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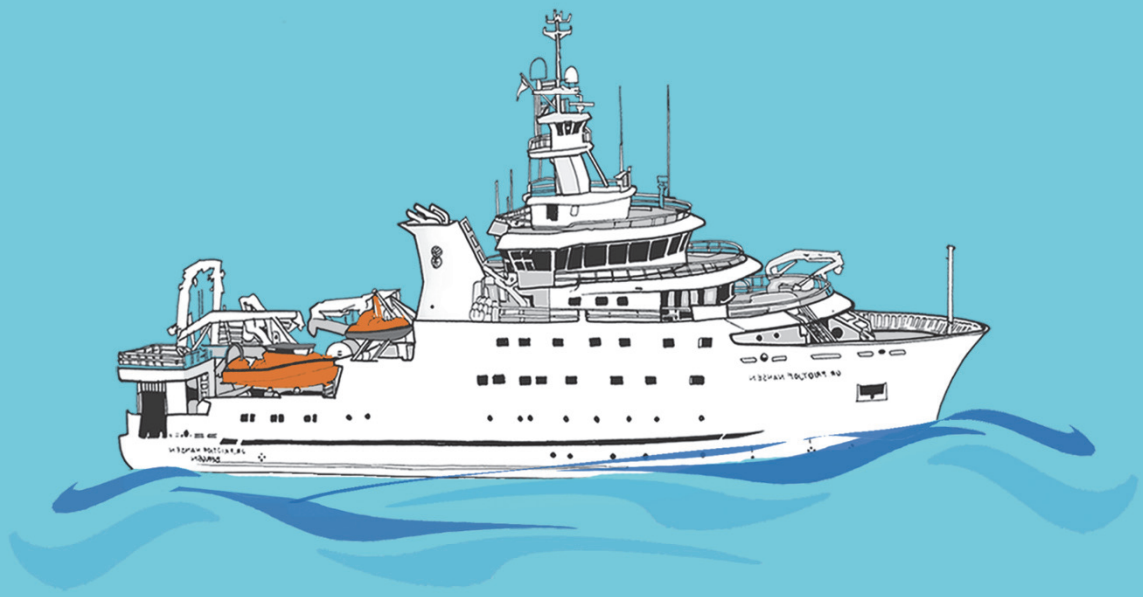

SURVEYS OF THE DEMERSAL FISH RESOURCES OF ANGOLA

Angola

26 May–27 June 2019

Instituto Nacional de Investigação Pesqueira e Marinha
Luanda, Angola

Institute of Marine Research
Bergen, Norway

THE EAF-NANSEN PROGRAMME (2017–2021)

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

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

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

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

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

LE PROGRAMME EAF-NANSEN (2017-2021)

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

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

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

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

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

Johannessen, T., Michalsen, K., Estevão, V., Nangolo, E., Bruck, S.A., Gabrielsen, H., Johnsen, E., Lødemel, H. Naustvoll, L.J., Olsen, M., Ostrowski, M., Zaera-Pérez, D. 2021. Surveys of the demersal fish resources of Angola, Angola, 26 May–27 June 2019. NORAD-FAO PROGRAMME GCP/GLO/690/NOR, CRUISE REPORTS *DR FRIDTJOF NANSEN*, EAF-Nansen/CR/2019/6

CRUISE REPORTS *DR FRIDTJOF NANSEN*

SURVEYS OF THE DEMERSAL FISH RESOURCES OF ANGOLA

Angola

26 May–27 June 2019

by

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Institute of Marine Research
Bergen, 2021

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EXECUTIVE SUMMARY

The area surveyed in 2019 by the research vessel (R/V) *Dr Fridtjof Nansen* includes the continental shelf and upper slope of West Africa from South Africa to Morocco. Leg 2.4 (in part) and the whole of leg 2.5 covered the continental shelf and upper slope of Angola between the 30 m and 600 m depth, from the border with Namibia to the border with The Democratic Republic of Congo. The main objective of Leg 2 was to provide a synoptic regional coverage of the demersal resources in Southwest Africa.

Hydrographic variables (depth, temperature, salinity and oxygen) were measured with a CTD at most bottom trawl stations and along every degree of latitude in connection with "ecosystem transects" where plankton, egg and larvae, micro-plastics and water for chemical analyses were sampled at predefined depths.

This report summarises main results for demersal resources, while much of the other data collected, i.e. the oceanographic, plankton, top predator, jellyfish, benthic invertebrate and hake biological data, are presented with little analysis or comment. These data will be used for projects as part of the EAF-Nansen Science Plan.

During a post-survey workshop held in November 2019 a regional section, Chapter 5 was agreed to briefly investigate the transboundary distribution of the key demersal stocks between South Africa, Namibia and Angola.

This survey was conducted in April and May; most previous surveys since 1996 have been conducted earlier in the year (February- March). Hence this factor has to be taken into account when comparing the results with revious surveys in Angola.

CHAPTER 1. INTRODUCTION

The research activities under the EAF-Nansen Programme 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.

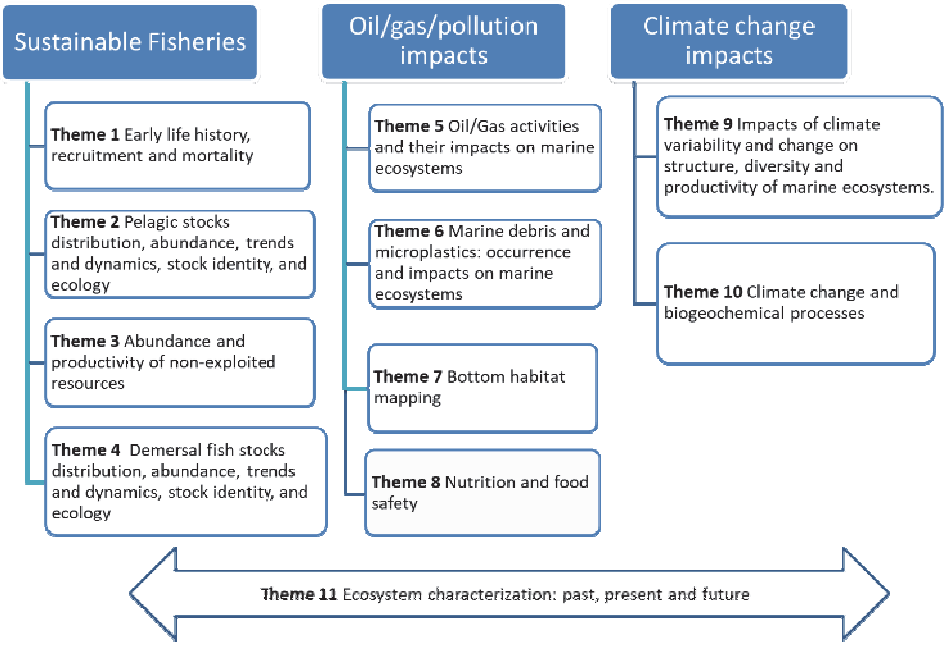


Figure 1. Research themes of the EAF-Nansen science plan

1.1 Survey objectives

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 production, zooplankton, ichthyoplankton and jellyfish

- To describe the primary productivity and the abundance and biomass patterns of phytoplankton of the region.
- To describe patterns in abundance, biomass and species composition of the mesozooplankton community

- To collect depth-stratified samples of zoo- and phytoplankton on six monitoring lines - Cunene, Namibe, Lobito, Palmeirinhas, Ambriz and Congo River – in order to continue the studies on feeding biology of fish by relating stomach content to zooplankton composition and density.

- To provide information on the abundance patterns of ichthyoplakton 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 fish resources

- Distribution and abundance of demersal resources using the swept-area method.

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

- To collect the stomach samples for *D. angolensis, D. macrophthalmus, M. polli* and *M. capensis*, and gonad samples for *D. angolensis* and *D. macrophthalmus,* for subsequent analyses at the INIPM Lab.

- Study the stock structure of *D. macrophthalmus, M. capensis, M. polli*, and *C. maritae* (mainly through meristic and morphometric characteristics).

- To opportunistically collect samples of the two species of juvenile hake, *M. capensis* and *M. polli*, for investigation into species identification using vertebrae counts.

- To collect data for comparative studies of the distribution and size structure of the two species of juvenile hake.

- To collect benthic invertebrates from both trawls and sediment samples for species identification and species composition studies.

- To collect environmental data using CTD casts at trawl stations for subsequent studies of factors influencing the distribution of key demersal fish stocks.

- Identification of spawning/nursery areas.

1.1.4 Microplastics and neuston communities

- 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.

1.1.5 Marine mammals and seabirds

- To register the occurrence of marine mammals and seabirds.

1.1.6 Food safety and pollution

- To collect samples for levels of environmental contaminants, nutrients, parasites and microorganisms with regards to food safety and pollution of selected species.

1.2 Survey area

The area surveyed in 2019 by the R/V *Dr Fridtjof Nansen* included the continental shelf and upper slope of West Africa, from South Africa to Morocco. Furthermore, a dedicated survey to the Discovery sea mounts in collaboration with SEAFO was carried out, as well as two mesopelagic transects as in 2017. Leg 2 covered the continental self and upper slope of Southwest Africa (Figure 2) to provide a synoptic coverage of the demersal resources at the regional level.

Figure 2. Overall survey programme for 2019 in southwest Africa

Leg 2.4 and 2.5 covered the continental shelf and slope of Angola between the 20 m and 800 m isobaths, from the Cunene River in the south to the Congo River in the north. The survey design followed the same standard as first developed by the Nansen Programme in the 1990s.

1.3 Participation

A total of 28 scientists and technicians from Namibia, Angola and Norway participated in the survey on Leg 2.4. On Leg 2.5, 27 scientists from Angola, The Democratic Republic of Congo (Congo Kinshasa), The Republic of Congo (Congo Brazzaville) and Norway participated. The full list of scientists and their affiliations is given in Table 1.

Table 1. List of participants, their role and affiliation during the survey off a) southern and central Angola (leg 2.4), and b) northern Angola (leg 2.5). TL – team leader

a) Leg 2.4

Name	Role	Affiliation
Kathrine Michalsen	Cruise leader	IMR
Ester Nangolo	Local cruise leader	MFMR
Diana Zaera-Pérez	Fish sampling TL	IMR
Sarah Bruck	Fish sampling TL	IMR
Virgilio Estevão	Local cruise leader	INIPM
Tarah Mbangula	Fish biology	MFMR
Jan Frode Wilhelmsen	Acoustic engineer	IMR
Fredrik Madsen	Acoustic engineer	IMR
Saskia Kisting	Water Chemistry	MFMR
Irene Moçambique	Water Chemistry	INIPM
Beat Gasser	Water Chemistry	IAEA
Blessing Kamwi	Water Chemistry	MFMR
Geraldina José	Fish biology	INIPM
Sténia Isaias da Costa	Plankton biology	INIPM
Timoteus Kadhila,	Fish biology	MFMR
Johnny Gamatham	Fish biology	MFMR
Pedro Panzo	Fish biology	INIPM
Guilherme Camarada	Fish biology	INIPM
Lessyn Kalweenya	Fish biology	MFMR
Thussnelde Ngutjinazo	Plankton biology	MFMR
Bernardo Moises Fernandes	Plankton biology	INIPM
Joao Gouveia Eusebio Dias Dos Santos	Plankton biology	INIPM
Leevi Mwaala,	Plankton biology	MFMR
Malakia Shimhanda	Fish biology	MFMR
José Amaro Francisco	Hydrography	INIPM
Araricky Shikongo (UNAM stud.)	Whale and bird obs.	UNAM
Marek Ostrowski	Hydrography TL	IMR
Heidi Gabrielsen	Plankton TL	IMR

b) Leg 2.5

Name	Role	Affiliation
Tore Johannessen	Cruise leader	IMR
Magne Olsen	Fish sampling TL	IMR
Helene Lødemel	Water chemistry TL	IMR
Erlend Langhelle	Fish sampling TL	IMR
Endre Johnsen	Food safety TL	IMR
Lars Naustvoll	Plankton TL	IMR
Geir Landa	Acoustic engineer	IMR
Hege Rognaldsen	Acoustic engineer	IMR
Agnethe Herzberg	Water Chemistry	IMR
Virgílio Narciso Avelino Estevão	Local cruise leader	INIPM
Angel Elwelwe Matunga	Fish	MPE
Lia Francisco dos Prazeres Neto Sousa	Plankton	INIPM
Sónia Cristina Pedro da Silva	Plankton	INIPM
Marcelina Carla André Fernandes	Plankton	INIPM
Florêncio Estevão André	Water chemistry	INIPM
Eduardo Tchitombi Canjongo Saquenha	Water chemistry	APCMN
Domingas Nsaku	Fish	INIPM
Maria de Fátima dos Reis Delicado Sebastião	Fish	INIPM
Faustino Kula Paulo	Fish	INIPM
Nelson Francisco Baião	Fish	APCMN
Roseline Blanche Akenze Née Ognimba	Fish	MAEP
Virginie Perpétue Poaty Née Malanda	Fish	MAEP
Paulo André de Sousa Coelho	Plankton	INIP
Nelson Dembi Bumba Quinta	Fish	CIP - LOBITO
Antoine Missamou	Food safety	MAEP
Koffi Mulumba N´Kelenda Casimir	Fish	MPE
Ahmed Stanislas Belvere Nakavoua	Plankton	MAEP

List of institution abbreviations:

IMR	Institute of Marine Research, Norway
MFMR	Ministry of Fisheries & Marine Resources, Namibia
INIPM	Instituto Nacional de Investigação Pesqueira e Marinha, Angola
IAEA	International Atomic Energy Agency
UNAM	University of Namibia
MAEP	Ministére de d'Agriculture, de l'Elevage et de la Pêche/Direction Animale de la Pêche et de d'Aquculture, The Republic of Congo
MPE	Ministére de la Pêche et Elevage, The Democratic Republic of Congo
APCMN	Académia de Pescas e do Mar do Namibe, Angola
CIP	Centro de Investigação Pesqueira do Lobito, Angola

1.4 Narrative

Leg 2.4: The vessel left Walvis Bay in the morning of 11 May 2019, conducting surveys in Namibian waters before crossing the border to Angola on Sunday 26'th. A total of three bottom trawl stations were conducted near Cunene River. Three superstations at 30 m, 100 m and 500 m and a total of 17 bottom trawls were conducted before the vessel reached the Namibe Environmental Line on 29 May 2019 at 17h00 UTC. This transect was completed on

the 30 May 2019 at 13h25. Two bottom trawls were conducted in Cabo Santa Marta before starting the coverage of the central region. After conducting environmental transects every 60 nm, the vessel arrived in the central region at 01h:00 the 31 May 2019 and proceeded with the deepest station on the Lobito environmental line. The vessel continued with bottom trawls and completed the bottom trawl coverage of the central region. The vessel came into port at Luanda at 08:00 local time on the 10 June 2019.

Leg 2.5: This leg covered the northern Angolan region. The vessel left Luanda on 13 June 2019 at 16:30 local time to complete the Luanda – Palmerinhas monitoring line that started at the end of leg 2.4. On 22 June 2019 the vessel entered the EEZ of the Democratic Republic of Congo (DRC) to do a hydrographical transect of 8 CTD stations along the border between Cabinda (Angola) and DRC, on the north side of the Congo River and returned to Angolan waters on 23 June 2019 to do the Congo River monitoring line, just south of the Congo River. The surface water was strongly affected by water from the river, colour being brownish and the innermost stations having high concentrations of cyanobacteria. Leg 2.5 was completed on 26 June 2019, and the vessel arrived in Luanda at 08:00 local time on 27 June 2019.

1.5 Survey design and survey effort

The survey followed a systematic transect design, with a semi-random distribution of bottom trawl stations along transects. Demersal trawling was carried out on predetermined positions within predetermined depth strata (Table 2). Transects ran perpendicular to the Angolan coastline, and were about 15 NM apart, with transect lengths ranging from 20-80 NM. As in previous surveys (2013-2015), additional trawl stations were performed in the area between Benguela and Tombua to obtain a time series of catch rates of demersal important species for future analyses. These stations are not included in the current biomass estimates.

Demersal trawling was carried out within 9 depth intervals on each transect (see Table 2). All hauls shallower than 300 m were done during daytime, generally between 05:00 and 17:00 UTC, to cover the main fish resource. Deeper than 300 m, trawling was carried out also during dark hours, mainly to cover the abundance and distribution of shrimps and hake. This is justified since night lifting of deep-water hakes from the bottom is considered to be minimal (Ingólfsson *et al*., 2005). The planned design of at least one trawl haul per depth interval could not always be followed due to unsuitable bottom conditions or non-accessible oil production areas in the northern region. Figure 3 to Figure 6 show cruise tracks, and locations of stations for hydrography, bottom trawl and plankton, respectively.

Figure 3. Course track along the coast of Angola

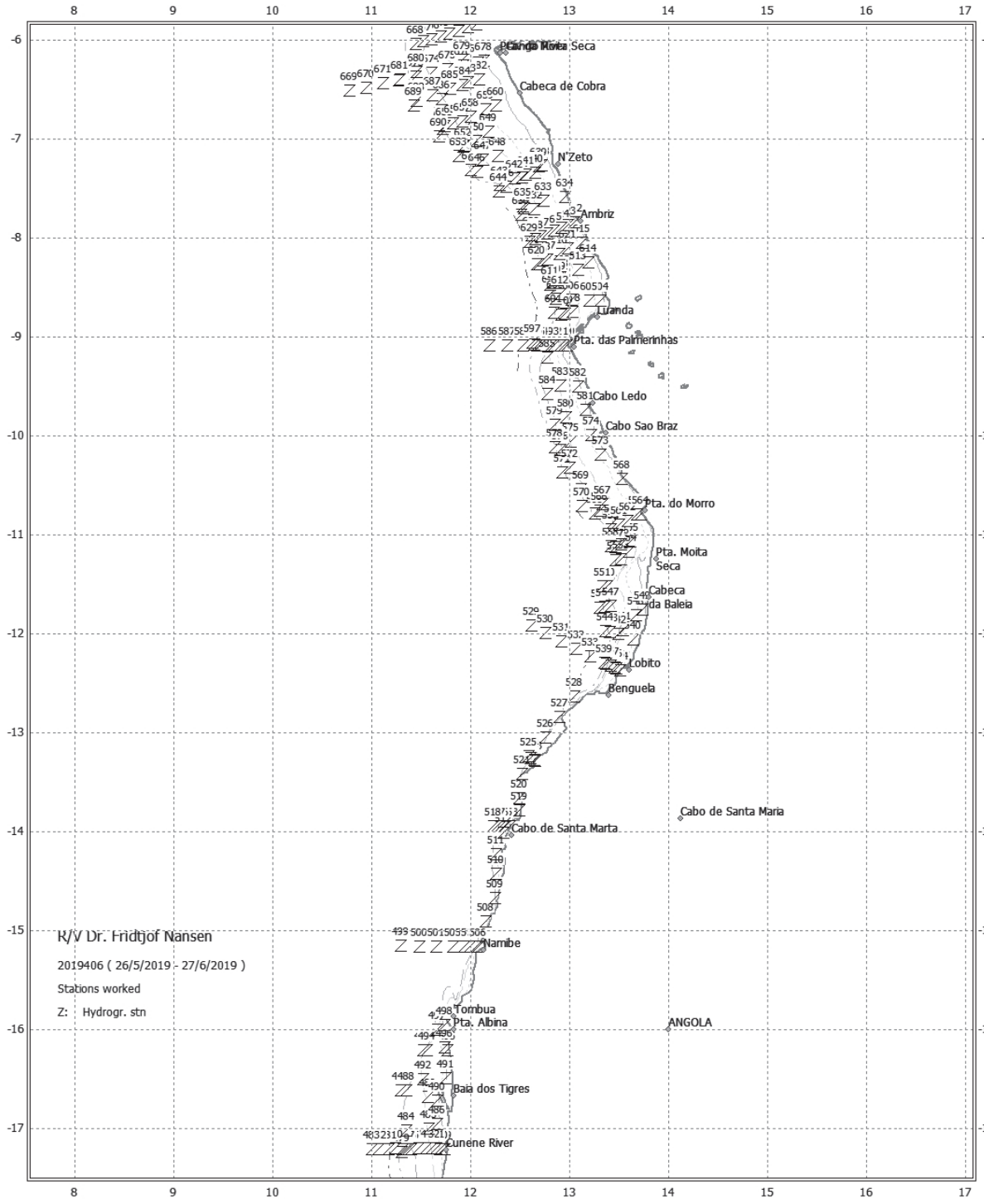


Figure 4. CTD stations along the coast of Angola

Figure 5. Bottom trawl stations along the coast of Angola

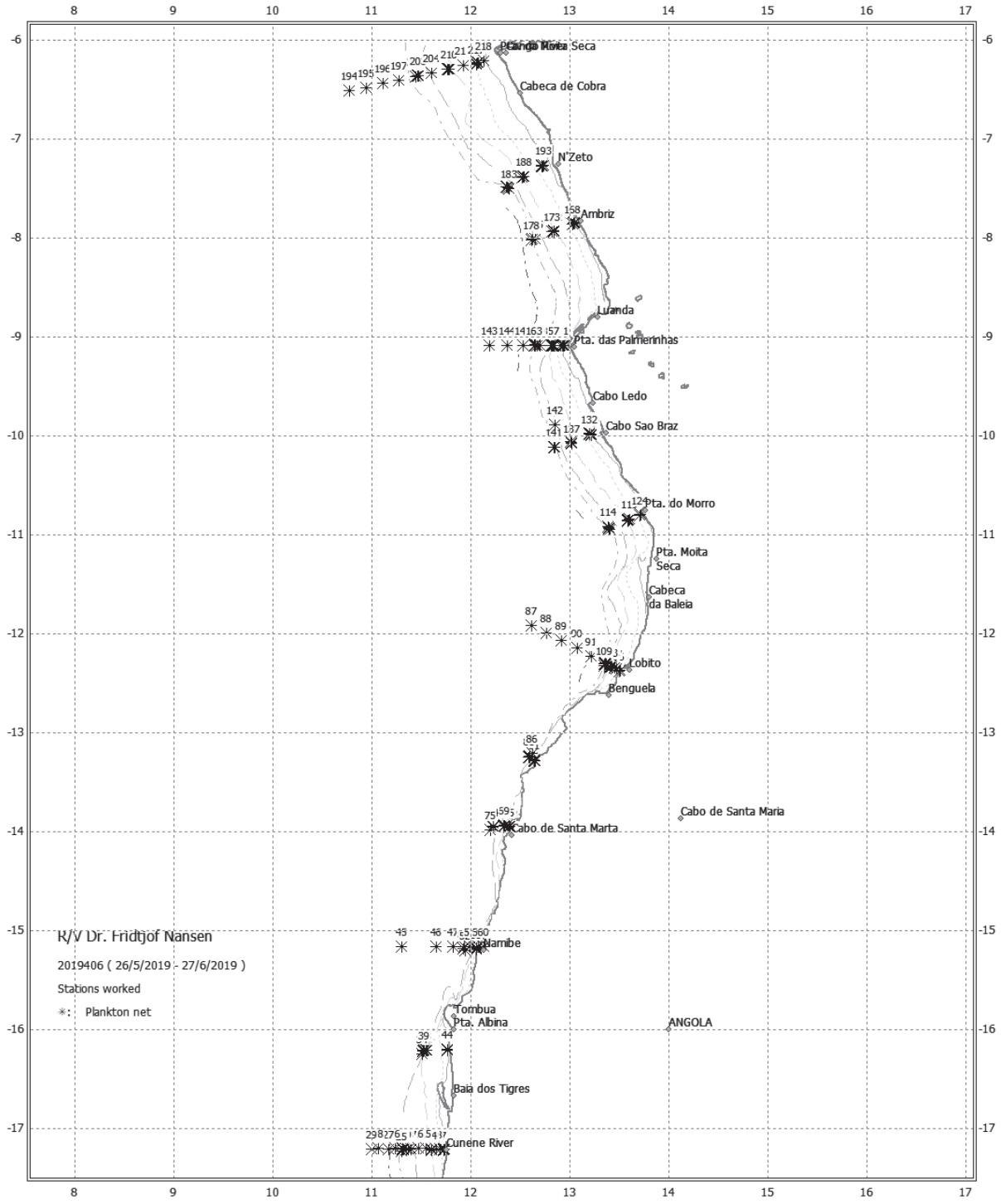


Figure 6. Plankton stations along the coast of Angola

Table 2 presents survey effort in terms of number of valid bottom trawl hauls per depth stratum, total number of successful hauls, number of invalid hauls, number of CTD stations, distance surveyed and the size of the various depth strata. In addition, the table also shows effort relative to the stratum size as percentage hauls versus percentage area. For example, for the northern region (Lunda-Congo River), the 20-50 m depth stratum measured 1 379 square nautical miles (NM2) and 9 bottom trawl hauls were carried out. The size of the stratum corresponded to 16.4 % of the surveyed area of the region (8395 NM2), and the number of

hauls to 12.7% of a total of 71 valid hauls. The surveyed area of the norther region (8 395 NM2) constituted 51% of the total area surveyed in Angola, and the sailed distance was 1 307 NM. The overall average coverage for Angola was 1 (one) valid trawl station per 93 NM².

