0
40	0.0	0.0	0.0	0.0
Total	**3 790.9**	**5 922.6**	**251.0**	**500.3**

Guinea-Bissau

Length	Numbers in millions		Biomass in 1 000 tonnes	
(cm)	*S. aurita*	*S. maderensis*	*S. aurita*	*S. maderensis*
5	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0
9	28.0	0.0	0.2	0.0
10	97.9	0.0	0.9	0.0
11	42.5	0.1	0.5	0.0
12	0.6	0.7	0.0	0.0
13	2.5	0.6	0.1	0.0
14	1.7	0.8	0.0	0.0
15	6.3	1.6	0.2	0.1
16	0.1	0.7	0.0	0.0
17	2.3	1.1	0.1	0.1
18	1.9	3.3	0.1	0.2
19	3.4	20.1	0.2	1.3
20	21.9	64.1	1.6	4.8
21	79.1	167.0	6.7	14.4
22	116.1	278.2	11.2	27.3
23	193.8	386.9	21.4	43.0
24	144.1	286.6	18.0	35.9
25	174.3	142.2	24.6	20.0
26	96.1	159.2	15.2	25.0
27	61.6	108.5	10.9	18.9
28	53.5	98.6	10.6	19.1
29	48.6	15.0	10.7	3.2
30	4.9	23.3	1.2	5.5
31	0.0	0.0	0.0	0.0
32	0.0	0.0	0.0	0.0
33	0.0	0.0	0.0	0.0
34	0.0	0.0	0.0	0.0
35	0.0	0.0	0.0	0.0
36	0.0	0.0	0.0	0.0
37	0.0	0.0	0.0	0.0
38	0.0	0.0	0.0	0.0
39	0.0	0.0	0.0	0.0
40	0.0	0.0	0.0	0.0
Total	**1 181.2**	**1 758.6**	**134.4**	**218.5**

ANNEX X. OVERVIEW OF BIOLOGICAL SAMPLES

Liberia

Species	Lengths	Weights	Sex	Maturity
Ariomma bondi	100	98		
Caranx rhonchus	94	75		
Trachurus trecae	119	119	49	49
Sardinella aurita	924	924	427	427
Sardinella maderensis	177	177	62	62
Cynoglossus canariensis	2	2	2	2
Brachydeuterus auritus	100	100	30	30
Pomadasys jubelini	6	6	6	6
Galeoides decadactylus	260	257	141	141
Pentheroscion mbizi	100	99		
Pseudotolithus senegalensis	197	194	102	102
Pseudotolithus typus	263	263	90	90
Scomber colias	187	87	76	76
Penaeus notialis	134	123	64	64
SPARIDAE	721	716	30	30
Boops boops	100	100		
Dentex angolensis	613	611		
Dentex canariensis	5	5		
Total	4 102	3 956	1 079	1 079

Sierra Leone

Species	Lengths	Weights	Sex	Maturity
Trachurus trecae	10	10	10	10
Sardinella aurita	570	550	290	290
Sardinella maderensis	418	340	210	210
Cynoglossus canariensis	70	70	68	68
Cynoglossus senegalensis	52	52	52	52
Brachydeuterus auritus	795	795	240	240
Pomadasys jubelini	120	120	106	106
Pomadasys incisus	10	10	10	10
Lutjanus goreensis	1	1	1	1
Galeoides decadactylus	554	446	208	208
Pentanemus quinquarius	144	144	60	60
Pseudotolithus senegalensis	566	473	210	210
Pseudotolithus typus	157	155	80	80
Scomber colias	16	16	16	16
Penaeus notialis	151	124	140	140
SPARIDAE	411	402	70	70
Dentex angolensis	182	181		
Dentex canariensis	5	5	5	5
Pagellus bellottii	66	66	66	66
Total	4 298	3 960	1 842	1 842

Guinea

Species	Lengths	Weights	Sex	Maturity
Trachurus trecae	2	2	2	2
Sardinella aurita	359	348	149	149
Sardinella maderensis	476	476	224	224
Brachydeuterus auritus	213	213	74	74
Pomadasys jubelini	3	3	3	3
Pomadasys incisus	23	23	23	23
Pomadasys rogeri	7	7	7	7
Galeoides decadactylus	204	204	64	64
Scomber colias	5	5	5	5
Epinephelus aeneus	2	2	2	2
SPARIDAE	558	553	223	223
Dentex canariensis	1	1	1	1
Pagellus bellottii	606	602	312	312
Pagrus caeruleostictus	100	100		
Sepia hierredda	137	133	137	137
Total	2 696	2 672	1 226	1 226

Guinea-Bissau

Species	Lengths	Weights	Sex	Maturity
Trachurus trecae	3	3	3	3
Sardinella aurita	247	247	91	91
Sardinella maderensis	439	439	205	205
Cynoglossus senegalensis	4	4	4	4
Brachydeuterus auritus	164	163	61	61
Pomadasys jubelini	100	100	30	30
Pomadasys incisus	4	4	4	4
Galeoides decadactylus	218	218	78	78
Pseudotolithus senegalensis	1	1	1	1
Scomber colias	7	7	7	7
Penaeus notialis	32	32	32	32
SPARIDAE	138	138	60	60
Dentex angolensis	1	1	110	110
Pagellus bellottii	396	396		
Sepia hierredda	68	68	68	68
Total	1 822	1 821	754	754

Flesh samples

Liberia

Species	Number of samples
Polydactylus quadrifilis	1

Sierra Leone

Species	Number of samples
Brachydeuterus auritus	1
Caranx crysos	1
Caranx rhonchus	1
Caranx senegallus	1
Carlarius parkii	1
Chloroscombrus chrysurus	1
Decapterus punctatus	1
Dentex angolensis	1
Dentex canariensis	1
Dentex congoensis	1
Dentex maroccanus	1
Drepane africana	1
Epinephelus aeneus	1
Galeoides decadactylus	1
Pagrus caeruleostictus	1
Polydactylus quadrifilis	2
Pomadasys jubelini	1
Pseudotolithus senegalensis	1
Pseudotolithus typus	1
Sardinella maderensis	1
Scomber colias	1
Selar crumenophthalmus	1
Selene dorsalis	1
Sphyraena guachancho	1

Guinea

Species	Number of samples
Carlarius latiscutatus	1
Pomadasys rogeri	1

Fin clips

Liberia

Species	Number of samples
Dentex angolensis	90
Pseudotolithus senegalensis	42
Pseudotolithus typus	60
Sardinella aurita	127
Sardinella maderensis	32
Scomber colias	60
Dentex angolensis*	60
Total	471

Sierra Leone

Species	Number of samples
Dentex angolensis	30
Pseudotolithus senegalensis	30
Pseudotolithus typus	30
Sardinella aurita	93
Sardinella maderensis	61
Scomber colias	16
Dentex angolensis*	60
Total	320

Guinea

Species	Number of samples
Sardinella aurita	30
Sardinella maderensis	32
Scomber colias	5
Total	67

Guinea-Bissau

Species	Number of samples
Pseudotolithus senegalensis	1
Sardinella aurita	30
Sardinella maderensis	30
Scomber colias	5
Dentex angolensis*	6
Total	72

* indicates possible confusion of species in the sample

Stations where confusion of Dentex spp. and Pagellus belotti may have occurred:

Date	Station
28/08/2019	10
30/08/2019	20
30/08/2019	21
03/09/2019	43
05/09/2019	57
17/09/2019	125

Special request from Guinea

Species	Number of samples	Sample type
Epinephelus aeneus	2	Whole
Pagellus bellotti	90	Whole
Pagrus caeruleostictus	25	Whole
Pagrus caeruleostictus	25	Whole
Total	142	

Offloaded in Las Palmas

Sargassum

Country	Species	Sample type	Number of samples
Sierra Leone	Sargassum	Whole	3
Guinea	Sargassum	Whole	3
Guinea-Bissau	Sargassum	Whole	3

ANNEX XI. DEPTH STRATA INFORMATION

Liberia	Depth	0-30 m	30-50 m	50-100 m	Total
	Area NM^2	850	990	3 140	4 980

Sierra Leone	Depth	20-30 m	30-50 m	50-100 m	Total
	Area NM^2	1 640	2 160	2 220	6 020

Guinea	Depth	20-30 m	30-50 m	50-100 m	100-200 m	Total
	Area NM^2	1 350	4 100	1 110	700	7 260

Guinea-Bissau	Depth	20-30 m	30-50 m	50-100 m	100-200 m	Total
	Area NM^2	1 000	1 600	1 560	1 270	5 430

ANNEX XII. 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**
Data types	Data						
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	Thermosalinograph	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 biomass		x				
Biology	Phytoplankton		x				
Pollution	Microplastics						x
Geology	Sediment (trawl)						x
Geology	Grab					x	
Observation platforms	VAMS				x		
Observation platforms	WBAT				x		
Observation platforms	Deep vision				x		

ANNEX XIII. SAMPLES TO BE COLLECTED, PRESERVATION AND FOLLOW-UP WORK

Gear/equipment	Samples	Analysis	Preservation	Port of offloading	Transport	Institute	Contact person Leg 3.2	Deadline for analysis
Niskin bottles on CTD Rosette	Seawater	Nutrients	0.2 ml chloroform (4°C)	Las Palmas	Air	IMR	David Cervantes	February 2020
WP2 (180 µm) from max 200 m 1/2 Split	Aluminium trays	Zooplankton biomass estimati	Dried and then frozen	Las Palmas	Air	IMR	Stamatina Isari	February 2020
WP2 (180 µm) from max 200 m 1/2 Split	Bottles with ½ of bulk WP2 sample	Zooplankton community identification	4% formaldehyde	Las Palmas	Air	FSSD Ghana	Hawa Bint Yaqub	February 2020
Bongo V (left net, 405 µm), double oblique tow from max 200 m	Bottles with the bulk of the sample	Ichthyoplankton community identification	4% formaldehyde	Las Palmas	Air	IMR	Stamatina Isari	February 2020
Bongo H (right net 405 µm), double oblique tow from max 200 m	Bottles with the bulk of the sample after sorting ichthyoplankton	Ichthyoplankton community identification	4% formaldehyde	Las Palmas	Air	IMR	Stamatina Isari	February 2020
	Bottles with the bulk sample after sorting ichtyoplankton (if not done on live sample)	Ichthyoplankton community identificaiton	96% ethanol	Las Palmas	Air	IMR	Stamatina Isari	February 2020
	Scintillation vials with sorted larval fish and eggs from one of right bongo net (H)	Ichthyoplankton community identification	96% ethanol	Las Palmas	Air	IMR	Stamatina Isari	February 2020
Manta trawl (335 µm): surface tow for 15 mins	Neuston community identification	Neuston community identifica	96% ethanol	Las Palmas	Air	IMR	Stamatina Isari	February 2020
	Scintillation vials with sorted larval fish and eggs from the bulk manta sample	Species identification, Genetic	96% ethanol (unmethylated)	Las Palmas	Air	IMR	Stamatina Isari	February 2020
	Aluminium trays with sorted microplastics form the bulk manta sample	Abundance and chemical composition of microplastics	Photographed, dried and frozen	Las Palmas	Air	IMR	Bjørn Einar Grøsvik	February 2020
Fish Trawl	Jellyfish arm	Genetics	96% Ethanol + frozen	Las Palmas	Air	UWC	Mark Gibbons	February 2020
Fish Trawl	Jellyfish the rest	Taxonomic identification	8% formalin	Las Palmas	Air	UWC	Mark Gibbons	February 2020
Fish Trawl	Finclips of priority species (list of species)	Genetics (stock identity)	96% Ethanol	Las Palmas	Air	IMR	Geir Dahle / Maria Sanchez	February 2020
Fish Trawl	Whole Fish	Reproduction and stock identi	Frozen	Las Palmas	Air	CNSHB	Ibrahima DIALLO	February 2020
Fish Trawl	Sargassum - Plastic bags with piece of the seaweed	Genetics/Morphometrics	Frozen	Las Palmas	Air	FSSD Ghana	Hawa Bint Yaqub	February 2020

ANNEX XIV. ADDITIONAL HYDROGRAPHICAL DESCRIPTIONS

Thermosalinograph temperature

The temperature values were regulated over a grid of 4 km resolution. Some overlapping of the tracks were not separated to avoid gaps in data. Nonetheless, these areas have indicated close values of temperature.

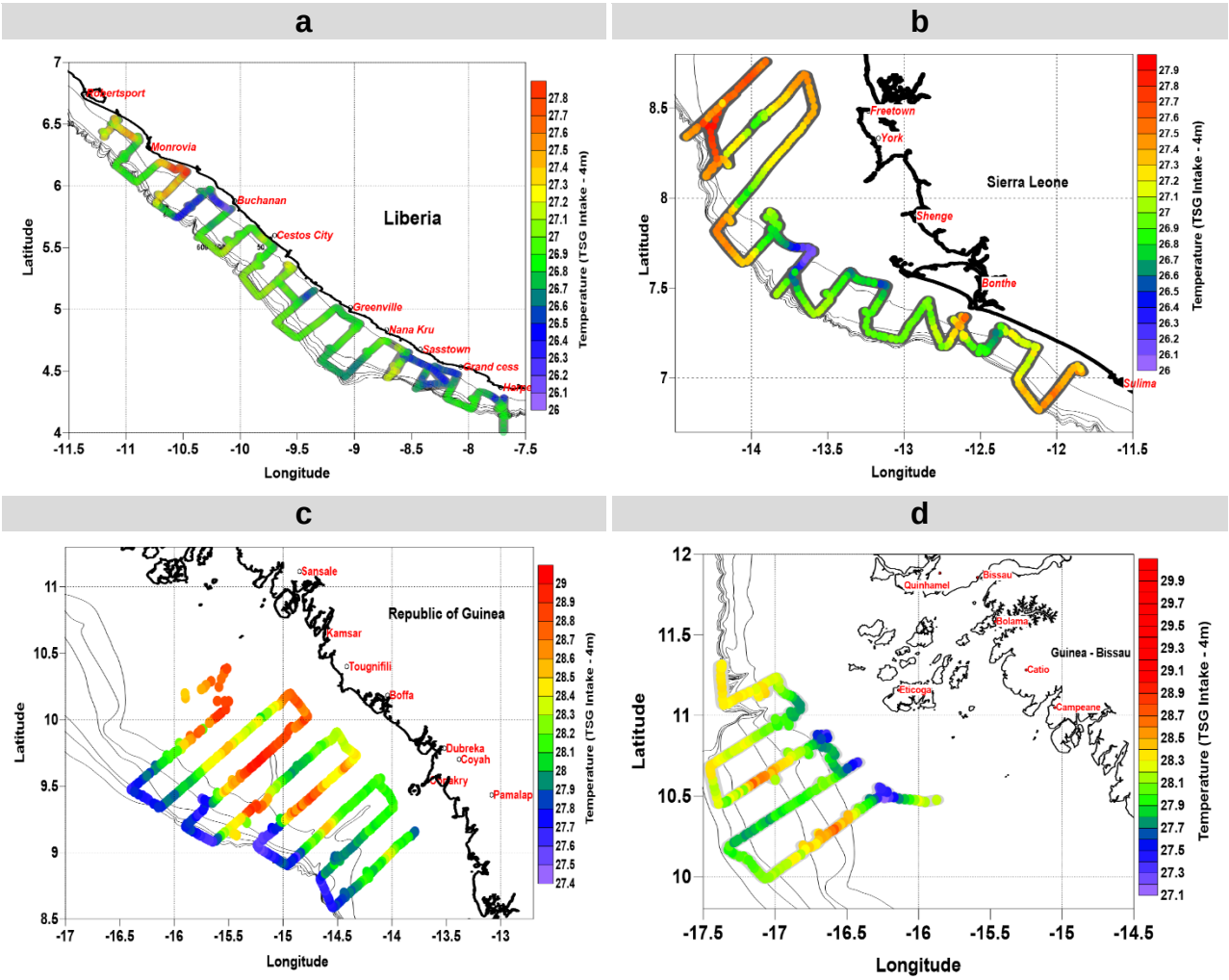


Figure XIV.1. Along track TSG temperature at 4 m depth off: a) Liberia b) Sierra Leone c) Guinea d) Guinea-Bissau

Figure XIV.1 shows temperatures ranging from 26ºC to 30°C throughout the survey. At the coast of Liberia, temperatures over the track exhibit low values (26–27°C) except off Monrovia where they increase slightly above 27.6°C. The same pattern is observed in Sierra Leone where low values are noticed between off Bonthe and York. Higher values just below 28ºC are measured just after Sulima and off Freetown. Off the shelf of Guinea, the lowest temperatures are observed over the shelf break on the deepest isobaths from 200 m but they are still higher than those seen in Liberia and Sierra Leone. The highest temperature values are recorded over the large continental shelf with values reaching 29–30°C, which is possibly

due to increased solar exposure from the sun. Off Guinea-Bissau, the coastal regions recorded values near 27.5ºC with some warmer values midway across the shelf.

Further investigation of hydrographic transects

Guinea

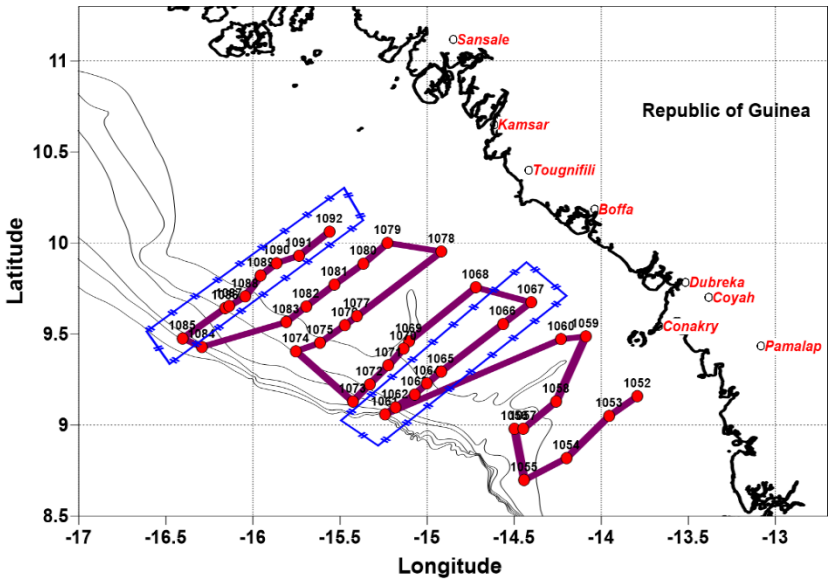


Figure XIV.2. CTD stations, trackline and transects off Republic of Guinea. **Red dots**: Stations; **Violet line**: Trackline; **Blue polygon**: *Transect Boffa* and *Transect Kamsar*

Transect Boffa

Figure XIV.3 shows the different sections of the Boffa transect in the southern boundary of the continental shelf of Guinea. This transect is characterised by the presence of Guinean waters on the coastal area. The upper layer's surface water temperature is between 27.5°C with a salinity less than 30 PSU. These upper layers are stratified with the thermocline located at 30-35 m depth. Underneath the thermocline, the salinity maximum can be observed at 35.8 PSU. The fluorescence is low in the first 10 m and has a maximum at depths that include the thermocline. A particularly high fluorescence is observed in the coastal area underneath the upper waters at about 12 m depth at 3 NM from the coast. The DO values are high over the first 10 m depth with values higher than 4.5 ml/l. A notable large tongue of oxygenated surface water is observed at the coast with DO values of 4.7 ml/l. Around 280-300 m depth, a hypoxic zone with DO value of 47.86 µmol/kg (DO = 1.1 ml/l; Density = 1026.5 kg/m^3) is encountered.