Table 2. Survey effort in terms of number of trawl hauls per region (see text for explanation)

	Depth strata												
Region	20-50m	50-100m	100-200m	200-300m	300-400m	400-500m	500-600m	600-700m	700-800m	Total area/ Valid BT st.	Invalid BT st.	CTD*	Distance (NM))
Congo River-Ponta das Palmerinhas (S09º00'-S06º00')													
Area (NM2)	1379	1969	1940	601	550	437	409	408	702	8395			
# hauls (BT)	9	13	12	7	7	6	5	5	7	71	5	95	1307
%area	16.4	23.5	23.1	7.2	6.6	5.2	4.9	4.9	8.4	51			
%hauls	12.7	18.3	16.9	9.9	9.9	8.5	7.0	7.0	9.9.				
Ponta das Palmerinhas-Benguela (S12º40'-S09º00')													
Area (NM^2)	1068	1586	1439	407	372	343	346	268	357	6186			
# hauls (BT)	10	14	13	11	9	10	7	5	5	84	0	69	1126
%area	17.3	25.6	23.3	6.6	6.0	5.5	5.6	4.3	5.8	37			
%hauls	11.9	16.7	15.5	13.1	10.7	11.9	8.3	6.0	6.0				
Tombua- Cunene (S17º15'-S16º 00')													
Area (NM^2)	507	591	594	100	77	48	39			1956			
# hauls (BT)	7	6	5	0	2	0	1	1	0	17	5	61	660
%area	25.9	30.2	30.4	5.1	3.9	2.5	2.0	0.0	0.0	12			
%hauls	31.8	27.3	22.7	0.0	9.1	0.0	4.5	4.5	0.0				
Grand total													
Area (NM2)	2954	4146	3973	1108	999	828	794	676	1059	16537			
# hauls (BT)	26	33	30	18	18	16	13	11	12	172	10	225	3093
%area	17.9	25.1	24.0	6.7	6.0	5.0	4.8	4.1	6.4				
%hauls	14.7	18.6	16.9	10.2	10.2	9.0	7.3	6.2	6.8	Total hauls: 172			

Along every degree of latitude (every 60 NM), an ecosystem transect was carried out with 3 superstations, at 30 m, 100 m and 500 m depth (see sampling depths in Annex I). Super-stations included CTD and sampling of plankton, fish eggs and larvae, micro-plastics and water for chemical analyses. In addition, the following Angolan Monitoring lines were sampled using CTD and WP2 for zooplankton: Cunene, Namibe, Lobito, Palmeirinhas, Ambriz and the Congo River. Due to lack of time, WP2 sampling was not carried out along the Ambriz monitoring line. At the bottom trawl stations, additional CTD sampling were carried out, except when the distance to the closest CTD station (e.g. super-station) was less than a couple of NMs.

Table 3 summarises the overall survey effort, whilst Table 4 shows number of plankton samples at super stations per region.

Table 3. Total survey effort – distance sailed, number of transects, valid bottom trawl stations, CTD, Superstations, Bongo, WP2 and Manta, and additional sampling at the Angolan monitoring lines

Date	26 May- 27 June
Distance (NM)	3093
Transects	32
Bottom trawl stations	172
CTD	225
Super stations	35
Bongo	35
WP2	36
Manta	34
Angolan monitoring lines	6
CTD	53
WP2	42

Table 4. Overview of plankton sampling at superstations per region

Region	Sampling device	Stations sampled	Stations not sampled
Northern	WP2	9	
	Manta trawl	9	
	Bongo	9	
Central	WP2	13	
	Manta trawl	13	
	Bongo	12	1
Southern	WP2	14	
	Manta trawl	13	1
	Bongo	13	1

CHAPTER 2. METHODS

2.1 Underway hydrographic sampling

2.1.1 Meteorological data recording

Meteorological data were logged continuously from the AANDERAA Smartguard meteorological station. The parameters included wind direction and speed, air pressure, relative humidity, air temperature and solar radiation. Raw data were logged to the Nansis tracklog system averaged every 60 seconds. Raw data were screened and cleaned for missing data and outliers. The screening revealed the poor quality of the recorded wind data. These data were dotted with numerous gaps of zero wind velocity. Some of these gaps lasted up to several hours. During postprocessing, the sections containing gaps were excluded from the analysis. The remaining data underwent spatial averaging on a grid 14x14 km to account for clustering (duplicated points in space) at locations of trawl hauls.

2.1.2 Thermosalinograph

Two SBE 21 SeaCAT Thermosalinograph (TSG) units operated underway, collecting data on temperature and conductivity from the water intake located at 4- and 6- meters depth, respectively. Salinity was calculated using temperature and conductivity data from the internal sensors mounted inside the instrument's housing. The ambient ocean temperature was measured with an external sensor fitted at the inlet where seawater is pumped into the system. The 4-meter unit was additionally equipped with a Sea-Bird WETStar Fluorometer.

The instruments' firmware sampled the sensor data at 10 second intervals. As the first step in the quality control, the raw data were screened for outliers, flow-pass filtered at 5-minute lag and subsampled to 2-minute averages.

The previous survey (201904) identified periods with large (±0.1‰) high-frequency variations that biased the TSG salinity record. These were attributed to the high-frequency variations sourced from variable flow rates through the sensor. The screening during this survey confirmed the same problem for both TSG units. To reduce the bias, a median filter was applied before the low-pass filtering step.

A cross-calibration was performed to validate the TSG output against the CTD standard. The CTD-recorded temperature, conductivity, salinity and fluorescence were regressed against the respective TSG parameters sampled from the continuous underway record at times of CTD stations. In the case of temperature, the external TSG sensor was used.

The temperature and conductivity regression slopes were close to 1 and intercepts were small, suggesting an excellent TSG-CTD correspondence. The R-squared parameter, denoting the error explained, was close to 1 for both sensors, thus further strengthening the above observation. However, the salinity regression was visibly deteriorated compared to those characterizing the sensor data, with TSG salinities scoring higher compared to the CTD-measured, and with several large outliers on the scatter plot.

The fluorescence sensors provided only a relative measure of chlorophyll. During Leg 2.4 the linearity between TSG and CTD mounted sensors was reasonably good, but with the CTD fluorescence displaying double RFU values compared the TSG (RFU – relative fluorescence unit). The same cross-calibration performed on the results from Leg 2.5 produced a substantially different result. The discrepancies between the TSG and CTD salinity and fluorescence were large, and the relations were non-linear. The quality of this dataset is still under validation, and therefore TSG results from Leg 2.5 (off Northern Angola) are exclude from this report.

Annex II provides and overview of the hydrography sensors and the water chemistry quality assurance.

2.1.3 Current speed and direction measurements (ADCP)

The ship is equipped with two vessel-mounted Acoustic Doppler Current Profilers from Teledyne RDI, operating at frequency 75 and 150 kHz, respectively. During this survey, the 75 kHz unit was factory-serviced, not available onboard.

Ocean currents were recorded with the 150 kHz ADCP configured in narrowband mode with 8 m vertical bins to a maximum 350-500 m depth, depending on the volume of plankton in the water column. The heading data to rotate the currents from the ship-referenced to the earth coordinates were obtained from the vessel's differential GPS, Seapath. An additional rotation of -0.14 degrees was applied to correct for the misalignment between the true and the instrument pre-configured transducer orientation. This correction was obtained using statistical analysis.

2.2 Fixed station sampling

Trawl sampling was carried out along transects perpendicular to the coastline, approximately 15 NM apart (Figure 5). Along every 4th transect, which corresponds to 1° latitude, extended sampling of biological and hydrographical variables was carried out. These stations are referred to as "super-stations" and "super-transects". The standard Nansen protocol for super-stations is to sample at 30 m, 100 m and 500 m depth. The samples collected on these transects are shown in Figure 7.

In addition, CTD stations without water samples were sampled at most of the trawl stations, and sometimes also between the "super-stations" when there were no trawl hauls and the distance between super-stations was >5 NM. Also, the main monitoring lines in Angola were sampled (red lines in Figure 8) using CTD and WP2 for zooplankton. In addition, the Ambriz CTD line was sampled as a monitoring line (but without the WP2 due to time limitations).

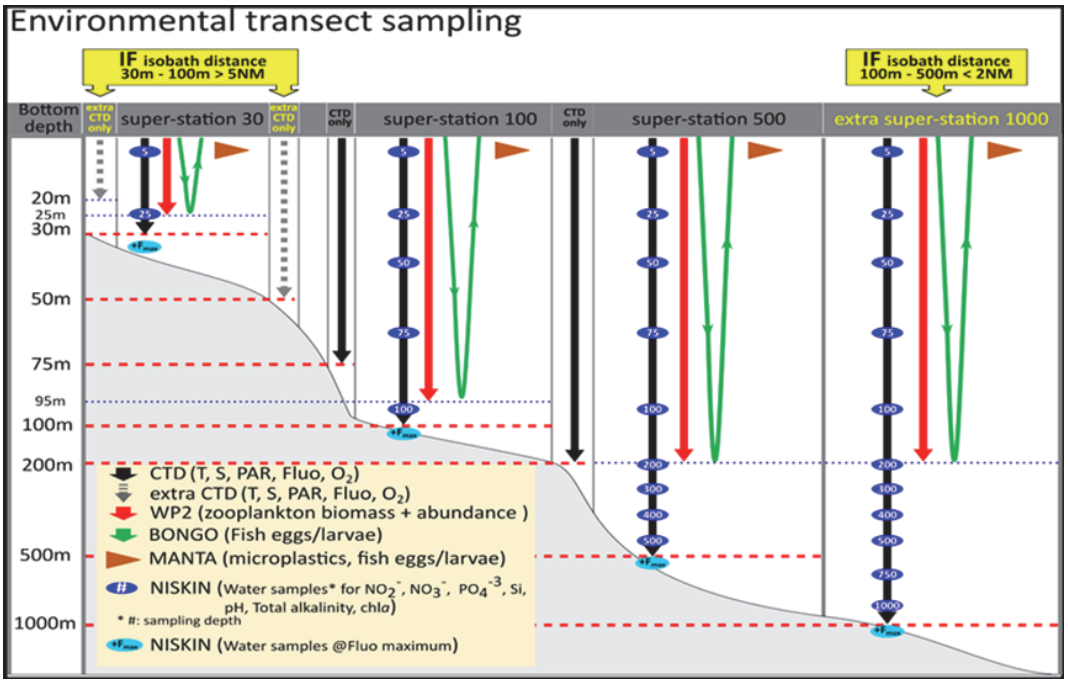


Figure 7. Sampling diagram showing the depth and the equipment used at the super stations transects, from the inshore towards the deep 500 m stations. Note, phytoplankton samples were not taken during the survey

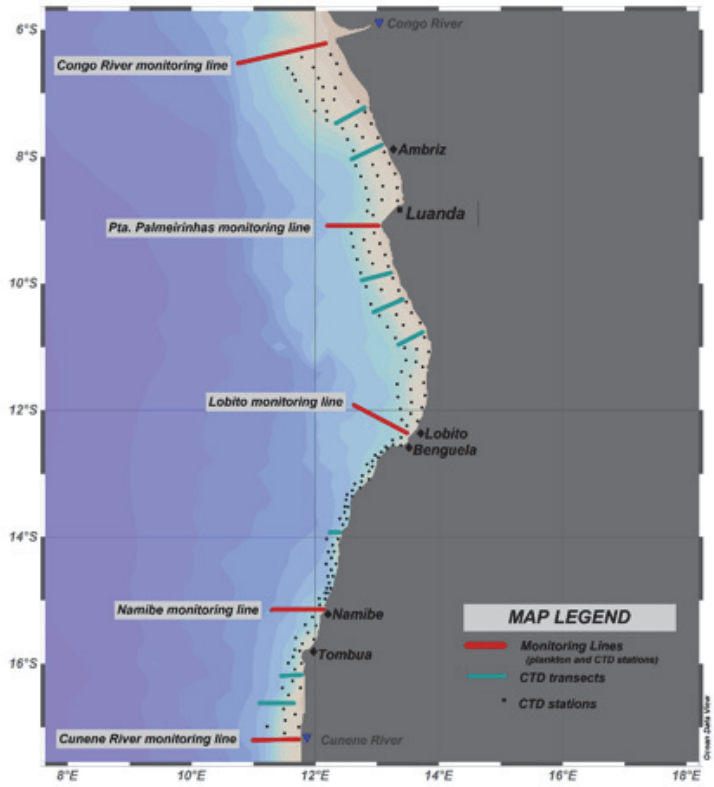


Figure 8. Overview of the Angolan monitoring lines

CTD stations were sampled using a Sea-Bird 911plus CTD equipped with 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, a Satlantic Photosynthetically Active Radiation LOG ICSW sensor and a rosette of 12 bottles for water samples. All sensor logging and profiling was performed using Seabird's Seasave software (see specs in Annex II).

2.2.1 Ocean acidification parameters (pH and total alkalinity)

Water samples for pH and total alkalinity analyses 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 analyses 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.

2.2.2 Nutrient samples

Seawater samples for nutrient analyses (nitrite, nitrate, silicate and phosphate) were collected at standard depths (one sample at each depth) at each super-station in 20 ml polyethylene vials. Samples were preserved with 0.2 ml chloroform and kept refrigerated and dark (Hagebø and Rey, 1984) until being sent to the Institute of Marine Research for analysis. Analyses will be performed using a Skalar San++ Continuous Flow Analyser while following standard procedures (Grasshoff *et al*., 1999). Storage and transport may introduce loss of accuracy of the results.

Once analyses were complete, phosphate and silicate concentrations combined with the on-board measurements of pH and total alkalinity would be used to calculate the area's inorganic carbon components along with the aragonite saturation state to update the ocean acidification status of the region.

2.2.3 Chlorophyll *a*

Water for chlorophyll-α samples were collected in 1 000 ml polyethylene bottles and transferred into 260 ml bottles for filtration. Three replicates were filtered on depths where sensor data from the bottle files indicate values higher than 0.5 ug/l. In areas with very low

chlorophyll concentration (all below 0.5) double amount of water (2x260ml) was filtered. On all other depths, 1 replicate of 260 ml was done. These water samples were collected 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 at -80°C until further analyses.

Qualitative phytoplankton samples with an algae net were not collected during the survey, except for three samples obtained at the Congo River monitoring transect for training purposes.

2.2.4 Zooplankton sampling

Zooplankton samples were collected with vertical tows of a WP2 net (180 µm). The net was towed from 5-10 m above the bottom to the surface, or from 200 m depth to the surface at deep stations. Each sample was divided in two equal parts using a Motoda splitter. One half was size fractionated through 2 000, 1 000 and 180 µm mesh sizes, and dried in the oven (60^{o}C) in pre-weighed aluminium trays. The second half was preserved in 4% borax buffered formaldehyde solution.

2.2.5 Fish eggs and larvae

Fish eggs and larvae were collected with double oblique tows of a Bongo with 405 µm nets at super-stations. The Bongo was towed from 5-10 m above the bottom to the surface, or from a maximum depth of 200 m at deeper stations The Bongo sampler have two separate nets, Bongo L (left) and Bongo R (right). The samples from the Bongo was treated as follows:

a) Bongo L was sieved on a 180 µm net and transferred to a 100 ml bottle (or bigger) and preserved immediately in 4% formaldehyde. These were transferred to INIPM in Angola for future ichthyoplankton sorting and identification.

b) The Bongo R was examined under the microscope and ichthyoplankton was sorted. After sorting, larvae were photographed and preserved in 96% ethanol in small, labelled scintillation vials or cryovials indicating clearly the part of the sample used (i.e. 50%), the preservative, station etc. When sorting was finished, the bulk sample was preserved in 4% borax buffered formaldehyde (especially made for ichthyoplankton) in labelled bottles (as "sorted"). These jars (all preserved in 96% ethanol) were transferred to INIPM in Angola for rechecking ichthyoplankton presence and taxonomic identification of the ichthyoplankton, respectively.

In addition, surface samples from the Manta trawl were sorted onboard for microplastics (see section 2.2.6) and ichthyoplankton. These vials with sorted larvae and eggs preserved in 96% ethanol were transferred to IMR for taxonomic identification, and the bulk Manta trawl samples preserved in 96% ethanol were transferred to University of Western Cape, South Africa, for future analysis.

2.2.6 Microplastics and debris

Microplastics are small pieces of plastic normally less than 5 mm. Microplastics were collected at all super-stations. At each station, the surface layer was sampled with a Manta-trawl having a rectangular opening of 19 cm × 61 cm (HxW), mesh-size 335 µm and two wings to keep it in balance and at the surface during the tow. Trawls were hauled horizontally at a speed of ~1.5 ms^{-1} for 15 minutes. Trawling was performed on the starboard side about midship, a few meters away from the ship attempting to avoid the wake of the vessel. Geographical start and stop positions were recorded in the bridge-log. In addition, the counts of a flowmeter attached below the trawl opening were recorded at start and stop of each trawl event.

The Manta-trawl samples were washed in filtered seawater over a sieve with mesh-size 180 µm. Microplastic particles were picked from the sample under a stereomicroscope. All assumed microplastic items were then placed on a gridded petri dish for examination under the stereomicroscope, photographed and, to the extent possible, also measured and described (e.g. length, shape, type and colour). The sorted microplastics were washed with distilled water and dried in pre- weighed aluminium-trays. The aluminium trays with microplastics were transferred to IMR for further processing.

2.3 Bottom mapping echo sounder

The EM710 multibeam echo sounder is a high-resolution seabed mapping systems. The EM710 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 EM710 was not operational for most of the survey. Data from the EM710 was logged to the on-board Olex plotting system and to raw data files.

During the survey, swath coverage and depth range settings were adjusted regularly to optimize the mapping. The measured sound speed profile was also input in the system when CTD measurements were carried out. Tide correction was not done.

The recorded data were viewed on Olex, the onboard navigation planning system.

2.4 Top predator observations

Observations were carried out when weather permitted from the observation platform of the vessel, situated 21.5 m above sea level, during daylight hours between 08:00 to 18:00 (with breaks). Marine mammal observations were the main objective with seabirds' observations of secondary importance.

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

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

2.4.1 Cetaceans

Observation of sea mammals was carried out along the southern and central region of Angola. This was performed by using either naked eye or Trinovio (8×42) binoculars to an approximate distance of 2.5 km from the vessel to locate and identify different species as well as to determine group sizes. Species identification was carried out through the careful observation and photography. A Nikon AF-S Nikkor camera with 80-400 mm telephoto lens was used to take images which were used for further species identification, where, specific features such as shape and height of the blow, body shape and size, color patterns and animal behavior were observed. Two cetacean field and identification guides were consulted for more challenging identifications (Sea Search, n.d. and Jefferson *et al.*, 2015).

All significant sighting data for cetacean were recorded on a Data form prepared by Sea Search-Namibian Dolphin Project. The following data were recorded every time a cetacean was spotted: time, date, location, sea surface temperature (SST), cloud cover, depth (m), sightability, speed and direction of the wind, number of boats/vessels and interaction/behaviour of cetacean with the vessel, and the group size.

2.4.2 Seabirds

Seabird observations were conducted in similar approach to marine mammals and in the same regions. A field guide (ACAP, 2015; Onley & Scofield, 2007; Bianchi *et al.*, 1999) was used to assist with species identification of unknown seabird species. Data recorded were date the Angolean demersal survey commenced to the date it ended (Leg 2.4), and species were identified and counted based on two method codes; accuracy (ACC) and estimation (EST). Unit codes were also used to represent individuals flying over sea (IFS) and individuals sitting on water (ISW). Moreover, other parameters recorded were; the location, depth, SST, visibility and sea state. A GPS-position was recorded every time seabirds were observed. Sightings were only recorded while the vessel was in transit between research stations. Observations started at least 20 minutes after a trawl had been completed to give the vessel time to move away from the birds that gathered for the trawl pickings. Birds following the vessel between stations were not recorded.

2.5 Bottom-trawl fish sampling

2.5.1 Trawling strategy

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 800 m depth, equally spaced approximately 15 nautical miles apart.

Trawls where the bottom depth was less than 300 m were carried out during daylight hours (07h30 to 19h30 local time, i.e. 05h30 to 17h30 UTC), as during the night hake and many other organisms lift off the bottom, a behaviour known as diurnal vertical migration (DVM), and are therefore not available to the trawl gear. This behaviour is believed to be less marked in waters deeper than 400 m. As most trawl positions were less than 300 m depth, this presented special challenges in designing the course track. It was not possible to conduct the survey on a transect-by-transect basis, but a certain amount skipping stations and then back-tracking at a later time was required.

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

Trawl duration was standardized to 30 minutes, however trawls with durations of more than 15 minutes were included in the estimates, unless the acoustic recordings were high, and the trawling was ended earlier due to high fish densities. The trawling start time is controlled by using a “SCANMAR" sensor to detect the landing of the trawl on the bottom, and the stop-time is defined as the time when the wires start to haul the net. In some cases, the towing was interrupted before 30 minutes either due to poor bottom conditions or too high catches of fish indicated by the installed catch sensors. If the stations were not trusted to reflect the density of fish on the bottom they were coded as invalid (code 9) in the Nansis database.

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

2.5.2 Biological sampling

Biological sampling of fish was carried out from all bottom trawl hauls. All catches were sampled for composition by weight and numbers of each species caught. 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).

Biological data of some of the main commercially demersal species (*Dentex angolensis*, *D. macrophthalmus*, *Merluccius polli* and *M. capensis*) was recorded from 10 specimens per species per degree latitude (Table 5). For both hake types (Cape and deep water), 20 specimens per species per trawl were selected randomly in the southern region. Parameters recorded were length, weight, sex and gonad maturity stage, while otoliths for *Merluccius capensis*, *M. paradoxus* and *Argyrosomus inodorus* were removed for later analysis (see Annex VI). Length (total length to the nearest cm) and weight (to the nearest 0.5 g) were recorded using the onboard electronic fish meters and scales. Length and weight were measured for up to100 fish and were used to estimate the length-weight relationship.

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

Length frequencies and length-weight parameters were recorded for all other priority species, up to a maximum of 10 fish per degree latitude. The species sampled were:

- *Pagellus bellotti*
- *Umbrina canariensis*
- *Trachurus trecae*
- *Brachydeuterus auritus*
- *Pseudotolithus* spp
- *Pomadasys* spp
- *Sardinella aurita* and *S. maderensis*

In addition, samples for genetic analysis at IMR were collected for *Trachurus capensis* and *Scomber colias*. Gonad and stomach samples were collected for *D. macrophtalmus* for further diet analysis and ecological role.

Table 5. Main target species sampled and preserved for future genetic and gonadal studies

Species	Specific sampling	Number of samples
M. paradoxus *M. capensis*	Whole fish (for parasites + standard sampling of maturity, stomach, otoliths) Finclips samples for genetic analysis	5 specimens <40 cm/degree 5 specimens >40 cm/degree
D. macrophtalmus	Whole frozen fish for morphometric analysis Finclips samples for genetic analysis	30 specimens/degree
Trachurus capensis *Scomber colias*	Whole frozen fish for morphometric analysis Finclips samples for genetic analysis	20 specimens/degree

A flow diagram of the sampling procedures used in the fish lab is shown in Annex VI.

A summary of the samples collected, including the purpose of collection and the receiving laboratories is shown in Annex VII.

2.5.3 Demersal invertebrate sampling

The two stainless steel cylinders (approx. 2 litres in volume) were not mounted on the footrope of the trawl during this survey because nobody had the capacity to analyse these samples (neither for grain size nor demersal invertebrate species identification).

2.5.4 Swept-area biomass calculations

2.5.4.1 Traditional swept-area estimation

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; Pennington and Strømme, 1998).

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

$$B = \frac{A}{a}.\frac{\overline{X}}{q}$$

A is the total area surveyed, *a* is the swept-area of the net per haul, $\overline{X}$ is the average catch per haul (the index of abundance) and q (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 $\overline{X}_i$ and s_i^2 respectively, then an unbiased estimate of the population mean $\overline{X}$ is the stratified mean $\overline{X}$st, which is given by:

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

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

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

where n_i is number of hauls in the ith 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 IV.

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). The newly developed StoX software was not used.

2.6 Acoustic sampling

2.6.1 Sonar data

No sonars were used during the survey.

2.6.2 Echo sounder

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 eco sounders were conducted in Walvis Bay on 11-12 May 2019 and hence the echosounder gains were adjusted at the start of this survey. Annex IV gives the details of the acoustic settings used during the survey. Acoustic data were not processed on board, but all data were stored to files, as in all previous demersal surveys in Angola.

CHAPTER 3. RESULTS

3.1 Oceanography

3.1.1 Wind conditions

Figures 9 and 10A demonstrate the wind conditions encountered during the survey. The first two days experienced severe weather, with wind speed exceeding 14 m s^{-1} (near gale according to the Beaufort scale). Elsewhere during the survey period, the weather was settled, with prevailing wind conditions from calm to moderate (light to moderate breeze in the Beaufort scale). A strong daily cycle visible in Figure 10A, suggests a sea breeze type of wind conditions, associated with diurnal in local air pressure caused by the changes in the land and sea temperature gradient between the day and night.