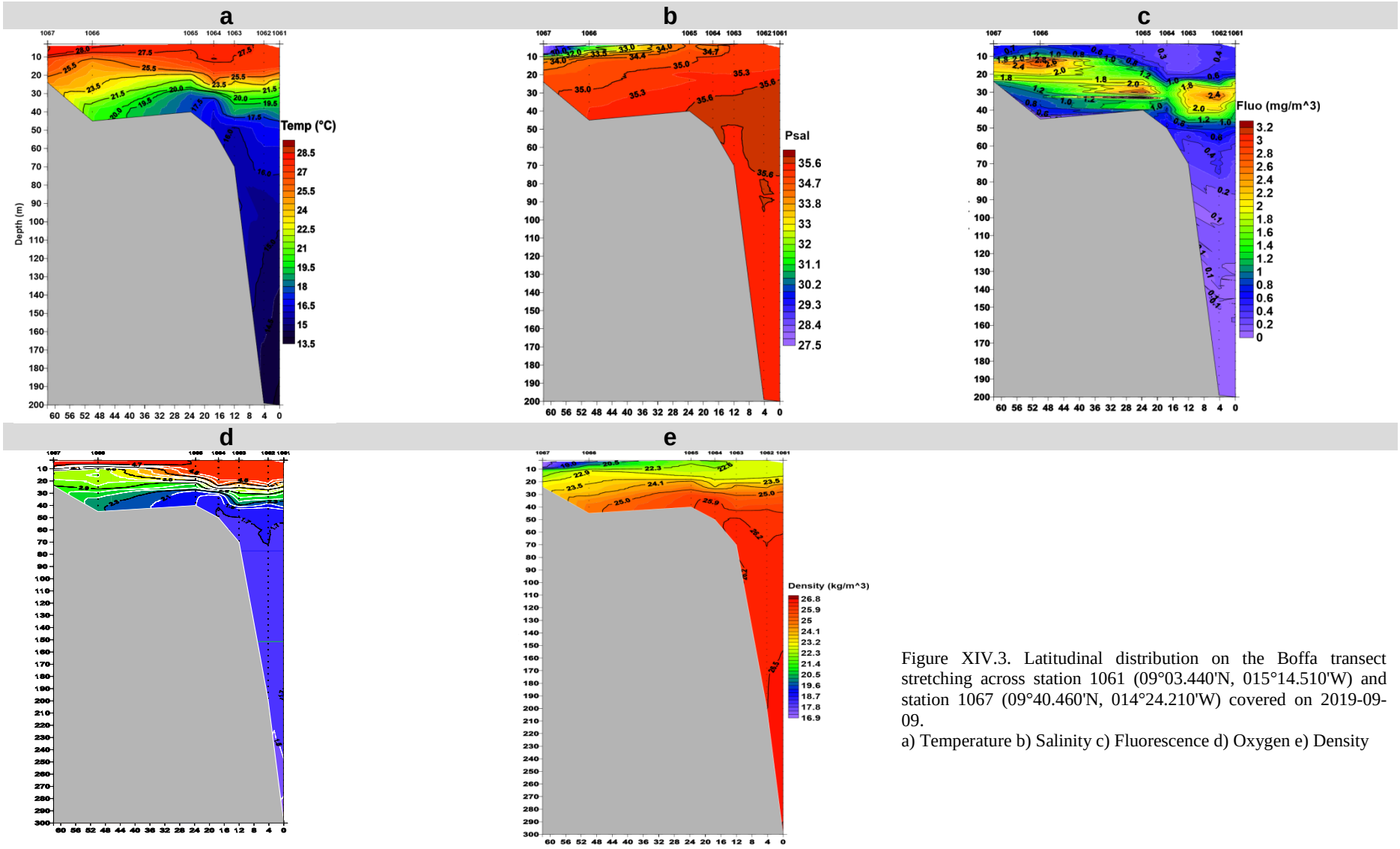


Figure XIV.3. Latitudinal distribution on the Boffa transect stretching across station 1061 (09°03.440'N, 015°14.510'W) and station 1067 (09°40.460'N, 014°24.210'W) covered on 2019-09-09.
a) Temperature b) Salinity c) Fluorescence d) Oxygen e) Density

Transect Kamsar

Figure XIV.4 shows the different hydrographic sections over the Kamsar transect in the northern boundary part of the continental shelf of the Republic of Guinea. Along the transect, the upper layers are dominated by hot waters with temperatures between 26–28°C down to 20 m depth. A thin surface water layer with a temperature of 29°C is observed at the coast. Below, a distinct thermocline extends over a thickness of 10 m between 30–40 m depth, surmounting colder waters.

The salinity of these surface waters is less than 35.2 PSU with a small observed coastal area exhibiting the transect's lowest salinity (35 PSU). Between 40–80 m depth, the salinity maximum (35.7 PSU) is visible offshore surrounded by a large zone of values ranging between 35.5-35.6 PSU down to 180 m.

The fluorescence shows a subsurface layer higher than 1 mg/m^3 with a maximum (3.2-3.4 mg/m^3) located in the thermocline band. In deeper waters, values are less than 0.2 mg/m^3.

The DO values indicate more oxygenated surface waters in the first 20 m with concentrations higher than 4.0 ml/l. Below 70 m depth, lower DO values are observed (1.3 ml/l) down to 300 m depth (56.6 µmol/kg as confirmed by density values).

Here also, over the Kamsar transect, sections show stratified waters with typical tropical structures different from upwelling structures. The coastal area seems to be occupied with continental waters as indicated by the thin warmer water of 29°C.

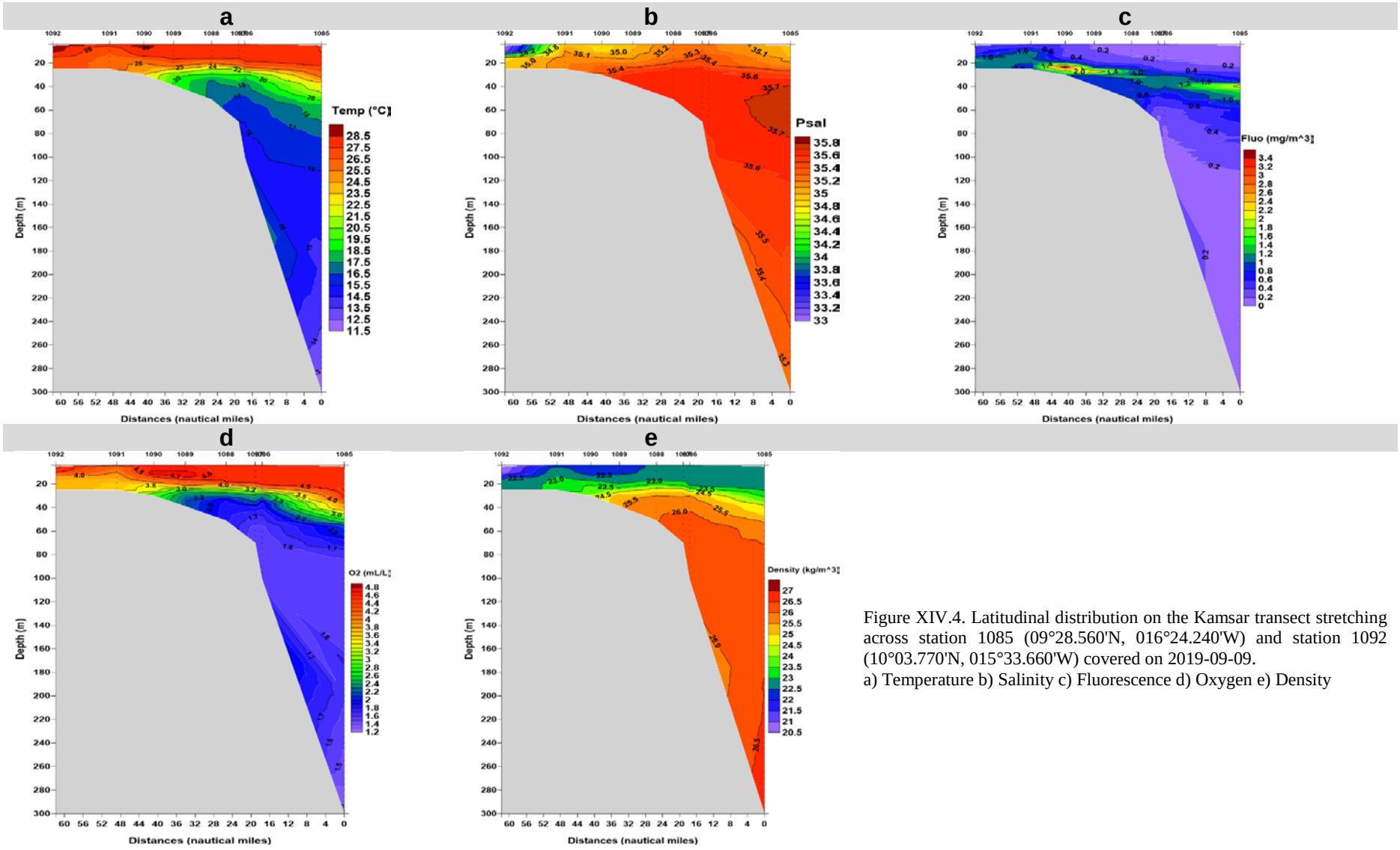


Figure XIV.4. Latitudinal distribution on the Kamsar transect stretching across station 1085 (09°28.560'N, 016°24.240'W) and station 1092 (10°03.770'N, 015°33.660'W) covered on 2019-09-09.
a) Temperature b) Salinity c) Fluorescence d) Oxygen e) Density