Figure 10 B presents the same data, transformed to the form of zonal Ekman transport – a measure of wind-induced upwelling intensity:

$$Q_y = \frac{-\tau_x}{f \cdot \rho}$$

where:

Q_y – the upwelling index along the Angolan coast, approximated as the zonal component of Ekman transport)

τ_x – northward wind stress, derived from the observed wind speed and direction data according to the standard empirical formula (Large and Pont, 1981)

f – Coriolis parameter (latitude dependent)

ρ – density of seawater

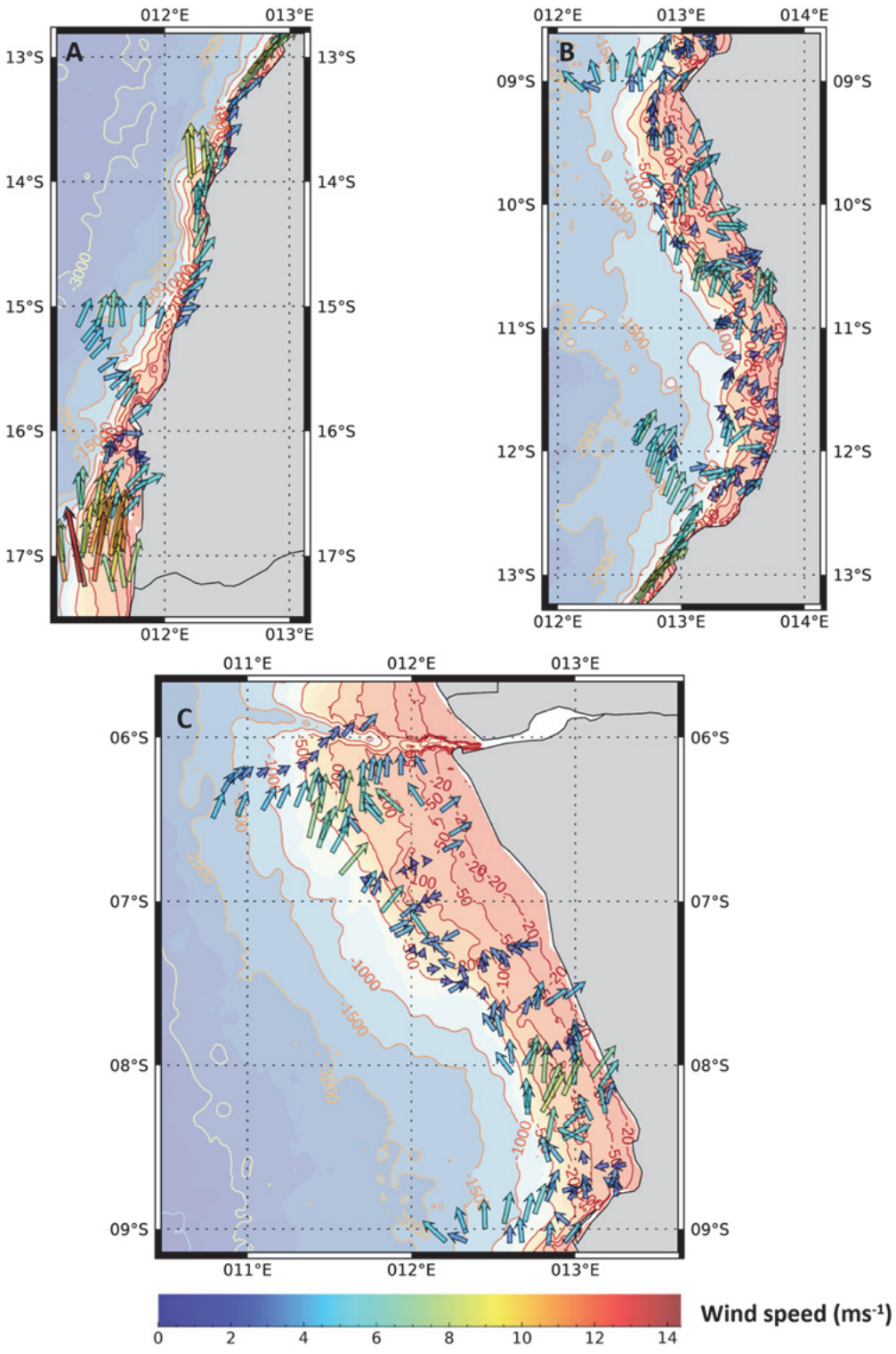


Figure 9. Distribution of wind along the survey track by region, A) Southern Angola (May 26 to 31), B) Central Angola (May 31 to June 9) and C) Northern Angola (June 12 to 26). Each wind vector is an average of the 1-minute along-track collected wind data on 14x14 km grid cells

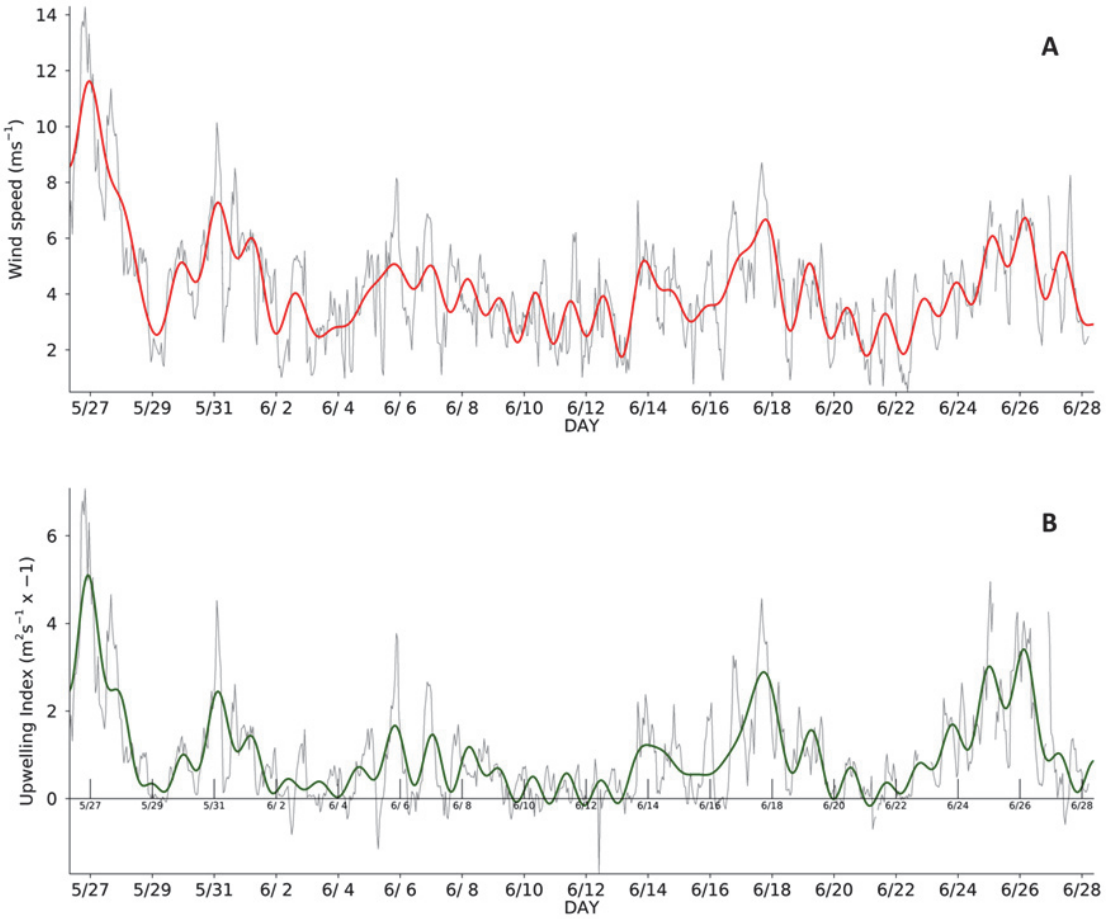


Figure 10. Time evolution of wind speed (A) and wind-derived upwelling index (B) along the survey track. The grey lines represent the hourly values. The coloured lines are the versions of the same data low-pass filtered at the 24-hour cut-off. The upwelling index represents the rate of zonal Ekman transport at a latitude of the observations

This expression has wind speed (τ_x) in the numerator and latitude (f) in the denominator. Thus, given a constant wind speed, upwelling intensity must increase as the vessel sails towards the equator. Figure 10B highlights this latitude dependence of the upwelling intensity by revealing two upwelling episodes in the northern part of the surveyed region (peaking on June 18 and 26), occurring under moderate wind conditions. In brief, the presented result demonstrates that due to the latitude effect, upwelling intensities off Northern Angola can be comparable to the Benguela upwelling despite significantly lower wind speeds.

3.1.2 Ocean currents

3.1.2.1 Southern Region

The currents were measured underway continuously except on May 31-June 1, when the instrument was turned off accidentally due to operational error. Figure 11 (A, B) present the result for the southern region. In the regional oceanography context, the southern region is referred to as the Angola-Benguela Frontal Zone (ABF) – a confluence zone between two opposite flowing current systems, the southward flowing Angola Current (warm) in the north

and, the northward flowing Benguela Current (cold) in the south. The confluence leads to the formation of a westward flowing southern South Equatorial Current (sSEC) that transports water masses seawards from the African coast.

During the survey, the presence of the opposite flowing Angola and Benguela currents was clearly manifested in the ADCP data from the two principal sections occupied in the southern region – the Cunene and Namibe sections (Figure 12A, B). The northward current dominated the observations made across the southmost Cunene section, whereas the southward current prevailed across Namibe – at the northern limit of the area in Figure 11. The southward flow continued to dominate all ADCP observations from the southern region, made to the north of Namibe (not shown).

The northward flow observed at the Cunene section, formed a distinct sub-surface core, featuring a region of a peak current speed of 25-30 cm s^{-1}, located below 100 m depth (Figure 12B). In contrast, the southward flow observed in the Namibe section was surface intensified. Its core was attached to the continental boundary. The southward velocity peaked at 50 cm s^{-1} just next to the steep continental slope (Figure 12A). Below the 100 m depth, the current speed was reduced to the tenth of its surface magnitude.

The difference in the vertical flow structure notwithstanding, the meridional volume fluxes in the top 350 m of the water column measured across the two sections (both sections roughly the same length) were comparable - 0.43 Sv northward transport at Cunene vs 0.51 Sv southward transport at Namibe. (Sv is the sverdrup, a unit of volume transport; 1 sverdrup is equal to 1 million cubic meters per second).

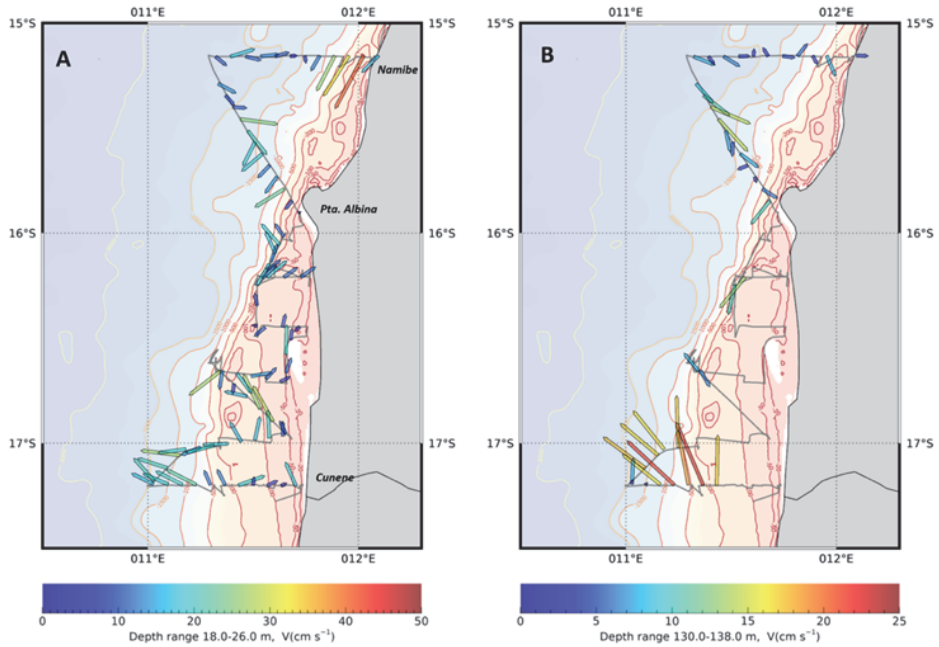


Figure 11. Currents measured along track in Southern region (26-20 May), in the sub-surface and sub-thermocline layers (18-26 and 146-154 m, shown in Panel A and B, respectively). The arrows in A and B, respectively). The arrows in A and B are not in the same scale; magnitude of the current colour coded; colour scales below the respective figures

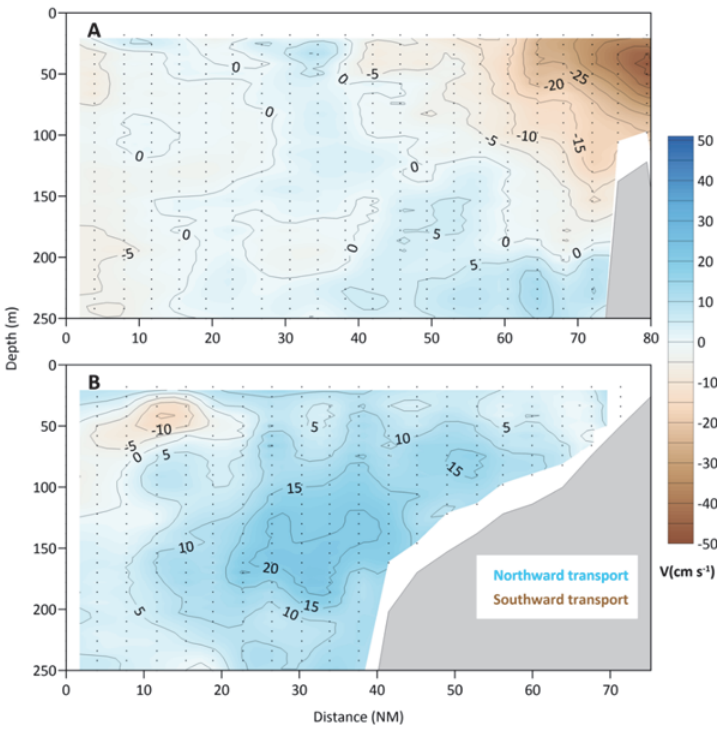


Figure 12. Vertical sections of the meridional current at the two extremities of the Angola-Benguela front – as viewed from the south. Panel A, Namibe section (May 29, 2019); Panel B, Cunene (May 26, 2019). Southward flow (into of the page) – brown; northward flow (out of the page) – blue

The westward direction of the current vectors along the offshore fringe of the survey area shown Figure 11 could be related to the formation of the westward flowing sSEC. However, the survey was confined to the inner shelf (the Cunene and Namibe sections apart), and these very few data ponts are insufficient for conclusive interpretation. Over the inner continental shelf where the observations were concentrated, the confluence of the Angola and Benguela currents and the resulting westward flow were not observed. Instead, the observed currents were variable, both with respect to speed and direction. This large variability at short timescale suggests a stronger response of the coastal currents to local wind conditions and upwelling (cf. Sections 3.1.1.1 and 3.1.3.1), rather than to the major regional ocean current system.

3.1.2.2 Central and Northern Regions

Figure 13 A, B presents the distribution of subsurface currents observed in the central and northern regions. Moderate currents, 10-30 cm s^{-1}, flowing alongshore towards the north were prevalent. These currents could point to the prevailing south-easterly coastal winds as the main driver of the coastal circulation (cf. Section 3.1.1.1) if it were not the case of the two current reversal episodes. During those two "Angola Current Episodes", the northward current abruptly reversed southwards and remained so for a protracted period, flowing against the dominant south-easterly wind. The southward flow occupied then the entire water column and spread across the width of the continental shelf. The first event of this kind happened as the vessel was on the approach course to Luanda, 6-9 June 2019, the other one occurred off Ambriz on 17-18 June 2019.

Figure 13, C-E demonstrates the rapid change in the current conditions between the first Angola Current episode, observed on June 9, and immediately after it subsided, on June 14. During the event, a burst of the southward current with speed over 40 cm s^{-1} occupied the entire water column (Figure 13 D). Just three days later, at the same location, the flow the prevailing northward-flowing current was restored (Figure 13 E). Figure 13 C summarizes the contrasting flow patterns, showing the sub-surface current vectors during both observations overlayed one on top of another. As should be evident, the coastal currents within the Angolan continental shelf can change abruptly within a day, notwithstanding the dominant wind conditions.

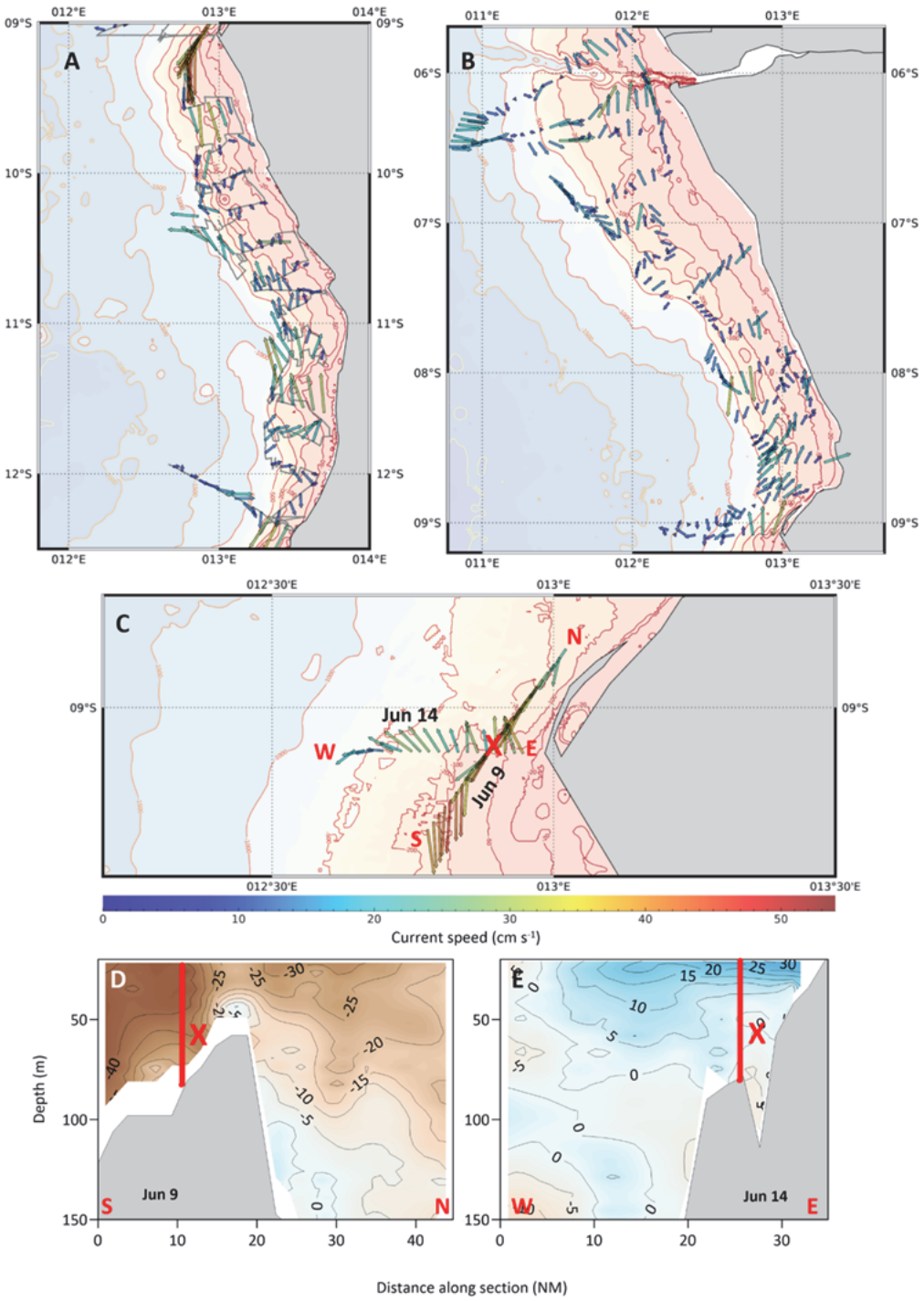


Figure 13. The mean current at 18-26 m depth observed in the Central (Panel A) and Northern (B) regions, during 1-26 June 2019. The variable flow conditions evidenced in Panels C-E. The same spot (marked as "X") was revisited two times, on June 9 and June 14. Panel C, horizontal currents at 18-26 m combining both observations. Panels D and E, vertical distributions of meridional flow on June 9 and June 14, respectively. Southward flow – brown; northward flow – blue

3.1.2.3 Currents over the Congo River Canyon (Democratic Republic of the Congo)

The observations from the Congo River discharge region provided a rare opportunity to observe the currents inside the Congo River Canyon. The results are presented in Figure 14. The vessel crossed the Canyon on June 22 two times; the first time in the vicinity of the river mouth (Section B in Figure 14) and the second time in the continental slope area (Section A in the same figure). The north-westward current dominated in the top surface layer, above the Canyon (Figure 14A). Inside the Canyon (Section B in Figure 14), the current became two dimensional. Guided by the canyon walls, the flow was outwards (westward) above 100 m depth, and inwards (eastward) down below. In the outer part of the Canyon (Section A). The same deep inflow pattern was observed below 100 m. In contrast, the outflow region above 100 m had diffused: the current turned north-westward following the direction of the bathymetric contours.

We performed an estimation of the zonal volume flux below and above the 100 m depth across Section B, which indicated a nearly perfect balance between the inflow and the outflow: 0.017 Sv fed inward in the deep part of the Canyon and 0.018 Sv removed outward with the westward flow above 100 m. A naive interpretation of this result would be to suggest a vertical convection from the bottom to the upper layer taking place at the inshore Canyon side, but such a conjecture would not be dynamically feasible. As shown by detailed studies on underwater canyon dynamics elsewhere, the inflow and outflow patterns in deep Canyons tend to oscillate on short time scales, e.g., related to tides or suspension currents. It could be thus that the two observations made at two different locations during this survey fortuitously captured the same phase of otherwise complex, time-varying dynamic process.

It should also be noted that the presented ADCP-derived currents were recorded from the depth of 18 m and thus did not capture the flow within the Congo River plume itself, as the depth of the plume is less than 10 m.

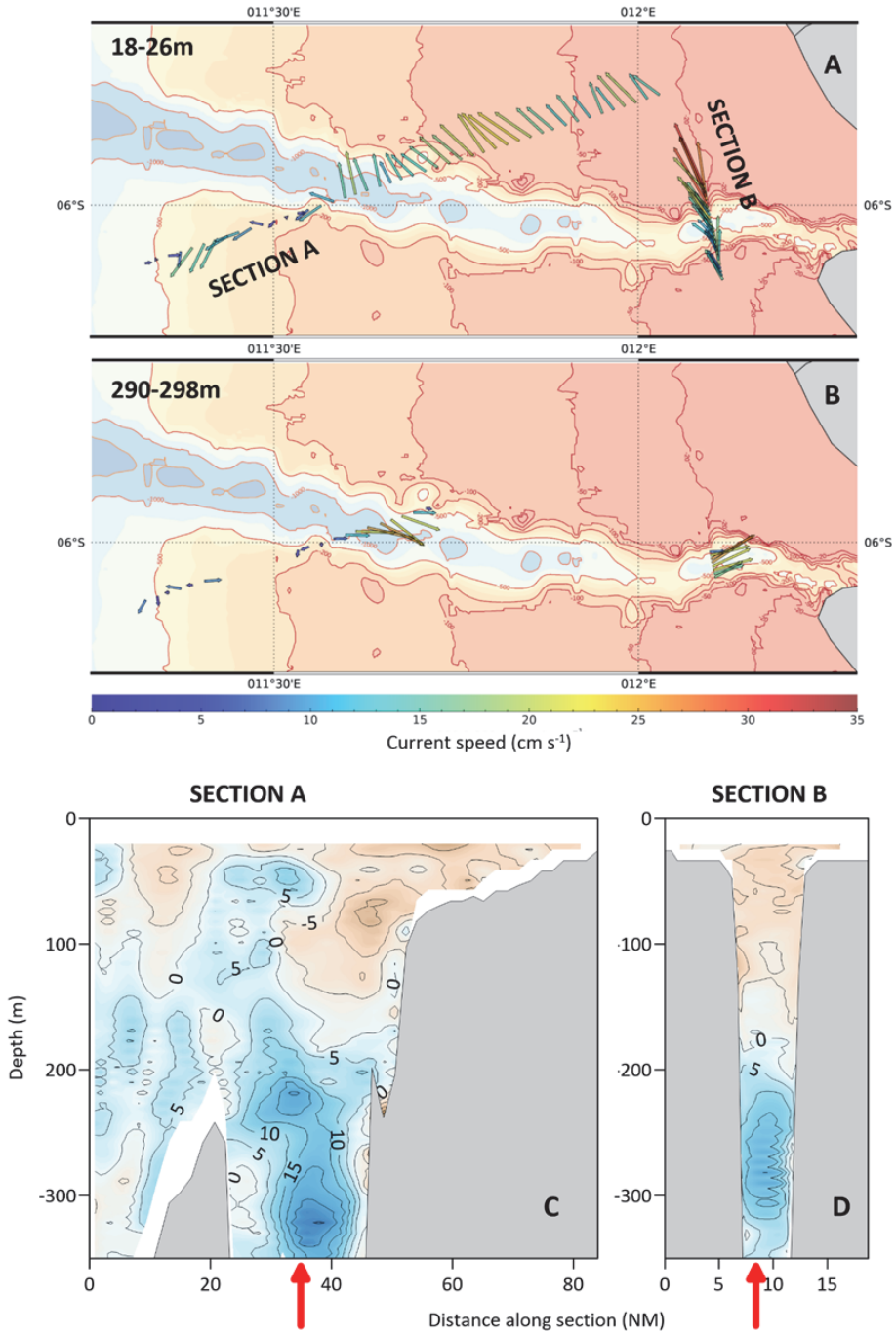


Figure 14. Currents observed across the Congo Canyon on June 22, 2019. Panels A and B: maps of the mean current from depth 18-26 m and 290-298 m, respectively. Panels C and D: vertical distributions of the zonal current across these sections as viewed from the east. The arrows point to the Congo Canyon centres across the respective sections. Westward flow (out of the page) – brown; eastward flow (into the page) – blue

3.1.3 Underway observations: temperature, salinity and fluorescence

3.1.3.1 Southern Region

Maps of near-surface temperature, salinity and fluorescence are presented in Figure 15. Emerging from these maps is the division between the upwelling-dominated southern sub-region, and northern sub-region dominated by advection of tropical waters. The division line runs at the centre of the Baia dos Tigres sand spit, located just south of 16° 30'S. In the southern sub-region, a dominant feature was the tongue of upwelling-induced cold plume confined to the nearshore waters (Figure 15, left). Within this tongue, the temperature decreased shoreward to reach the minimum of less than 16°C at its south-east corner.

The salinity decreased in a similar manner, with the 35.8 psu isohaline (Figure 15, middle) following closely the shape of the 17°C isobath (Figure 15, left). This T-S plume characteristics betrayed the fact that the active upwelling cell was sourced from central water masses underlying the thermocline, and therefore colder and less saline from the surrounding it ambient surface waters.

In the northwestern corner of the area, a warm water pool T > 20°C dominated the observations. Its origin was advective, associated with the warm Angola Current, as described in Section 3.1.2. The thermal pool region displayed extreme levels of fluorescence-derived chlorophyll, exceeding 4 mg/m^3. This result was unexpected, as tropical waters carried with the Angola Current are thought to be oligotrophic. Noteworthily, these fluorescence levels were much higher from those observed within the upwelling plume of Baia dos Tigres (Figure 15, right).

3.1.3.2 Central region

Off Central Angola, the highest TSG temperatures, exceeding 25°C, were recorded at the shelf break and in the continental slope area (Figure 15 C). The region of relatively colder water pool (T < ~20°C) was confined to the coastal area off Rio Longa. The coast-to-offshore temperature gradient indicated an active upwelling cell. Although, contributions of calm winds cannot be entirely excluded, the vertical structure of the water column, described in the next section, suggest for the occurrence of the remotely forced upwelling type, induced by seasonal rise of the thermocline along the African coast.