Guinea-Bissau

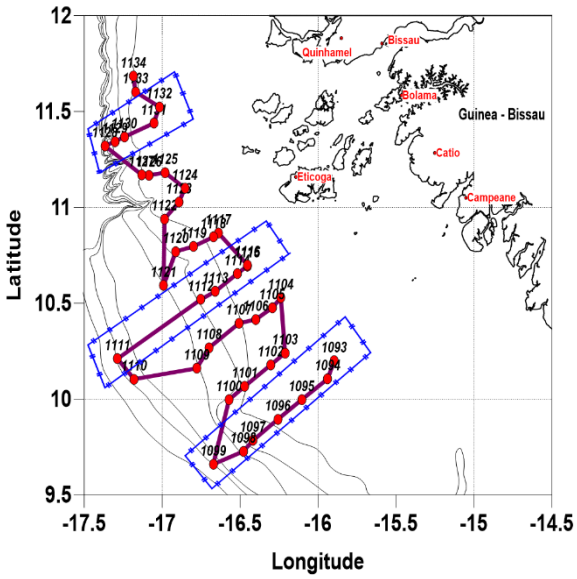


Figure XIV.5. CTD stations, trackline and transects off Republic of Guinea Bissau. **Red dots**: Stations; **Violet line**: Trackline; **Blue polygon**: *Transect Campeane*, *Transect Catio and Transect Quinhámel*

Transect Campeane

Figure XIV.6 shows the hydrographic section over transect Campeane in the southern boundary part of the continental shelf of Guinea Bissau. The upper water layers are dominated with temperature maxima ranging between 27-28°C down to 20 m depth with a thermocline located at 30-35 m depth. Subsurface salinity is less than 35.2 PSU with a small observed coastal area minimum of 35 PSU. The salinity maximum (35.7 PSU) extends from the continental shelf to the high sea at about 40 m depth. Below and down to 300 m, the salinity values range between 35.6 and 35.3 PSU. Fluorescence shows a subsurface layer higher than 1.2 mg/m^3 with a maximum (3.2-3.4 mg/m^3) located in the thermocline band. Farther down, values are less than 0.2 mg/m^3. The DO values indicate more oxygenated surface waters in the first 20 m depth with concentrations higher than 4.4 ml/l. DO values begin to decrease in the water column down to 300 m where the DO concentration is 1.4 ml/l (60.9 µmol/kg as confirmed by the density values). The transect shows stratified waters with typical tropical structures different from the upwelling ones.

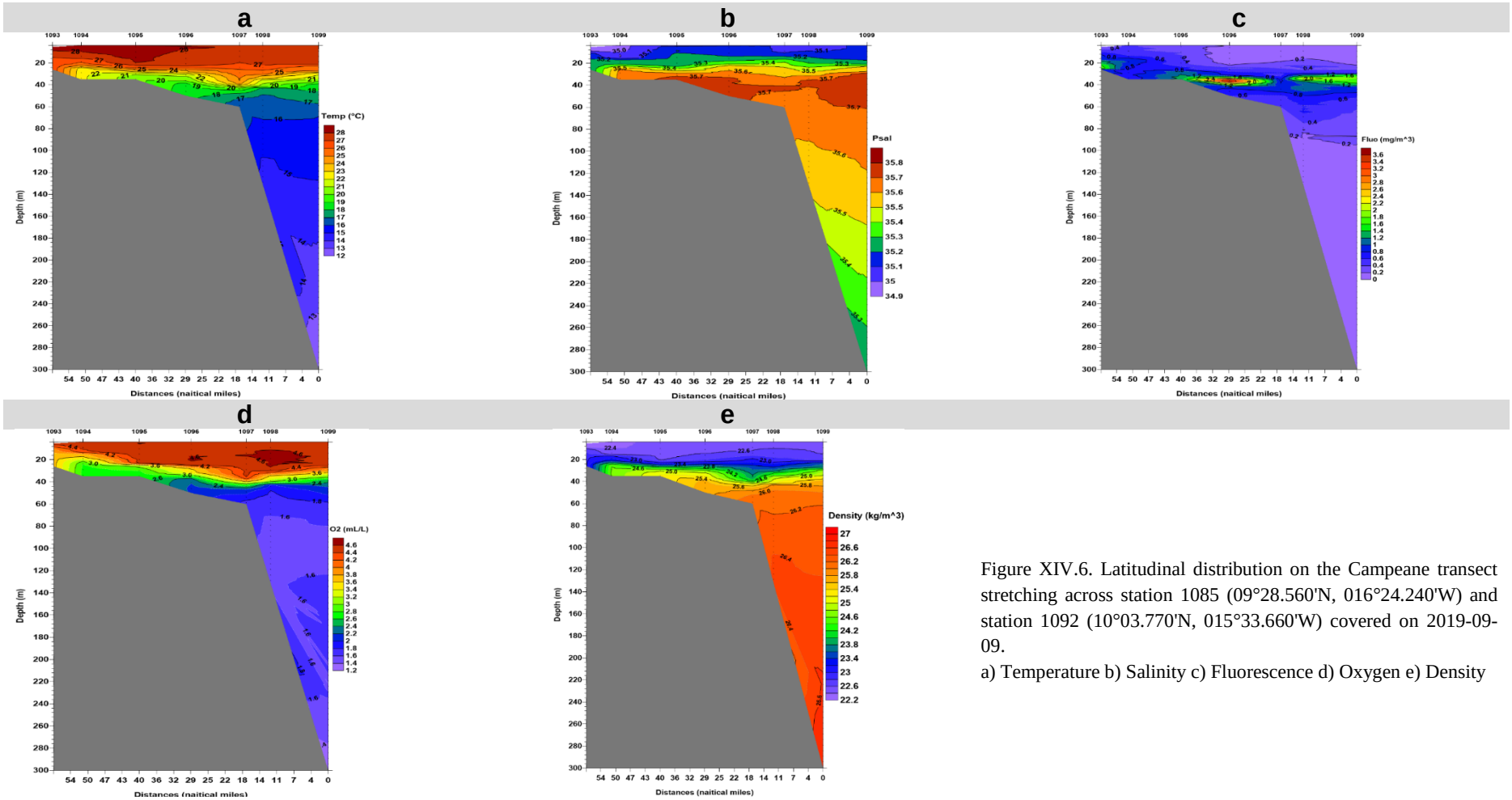


Figure XIV.6. Latitudinal distribution on the Campeane transect stretching across station 1085 (09°28.560'N, 016°24.240'W) and station 1092 (10°03.770'N, 015°33.660'W) covered on 2019-09-09.

a) Temperature b) Salinity c) Fluorescence d) Oxygen e) Density

Transect Catio

Figure XIV.7 shows the hydrographic section over transect Catio. The upper layers of the Catio transect are dominated by warm waters reaching 28°C in the first 20 m depth, with a thermocline located near 30 m depth. The salinity of these surface waters range between 35.3 and 35.4 PSU with a small observed minimum at the coast (35-35.1 PSU). The salinity maximum is visible offshore with a value of 35.8 PSU. The fluorescence maximum is located between 20-40 m with the highest values of the entire survey reaching 5.6 mg/m^3. In the deepest water the values are less than 0.2 mg/m^3. The surface waters are more oxygenated in the first 30 m with concentrations higher than 4.0 ml/l. Near 300 m, dissolved oxygen concentrations reach lows of 1.4 ml/l, verifying another hypoxic region.