Figure 15A reveals a filament of a reduced salinity that extended across the width of the continental shelf in the Rio Longo area. This salinity filament coincided with the region enhanced productivity and appeared to occur at the convergence between two opposite flowing currents (Figure 16B). In the context of the "Angola Current Episode" interpretation, introduced in Section 3.1.2.2, the observed convergence and productivity enhancement were a transient, associated to a front linked to the abrupt reversal of the coastal current from north- to southward.

In addition to onboard observations, the survey was receiving the satellite-derived Synthetic Aperture Radar (SAR) imagery covering the Central Region. The SAR revealed the activity of internal waves enhancing the upwelling intensity within the Rio Longa cell.

3.1.4 Standard sections

3.1.4.1 Southern Region

The Cunene section (Figure 16) was characterized by a uniform salinity of 34.4 psu down to 150 m depth and a gradual decrease in temperature from 18°C at the surface to 10°C at 350 meters. In contrast to the other sections occupied during this survey, the thermocline was not well manifested. The observed T-S relation was characteristic of East South Atlantic Central Water (ESACW), which is transported with the Benguela Current from the Cape Basin along the Namibian coast. Given the severe weather conditions the survey experienced along this section (cf. Figure 9), the wind-induced vertical mixing was likely responsible for the observed weakening of the thermocline. There was an upward tilt of the isotherms of 16-17°C indicating a possible upwelling. According to the TSG observations, however, the Cunene section was located at the southern fringe of the cold-water plume, thus characterized by a reduced upwelling intensity compared to the Baia dos Tigres region (cf. Figure 14). The oxygen distribution exhibited lower oxygen concetrations ($O_2 < 2$ ml^{-1}) comared to those characterizing the typical ESACW range. The depleted ESACW oxygen levels observed at this section could be a result of high local production-consumption turnover under favourable upwelling conditions, as well as a result of advection of hypoxic waters from Namibia with the Benguela Current.

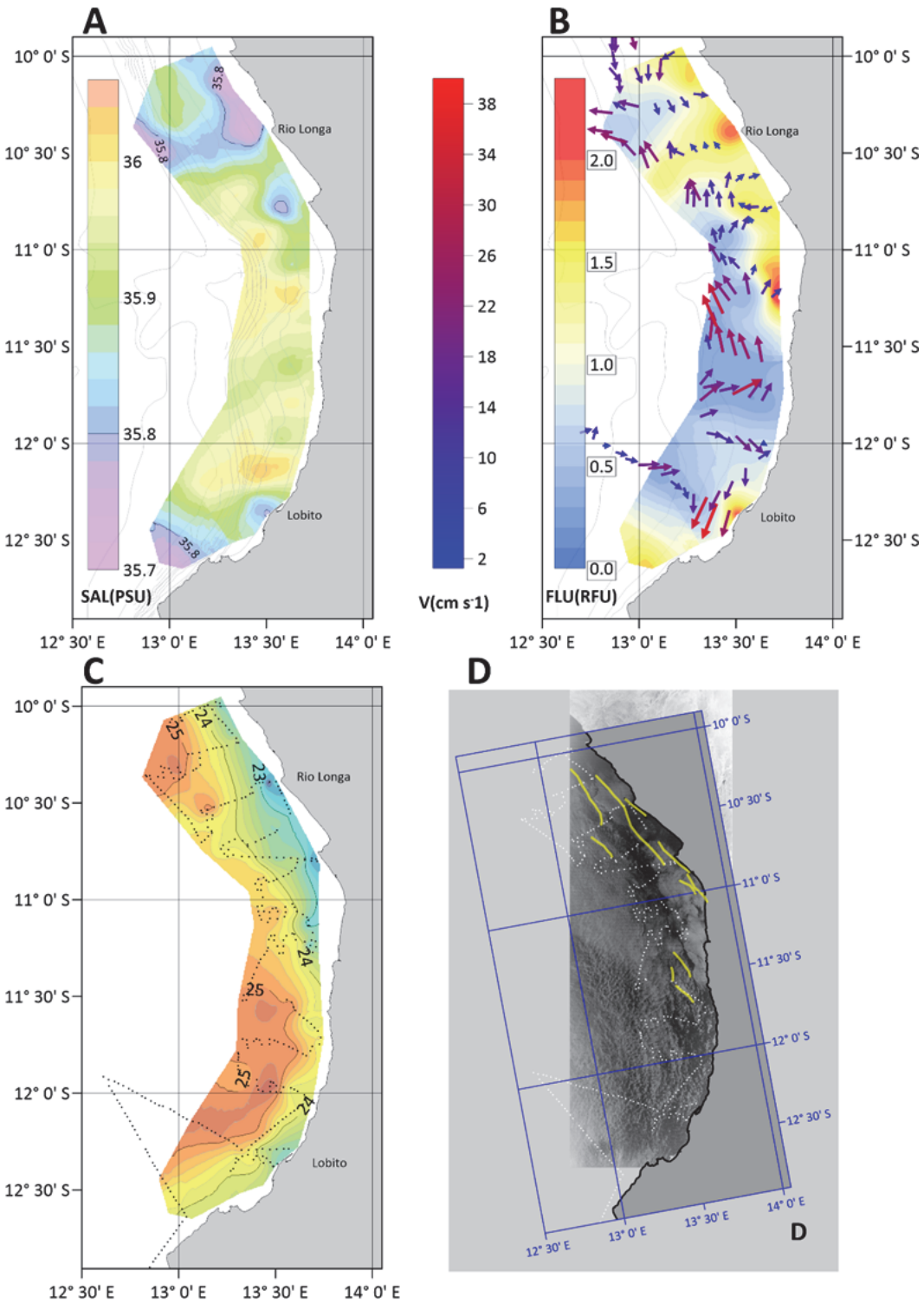


Figure 15. Distributions of salinity (A) fluorescence (B) and temperature (C) at 4 m depth from TSG observations. ADCP-derived currents at depth 26-34 presented on top of the fluorescence distribution (C). D – TerraSAR-X SAR image from June 6, 2019 04h45 presenting the activity of internal waves in the Central Region

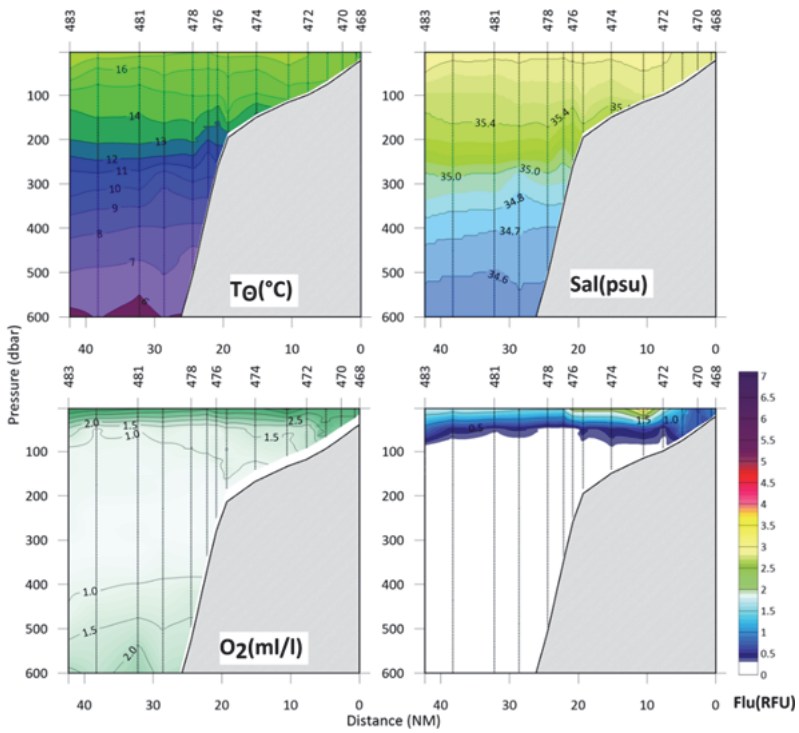


Figure 16. Vertical sections of temperature, salinity, oxygen and fluorescence off Cunene River

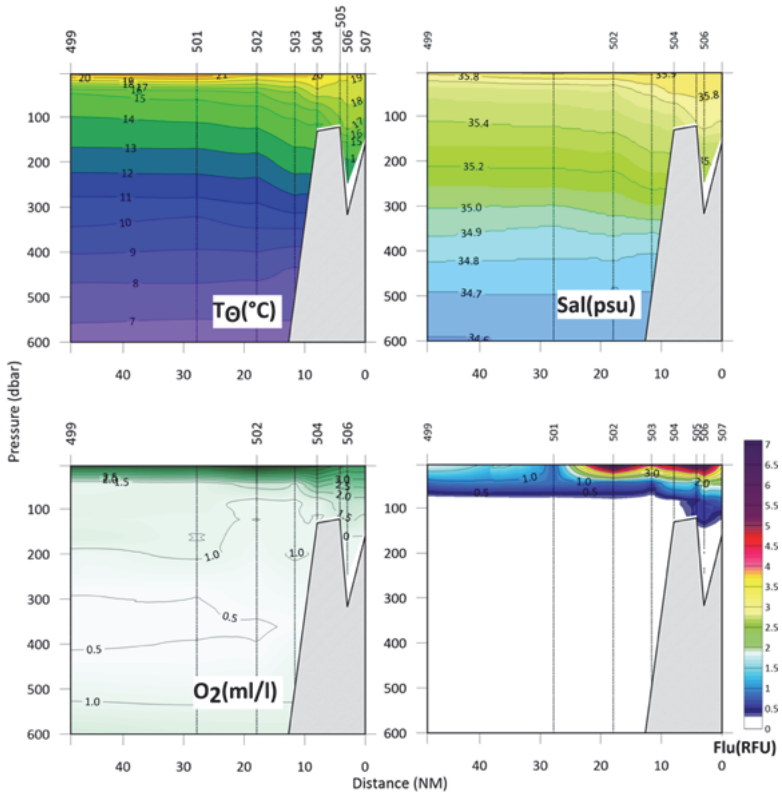


Figure 17. Vertical sections of temperature, salinity, oxygen and fluorescence off Namibe

Along the Namibe section (Figure 17), the distributions of all seawater properties followed the spatial pattern of the Angola Current (cf. Figure 12A) with the highest temperature, salinity and oxygen concentrations observed in the core of this current, close to the continental boundary. This containment of high temperature, salinity and oxygen waters within the inflow region, proved their advective origin the ABFarea. Characteristic to the Namibe section was also the extreme fluorescence levels, far exceeding the levels observed elsewhere during this survey (cf. Section 3.1.2.2). It was a very unusual observation, potentially revealing a significant and undocumented yet form of natural or antropogenic enrichment in the ABF waters. However, given the relative (uncalibrated) nature of the collected fluorescence data and a poor coverage over the alleged extreme productivity area, it is necessary to treat this result with reserve.

3.1.4.2 Central Region

A strong pycnocline at 30 m depth characterized the offshore region along the Lobito section (Figure 19). The pycnocline separated the warm (T > 20°C), saline (S> 35.8 psu) and well-aerated (O_2 > 3 ml^{-1}) surface layer from the underlying it SACW region where temperature and salinity decreased with depth gradually and anoxic oxygen conditions were dominant. In particular, the depth range of 300-400 m saw the oxygen concentrations falling below 0.5 ml l^{-1}, indicating the presence of Oxygen Minimum Zone (OMZ). In the upper layer, the contours of all seawater properties tilted downwards toward the coast, indicating a downwelling condition and southward flowing geostrophic current. The direct current measurements, using ADCP (Figure 11), confirmed the presence of a southward flowing surface current nearshore at this location. Furthermore, the salinity and oxygen associated to this coastal flow were in the same range as those observed off Namibe, indicating that the Lobito was the source region for tropical waters advected with the Angola Current and observed along the Namibe section (cf. Figure 12 and 17).

The temperature and salinity distributions observed off Palmerinhas (Figure 18) were similar to those recorded off Lobito, except for the latitude-related warming and higher salinity in the surface waters. In contrast, the oxygen concertation was dissociated from the temperature and salinity distributions. The oxygen levels characteristic to the surface layer (O_2 > 3.5 ml l^{-1}) were at this section still detectable down to 150 m - deep below the thermocline depth. Conversely, in contrast to the Lobito section, the OMZ (O_2 < 1 ml l^{-1}) was not detected along this section.

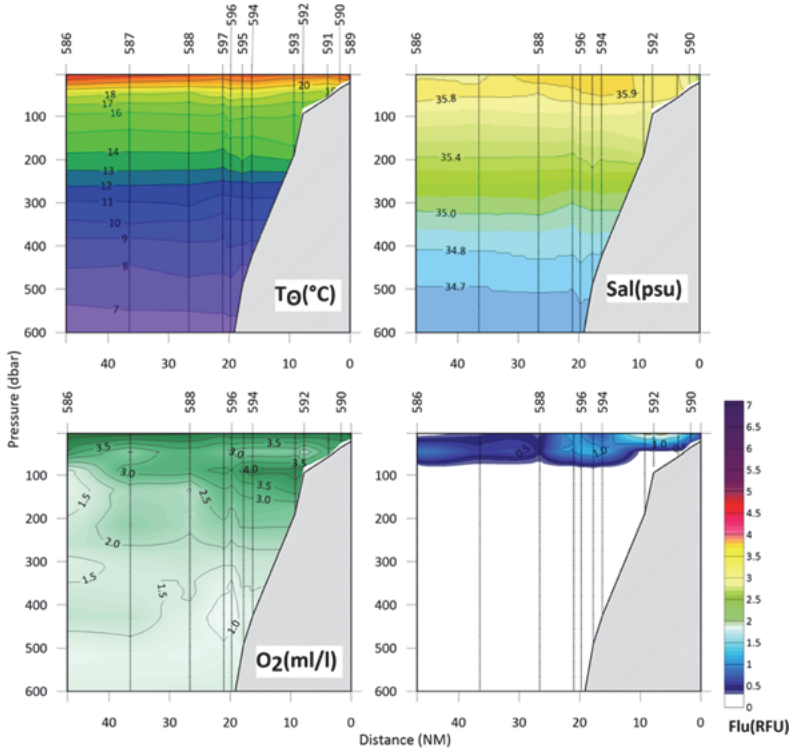


Figure 18. Vertical sections of temperature, salinity, oxygen and fluorescence off Palmerinhas

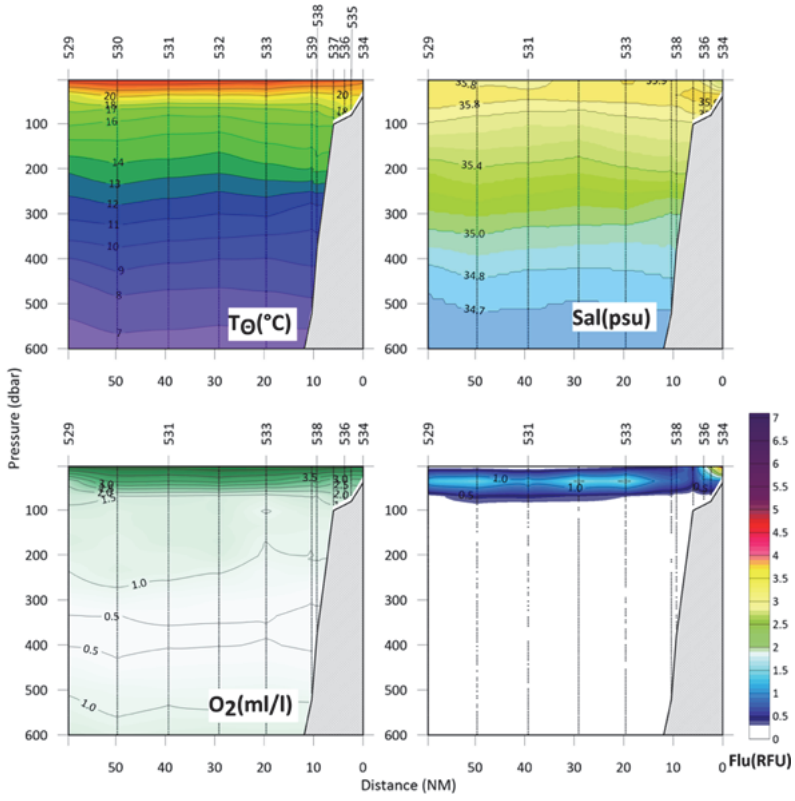


Figure 19. Vertical sections of temperature, salinity, oxygen and fluorescence off Lobito

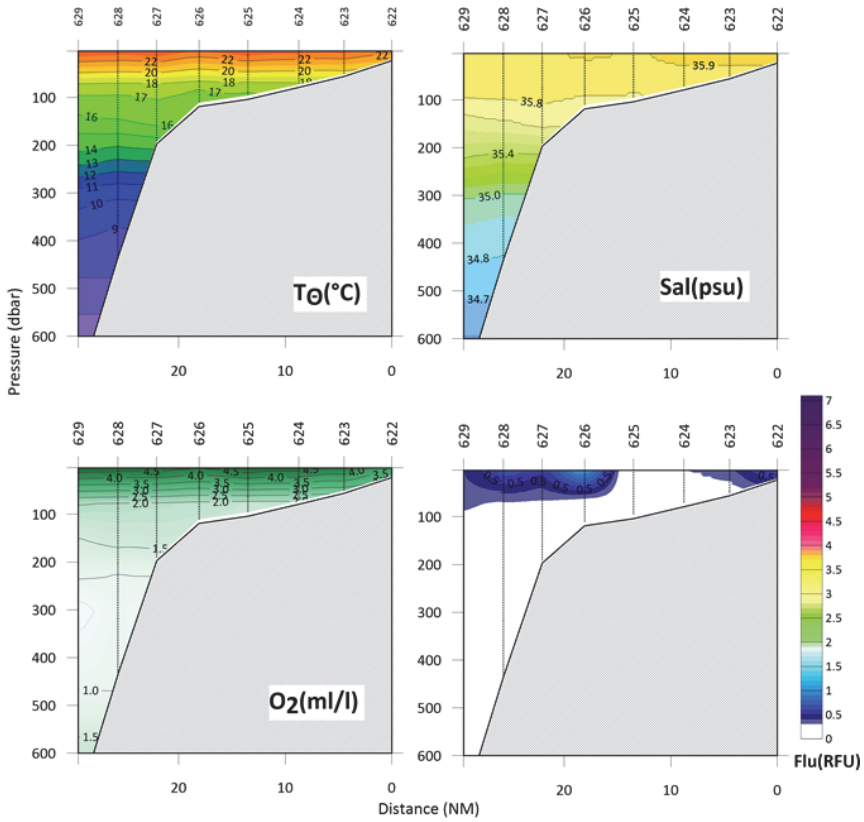


Figure 20. Vertical sections of temperature, salinity, oxygen and fluorescence off Ambriz

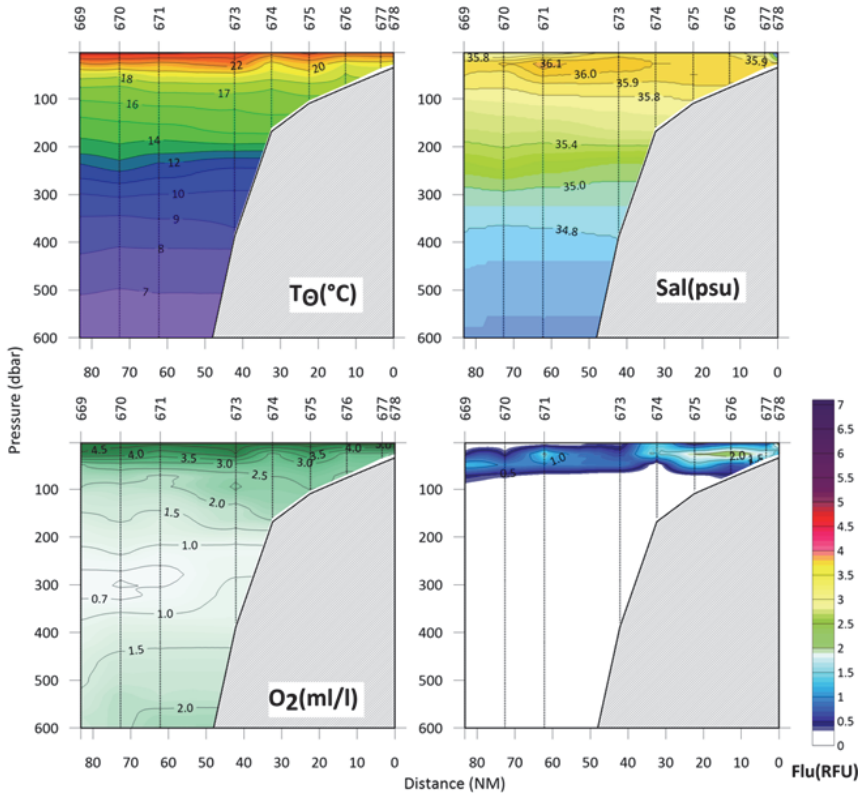


Figure 21. Vertical sections of temperature, salinity, oxygen and fluorescence off Moita Seca (the Congo River outflow region)

3.1.4.3 Northern Region

Seawater properties observed along the Ambriz section (Figure 20) displayed features characteristic to the remotely forced type of upwelling. Despite calm weather, the shallow thermocline was tilted upwards near the coast, indicating upwelling, with salinity showing a maximum in the same region. Unlike in the wind-driven upwelling case, the thermal stratification remailed strong from the shelf break to the coastal area. Underlaying this shallow thermocline was a hypoxic layer, ($O_2 < 2.5$ ml^{-1}). The presence of this layer manifested nutrient-rich SACW water mass, impinging onto the inner shelf under the shallow thermocline.

The Congo River section (off MoitaSeca, Angola; the southern side of the Congo River Canyon) was characterized by hight stratification over the op 25 m of the water column (Figure 21). Salinity varied widely in this layer due to discharge of water from the Congo River, from the minimum concentration (28 psu) at the mouth of the river, increasing gradually offshore. Below the thermocline, salinity displayed a maximum, S > 36 psu, characteristic to water masses originated in the equatorial Atlantic. The OMZ was present in the depth range 250-350 m as the oxygen concentration dropped below 1 ml^{-1}. Fluorescence varied between 0.1 µg/l and 0.3 µg/l. These low values indicated low biological activity over the whole section.

3.1.5 Nutrient distribution

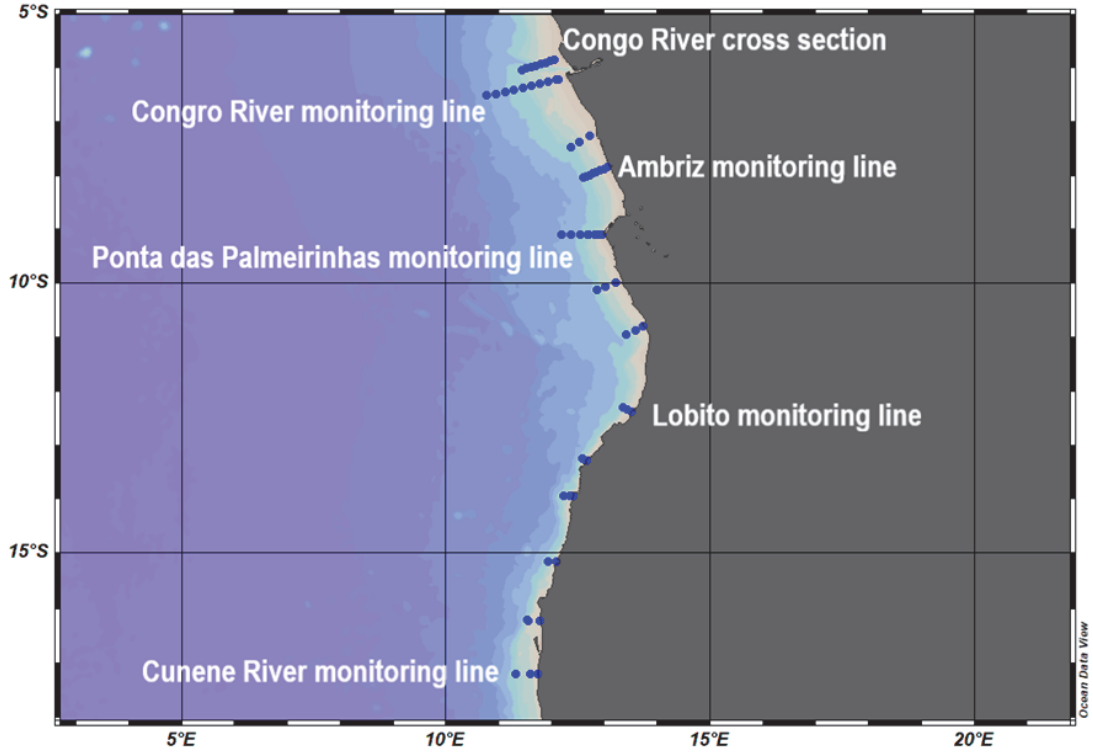
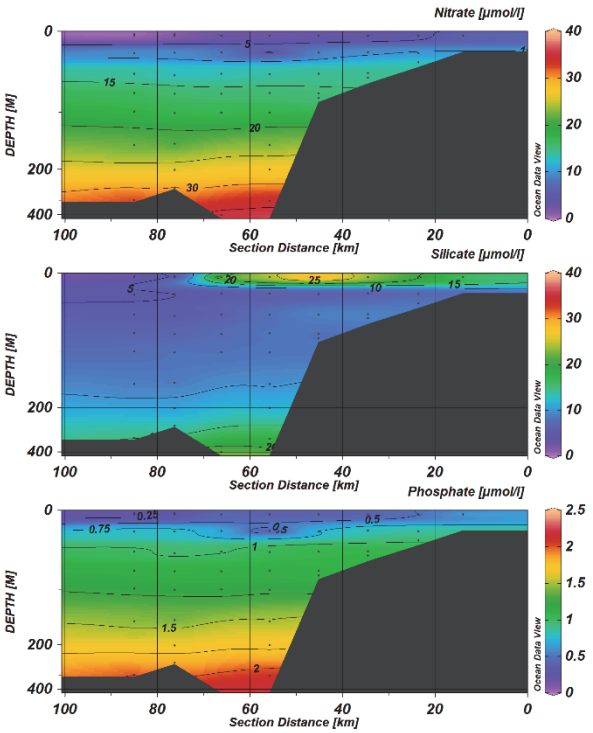


Figure 22. Transect identifications for nutrient and ocean acidification parameters

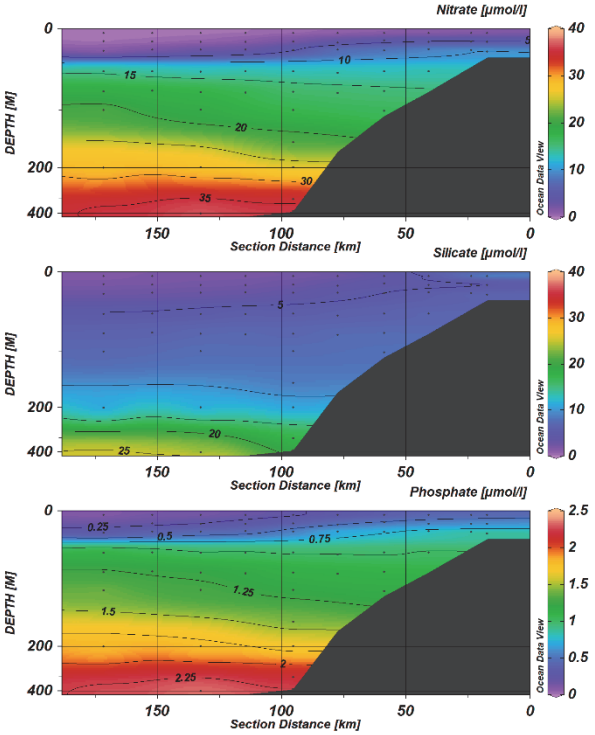
As typical for nutrient distribution, nutrients are depleted in subsurface water and increase with depth (Figure 23). This holds true over all sections except for the Congo River cross

section and the Cunene River cross section. Silicate concentrations at 5 m depths are high at the Congo River cross section as values go over 20 µmol/l for stations between 11.5°E and 12°E. At the Cunene River cross section, a moderate nutrient prescence is detectable throughout the water column and especially on the shelf.