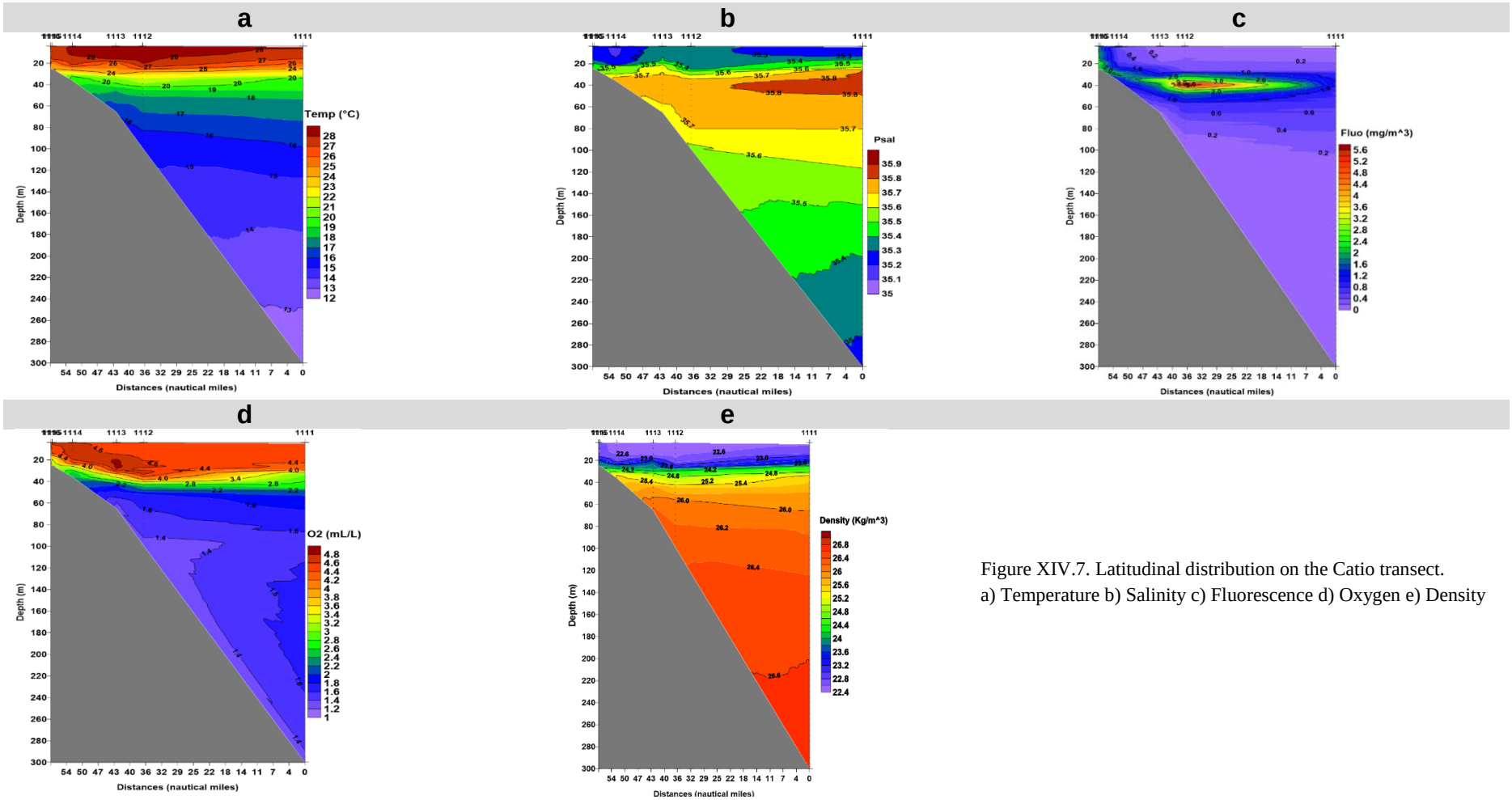


Figure XIV.7. Latitudinal distribution on the Catio transect.
a) Temperature b) Salinity c) Fluorescence d) Oxygen e) Density

Transect Quinhámel

Figure XIV.8 shows the hydrographic section over transect Quinhámel. The upper layers are dominated by hot waters with temperatures between 27-28°C in the first 20 m and a thermocline near 30 m depth. The subsurface salinity presents coastal lows between 35.3 and 35.4 PSU extending over 4 NM down to 25 m. While the salinity maximum of 35.8 PSU is observed between 15-30 m offshore. The fluorescence maximum is located between 20-40 m with the highest values ranging between 2.4-2.5 mg/m^3. The subsurface waters are more oxygenated in the first 25 m depth with concentrations higher than 4.3 ml/l and a maximum offshore of 4.7 ml/l. At about 300 m depth, the DO concentration is 1.7 ml/l with a density of 26.6 kg/m^3. The DO concentration is then equivalent to 73.9 µmol/kg.

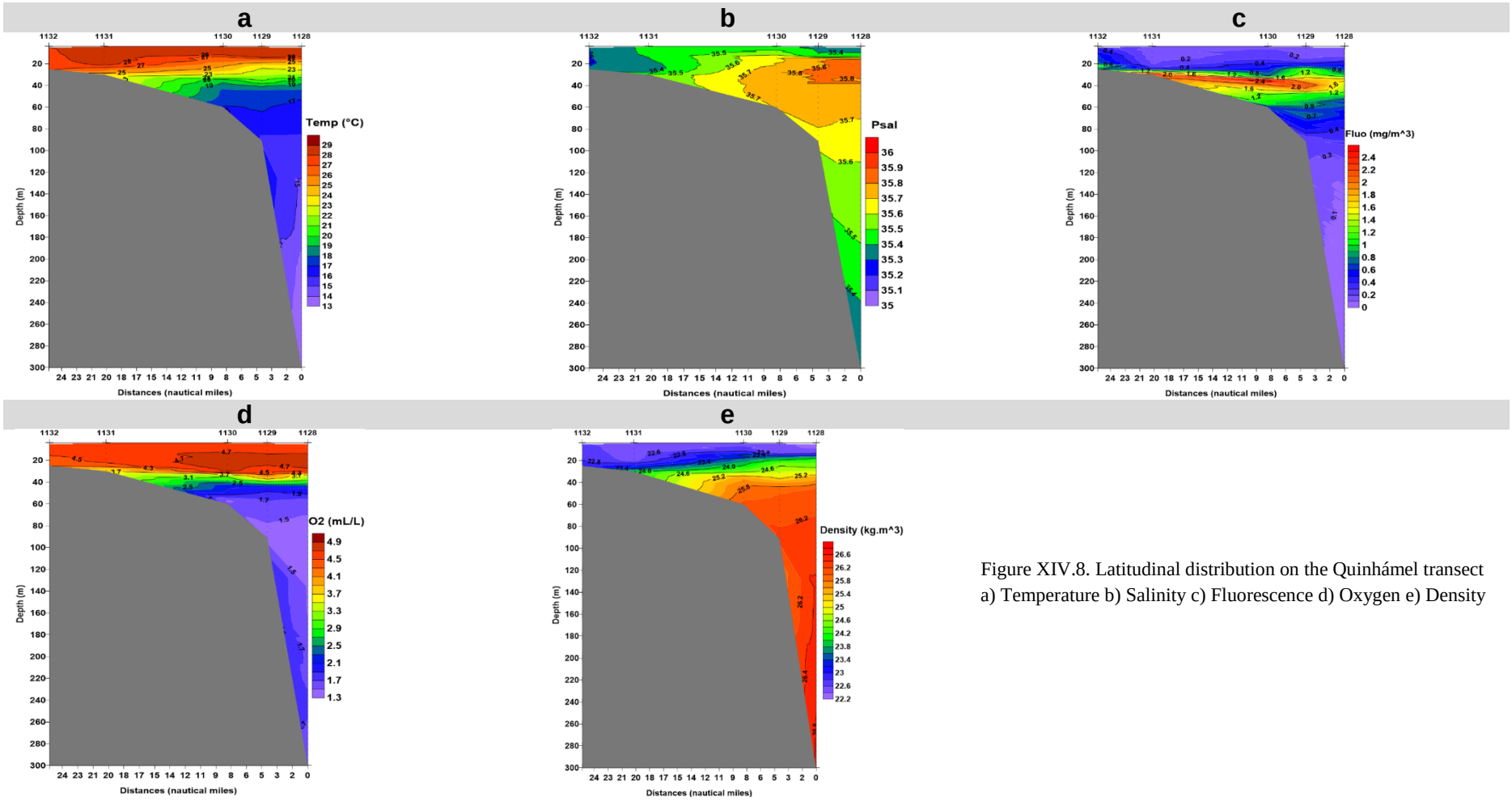


Figure XIV.8. Latitudinal distribution on the Quinhámel transect a) Temperature b) Salinity c) Fluorescence d) Oxygen e) Density

ANNEX XV. REPORT ON TOP PREDATORS AND SARGASSUM (IN FRENCH)

Rapport de la campagne d'évaluation des ressources démersales, pélagiques et écosystémique de l'Afrique de l'Ouest : Libéria, Sierra Léone, Guinée et la Guinée Bissau

Observation des Mammifères Marins

Aboubacar SANE[1], Nathaniel LEESOLEE[2]

1. ***Guinée*** *(Chercheur au centre National des Sciences Halieutiques de Boussoura)*
2. ***Libéria*** (*National Fisherie and Aquacculture Authority*)

I. INTRODUCTION :

La campagne d'évaluation des ressources démersales, pélagiques et des écosystèmes transfrontaliers dans l'ouest du golf de Guinée, regroupant : Libéria, Sierra Léone, Guinée et la Guinée Bissau à bord du Navire de recherche océanographique Fridjoft Nansen.

L'objectif principal dans cette 3ème étape est de couvrir les ressources démersales et pélagiques du plateau continental et de la pente supérieure grâce à un relevé régional qui permet un aperçu synoptique de la distribution et de l'abondance des ressources qui peuvent être partagées dans la région.