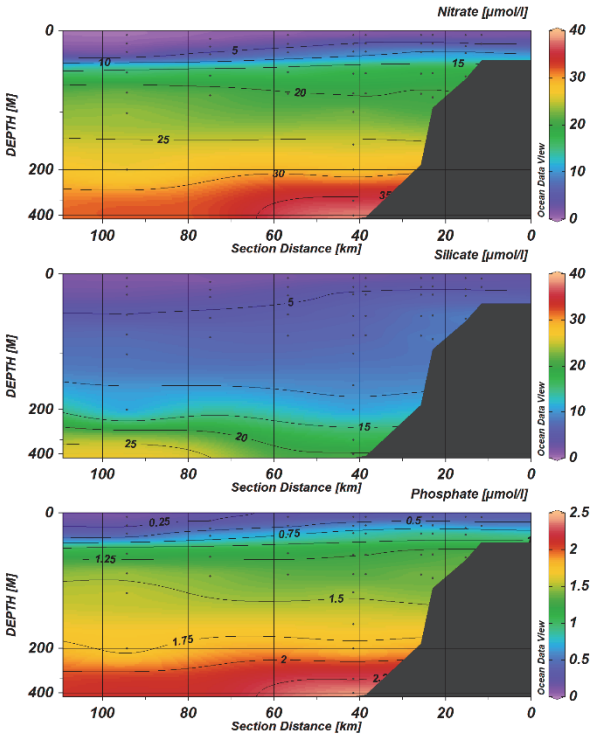
Congo River cross section



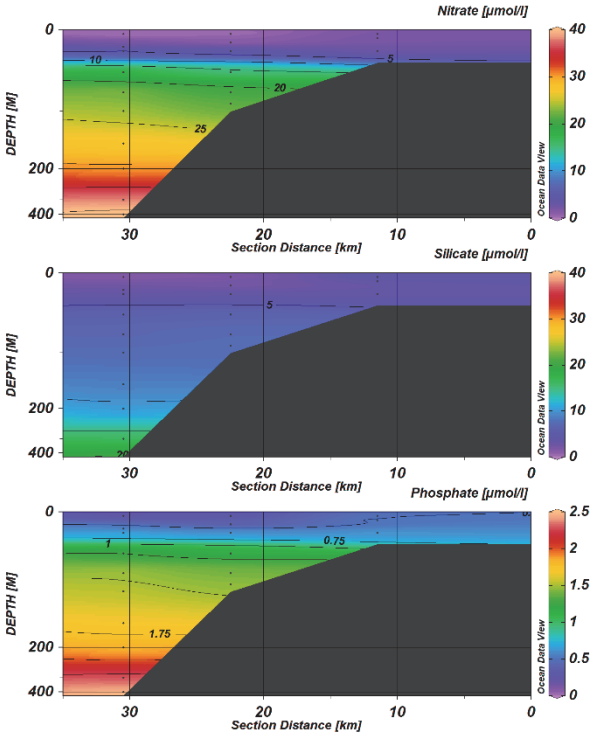
Congo River monitoring line



Ponta das Palmeirinhas monitoring line



Lobito monitoring line



Cunene River monitoring line

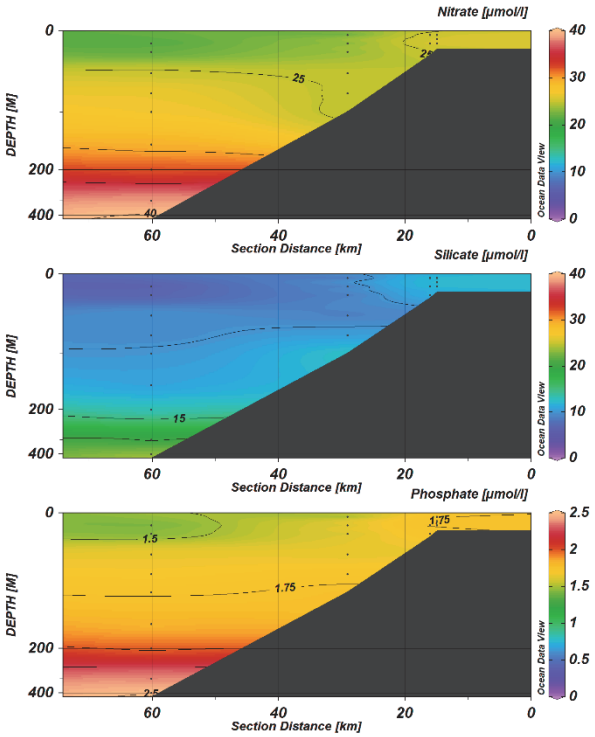


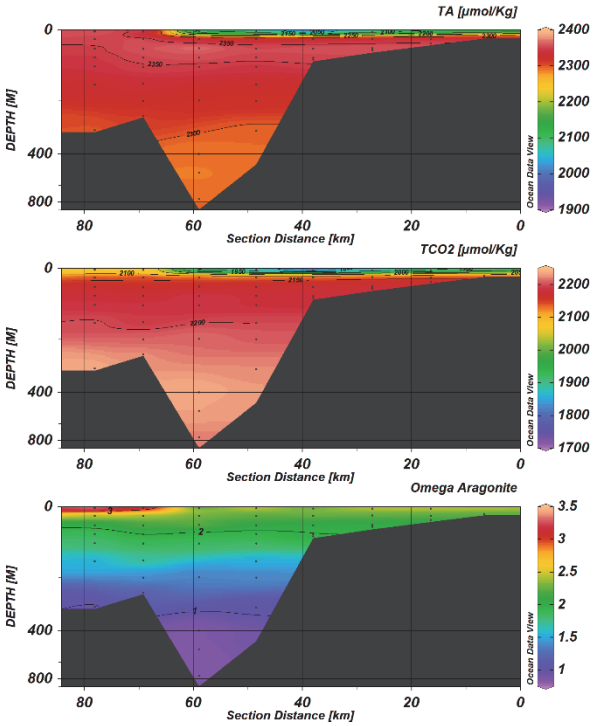
Figure 23. Vertical distribution of nutrients along the northern, central and southern regions of Legs 2.4 and 2.5

3.1.6 Ocean acidification

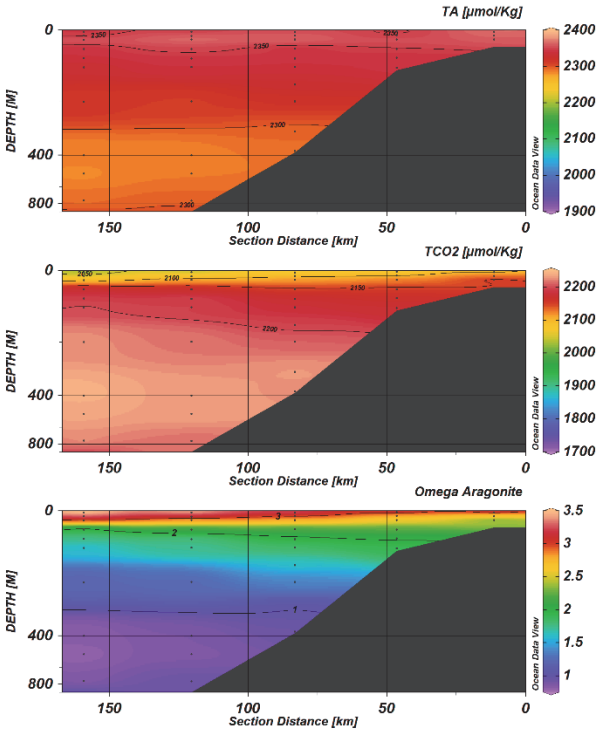
In the northern region of the survey (Figure 22), the concentration of inorganic carbon (TCO2) and total alkalinity (AT) is lowest in subsurface waters and increases with depth at all four sections, with the lowest concentrations found in the Congo River cross section subsurface water. In the two longer sections, the Congo River monitoring line and the Ponta das Palmeirinhas transect, subsurface concentrations are found to be lowest offshore.

The degree of calcium carbonate saturation, Ω, is an indicator of the dissolution potential of shells and skeletons made from $CaCO_3$, where $\Omega > 1$ means the water is over-saturated with respect to carbonate ions. If $\Omega < 1$ then the seawater is undersaturated with carbonate ions and the chemical environment promotes the dissolution of $CaCO_3$ shells and skeletons and is therefore unfavorable for calcifying organisms (coral, shellfish, etc.). In all sections, $\Omega = 1$ is found near 300 m depth with calcium carbonate saturation falling below 1 thereafter deeper in the water column.

Congo River cross section



Congo River monitoring line



Ambriz monitoring line Ponta das Palmeirinhas monitoring line

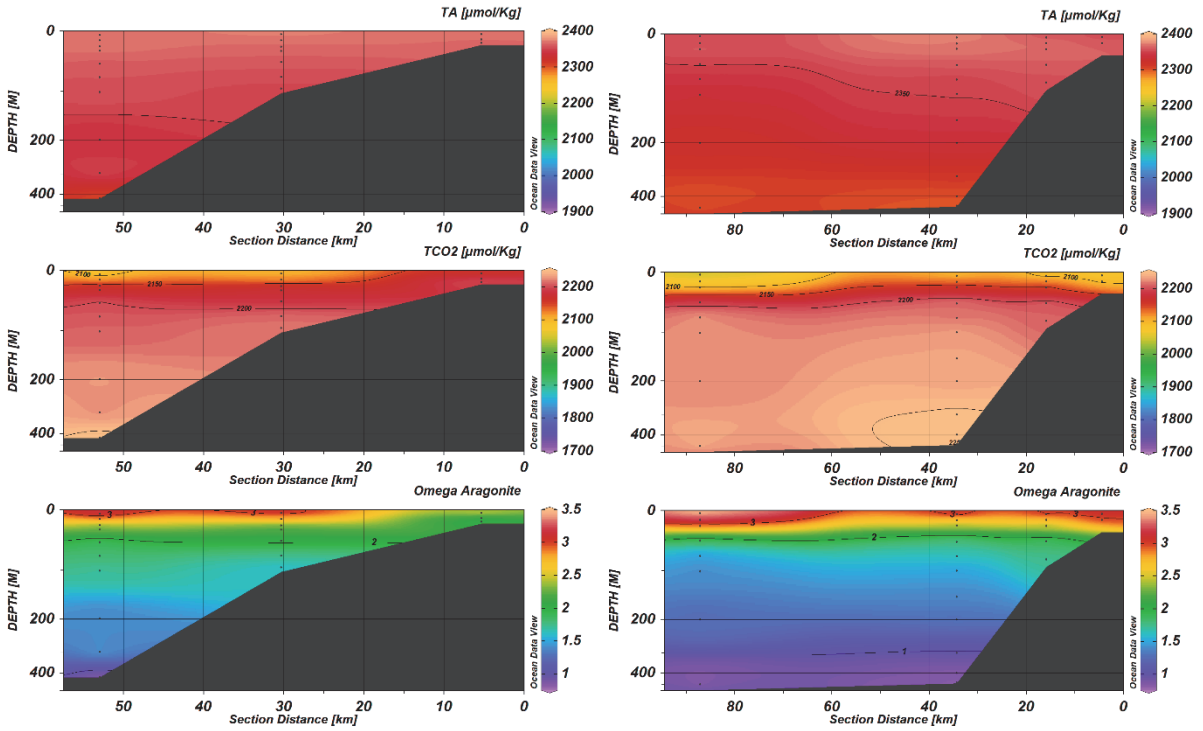


Figure 24. Total Alkalinity (TA), total inorganic carbon (TCO2) and Aragonite saturation (Omega Aragonite) at three monitoring sections in the north of Angola and one section crossing the outflow of the Congo River

3.2 Plankton and microplastic sampling

Most of the collected samples will be analysed after the survey, at the INIP and the IMR. Here, only preliminary results from samples worked up during the survey are presented. In Figure 25 the position of super transects along the Angolan coast, where plankton and microplastics were sampled, is shown.

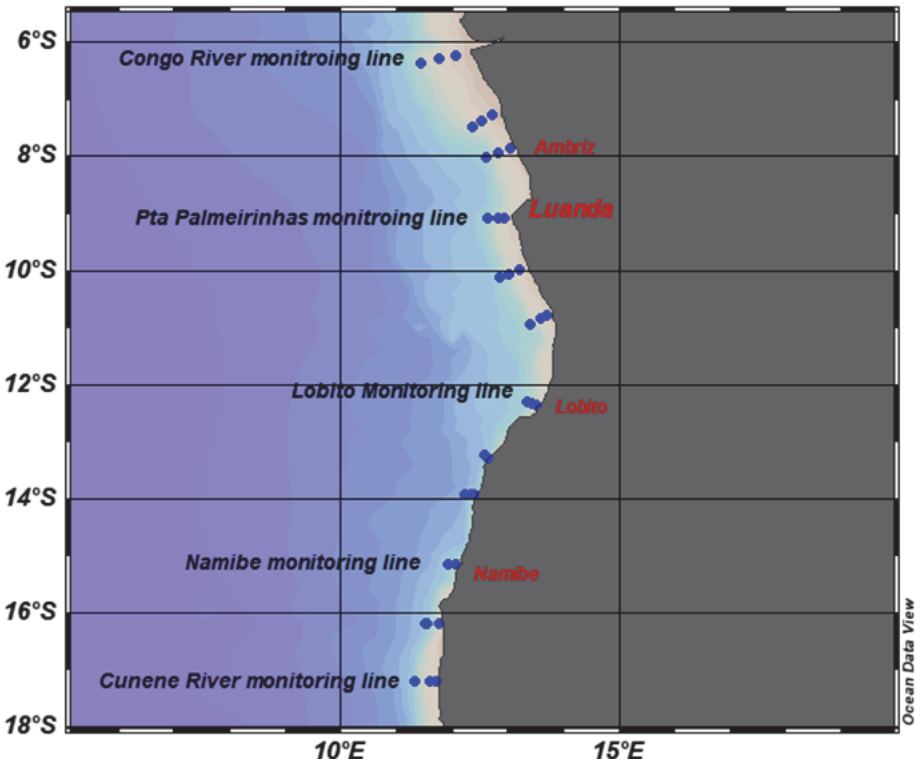


Figure 25. Super-stations (blue dots) where sampling of plankton and microplastics was carried out

3.2.1 Zooplankton

A total of 98 aluminium trays for zooplankton dry weight were produced during the survey and transferred to IMR for zooplankton biomass estimation. Based on these measurements the horizontal distribution pattern of mesozooplankton biomass is presented in Figure 26 (left panel). Total zooplankton biomass ranged between 0.30-18.50 g m^{-2}, showing overall higher values from the coast of Lobito and to the south.

Size fractionation of samples revealed that organisms smaller than 1 mm in size comprised most of the biomass, especially at coastal stations (Figure 26, right panel). As an exception, from the Lobito monitoring line (Figure 25) and to the south, certain stations including coastal ones, showed a high proportion of organisms larger than 1 and 2 mm, suggesting that in this area larger zooplankton organisms might be relevant in the plankton community (Figure 26, right panel). The second half of the WP2 samples that were preserved in 4% borax buffered formaldehyde were transferred to INPIM in Angola for future zooplankton taxonomic identification and to provide insight into the composition of the zooplankton community.

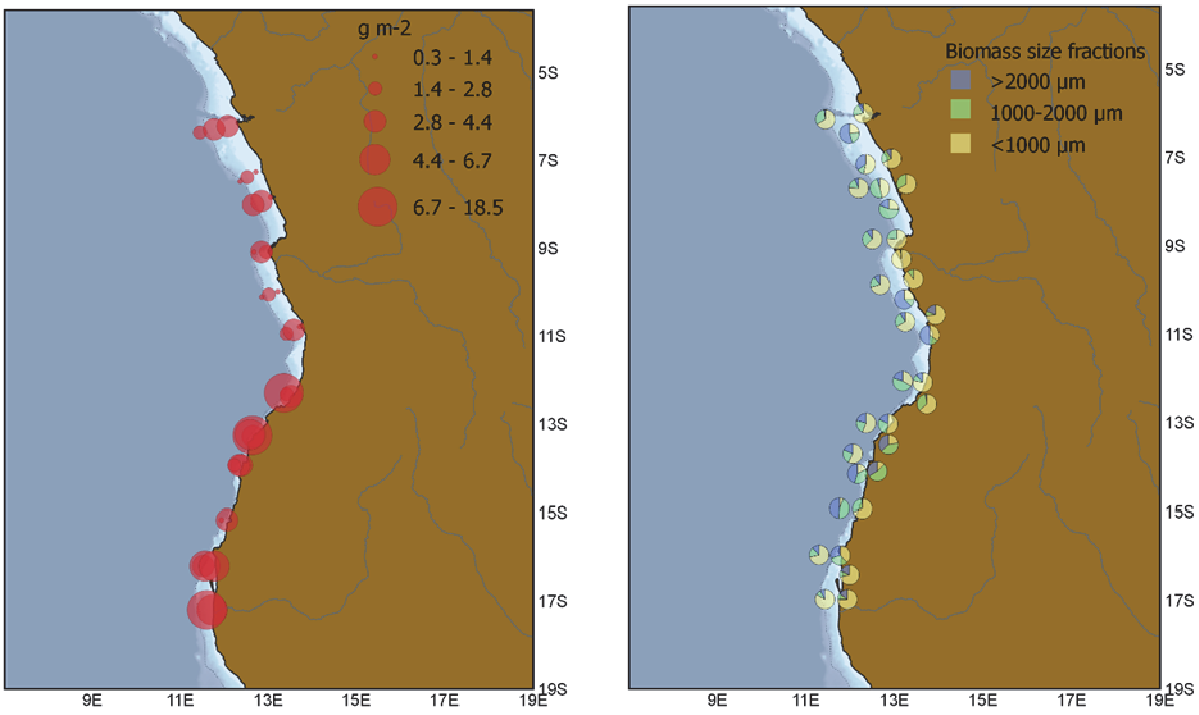


Figure 26. Horizontal distribution of total zooplankton biomass (g m^{-2}) in the superstation grid (left panel) and the contribution of different size fractions at each station (right panel)

3.2.2 Ichthyoplankton

A total of 38 bulk Bongo samples (left net) were preserved in formaldehyde and transferred to INIPM in Angola for future ichthyoplankton sorting and identification.

From the right Bongo net a total of 21 jars with bulk plankton, and 30 vials with sorted fish larvae and eggs (all preserved in 96% ethanol) were transferred to INIPM in Angola for analysis of ichthyoplankton presence in the plankton community and taxonomic identification of the ichthyoplankton.

In addition, surface samples from the Manta trawl which were sorted onboard for microplastics (see section 2.2.6) and ichthyoplankton, and 31 vials with sorted fish larvae and eggs preserved in 96% ethanol were transferred to IMR for taxonomic identification. In addition, 39 bulk Manta trawl samples preserved in 96% ethanol were transferred to University of Western Cape, South Africa, for future analysis.

For the results below, all the information regarding the number of fish eggs and larvae refers to total individuals sorted for each sample collected; in the same way, the number of microplastics refer to the items found in the samples collected.

3.2.2.1 Fish eggs

The number of fish eggs collected with the Bongo net were high in the northern part of the survey area (24), and in particular along the transect north for Ambriz and at the outermost

stations at the Congo River Monitoring line (Figure 25). There were also relatively high number of eggs at the 100 m-depth super-station in the Pta. Palmeirinhas monitoring line (Figure 25). The stations that were sampled south of the Pta. Palmeirinhas monitoring line showed a low number of fish eggs (Figure 27). An example of the fish eggs and larvae collected with the Bongo net is given in Figure 28.

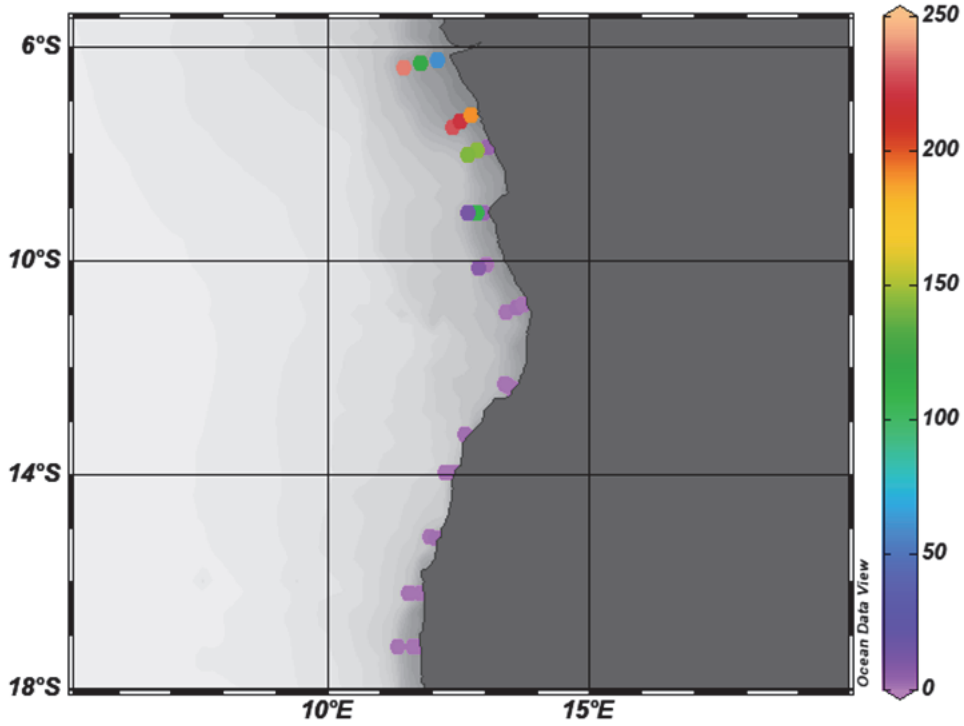


Figure 27. Number of fish eggs in the Bongo net, sampling the water column

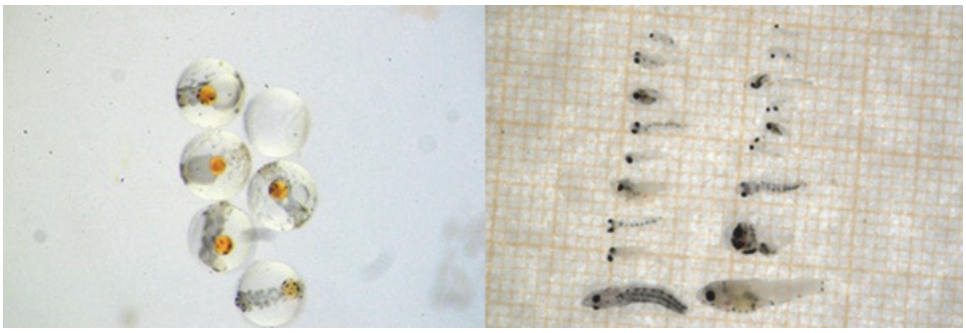


Figure 28. Fish eggs (left) and larvae (right) collected with the Bongo net

The number of fish eggs collected in the surface with the Manta net is shown in Figure 29. Compared to the number of fish eggs found in the water column (collected with Bongo net), the number of fish eggs found in these surface samples was in general higher (Figure 29). The highest number of fish eggs was found at the transect north of Ambriz, outside N'Zeto, and at the innermost station at the Congo River monitoring line (Figure 29, see Figure 25 for location of transects). South of Palmeirinhas monitoring line the density of fish eggs was low (Figure 26), in accordance with the number found collected with the Bongo net.

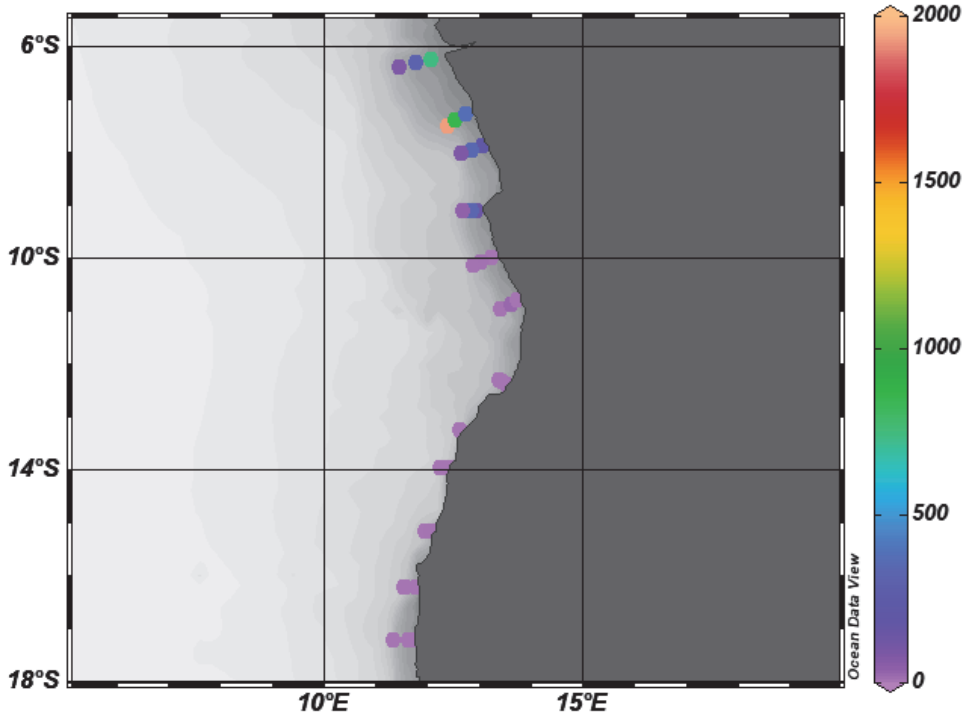


Figure 29. Number of fish eggs collected with the Manta net

The number of fish eggs found both in the water column (collected with Bongo net) and in surface waters (collected with Manta trawl) suggest that the highest concentration of fish larvae were located in the northern part of the surveyed area, whereas the lowest concentrations were found south of the Pta. Palmeirinhas monitoring line.

3.2.2.2 Fish larvae

The number of fish larvae collected with the Bongo and Manta nets are shown in Figure 30 Figure 31, respectively. The highest number of fish larvae collected with the Bongo net were observed at the outermost station on the Ambriz transect and at the 100 m depth station of the Pta. Palmerinhas monitoring line (Figure 30). South of the Pta. Palmerinhas monitoring line, the concentrations of fish larvae were generally low, except for a station located at Cunene River monitoring line.

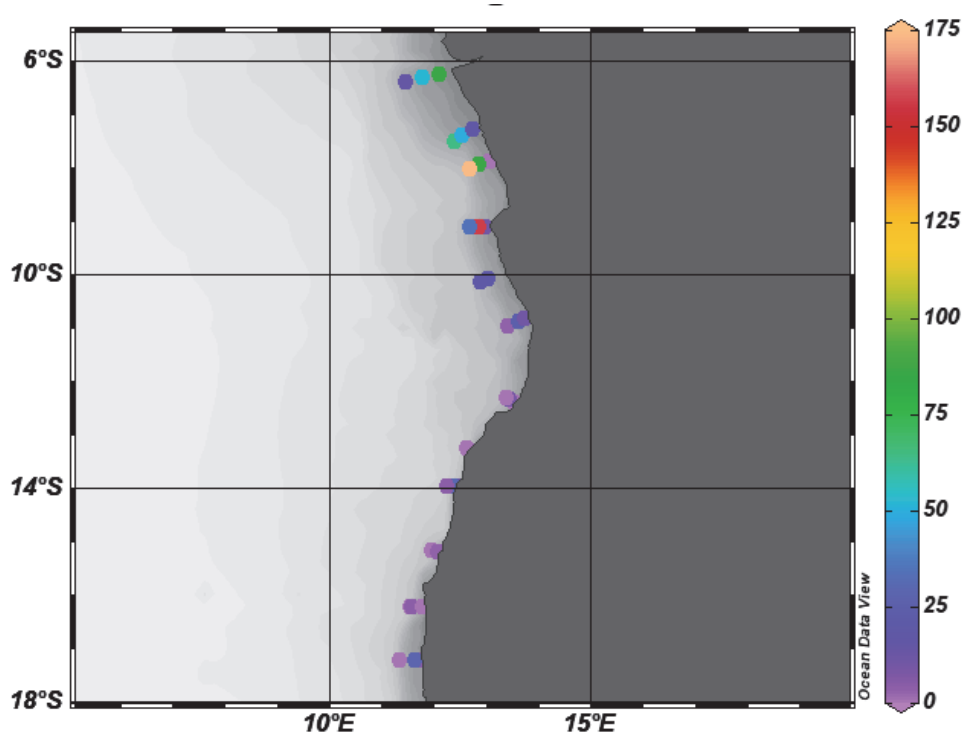


Figure 30. Number of fish larvae in the Bongo net

The analysis of samples collected in the surface with the Manta net showed that the highest concentration of fish larvae was located north of the Pta. Palmeirinhas monitoring line (Figure 31). Stations of the Ambriz and N'Zeto transects presented the highest number of fish larvae found in the surveyed area (Figure 31). In the southern part of the surveyed area, the number of fish larvae was generally low, except for the outermost station of the Cunene monitoring line (Figure 31).

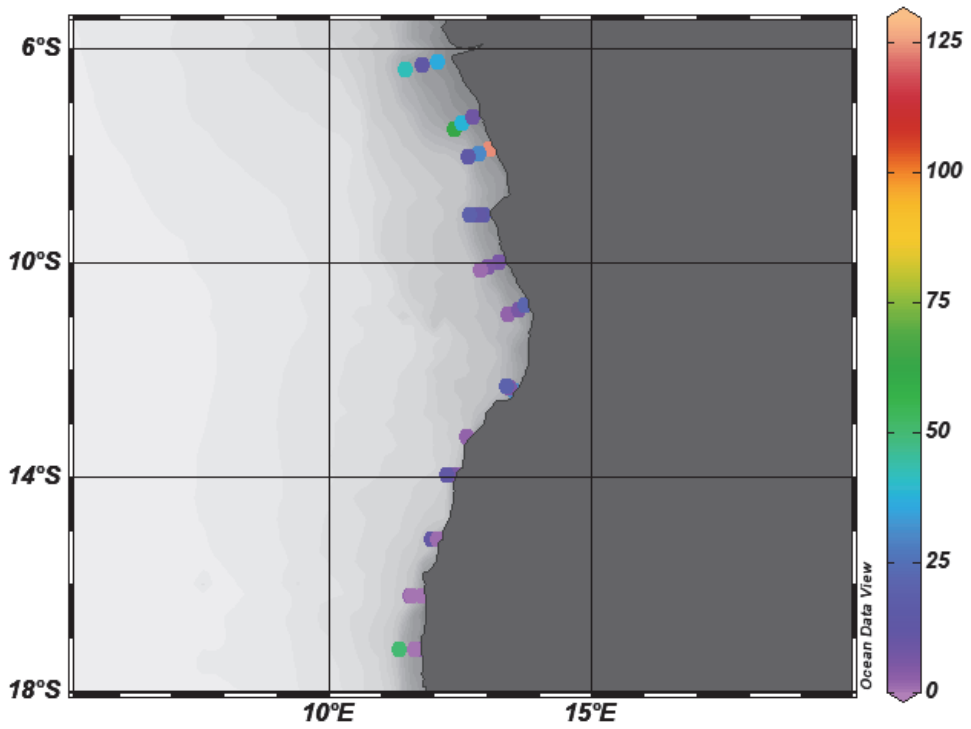


Figure 31. Number of fish larvae collected with the Manta net

As a general trend the number of fish larvae was similar to that found for the fish eggs. The highest number of fish larvae was located in the northern part of the surveyed area, from the Pta. Palmerinhas monitoring line and to the north, and south of this area the number was rather low. Unlike that for the counts of fish eggs where the highest number was found in the surface samples, the number of fish larvae was similar in samples collected in the surface and in the water column.

3.2.3 Phytoplankton blooming

A dinoflagellate bloom was found in the southern part of Angola, in the shallow area outside Tiger Bay. To identify the species responsible for the bloom, a sample was collected from the surface and analysed under the microscope in the plankton laboratory. After inspection, the dinoflagellate responsible for the bloom was identified as *Noctiluca scintillans*, commonly called sea sparkle which form red tides when blooming. Pictures of the bloom are shown in Figure 32.

Figure 32. Bloom of *Noctiluca scintillans* outside Tiger Bay, Angola

3.2.4 Microplastics

A towed Manta trawl was used to collect sample from water surface to evaluate the presence of microplastics. The number of microplastic particles found along the coast of Angola is shown in Figure 33. Microplastics were observed at almost all stations in the survey area. In general, there were higher numbers of microplastic particles in the mid and northern part of the area. The highest numbers were counted at the outermost station at the Congo River monitoring line and the two inner stations on the Pta. Palmeirinhas monitoring line (Figure 33).

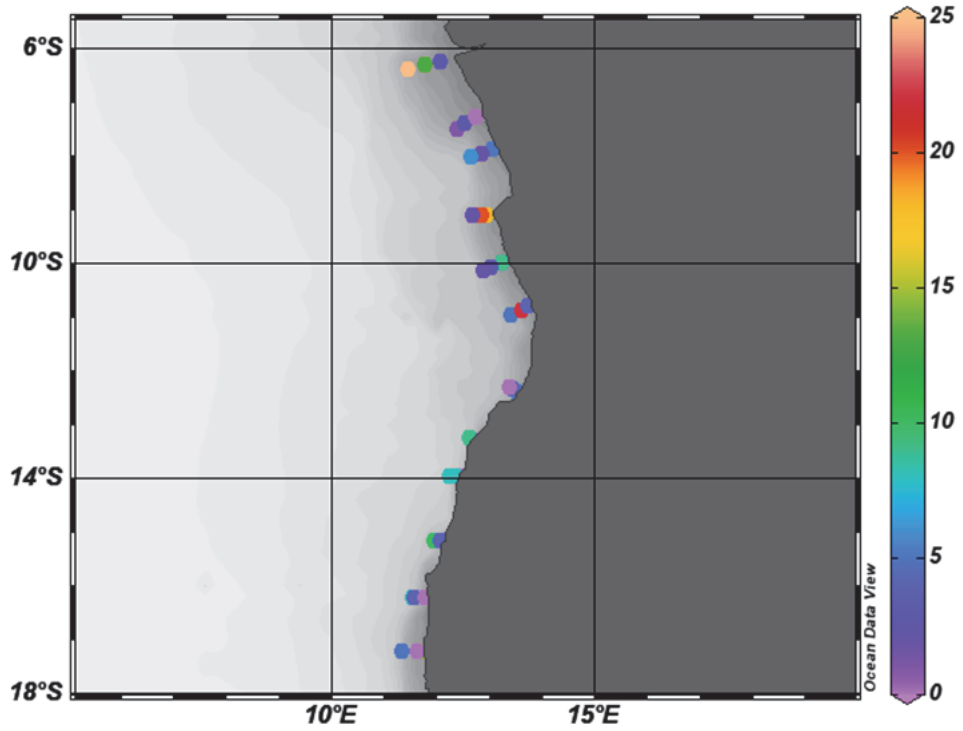


Figure 33. Number of microplastic particles in the surface water sampled using Manta net

The samples were also inspected under the microscope, and the microplastics found were recorded by taking pictures with a camera attached to the microscope. After inspection, the microplastics were dried in an oven at 60°C and sent to the IMR for further analysis. A total of 31 aluminium trays with microplastics were transferred to IMR for further processing. Some of the objects found in the samples were rests of paint and rust from the ship and some were identified as plastic, mostly micro-fibres. A few examples are shown in Figure 34.

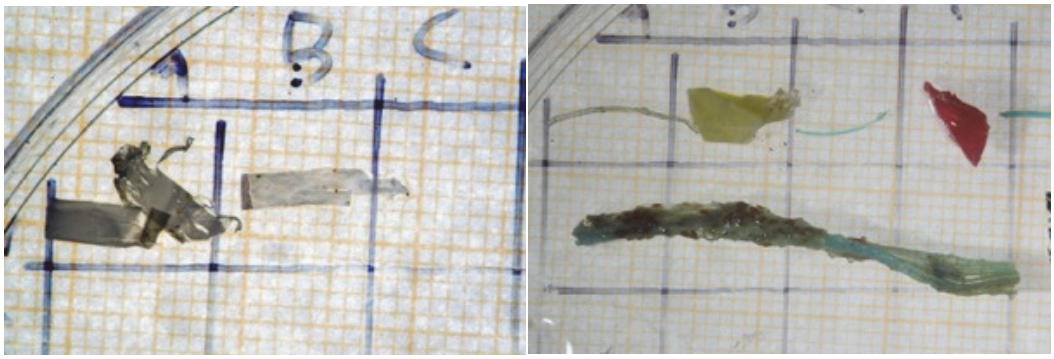


Figure 34. Microplastics found in the Manta net

3.3 Top predator observations

Top predator observations were only carried during Leg 2.5. More information about top predator observations is given in Annex XIII.

3.3.1 Cetaceans

A total number of 10 sighting of 90 individuals of whales and dolphins belonging to four different species were made (Figure 36). Bottlenose dolphin was the most abundant species with a total number of 76 individuals seen on 5 occasions (Table 6 and Figure 35). Fin whale and Minke whale were seen on two occasions and Pilot whale on one occasion. The low number of sightings can largely be attributed to the majority of the region's whales being in the southern oceans this time of the year during the whales' annual summer feeding migration.

Table 6. Species, total number per species and sighting occasions of cetaceans along the Angolan coastline, southern and central region (Leg 2.4)

Species name	Total number per species	Sighting occasion
Bottlenose dolphin	76	5
Fin whale	2	2
Minke whale	2	2
Pilot whale	10	1
Total	90	10

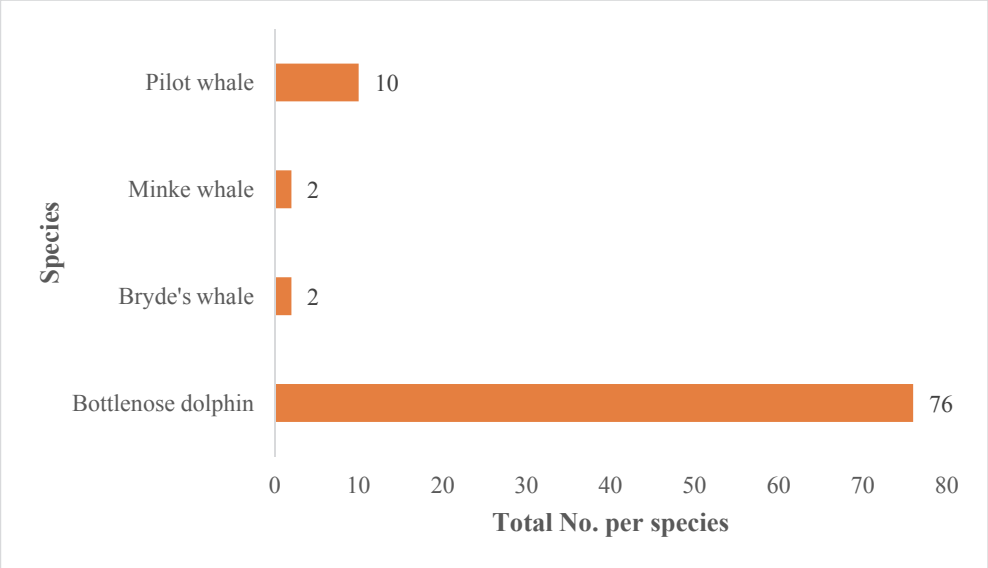


Figure 35. The total number of cetaceans' species along the Angolan coastline, southern and central region (Leg 2.4)

Figure 36. Distribution of the the 10 sightings of cetaceans along the Angolan coastline

3.3.2 Seabirds

A total number of 76 sightings of 1252 individuals of seabirds belonging to 13 different species. Cape gannets were seen the most, with a total of 17 sighting occasions, whereas the Black-browned albatross and Wedge-tailed shearwater were seen the least with only one sighting occasion of each species (Table 7). Cape gannets dominated with a total of 573 individuals (Figure 37). The low sighting of some seabird species can probably be attributed to the fact that most seabirds are migratory and they probably have migrated to the south in search for food and breeding grounds.

Table 7. Species, total number per species and sighting occasions of seabirds along the Angolan coastline

Species name	Total number	Sightings occasion
Atlantic shearwaters	18	3
Atlantic yellow-nosed albatross	21	3
Black-bellied storm petrel	52	4
Black-browned albatross	5	1
Cape gannets	573	17
Cory's shearwaters	32	3
Gulls	178	11
Juvenile cape gannets	24	7
Juvenile northern giant petrel	5	2
Madeiran storm-petrel	21	3
Sooty shearwaters	222	11

Species name	Total number	Sightings occasion
Unidentified seabirds	55	7
Wedge-tailed shearwater	16	1
Wilson's storm petrel	30	3
Total	1252	76

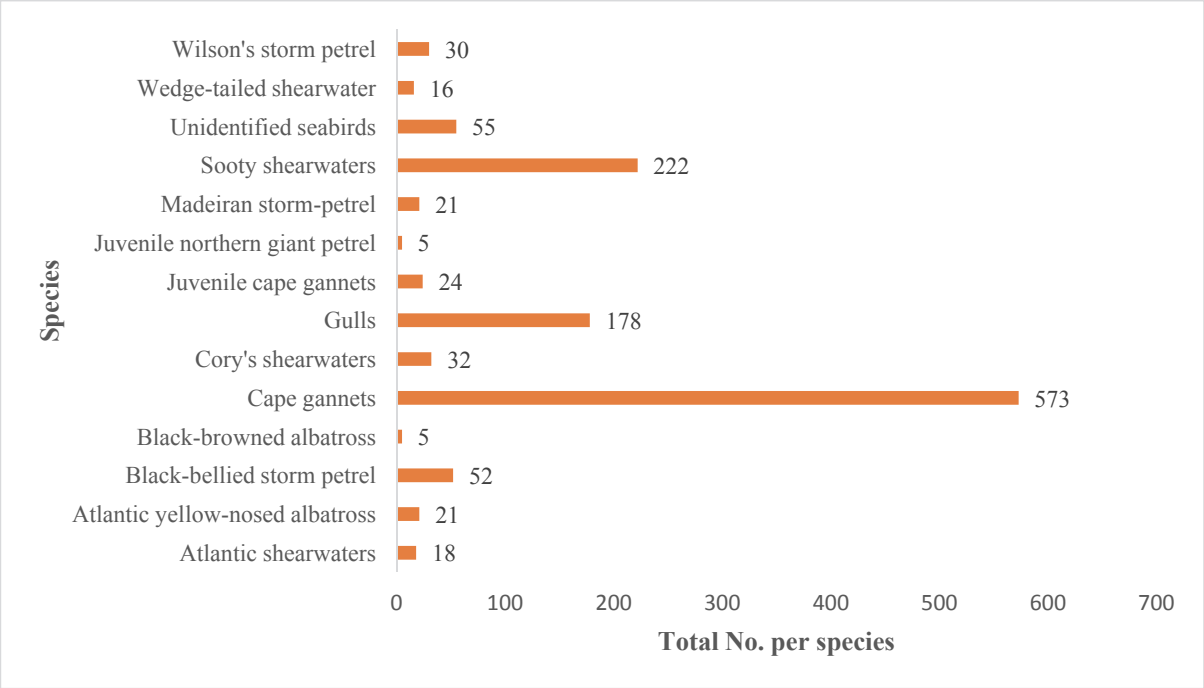


Figure 37. The total number of seabird species along the Angolan coastline

3.4 Demersal resources – catch rates, distribution and biomass estimates

The results of fish sampling are presented by region, i.e. northern: Congo River - Ponta das Palmerinhas, central: Ponta das Palmerinhas - Benguela, southern: Cunene-Tombua. The positions of all trawl hauls used in these estimates are shown in Figure 5. Catch rates are presented in Annex XII, also with means and standard deviations. The geographical distribution is presented for selected species (e.g. Figure 38 and Figure 36), and biomass estimates based on the swept-area methodology for important species and groups are compared with historical data. Pooled length distributions of the main commercial species of the three regions of Angola are shown in Annex IX. Further, the mean densities (tonnes/NM^{-2}) and the frequency of occurrence of the most important species are shown in Annex X. Annex XI shows the list of species included in the groups with related Nansis species codes.

3.4.1 Congo River - Ponta das Palmerinhas

The area north of the Congo River (Cabinda) is inaccessible to fisheries research surveys due to the restricted oil exploitation area. During some of the previous surveys this area (Cabinda) has been covered, but to make results comparable over time, the biomass estimates only include trawl stations south of the Congo River.

3.4.1.1 Catch rates on inner shelf, outer shelf and slope

Thirteen successful swept-area trawl stations were carried out on the inner shelf, 21 on the outer shelf and 37 along the slope (Table 8). The mean sampling depth for the inner shelf, outer shelf and slope was 44.4, 109.9 and 475.0 m, respectively. On the inner shelf, the mean catch rate of all species was 520.8 kg/h, of which the demersal group contributed to 61 % and the pelagic group to 11%, whereas the other three main groups, cephalopods, shrimps and sharks, contributed to 1% each. The remaining, classified as “others”, contributed 25%. On the outer shelf, the mean catch rate was 392.9 kg/h, with the demersal group contributing to 45%, the pelagic group contributed 26%, and shrimps, sharks and cephalopods combined to 2%. The highest total mean catch rate was obtained on the slope with 868.1 kg/h, of which 68% belong the Other, followed by shrimps (16%) and demersal (12 %).

Table 8. Mean catch rates (kg/h) of main groups, pelagic groups, demersal groups and deep-water species/groups on the inner shelf, outer shelf and slope in Northern Angola. Number of stations per stratum are presented under main groups, and mean depth (mean d.) of the trawl stations per interval under pelagic groups (inner and outer shelf) and under the deep-water groups (slope). Numbers in brackets indicate proportion (%) of total catch

Main groups

Stratum	No. of sta.	Cephalopods	Demersal	Pelagic	Sharks	Shrimps	Other	Total
Inner shelf	13	4.6 (1)	319.1 (61)	59.1 (11)	3.1 (1)	4.4 (1)	130.7 (25)	520.8
Outer shelf	21	7.7 (2)	175.5 (45)	100.5 (26)	0.0 (0)	0.3 (0)	108.9 (28)	392.9
Slope	37	10.2 (1)	105.9 (12)	13.8 (2)	12.7 (1)	135.3 (16)	590.1 (68)	868.1

Pelagic groups

Stratum	Mean d.	Barracuda	Carangidae	Clupeoids	Hairtails	Scombrids
Inner shelf	44.4	28.5 (5)	14.5 (3)	7.5 (1)	4.6 (1)	0.4 (0)
Outer shelf	109.9	0.0 (0)	93.8 (24)	0.2 (0)	5.5 (1)	1.0 (0)

Demersal groups

Stratum	Croakers	Groupers	Grunts	Hakes	Seabreams	Snappers
Inner shelf	45.5 (9)	0.6 (0)	52.6 (10)	0.0 (0)	47.1 (9)	0.1 (0)
Outer shelf	24.6 (6)	5.1 (1)	0.1 (0)	0.0 (0)	140.8 (36)	0.0 (0)

Deep-water species/groups

Stratum	Mean d.	A. varidens	Hakes	N. africana	P. longirostris	Seabreams
Slope	475.0	10.1 (1)	52.4 (6)	103.9 (12)	15.3 (2)	7.8 (1)

Among the pelagic group, barracudas gave the highest mean catch on the inner shelf with 28.5 kg/h. However, it should be noticed that 88% of barracudas was caught in only one of the 13 hauls (Annex XII). The most abundant pelagic group caught on both the inner and outer shelf was carangids with 14.5 and 93.8 kg/h, respectively, corresponding to 3 and 24% of the total catch. *Trachurus trecae* was the most abundant carangid on both the inner and outer shelf (Annex X). Clupeoids were encountered less frequently with a mean catch rate of 7.5 kg/h (1%) on the inner shelf. The mean catch rate of hairtails were ~5 kg/h (1%) on both the inner and outer shelf.

Among the demersal groups, seabreams were caught at all but one station on the inner and outer shelf, with mean catch rate of 47.1 and 140.8 kg/h, respectively, and *Dentex angolensis* was the most abundant species. Grunts were almost exclusively caught on the inner shelf with bigeye grunt (*Brachydeuteus auritus*) as the dominating species. Croakers were caught on both the inner and outer shelf, and canary drum (*Umbrina canariensis*) was the dominating species of this group. Groupers and snappers were both rare on the inner shelf, but some groups were caught on the outer shelf.

Hakes were only caught along the slope with a mean catch rate of 52.4 kg/h (6%). The mean catch rates of the three shrimp species, *Nematocarcinus africana, Parapenaeus longirostris*, *Aristeus varidens*, were 103.9, 15.3 and 10.1 kg/h, respectively.

3.4.1.2 Distribution

D. angolensis was distributed all along the coast from the Congo River to Ponta das Palmerinhas, mainly between 50 and 200 m depth (Figure 38). No hotspots were identified, and all densities fell within the 0-10 t/nm^2 interval. Benguela hake (*M. polli*) was also found all along the northern region of Angola, but mainly along the upper part of the slope.