En plus de déterminer la répartition et l'abondance des espèces et des communautés démersales et pélagiques, et de prélever des échantillons biologiques comme indiqué dans le protocole, l'échantillonnage sera effectué pour déterminer les conditions océanographiques (y compris physique, chimique et biologique), l'échantillonnage des microplastiques et l'enregistrement de la présence de débris marins.

Dans cette campagne à bord de Nansen, l'observation des tops prédateurs (les mammifères marins), les algues pélagiques (Sargassum) et les oiseaux marins ont été réalisés.

Les observations sont effectuées dans la journée à partir du point le plus élevé du navire dans des transects continus.

La zone d'observation (90° ou 180°) et la distance d'observation par rapport au navire (50-300 m selon les conditions d'observation).

L'observation des mammifères marins et des oiseaux de mer sur les mêmes transects utilisés pour l'enregistrement des prédateurs supérieurs permettre d'enregistrer la présence d'algues pélagiques sargastiques flottantes. Les coordonnées des agrégations voyantes sont consignées et accompagnées de photographiques.

Contrairement aux poissons, les mammifères marins ont des poumons et respirent à la surface. Leur sang est chaud (ils maintiennent leur température interne constante), ils mettent bas et allaitent leur petit.

Les cétacés sont des mammifères entièrement aquatiques qui présentent environ :

15 familles ;

43 genres ;

90 espèces dans le monde.

Ils sont divisés en deux grands groupes :

Les Odontocètes *(*cétacés à dents*)* qui regroupent les dauphins, les orques, les globicéphales, les cachalots, les baleines à bec, les marsouins, les narvals et les bélougas et autres… ;

Les Mysticètes *(*cétacés à fanons*)* qui regroupent les rorquals, les baleines franches et les baleines grises.

II. MATERIELS ET METHODES :

II.1. MATERIELS DE TRAVAIL :

- Le navire R/V *Dr Fridjoft Nansen* de Norvey;
- 2 appareils photos, un de marque CANON EOS 650 monté de zoom 75-300mm et le second de marque Nikon D- 810, AFS de zoom 80-400mm ;
- Un GPS de marque Garmin type GPSMAP 78 séries ;
- Une paire de jumelles Trinovid monté d'un compas 8x42;
- Des guides d'identification des mammifères marins ;
- Fiche d'observation ;
- Fiche d'effort.

II.2. METHODOLOGIE :

La durée d'observation à bord du navire de recherche ***Dr Fridjoft Nansen*** était de 22 Août au 22 Septembre 2019 dans les pays respectifs (Libéria, Sierra Léone, Guinée et Guinée Bissau de Leg 3.2). Les observations sont effectuées à l'aide d'yeux nus et/ou de jumelles dans des transects continus de 7h00 à 18h00 dans la journée à partir du point le plus élevé du navire avec des temps de pauses pendant les heures de repas de 10- 15mn. La zone d'observation (90° ou 180°) et la distance d'observation par rapport au navire (50-300 m selon les conditions d'observation).

Les efforts d'observations ont été effectués pour localiser les mammifères. Le but principal de la croisière de recherche du navire, et les transects tracés étaient dictés par les nécessités d'échantillonnage identification de poisson, des invertébrés, conductivité, température, densité (CTD), contamination, Plancton, hydrographie et l'acoustique. Considérant que nos observations étaient visées sur les mammifères marins, les algues pélagiques (Sargasses) et

les oiseaux marins, le navire était utilisé comme plateforme d'opportunité. Pour chaque observation, les paramètres suivants ont été utilisés et notés sur des fiches d'observations élaborées à cet effet pour les cétacés :

II.I.1.Fiche d'observations : Le nom des observateurs; la date; l'heure de début et de fin d'observation des cétacés dans un groupe ; la localité ; le numéro du waypoint (GPS) ; la distance initiale et la distance la plus proche estimé ; l'angle d'observation à partir du navire ; la position géographique, la composition et la taille du groupe (estimation minimum, meilleure, maximum), le comportement réaction au navire (indifférent, attraction, s'enfuir), données morphologique comme la forme de la nageoire dorsale, les souffles, et l'espèce ont été enregistrés dans la fiche d'observation.

II.2.2. Fiche d'effort : portant les paramètres suivants a tété également utilisée. Parmi ceux-ci on peut citer :
La date ; la vitesse de la croisière ; le temps local (heure de départ heure d'arrêt en minutes); la durée de la période de l'observation ; la force du vent (beaufort) ; les conditions de la mer ; la houle ; la visibilité et la distance totale parcourue durent cette journée ont été enregistrés dans cette fiche.

Un autre enregistrement concernant d'autres paramètres fournis par l'équipe de l'acoustique du navire : La température ; la profondeur de la mer du lieu où le groupe d'animaux a été observée.

Pour l'observation des algues sargasses pélagiques et les oiseaux les prises de photos ont été réalisées ainsi que les coordonnées de leur localisation dans les transects d'observation des mammifères marins ont été consignés. Pour l'identification, il serait judicieux de faire appelle à un ornithologue.

III. RESULTATS :

III.1. TEMPS D'OBSERVATION ET DISTANCE PARCOURUES

TABLEAU1 : Effort (temps d'observation et distance parcourues) par pays

Libéria		Sierra Leone		Guinée		Guinée-Bissau	
Temps (mn)	Distance (km)	Temps (mn)	Distance (km)	Temps (mn)	Distance (km)	Temps (mn)	Distance (km)
5.089	**674,8**	**2.936**	**587,2**	**5.918**	**711,4**	**3.291**	**383, 33**
FFORT TOTAL HEURES				**17.234 mn soit : 287,33 h**			
TOTALE DISTANCE PARCOURUE				**2356,33 Km**			

Du Libéria en Guinée-Bissau, **287,33h** ont été mis à profit et une distance de **2356,73km** parcourus pour l'observation des mammifères marins dans les différents transects.

<u>TABLEAU2</u> : Paramètres d'observations des mammifères marins (Libéria) :

Dates	Heures d'observation	Espèces	Situation géographique		Estimation groupes			Pays
			Latitude	Longitude	Minimum	Maximum	Meilleur	
26-08-2019	9 :30 à 9 :57	Delphinus spp	04°12.033''	07°43.260''	**30**	**40**	**20**	**Libéria**
26-08-2019	9 :10 à 9 :14	Delphinus delphis	04°15.282''	07°41.695	**50**	**30**	**20**	**Libéria**
26-08-2019	8 :22 à 8 :30	Globicephala macrorhynchus	04°15.282'	07.41.695'	**2**	**2**	**2**	**Libéria**
26-08-2019	10 :30 à 10 :35	Globicephala macrorhynchus	04°11.410''	07°44.188''	**2**	**2**	**2**	**Libéria**
26-08-2019	10 :23 à 10 :27	Globicephala macrorhynchus	04°11.410''	07°44.188''	**2**	**2**	**2**	**Libéria**
26-08-2019	10 :23 à 10 :27	Globicephala macrorhynchus	04°11.410''	07°44.188''	**2**	**2**	**2**	**Libéria**
26-08-2019	15 :30 à15 :36	Globicephala macrorhynchus	04°16.369	07°55.416	**2**	**2**	**2**	**Libéria**
26-08-2019	14 :50 à 14 :55	Globicephala macrorhynchus	04°16.365''	07°55.416	**2**	**2**	**2**	**Libéria**
27-08-2019	16 :20 à 16 :29	Globicephala macrorhynchus	04°26.582''	08°14.215''	**1**	**1**	**1**	**Libéria**
28-08-2019	16 :20 à 16 :29	Globicephala macrorhynchus	04°40.878''	09°12.609''	**2**	**2**	**2**	**Libéria**
29-08-2019	12 :01 à 12 :06	Megaptera novaeangliae	05°09.145''	09°21.128''	**1**	**1**	**1**	**Libéria**
30-08-2019	12 :40 à 12 :45	Balaenoptera ssp.	05°35 .364''	09°59.290''	**2**	**2**	**2**	**Libéria**
30-08-2019	15 :40 à 15 :49	Balaenoptera ssp	05°29.784''	10°06.468''	**2**	**2**	**2**	**Libéria**
31-08-2019	14 :00 à 14 :05	Megaptera novaeangliae	05°54.680''	10°41.229	**1**	**1**	**1**	**Libéria**
31-08-2019	14 :40 à 14 :42	Megaptera novaeangliae	05°55.717''	10°99.808''	**1**	**1**	**1**	**Libéria**
31-08-2019	14 :53 à 14 :56	Balaenoptera ssp	05°57.508''	10°37.803	**1**	**1**	**1**	**Libéria**
01-09-2819	07 :00 à 07 :05	Globicephala macrorhynchus	06°14.458''	10°59°915''	**1**	**1**	**1**	**Libéria**

TABLEAU3 : Paramètres d'observations des mammifères marins (Sierra Leone)