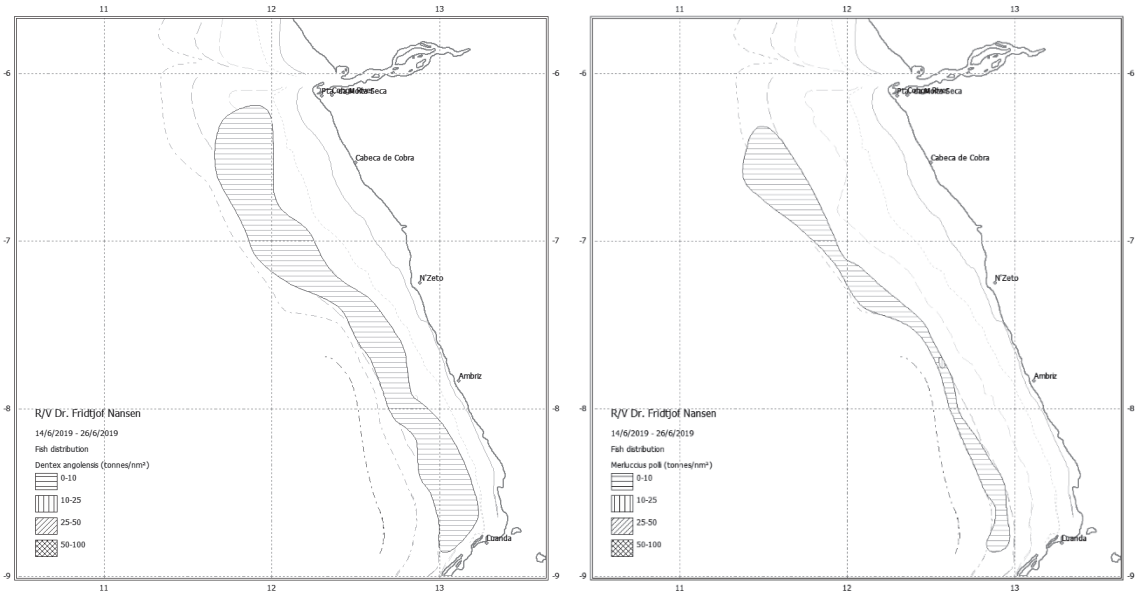


Figure 38. Distribution of Dentex angolensis (left) and Merluccius polli (right) in the northern region, Congo River - Ponta das Palmerinhas. Depth contours at 20 m, 50 m, 100 m, 200 m, 500 m and 1 000 m

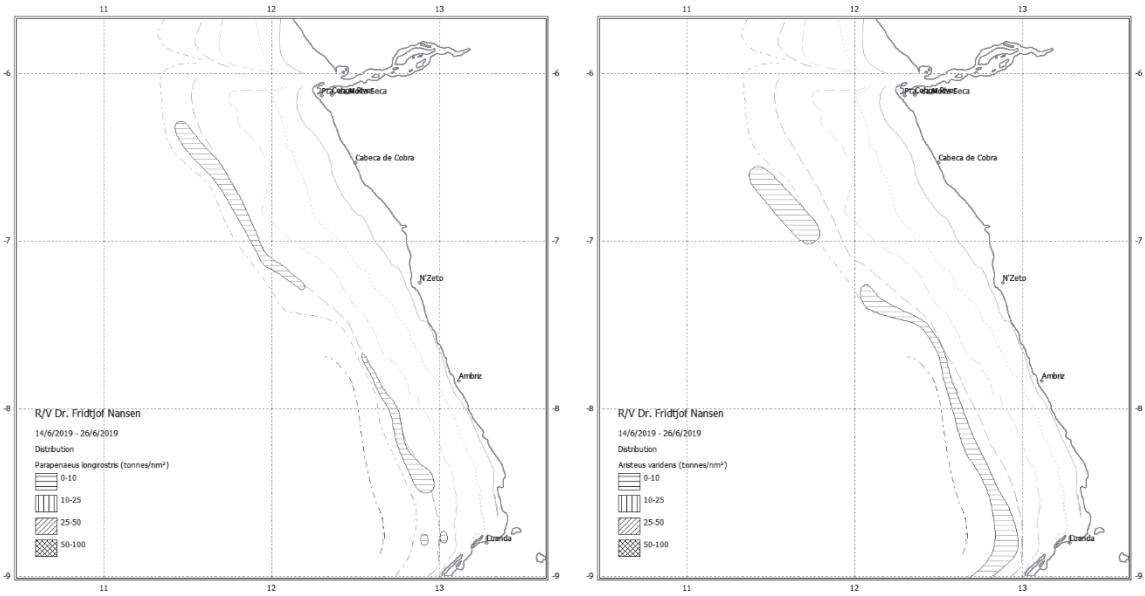


Figure 39. Distribution of the shrimps, P. longirostris and A. varidens, in the northern region, Congo River - Ponta das Palmerinhas. Depth contours at at 20 m, 50 m, 100 m, 200 m, 500 m and 1 000 m

The shrimp, *P. longirostris,* was distribute in two main strata along the northern region of Angola, mainly along the upper slope, and in two minor strata near Luanda (Figure 39). *A. varidens* had a wider distribution, but lower concentration (Table 8) and was found deeper down the slope than *P. longirostris.*

3.4.1.3 Biomass estimates

Table 9 presents the swept-area biomass estimates from 1985 to 2019 and the mean values for the 10-yr period prior to 2019 (no surveys in 2018 and 2019) for commercial species and for fish groups found on the northern shelf of Angola. The biomass estimates of pelagic species should be treated cautiously because bottom trawl is not an optimal sampling gear for schooling species inhabiting the water column rather than the demersal zone. Some of the biomass estimates are uncertain as reflected in high coefficients of variation (CV) over time, e.g. *M. polli* and clupeids, which make temporal trends unreliable. No *M polli* were caught on the shelf in 1919.

Seabreams was the most abundant group on the northern shelf in 2019 with an estimated biomass of 17 600 tonnes , which is higher than the preceding 10-yr mean (12 200 tonnes). The temporal pattern in seabreams seems quite stable though. *Dentex angolensis* was the most abundant seabream by contributing to 36% of the combined seabream biomass.

The estimated biomass of croakers was of 1 034 tonnes, which is the lowest in the time series. The estimate is about 20% of the 10-yr mean (5.5 kt). As in previous years, *U. canariensis* was the most common croaker and contributed to 37 % of the total biomass. The biomass has dropped considerably the last three sampling years, similar to the decline observed in 2000-2001.

The estimated biomass of grunts (*Pomadasys incisus*, *P. jubelini*, *P. rogeri* and *P. peroteti*) was 3.5 kT, which is close to the10-yr mean. The bigeye grunt (*B. auritus*) had an estimated biomass of 10.6 kT, which corresponds to only 40% of the 10-yr mean.

The grouper biomass estimate for 2019 was 226 tonnes, which is below the 10-yr mean of 383 tonnes, and the second lowest in the time series. Considering the entire times series, the estimates show a downward trend in biomass.

Snappers are rarely caught as they are rocky dwellers where bottom trawling is prohibited. No snappers were caught on the shelf in 2019.

The biomass estimate of *Parapenaeus longirostris* was 38 t, corresponding to 29% of the 10-yr mean.

The 2019 biomass estimate of Sepiidae was 284 t, approximately half of the 10-yr mean. The Ommastrephidae biomass estimate was 418 t, which is almost twice the 10-yr mean.

The biomass estimate of the pelagic *Trachurus trecae* was 10.2 kt and thus higher the 10-yr mean of 6.8 kt.

Table 9. Biomass estimates (tonnes) of important species on the shelf (20-200 m) in northern Angola. CV values are indicated in brackets

Survey	M.polli		T.treace		Shrimps		Cephalopod		Sharks		Clupeids		Carangids		Scombrids	
1985,1	9	(1,00)	4 496	(0,68)	302	(0,47)	10 463	(0,76)	498	(0,49)	364	(0,59)	9 986	(0,50)	44	(1,00)
1985,2	0		3 324	(0,71)	139	(0,96)	694	(0,35)	451	(0,39)	3 907	(0,98)	3 740	(0,63)	30	(1,00)
1985,3	3 459	(1,00)	16 486	(0,73)	1 448	(0,83)	2 046	(0,41)	870	(0,74)	205	(0,99)	17 742	(0,67)	146	(0,77)
1985,4	7 415	(1,00)	36 044	(0,70)	107	(0,70)	436	(0,44)	78	(0,94)	483	(0,64)	42 506	(0,61)	88	(0,76)
1986,1	56	(1,00)	13 438	(0,49)	1 445	(0,48)	2 853	(0,53)	496	(0,46)	2 053	(0,42)	17 950	(0,38)	30	(1,00)
1986,2	290	(0,74)	8 053	(0,23)	486	(0,37)	1 179	(0,23)	825	(0,31)	1 365	(0,35)	10 364	(0,19)	210	(0,51)
1989,1	62	(0,88)	12 681	(0,55)	92	(0,62)	931	(0,32)	497	(0,59)	1 578	(0,96)	13 264	(0,52)	97	(0,72)
1989,2	250	(1,00)	11 535	(0,40)	509	(0,36)	549	(0,23)	729	(0,47)	1 924	(0,27)	13 966	(0,34)	220	(0,59)
1989,3	1 029	(0,98)	39 959	(0,36)	256	(0,53)	1 715	(0,55)	15 984	(0,67)	5 043	(0,44)	46 704	(0,36)	208	(0,36)
1991,1	0		21 484	(0,35)	381	(0,87)	935	(0,23)	705	(0,36)	1 841	(0,49)	43 605	(0,41)	96	(0,70)
1991,2	312	(0,69)	14 727	(0,43)	2 554	(0,92)	4 225	(0,36)	107	(0,50)	55	(0,46)	14 928	(0,42)	318	(0,45)
1992	1 304	(0,63)	15 520	(0,39)	79	(0,69)	3 114	(0,21)	298	(0,57)	8	(1,00)	17 942	(0,36)	158	(0,53)
1994	51	(0,73)	14 309	(0,49)	478	(0,85)	3 643	(0,28)	52	(0,67)	184	(1,00)	21 225	(0,37)	337	(0,53)
1995,1	127	(0,71)	305	(0,49)	951	(0,53)	451	(0,24)	679	(0,37)	1 369	(0,40)	7 078	(0,36)	181	(0,44)
1996	0		32 155	(0,30)	347	(0,33)	2 203	(0,19)	256	(0,39)	782	(0,83)	33 700	(0,28)	137	(0,69)
1997,1	25	(0,91)	37 094	(0,30)	474	(0,47)	6 218	(0,28)	758	(0,40)	6 391	(0,58)	130 055	(0,52)	288	(0,68)
1999	6	(0,71)	4 106	(0,28)	326	(0,50)	1 202	(0,21)	1 297	(0,32)	6 392	(0,32)	16 570	(0,30)	36	(0,85)
2000	12	(1,00)	6 583	(0,34)	150	(0,53)	609	(0,39)	3 302	(0,87)	619	(0,79)	22 483	(0,46)	69	(0,61)
2001	6	(1,00)	5 502	(0,53)	212	(0,43)	866	(0,54)	391	(0,40)	517	(0,37)	9 560	(0,40)	37	(0,53)
2002	0		9 765	(0,32)	52	(0,30)	956	(0,31)	178	(0,33)	1 442	(0,29)	13 125	(0,25)	75	(0,33)
2003	0		9 766	(0,32)	497	(0,42)	481	(0,34)	243	(0,29)	2 816	(0,31)	28 286	(0,58)	81	(0,84)
2004	0	(1,00)	9 146	(0,30)	196	(0,58)	1 059	(0,15)	492	(0,24)	1 567	(0,38)	12 764	(0,24)	22	(0,60)
2005	0		3 792	(0,29)	146	(0,34)	1 674	(0,19)	734	(0,18)	599	(0,40)	10 292	(0,33)	116	(0,68)
2006	0		5 078	(0,25)	320	(0,56)	1 024	(0,20)	556	(0,43)	2 388	(0,46)	11 445	(0,21)	50	(0,46)
2007	37	(0,99)	2 983	(0,23)	243	(0,43)	703	(0,15)	432	(0,28)	1 797	(0,33)	9 442	(0,24)	195	(0,49)
2008	0	NA	1 938	(0,30)	331	(0,64)	1 204	(0,22)	464	(0,25)	1 754	(0,45)	17 154	(0,39)	151	(0,42)
2009	0	NA	4 412	(0,22)	108	(0,52)	1 010	(0,16)	381	(0,43)	2 961	(0,65)	9 792	(0,37)	100	(0,46)
2010	26	(1,00)	2 073	(0,36)	638	(0,75)	906	(0,19)	316	(0,26)	1 818	(0,86)	5 966	(0,24)	85	(0,65)
2011	0	NA	4 108	(0,55)	106	(0,35)	970	(0,15)	510	(0,33)	3 639	(0,41)	10 792	(0,38)	76	(0,50)
2012	0	NA	7 164	(0,29)	71	(0,64)	2 484	(0,24)	97	(0,36)	39 588	(0,84)	13 824	(0,24)	52	(0,63)
2013	55	(0,69)	2 050	(0,37)	104	(0,39)	465	(0,16)	345	(0,27)	1 452	(0,85)	14 075	(0,41)	6	(1,00)
2014	402	(0,98)	24 612	(0,31)	332	(0,42)	1 542	(0,18)	87	(0,55)	1 955	(0,36)	31 239	(0,25)	302	(0,32)
2015	187	(1,00)	13 700	(0,32)	64	(0,42)	896	(0,27)	105	(0,47)	4 727	(0,86)	23 049	(0,29)	49	(0,77)
2016	175	(0,69)	4 420	(0,27)	280	(0,39)	503	(0,22)	19	(1,00)	224	(0,49)	19 885	(0,28)	19	(0,56)
2019	0		10 202	(0,46)	312	(0,40)	1 117	(0,16)	207	(0,70)	488	(0,92)	10 935	(0,43)	123	(0,56)
Avg. 07-16	88		6 746		228		1 068		276		5 992		15 522		104	

Table 9 (continued)

Survey	Hairtails		Barracudas		Snappers		Groupers		Grunts		Croakers		Seabreams		P.longirostris	
1985.1	15 711	(0.53)	254	(0.54)	0		479	(0.66)	248	(0.52)	1 519	(0.61)	14 690	(0.34)	117	(0.84)
1985.2	1 200	(0.85)	75	(0.42)	63	(0.72)	1 771	(0.48)	381	(0.67)	1 302	(0.59)	12 881	(0.20)	0	
1985.3	2 709	(0.41)	26	(1.00)	62	(1.00)	1 978	(0.46)	3 629	(0.48)	8 695	(0.52)	20 897	(0.40)	0	
1985.4	3 608	(0.42)	780	(0.89)	0		3 054	(0.37)	14 806	(0.58)	3 692	(0.48)	31 078	(0.24)	10	(1.00)
1986.1	8 078	(0.67)	2 080	(0.34)	434	(1.00)	676	(0.41)	1 231	(0.50)	2 307	(0.50)	17 193	(0.22)	521	(0.66)
1986.2	8 640	(0.50)	756	(0.26)	0		1 515	(0.31)	1 694	(0.31)	5 049	(0.20)	25 098	(0.17)	0	
1989.1	2 277	(0.41)	345	(0.44)	0		989	(0.71)	135	(0.59)	4 469	(0.52)	12 958	(0.22)	60	(0.79)
1989.2	3 712	(0.28)	2 973	(0.46)	33	(1.00)	841	(0.38)	1 102	(0.38)	3 231	(0.18)	7 283	(0.20)	22	(0.55)
1989.3	21 132	(0.67)	364	(0.62)	316	(1.00)	315	(0.44)	1 788	(0.51)	4 214	(0.39)	15 344	(0.35)	31	(0.91)
1991.1	11 448	(0.53)	2 739	(0.72)	0		642	(0.56)	822	(0.51)	3 797	(0.43)	4 769	(0.14)	0	
1991.2	4 949	(0.31)	79	(0.65)	0		1 022	(0.40)	860	(0.62)	6 450	(0.55)	15 741	(0.23)	129	(0.57)
1992	4 588	(0.28)	14	(0.76)	0		1 844	(0.48)	932	(0.46)	2 778	(0.31)	14 551	(0.13)	49	(1.00)
1994	4 423	(0.26)	325	(0.53)	0		2 474	(0.45)	612	(0.50)	4 095	(0.48)	19 599	(0.25)	478	(0.85)
1995.1	7 208	(0.35)	2 109	(0.56)	481	(0.77)	807	(0.42)	2 921	(0.64)	2 882	(0.38)	8 341	(0.17)	477	(0.69)
1996	3 939	(0.23)	89	(0.69)	0		2 002	(0.50)	5 161	(0.46)	9 292	(0.25)	19 985	(0.35)	10	(0.97)
1997.1	6 323	(0.24)	57	(0.87)	73	(1.00)	549	(0.42)	4 836	(0.54)	12 451	(0.30)	9 009	(0.16)	124	(0.83)
1999	14 001	(0.24)	2 712	(0.36)	5	(1.00)	1 011	(0.36)	5 600	(0.42)	8 528	(0.55)	13 304	(0.15)	113	(0.48)
2000	4 216	(0.46)	1 231	(0.70)	196	(1.00)	620	(0.28)	388	(0.58)	2 450	(0.40)	13 424	(0.21)	18	(0.55)
2001	17 036	(0.57)	856	(0.44)	723	(0.98)	793	(0.58)	2 271	(0.54)	1 458	(0.42)	8 927	(0.24)	101	(0.52)
2002	19 374	(0.37)	1 651	(0.41)	63	(1.00)	509	(0.53)	241	(0.29)	2 835	(0.31)	9 187	(0.21)	21	(0.61)
2003	6 716	(0.31)	2 344	(0.68)	142	(1.00)	334	(0.38)	1 375	(0.34)	8 078	(0.36)	11 346	(0.20)	62	(0.86)
2004	4 668	(0.28)	1 455	(0.59)	37	(0.96)	502	(0.38)	3 316	(0.47)	5 545	(0.38)	11 924	(0.17)	6	(0.77)
2005	5 632	(0.32)	705	(0.69)	278	(0.65)	568	(0.23)	5 754	(0.58)	7 949	(0.32)	18 282	(0.15)	5	(0.53)
2006	11 299	(0.22)	1 570	(0.31)	16	(0.93)	372	(0.38)	2 839	(0.42)	4 087	(0.33)	10 872	(0.15)	176	(0.86)
2007	9 102	(0.33)	1 587	(0.59)	83	(0.69)	460	(0.28)	7 966	(0.72)	3 901	(0.33)	12 758	(0.15)	135	(0.73)
2008	10 986	(0.32)	428	(0.27)	79	(1.00)	614	(0.31)	1 485	(0.38)	8 771	(0.35)	12 833	(0.17)	40	(0.54)
2009	7 272	(0.39)	1 591	(0.45)	168	(0.68)	586	(0.33)	3 209	(0.51)	3 936	(0.32)	9 974	(0.20)	84	(0.65)
2010	2 984	(0.27)	852	(0.48)	0	NA	358	(0.38)	3 197	(0.49)	5 518	(0.38)	13 161	(0.14)	596	(0.79)
2011	4 827	(0.28)	2 919	(0.42)	78	(1.00)	261	(0.51)	6 039	(0.32)	7 243	(0.37)	9 832	(0.12)	11	(0.57)
2012	1 805	(0.43)	954	(0.56)	8	(1.00)	258	(0.35)	5 022	(0.50)	4 703	(0.36)	11 479	(0.16)	42	(0.95)
2013	2 087	(0.25)	2 647	(0.54)	0	NA	134	(0.55)	934	(0.34)	12 598	(0.73)	11 663	(0.16)	36	(0.74)
2014	3 179	(0.63)	743	(0.37)	222	(1.00)	437	(0.38)	1 804	(0.36)	2 635	(0.36)	19 302	(0.16)	196	(0.66)
2015	2 194	(0.32)	1 168	(0.40)	0	NA	350	(0.41)	2 979	(0.41)	1 576	(0.25)	10 249	(0.17)	36	(0.69)
2016	3 529	(0.61)	1 348	(0.28)	0	NA	226	(0.41)	1 223	(0.35)	1 034	(0.29)	9 064	(0.21)	148	(0.63)
2019	867	(0.27)	1 714	(0.87)	4	(1.00)	546	(0.67)	3 518	(0.43)	5 478	(0.27)	17 583	(0.21)	38	(0.69)
Avg. 07-16	4 796		1 424		64		369		3 386		5 191		12 031		132	

Table 9 (continued)

Survey	Ommastrephidae		Sepiidae		D.macrophthalamus		D.angolensis		U.canariensis		B.auritus	
1985,1	10 273	(0,77)	13		200	(1,00)	2 196	(0,33)	1 132	(0,74)	40 729	(0,70)
1985,2	0		0		0		2 495	(0,34)	521	(0,89)	6 842	(0,73)
1985,3	0		154	(0,59)	0		2 949	(0,42)	602	(0,68)	9 182	(0,66)
1985,4	84	(0,81)	215	(0,78)	125	(1,00)	6 371	(0,59)	2 650	(0,50)	64 007	(0,62)
1986,1	1 847	(0,76)	808	(0,43)	2 058	(0,34)	3 814	(0,33)	279	(0,45)	95 679	(0,19)
1986,2	0		734	(0,33)	1 483	(0,29)	11 220	(0,21)	1 350	(0,29)	15 408	(0,25)
1989,1	506	(0,52)	288	(0,56)	0		1 612	(0,21)	542	(0,48)	5 450	(0,58)
1989,2	161	(0,32)	272	(0,44)	222	(0,53)	2 299	(0,35)	172	(0,33)	14 252	(0,28)
1989,3	1 661	(0,56)	45	(0,60)	100	(0,58)	2 614	(0,28)	1 194	(0,83)	51 225	(0,36)
1991,1	368	(0,32)	282	(0,46)	158	(0,64)	1 317	(0,23)	496	(0,44)	28 701	(0,43)
1991,2	2 718	(0,53)	229	(0,44)	690	(0,55)	3 198	(0,25)	4 375	(0,80)	1 661	(0,89)
1992	1 071	(0,24)	901	(0,37)	1 532	(0,66)	5 112	(0,16)	680	(0,37)	7 599	(0,70)
1994	441	(0,21)	1 910	(0,24)	1 740	(0,47)	3 451	(0,23)	2 740	(0,68)	7 572	(0,58)
1995,1	72	(0,35)	268	(0,28)	197	(0,68)	2 143	(0,23)	342	(0,70)	12 801	(0,45)
1996	589	(0,17)	929	(0,31)	2 169	(0,48)	4 303	(0,24)	2 073	(0,59)	26 804	(0,62)
1997,1	1 017	(0,43)	5 148	(0,33)	324	(0,47)	2 837	(0,25)	1 161	(0,48)	39 107	(0,27)
1999	391	(0,27)	411	(0,25)	146	(0,46)	2 881	(0,12)	3 582	(0,88)	37 727	(0,24)
2000	214	(0,50)	344	(0,61)	65	(0,52)	4 053	(0,47)	1 271	(0,66)	23 205	(0,42)
2001	176	(0,31)	679	(0,69)	417	(0,52)	1 228	(0,24)	188	(0,83)	13 842	(0,36)
2002	660	(0,44)	97	(0,28)	102	(0,72)	2 089	(0,32)	835	(0,50)	15 791	(0,39)
2003	115	(0,49)	255	(0,64)	16	(0,49)	3 491	(0,17)	3 239	(0,77)	66 410	(0,54)
2004	344	(0,25)	494	(0,24)	79	(0,68)	5 214	(0,24)	1 236	(0,32)	24 512	(0,52)
2005	146	(0,20)	1 307	(0,22)	136	(0,51)	6 727	(0,11)	3 640	(0,46)	52 045	(0,53)
2006	183	(0,45)	418	(0,25)	7	(0,81)	4 630	(0,12)	2 151	(0,56)	61 138	(0,40)
2007	42	(0,35)	429	(0,19)	11	(0,83)	5 980	(0,15)	622	(0,44)	12 523	(0,35)
2008	226	(0,30)	610	(0,33)	0	NA	4 809	(0,17)	3 171	(0,39)	52 481	(0,50)
2009	163	(0,25)	435	(0,21)	8	(0,79)	4 418	(0,17)	985	(0,35)	23 822	(0,72)
2010	137	(0,25)	538	(0,30)	20	(0,67)	7 293	(0,15)	3 389	(0,52)	16 682	(0,45)
2011	44	(0,18)	746	(0,18)	1	(1,00)	5 888	(0,13)	1 975	(0,54)	25 797	(0,52)
2012	212	(0,42)	2 000	(0,30)	46	(1,00)	5 571	(0,19)	1 474	(0,54)	32 819	(0,42)
2013	149	(0,18)	129	(0,36)	5	(0,58)	7 008	(0,22)	11 640	(0,79)	27 898	(0,40)
2014	489	(0,32)	737	(0,24)	0	NA	8 045	(0,19)	1 400	(0,42)	44 915	(0,29)
2015	503	(0,49)	149	(0,28)	2	(1,00)	3 299	(0,16)	853	(0,37)	14 086	(0,47)
2016	88	(0,38)	258	(0,27)	0	NA	2 888	(0,17)	387	(0,31)	12 900	(0,39)
2019	416	(0,27)	284	(0,23)	0	NA	6 322	(0,17)	2 558	(0,43)	10 615	(0,51)
Avg. 07-16	205		603		9		5 520		2 589		26 392	

Biomass estimates along the slope of northern Angola are presented in Table 10. The slope is defined as the depth between 200 and 800 m. Shrimps was the group with the highest biomass estimate in 2019 with 13.5 kt, which is slightly higher than the 10-yr mean. *N. africana,* which is not a commercially important species, contributed to 76% of this estimate. The estimate for *P. longirostris* was 1.5 kt, which is 62% higher the 10-yr mean. The estimated biomass of *A. varidens* of 1.0 kt was almost twice as high as the 10-yr mean.

In 2019 the estimated biomass of *M. polli* was 5.2 kt, which is slightly higher than the mean of the 10 preceding years. The biomass of *M. polli* was relatively high during the first 10 years of the time series, but dropped to a lower level in the mid-1990s and has shown no marked trend since.

Estimated biomass as seabreams was 806 t, which is close to the 10-yr mean. *D. angolensis* contributed to 78% of the seabream biomass.

The biomass estimate of Ommastrephidae was 185 t, which is lower than the 10-yr mean of 270 t.