Dates	Heures d'observation	Espèces	Situation géographique		Estimation groupes			Pays
			Latitude	Longitude	Minimum	Maximum	Meilleur	
02-09-2019	08 :50 à 08 :55	Delphinus delphis	06°46.830'	11°50.800'	**150**	**300**	**200**	**Sierra Leone**
02-09-2019	10 :00 à 10 :06	Delphinus delphis	06°49.074'	11°47.155'	**200**	**300**	**100**	**Sierra Leone**
04-09-2019	14 :00 à 14 : 08	Balaenoptera spp	07°27.049'	13°28.946'	**2**	**2**	**2**	**Sierra Leone**
05-09-2019	10 :00 à 10 :05	Megaptera novaeangliae	07°47.760'	13°52.234'	**3**	**3**	**3**	**Sierra Leone**
06-09-2019	09 :20 à 09 :27	Megaptera novaeangliae	08°15.583'	14°08.902'	**1**	**1**	**1**	**Sierra Leone**
06-09-2019	13 :55 à 14 :00	Balaenoptera spp	08°19.415'	14°15.613'	**1**	**1**	**1**	**Sierra Leone**
06-09-2019	16 :39 à 16 :41	Balaenoptera spp	08°26.322'	14°14.044'	**1**	**1**	**1**	**Sierra Leone**
06-09-2019	17 :25 à 17 :32	Delphinus delphis	06°58.078'	11°40.980'	**100**	**300**	**200**	**Sierra Leone**

TABLEAU4 : Paramètres d'observations des mammifères marins (Guinée)

Dates	Heures d'observation	Espèces	Situation géographique		Estimation groupes			Pays
			Latitude	Longitude	Minimum	Maximum	Meilleur	
10-09-2019	14 :10 à 14 :13	Balaenoptera sp	09°20.009'	15°13.720'	**2**	**2**	**2**	**Guinée**
12-09-2019	10 :55 à 11:00	Delphinus delphis	09°45.444'	15°29.393'	**2**	**4**	**2**	**Guinée**
12-09-2019	11 :06 à 11:12	Delphinus delphis	09°45.446'	15°29.394'	**2**	**2**	**2**	**Guinée**
13-09-2019	09 :50 à 09:55	Globicephala macrorhynchus	09°37.888'	15°59.450'	**2**	**2**	**2**	**Guinée**
13-09-2019	10 :00 à 10:08	Megaptera novaeangliae	09°37.888'	15°59.450'	**2**	**2**	**2**	**Guinée**
13-09-2019	11 :50 à 11:04	Delphinus delphis	09°50.193'	15°56.501'	**200**	**300**	**200**	**Guinée**
13-09-2019	16 :00 à 16:08	Delphinus delphis	09°53.191'	15°44.142'	**50**	**100**	**300**	**Guinée**
16-09-2019	16 :00 à 16:08	Megaptera novaeangliae	10°11.651'	16°15.474'	**2**	**2**	**2**	**Guinée**
16-09-	16 :20 à 16:27	Megaptera	10°19.960'	16°27.739'	**2**	**2**	**2**	**Guinée**

2019		novaeangliae						
16-09-2019	17 :19 à 17:27	Delphinus delphis	10°10.604’	16°18.991’	**50**	**150**	**100**	**Guinée**

<u>TABLEAU5</u> : Paramètres d’observations des mammifères marins (Guinée-Bissau)

Dates	**Heures d’observation**	**Espèces**	**Situation géographique**		**Estimation groupes**			**Pays**
			Latitude	**Longitude**	**Minimum**	**Maximum**	**Meilleur**	
17-09-2019	10 :36 à 10:38	Balaenoptera sp	10°27.378’	16°27.402’	**1**	**1**	**1**	**Guinée-Bissau**
17-09-2019	12 :10 à 12:15	Delphinus delphis	10°21.488’	16°28.234’	**200**	**300**	**200**	**Guinée-Bissau**
17-09-2019	1 3 :27 à 13:35	Delphinus delphis	10°15.731’	16°41.471’	**300**	**500**	**400**	**Guinée-Bissau**
18-09-2019	08 :10 à 08:13	Delphinus delphis	10°29.092’	16°44.327’	**20**	**50**	**30**	**Guinée-Bissau**
20-09-2019	12 :30 à 12:34	Megaptera novaeangliae	11°10.229’	16°58.147’	**2**	**2**	**2**	**Guinée-Bissau**
20-09-2019	15 :07 à 15:11	Balaenoptera sp	11°11.481’	17°04.896’	**2**	**2**	**2**	**Guinée-Bissau**
20-09-2019	16 :50 à 16:55	Megaptera novaeangliae	11°10.320’	17°10.970’	**2**	**2**	**2**	**Guinée-Bissau**
21-09-2019	11 :12 à 11:15	Megaptera novaeangliae	11°35.864’	17°10.500’	**1**	**1**	**1**	**Guinée-Bissau**
21-09-2019	16 :40 à 16:46	Globicephala macrorhynchus	11°44.856’	17°23.111’	**8**	**8**	**8**	**Guinée-Bissau**
21-09-2019	16 :40 à 16:46	Globicephala macrorhynchus	11°44.856’	17°23.111’	**12**	**12**	**12**	**Guinée-Bissau**
21-09-2019	16 :40 à 16:46	Globicephala macrorhynchus	11°44.856’	17°23.111’	**4**	**4**	**4**	**Guinée-Bissau**
21-09-2019	16 :40 à 16:46	Delphinus delphis	11°44.856’	17°23.111’	**200**	**250**	**200**	**Guinée-Bissau**

IV. Observations des cétacés par pays :

Tableau 6 : LIBÉRIA

Petits cétacés ou dauphins à dents (Odontocètes)			
Espèces	**Nombre d'observations**	**Nombre total d'individus minimum**	**Observations**
Globicephala macrorhynchus	**9**	**16**	
Delphinus delphis	**1**	**50**	
Dauphins sp.	**1**	**30**	Saut+souffles
Grands cétacés à fanons (Mysticètes)			
Espèces	**Nombre d'observations**	**Nombre total d'individus minimum**	**Observations**
Megaptera novaeangliae	**3**	**3**	
Balenoptera sp.	**3**	**5**	Souffles+saut

Globicephala macrorhynchus : **16**
Delphinus delphis : **50**
Dauphins sp : **30**
Megaptera novaeangliae : **3**
Balaenoptera sp : **5**
Total : **104**

Au total **104** mammifères marins de différentes espèces ont été vus dans les eaux Libériennes pour 17 observations effectuées dans les transects. Certains ont été identifiés avec certitudes et d'autres par leurs souffles ou par leur comportement. Les Globicephala macrorhynchus on été observé 7 fois en couple et 2 fois en solitaire, 1 fois les Delphinus delphis en groupe avec les juvéniles, puis les Delphinus sp 1 fois en groupe.

Alors que les Megaptera novaeangliae ont été observé 3 fois avec 3 individus en solitaire et les Balaenoptera sp aussi 3 fois avec 5 individus de façon isolée.

Tableau 7 : SIERRA LEONE

Petits cétacés ou dauphins à dents (Odontocètes)			
Espèces	**Nombre d'observations**	**Nombre total d'individus minimum**	**Observations**
Delphinus delphis	**3**	**450**	Adultes+juvéniles
Grands cétacés à fanons (Mysticètes)			
Espèces	**Nombre d'observations**	**Nombre total d'individus minimum**	**Observations**
Megaptera novaeangliae	**2**	**4**	
Balenoptera sp.	**2**	**2**	

Delphinus delphis : **450**
Megaptera novaeangliae : **4**
Balaenoptera sp : **2**
Total : 456

En Sierra Leone, au total 456 mammifères marins d'espèces différentes ont été vu pour 7 observations dans les transects. 450 Delphinus delphis observés dans trois groupes différents constitués d'adultes et des juvéniles. Alors que les Megaptera novaeangliae sont vu 2 fois en couple de deux et les Balaenoptera sp 2 fois en solitaire.

Tableau 8 : GUINEE

Petits cétacés ou dauphins à dents (Odontocètes)			
Espèces	**Nombre d'observations**	**Nombre total d'individus minimum**	**Observations**
Globicephala macrorhynchus	**1**	**2**	
Delphinus delphis	**5**	**304**	
Grands cétacés à fanons (Mysticètes)			
Espèces	**Nombre d'observations**	**Nombre total d'individus minimum**	**Observations**
Megaptera novaeangliae	**3**	**6**	
Balenoptera sp.	**1**	**2**	Souffle+saut

Globicephala macrorhynchus : **2**
Delphinus delphis : **304**
Megaptera novaeangliae : **6**
Balenoptera sp : **2**
Total : 314

Au total, 314 mammifères marins ont été dénombrés dans la ZEE guinéenne, 2 Globicephala macrorhynchus pour une observation, 304 Delphinus delphis avec 5 fois d'observation. Le Megaptera novaeangliae trois (3) fois d'observation avec 6 d'individus et le Balaenoptera sp une observation sur 2 individus observés.

Tableau 9 : GUINEE-BISSAU

Petits cétacés ou dauphins à dents (Odontocètes)			
Espèces	**Nombre d'observations**	**Nombre total d'individus minimum**	**Observations**
Globicephala macrorhynchus	**3**	**24**	
Delphinus delphis	**4**	**720**	
Grands cétacés à fanons (Mysticètes)			
Espèces	**Nombre d'observations**	**Nombre total d'individus minimum**	**Observations**
Megaptera novaeangliae	**3**	**5**	
Balenoptera sp.	**2**	**3**	

Globicephala macrorhynchus **: 24**
Delphinus delphis : **720**
Megaptera novaeangliae : **5**
Balenoptera sp : **3**

Au total, **752** mammifères marins ont été observés dans les différents transects. Les Globicephala macrorhynchus ont vu 3fois avec 24 individus, Delphinus delphis 4fois avec 720 individus, Megaptera novaeangliae 3 fois, 5 individus et le Balaenoptera sp 2 fois à 3 individus.

TABLEAU SYNOPTIQUE DES MAMMIFERES MARINS OBSERVES DANS LES PAYS :
(*Liberia, Sierra Leone, Guinée et Guinée- Bissau)*

BIO-ECOLOGIE DES MAMMIFERES MARINS :

La respiration

Les cétacés ont la particularité d'être des animaux marins mais qui respirent de l'air. Ce sont des mammifères marins qui possèdent des poumons et doivent donc régulièrement remonter à la surface pour respirer. Un orifice situé au sommet du crâne appelé évent s'ouvre pour permettre les échanges respiratoires dès qu'ils arrivent à la surface. Leur corps possède une grande capacité de stockage du dioxygène et des adaptations physiologiques pour l'apnée.

Les sens

Les cétacés sont dotés de différents sens :

- une vision aux performances modestes,
- une bonne audition,
- un toucher jouant un rôle important dans les relations sociales,
- un odorat presque disparu,
- un goût qui joue un petit rôle dans la quête de nourriture.

L'écholocation

Certains cétacés, les odontocètes, utilisent l'écholocation qui permet grâce à l'envoi et la réception d'ondes sonores, de connaître avec précision la distance, la nature, la direction et la vitesse des objets qu'ils vont rencontrer et ce, à plusieurs centaines de mètres.

La reproduction

Les cétacés sont des mammifères. La gestation généralement longue donne naissance à un seul petit qu'ils allaitent. La plupart des espèces ont une maturité sexuelle tardive par rapport à leur durée de vie globale.

L'alimentation

Les odontocètes (cétacés à dents) sont des chasseurs qui se nourrissent pour la plupart de calamars, de sèches ou de poissons. Certains comme les orques sont des prédateurs pour des oiseaux ou d'autres mammifères marins.

Les mysticètes (cétacés à fanons) filtrent l'eau de mer avec leurs fanons pour se nourrir du krill (crevettes minuscules), du zooplancton, des petits poissons et des céphalopodes qui sont retenus.

Le comportement

Les cétacés passent toute leur vie dans l'eau. La plupart d'entre eux vivent dans les mers et très peu vivent dans les lacs ou rivières. Souvent à l'approche, ils montrent toute leur indulgence.

D'autres plus craintifs sondent (Cachalot) ou fuient avec une vitesse de pointe d'environ 20 nœuds (1 mille /heure ou 0,514 m/s). Ceci montre les différences collectives de comportement dans des régions semblables. Ils ne sont vus que pendant le jour surtout de l'aube à 11h.

Cela traduirait tout simplement leur activité essentiellement nocturne. En effet ils vont au fond des mers pour se nourrir la nuit et remontent en surface le jour pour se reposer. Les cétacés communiquent entre eux par des vocalisations.

Certaines espèces sont essentiellement solitaires, d'autres vivent en groupes familiaux (dauphins) ou en bancs, comptant des centaines d'individus. Les orques chassent souvent en groupe, ce qui semble indiquer l'existence d'une communication entre elles ***(COUSTEAU et DIOLE, 1973).***

Les cétacés en quelques chiffres

Noms communs	Longévité (en années)	Maturité (en années)	Gestation (en mois)
Grand dauphin	**30**	**10**	**12**
Dauphin long bec	**20**	**6**	**11**
Baleine à bosse	**45**	**6**	**12**
Cachalot	**65**	**10**	**15**

Source : *https://www.globice.org/espace-public/les-cetaces/la-biologie-des-cetaces/*

V. Zone de location des algues pélagiques (Sargasses)

LIBERIA

Dates	Temps d'observations (en heure)	Coordonnées		Pays
28-08-2019	09 :41	05°09.145"	09°21.128"	Libéria
28-08-2019	09 : 54	05°09.145"	09°21.128"	Libéria
28-08-2019	12 :20	05°09.145"	09°21.128"	Libéria
28-08-2019	12 :35	05°09.700"	09°35.946"	Libéria
29-08-2019	15 :50	05°17.591"	09°35.044"	Libéria
30-08-2019	08 :27	05°28.037	09°43.633"	Libéria
30-08-2019	12 :00	05°36.625"	10°00.833"	Libéria
30-08-2019	13 :22	05°34.352"	10°01.058"	Libéria
30-08-2019	13 :44	05°31.748"	10°04.003"	Libéria
31-08-2019	10 :40	05°48.479"	10°27.730"	Libéria
31-08-2019	10 :56	05°48.385"	10°27.856"	Libéria
31-08-2019	15 :12	05°59.270"	10°35.878"	Libéria
31-08-2019	15 :23	05°59.270"	10°35.879"	Libéria
31-08-2019	15 : 37	05°01.993"	10°33.249"	Libéria
01-09-2019	07 :14	06°14.609"	10°59.525"	Libéria
01-09-2019	08 :00	06°18.449"	10°56.522"	Libéria

01-09-2019	08 :12	06°19.468''	10°55.458''	Libéria
01-09-2019	15 :17	05°31.882''	10°04.738''	Libéria

SIERRA LEONE

Dates	**Temps d'observations** (en heure)	**Coordonnées**		**Pays**
02-09-2019	08 :20	06°46.437''	11°49.728''	Sierra Leone
02-09-2019	08 :46	06°46.784''	11°50.614''	Sierra Leone
02-09-2019	09 :03	06°49.567''	11°50.037''	Sierra Leone
05-09-2019	08 : 31	07°49.395''	13°50.239''	Sierra Leone
05-09-2019	09 : 28	07°49.364''	13°51.940''	Sierra Leone
05-09-2019	09 : 53	07°48.910''	13°51.073''	Sierra Leone
05-09-2019	13 : 06	07°39.889''	14°00.895''	Sierra Leone
05-09-2019	13 : 30	07°38.122''	14°03.455''	Sierra Leone
05-09-2019	14 : 03	07°41.299''	14°06.906''	Sierra Leone
05-09-2019	14 :40	07°45.341''	14°10.894''	Sierra Leone
05-09-2019	15 : 40	07°52.279''	14°11.185''	Sierra Leone
06-09-2019	07 : 15	08°26.555''	13°54.385''	Sierra Leone
06-09-2019	07 : 53	08°25.609''	13°57.598''	Sierra Leone
06-09-2019	08 : 05	08°24.454''	13°58.841''	Sierra Leone

GUINEE

Dates	**Temps d'observations** (en heure)	**Coordonnées**		**Pays**
09-09-2019	08 :13	09°07.243'	15°10.151'	Guinée
09-09-2019	08 :21	09°11.253'	15°06.355'	Guinée
09-09-2019	08 :50	09°10.512'	15°05.134'	Guinée
10-09-2019	14 :31	09°20.009'	15°13.729'	Guinée

GUINEE-BISSAU

Dates	**Temps d'observations** (en heure)	**Coordonnées**		**Pays**
17-09-2019	8 :00	10°28.315'	16°22.426'	Guinée-Bissau
18-09-2019	16 :13	10°41.306'	16°27.575	Guinée-Bissau
20-09-2019	15 :20	11°10.374'	17°05.989'	Guinée-Bissau
20-09-2019	16 :55	11°10.320'	17°10.970'	Guinée-Bissau
21-09-2019	12 :09	11°39.885'	17°05.970'	Guinée-Bissau
21-09-2019	15 :18	11°35.136'	17°19.903'	Guinée-Bissau
21-09-2019	17 :36	11°55.634'	17°23.915'	Guinée-Bissau

VII. DISCUSIONS :

Malgré les conditions difficiles due aux intempéries de la nature (la pluie, le soleil, le vent et la fraicheur) sur la plateforme du niveau IV du navire de recherche R/V *Dr Fridtdjof Nansen* l'observation des mammifères marins s'est effectué sur la côte Ouest atlantique allant du Libéria en Guinée-Bissau (via Guinée Conakry, Sierra Léone), qui est une zone réputée très poissonneuse et très fréquentée par les navires de pêches de nationalités diverses.

Les nombre de populations des cétacés qui habitent les eaux ouest africaines du golf de Guinée, il n'y existe pas d'estimations d'abondances disponibles. Néanmoins Plusieurs suivis permettront d'obtenir des informations sur l'évolution de leurs densités (abondances relatives) et ainsi conclure sur le futur des populations sur la stabilité en croissance ou en voie de disparition.

Ces observations cette année confirme la présence abondante dans les eaux Ouest africaines des *Megaptera novaeangliae* avec leurs nouveaux nés. Et c'est la baleine qui est l'espèce de cétacé la plus fréquemment rencontrée dans les observations.

Leur présence jusqu'au mois d'Août – Septembre, ce qui correspond à la saison de reproduction d'une population de l'hémisphère sud (Bamy et al 2010 ; Van Waerebeek et al 2001,2012) avec la présence d'un grand nombre de baleines avec leurs nouveaux nés, indiquent très probablement que ces baleines à bosse s'accouplent et mettent bas dans ces zones.

A l'issue de cette campagne à bord de Nansen les résultats encourageants ont été obtenus pendant ces 30 jours de mission. **1626** cétacés de différentes ont été observés. Les *Delphinus delphis* au nombre de **1524** domine largement, suivi de *Globicephala macrorhynchus* au nombre de **42**, de Delphinus sp au nombre de **30, de Megaptera** novaeangliae au nombre de 18 et de Baleines sp de *12* individus.

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