Table 10. Biomass estimates (tonnes) of important species and groups on the slope (200-800 m) in northern Angola. CV values are indicated in brackets

Survey	M.polli		Shrimps		Cephalopod		Sharks		Hairtails		Croakers	
1985,1	202	(0,00)	21	(0,00)	976	(0,00)	344	(0,00)	0		0	
1985,3	3 065	(0,36)	767	(0,48)	251	(0,28)	209	(0,55)	511	(1,00)	285	(0,37)
1985,4	28 753	(0,36)	11 989	(0,19)	260	(0,55)	0		1 342	(0,29)	8	(1,00)
1986,1	11 409	(0,15)	14 960	(0,10)	1 630	(0,29)	3 724	(0,52)	3 383	(0,26)	0	
1986,2	27 562	(0,27)	7 854	(0,22)	277	(0,36)	4 431	(0,29)	3 228	(0,26)	19	(1,00)
1989,1	13 518	(0,31)	7 772	(0,50)	1 631	(0,52)	2 376	(0,60)	795	(0,33)	0	
1989,2	8 168	(0,17)	4 370	(0,26)	166	(0,48)	375	(0,57)	352	(0,64)	1 624	(0,53)
1989,3	11 265	(0,39)	5 137	(0,14)	657	(0,46)	2 372	(0,24)	1 579	(0,87)	3	(1,00)
1991,1	19 597	(0,25)	8 671	(0,28)	135	(0,64)	1 376	(0,53)	65	(0,45)	3	(1,00)
1991,2	19 498	(0,28)	2 732	(0,14)	991	(0,42)	2 381	(0,31)	699	(0,26)	64	(0,80)
1992	13 290	(0,18)	8 992	(0,28)	209	(0,28)	1 462	(0,42)	1 148	(0,24)	244	(0,62)
1994	4 096	(0,20)	7 529	(0,23)	328	(0,20)	841	(0,28)	1 753	(0,16)	134	(0,60)
1995,1	5 892	(0,42)	9 641	(0,22)	316	(0,73)	1 367	(0,21)	2 284	(0,30)	0	
1996	5 065	(0,13)	4 435	(0,17)	566	(0,49)	307	(0,27)	1 627	(0,30)	34	(0,60)
1997,1	6 954	(0,12)	14 107	(0,15)	659	(0,15)	824	(0,44)	3 399	(0,52)	0	
1997,2	8 101	(0,17)	5 676	(0,70)	330	(0,79)	10	(1,00)	1 972	(0,60)	35	(1,00)
1999	3 624	(0,21)	11 539	(0,19)	1 142	(0,66)	1 060	(0,16)	3 088	(0,35)	113	(0,47)
2000	4 385	(0,23)	4 683	(0,19)	709	(0,19)	597	(0,34)	1 978	(0,45)	0	
2001	4 840	(0,28)	8 283	(0,27)	1 477	(0,56)	1 966	(0,52)	1 531	(0,29)	0	
2002	3 479	(0,26)	6 415	(0,31)	625	(0,39)	118	(0,33)	3 022	(0,44)	27	(0,76)
2003	5 310	(0,29)	7 986	(0,15)	421	(0,24)	1 305	(0,49)	1 237	(0,48)	27	(0,75)
2004	15 327	(0,50)	12 343	(0,13)	871	(0,27)	1 571	(0,34)	1 695	(0,23)	49	(0,84)
2005	10 994	(0,26)	10 285	(0,14)	382	(0,22)	1 180	(0,39)	1 468	(0,19)	19	(0,46)
2006	7 553	(0,21)	12 526	(0,15)	407	(0,23)	931	(0,60)	2 143	(0,32)	18	(0,79)
2007	4 117	(0,22)	14 856	(0,19)	316	(0,26)	501	(0,40)	749	(0,21)	9	(1,00)
2008	5 925	(0,15)	16 979	(0,16)	716	(0,33)	846	(0,25)	1 365	(0,31)	246	(0,55)
2009	2 814	(0,32)	15 238	(0,16)	984	(0,24)	1 152	(0,31)	1 077	(0,19)	24	(0,66)
2010	3 166	(0,32)	10 135	(0,17)	502	(0,23)	382	(0,31)	2 202	(0,36)	7	(1,00)
2011	2 433	(0,31)	11 151	(0,21)	609	(0,36)	669	(0,39)	1 062	(0,31)	146	(0,63)
2012	9 696	(0,31)	12 707	(0,19)	534	(0,28)	313	(0,32)	1 088	(0,45)	55	(0,81)
2013	3 579	(0,27)	10 060	(0,15)	801	(0,58)	784	(0,45)	762	(0,26)	158	(0,48)
2014	4 794	(0,25)	8 223	(0,16)	902	(0,15)	528	(0,39)	799	(0,30)	2	(1,00)
2015	7 594	(0,45)	12 586	(0,18)	777	(0,21)	482	(0,26)	449	(0,15)	42	(0,81)
2016	4 427	(0,30)	12 719	(0,19)	608	(0,32)	325	(0,44)	1 038	(0,52)	91	(0,53)
2019	5 160	(0,30)	13 515	(0,14)	1 157	(0,27)	1 380	(0,27)	1 386	(0,30)	86	(0,47)
Avg. 07-16	4 855		12 465		675		598		1 059		78	

Table 10 (continued)

Survey	Seabreams		P.longirostris		A.varidens		N.africanus		Ommastrephidae		D.angolensis	
1985,1	0		21	(0,00)	0		0		976	(0,00)	0	
1985,3	1 541	(0,00)	0		0		0		0		1 541	(0,00)
1985,4	0		2 108	(0,38)	6 691	(0,26)	2 864	(0,37)	142	(0,78)	0	
1986,1	108	(0,89)	1 166	(0,57)	538	(0,76)	12 631	(0,09)	1 618	(0,30)	98	(1,00)
1986,2	288	(1,00)	0		1 008	(0,20)	4 643	(0,34)	0		269	(1,00)
1989,1	66	(1,00)	419	(0,51)	204	(0,18)	6 953	(0,55)	1 429	(0,59)	0	
1989,2	4 061	(0,99)	366	(0,44)	164	(0,43)	3 682	(0,31)	135	(0,60)	4 038	(0,99)
1989,3	497	(0,79)	243	(0,29)	91	(0,15)	4 699	(0,15)	645	(0,47)	496	(0,79)
1991,1	49	(0,73)	88	(0,44)	70	(0,51)	8 315	(0,29)	129	(0,64)	49	(0,73)
1991,2	527	(0,29)	205	(0,43)	15	(1,00)	2 445	(0,16)	631	(0,48)	510	(0,29)
1992	510	(0,39)	170	(0,46)	272	(0,30)	8 439	(0,30)	143	(0,31)	465	(0,38)
1994	1 045	(0,40)	532	(0,25)	370	(0,27)	6 602	(0,26)	304	(0,22)	1 045	(0,40)
1995,1	506	(0,43)	860	(0,39)	326	(0,26)	7 269	(0,28)	61	(0,44)	449	(0,47)
1996	597	(0,63)	162	(0,27)	267	(0,18)	3 859	(0,20)	228	(0,29)	345	(0,66)
1997,1	871	(0,48)	605	(0,50)	333	(0,14)	13 096	(0,16)	622	(0,16)	826	(0,50)
1997,2	878	(1,00)	1 317	(0,60)	0		4 088	(0,81)	317	(0,81)	876	(1,00)
1999	389	(0,26)	542	(0,19)	237	(0,16)	10 540	(0,21)	1 121	(0,67)	339	(0,30)
2000	1 650	(0,90)	497	(0,18)	222	(0,19)	3 777	(0,24)	509	(0,25)	1 588	(0,94)
2001	494	(1,00)	535	(0,23)	243	(0,20)	6 746	(0,34)	1 001	(0,79)	481	(1,00)
2002	213	(0,64)	800	(0,46)	127	(0,25)	5 337	(0,37)	364	(0,56)	200	(0,68)
2003	141	(0,48)	629	(0,44)	383	(0,30)	6 873	(0,16)	220	(0,34)	135	(0,47)
2004	299	(0,30)	749	(0,43)	359	(0,16)	10 930	(0,15)	316	(0,23)	284	(0,31)
2005	562	(0,36)	984	(0,28)	639	(0,19)	8 535	(0,17)	330	(0,23)	547	(0,37)
2006	343	(0,42)	923	(0,29)	391	(0,16)	11 073	(0,18)	184	(0,20)	340	(0,42)
2007	612	(0,32)	981	(0,34)	373	(0,12)	13 285	(0,21)	125	(0,35)	595	(0,34)
2008	629	(0,29)	933	(0,31)	615	(0,12)	15 267	(0,18)	207	(0,34)	593	(0,28)
2009	523	(0,38)	971	(0,30)	914	(0,13)	13 121	(0,18)	131	(0,40)	523	(0,38)
2010	1 404	(0,42)	389	(0,27)	388	(0,17)	9 207	(0,19)	96	(0,33)	1 404	(0,42)
2011	1 215	(0,39)	1 138	(0,47)	653	(0,12)	8 793	(0,26)	122	(0,36)	1 211	(0,39)
2012	205	(0,73)	1 980	(0,45)	448	(0,17)	10 197	(0,23)	303	(0,34)	205	(0,73)
2013	982	(0,18)	364	(0,27)	526	(0,13)	9 075	(0,16)	91	(0,34)	973	(0,18)
2014	978	(0,29)	1 097	(0,33)	771	(0,21)	5 949	(0,21)	770	(0,16)	910	(0,31)
2015	1 382	(0,65)	997	(0,21)	550	(0,27)	10 802	(0,20)	572	(0,28)	1 379	(0,65)
2016	426	(0,28)	531	(0,23)	553	(0,20)	11 472	(0,21)	279	(0,38)	403	(0,28)
2019	806	(0,32)	1 523	(0,42)	1 025	(0,24)	10 277	(0,17)	185	(0,21)	670	(0,42)
Avg. 07-16	836		938		579		10 717		270		820	

3.4.2 Ponta das Palmerinhas - Benguela

3.4.2.1 Catch rates on inner shelf, outer shelf and slope

16 successful swept-area trawl stations were carried out on the inner shelf, 21 on the outer shelf and 47 along the slope. On the inner shelf, the mean catch rate of all species was 1 138.9 kg/h, of which the demersal group contributed to 65% (numbers in brackets) and the pelagic group to 14% (for landings per station and standard deviations, see Annex XII). The "Others" group contributed to 19% and cephalopods to 2%, whereas neither sharks nor shrimps were caught on the inner shelf. (Table 11).

On the outer shelf, the mean catch rate was 690,4 kg/h. The "Other groups" gave the highest catch rates by contributing to 86% of the catches, followed by demersals (25%), pelagics (7%) and cephalopods (2%). Catch rates of sharks and shrimps were insignificant.

Along the slope, total catch rates were 917.3 kg/h, of which the Other group contributed to 56%, demersals 25% and shrimps 16%. Catch rates of cephalopods, clupeoids and sharks were 4.0, 7.9 and 10.3 kg/h, respectively, which correspond to less than 3% of the total catch rates along the slope.

The catch rates of pelagics was about 3 times higher on the inner shelf than on the outer shelf. Carangids was the most abundant group on both the shallower and deeper parts of the shelf, and as for the northern shelf, horse mackerel (*T. trecae*) was the most abundant carangid. Barracuda and clupeoids were almost exclusively caught on the inner shelf. Hairtails were caught on both parts of the shelf, but in higher numbers on the inner shelf. Catches of scombrids were insignificant.

Among the demersal groups, seabreams was the most abundant group on both the inner and outer shelf with catch rates of 157.4 and 123.4 kg/h, respectively. Croakers was the second most abundant group and was caught on both parts of the shelf, with highest catch rates on the inner shelf. Grunts were almost exclusively caught on the inner shelf with a mean catch rate of 55.4 kg/h. Catch rates of groupers were insignificant, and no snappers were caught.

Among the deep-water species/groups, the hakes were the most abundant group along the slope, with a mean catch rate of 180.9 kg. Among the 3 shrimp species, the commercially unimportant *N. africana* was the most abundant species with mean catch rate of 180.3 kg/h. The catch rate of *A. varidens* was 21.1 kh/h and of *P. longirostris* 7.8 kg/h.

Table 11. Mean catch rates (kg/h) of main groups, pelagic groups, demersal groups and deep-water species/groups on the inner shelf, outer shelf and slope in central Angola. Number of stations per stratum are presented under main groups, and mean depth (mean d.) of the trawl stations per interval under pelagic groups (inner and outer shelf) and under the deep-water groups (slope). Numbers in brackets indicate proportion (%) of total catch.

Main groups

Stratum	No. of sta.	Cephal.		Demersal		Pelagic		Sharks		Shrimps		Other		Total
Inner shelf	16	23.6	(2)	737.7	(65)	155.0	(14)	0.0	(0)	0.5	(0)	222.0	(19)	1 138.9
Outer shelf	21	12.3	(2)	169.9	(25)	49.7	(7)	0.9	(0)	1.2	(0)	456.2	(66)	690.4
Slope	47	4.0	(0)	232.6	(25)	7.9	(1)	10.3	(1)	147.4	(16)	515.2	(56)	917.3

Pelagic groups

Stratum	Mean d.	Barracuda		Carangidae		Clupeoids		Hairtails		Scombrids	
Inner shelf	42.6	5.9	(1)	113.0	(10)	7.4	(1)	27.9	(2)	0.1	(0)
Outer shelf	113.5	0.1	(0)	33.9	(5)	0.4	(0)	15.1	(2)	0.3	(0)

Demersal groups

Stratum	Croakers		Groupers		Grunts		Hake		Seabreams		Snappers	
Inner shelf	58.8	(5)	1.1	(0)	55.4	(5)	0.0	(0)	157.4	(14)	0.0	(0)
Outer shelf	17.5	(3)	0.6	(0)	0.1	(0)	5.2	(1)	123.4	(18)	0.0	(0)

Deep-water species/groups

Stratum	Mean d.	A. varidens		Hake		N. africana		P. longirostris		Seabreams	
Slope	442.8	21.1	(2)	180.9	(20)	108.3	(12)	7.8	(1)	8.7	(1)

3.4.2.2 Distribution

Figure 40 shows the distribution of *Dentex angolensis* and *D. macrophthalmus* in the central region of the Angolan coast *D. angolensis* was found along the entire central shelf, mainly between 50 and 200 m depth with the widest distribution in the northern part of part of the shelf. *D. macrophthalmus* was more patchily distributed and was found mainly in the central and southern part of the shelf along the shelf-break. Figure 41 shows the distribution of Benguela hake (*M. polli*) in the central region. The species was found along large parts of the slope.

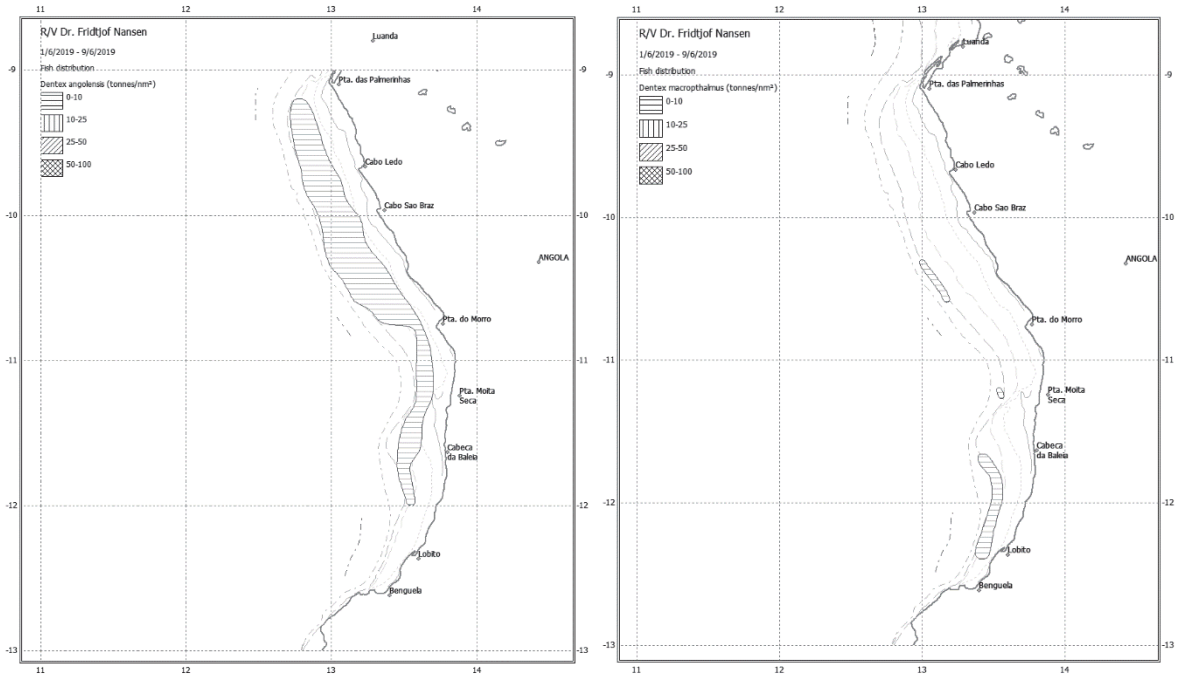


Figure 40. Distribution of Dentex angolensis (left) and D. macrophthalmus (right) in the central region, Ponta das Palmerinhas - Benguela. Depth contours at 20 m, 50 m, 100 m, 200 m, 500 m and 1 000 m

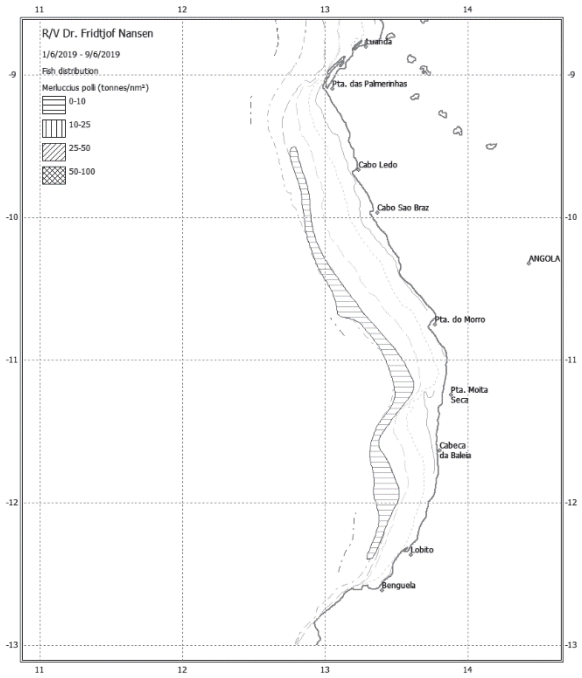


Figure 41. Distribution of Benguela hake (M. polli) in the central region, Ponta das Palmerinhas - Benguela. Depth contours at 20 m, 50 m, 100 m, 200 m, 500 m and 1 000 m.

The distributions of *A. varidens* and *P. longirostris* are pesented in Figure 42. *A. varidens* was found in a continuous belt along the slope, from Cabo Sao Braz to Benguela. *P. longirostris* was also found most of the slope of central region of Angola, but with a slightly more northerly distribution than *A. varidens.*

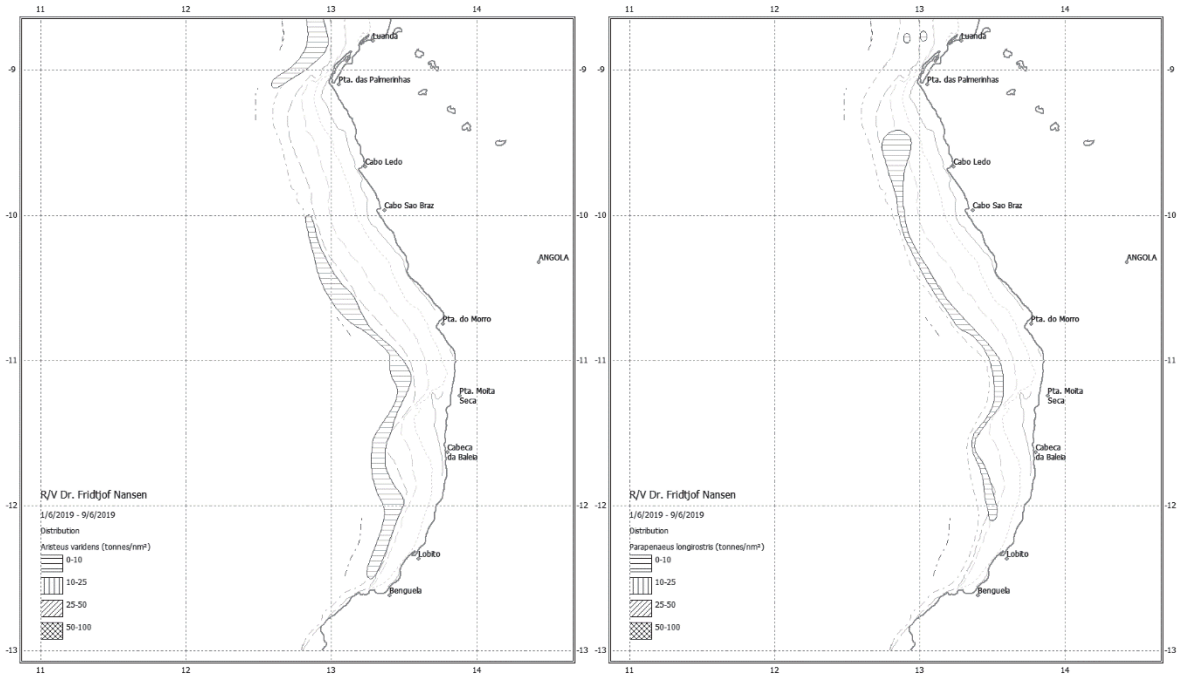


Figure 42. Distribution of A. varidens and P. longirostris in the central region, Benguela-Ponta das Palmerinhas / Luanda. Depth contours at 20 m, 50 m, 100 m, 200 m, 500 m and 1 000 m

3.4.2.3 Biomass estimates

Table 12 shows the time series (1985 to 2019) of swept-area biomass estimates for commercial species and groups of species on the central shelf off Angola. The biomass estimates were calculatd as previously described for the northern shelf of Angola.

M. polli was the only hake species caught on the shelf of the central region of Angola, although only on the outer part of the shelf (Figure 41. Distribution of Benguela hake (M. polli) in the central region, Ponta das Palmerinhas - Benguela. Depth contours at 20 m, 50 m, 100 m, 200 m, 500 m and 1 000 m.). The biomass estimate of 375 t is the highest since 2003, and well above the preceding 10-yr mean of 69 t. Compared to the length distribution in 2016 (both shelf and slope), *M. polli* was substantially bigger in 2019 (Annex X) with modal peaks at 27 cm, 37 cm and 48 cm, and a mean length of 32.0 cm (22.6 cm in 2016).

The combined biomass estimate of seabreams was 11.7 kt, which is 33% higher than the 10-yr mean. The biomass of *D. macrophthalmus* was estimated to 787 t, which corresponds to 42% of the 10-yr mean. The size was bigger in 2019 than in 2016 (avg. 27.5 vs 18.9 cm). This may indicate poor recruitment in recent years. The estimated biomass of *D. angolensis* was 2.5 kt and thus 23% higher the 10-yr mean of 2.1 kt. The size distributions showed three modal peaks at 11 cm, 19 cm and 29.5 cm. The smallest modal peak indicates some recent recruitment.

The estimated biomass of croakers was 4.4 kt. which is slightly higher than the 10-yr mean. *U. canariensis* was the most abundant croaker and contributed 37% to the biomass of the

group. The length of this species was 25.7 cm, vs. 28.8 cm in 2016. It should be noticed that the biomass is estimate for depths >20 m, whereas a substantial part of the croakers is found in shallower waters.

The 2019 biomass estimate of grunts (*Pomadasys incisus, P. jubelini*, *P. rogeri* and *P. peroteti*) was 2.9 kt tonnes, which is 37% of the 10-yr mean. The biomass estimate of big eye grunt (*B. auritus*) was 23.0 kt and thus 29% higher than the 10-yr mean. However, it should be noticed that a CV of 0.81 suggests that estimate of big eye grunt is uncertain.

The estimate for Groupers was 100 t which is only 26% av the 10-yr mean. The estimate time series shows a decreasing trend since 2011.

The estimated biomass of *P. longirostris* (deep rose shrimp) on the shelf was 94 t, which corresponds to 68% av the 10-yr mean.

Table 12. Biomass estimates (tonnes) of important species on the shelf (20-200m) in central Angola. CV values are indicated in brackets

Survey	M.polli		T.treace		Shrimps		Cephalopod		Sharks		Clupeids		Carangids		Scombrids	
1985,4	124	(0,58)	74 892	(0,59)	58	(1,00)	5 372	(0,46)	0	-	423	(0,72)	75 408	(0,58)	0	-
1986,1	276	(0,60)	17 875	(0,39)	1 632	(0,55)	1 439	(0,28)	228	(0,87)	717	(0,37)	20 440	(0,33)	34	(0,66)
1986,2	207	(0,58)	22 596	(0,48)	371	(0,67)	1 423	(0,47)	0	-	328	(0,47)	24 625	(0,43)	16	(1,00)
1989,1	121	(0,96)	6 999	(0,25)	237	(0,62)	1 864	(0,35)	148	(0,56)	560	(0,79)	12 736	(0,26)	155	(0,40)
1989,2	1 013	(0,47)	21 473	(0,31)	677	(0,44)	2 206	(0,20)	105	(0,62)	359	(0,48)	26 453	(0,28)	95	(0,30)
1989,3	480	(0,65)	9 579	(0,48)	453	(0,88)	2 015	(0,47)	285	(0,78)	1 707	(0,49)	12 816	(0,46)	310	(0,75)
1991,1	0	(1,00)	86 136	(0,46)	39	(0,58)	850	(0,18)	746	(0,62)	508	(0,48)	87 396	(0,45)	277	(0,50)
1991,2	618	(0,71)	47 927	(0,53)	125	(0,62)	2 021	(0,29)	115	(1,00)	36	(1,00)	48 814	(0,52)	126	(0,81)
1992	1 641	(0,37)	32 878	(0,26)	106	(0,67)	2 597	(0,18)	483	(0,66)	70	(0,60)	35 314	(0,25)	64	(0,53)
1994	2 393	(0,80)	61 886	(0,32)	292	(0,48)	2 696	(0,23)	269	(0,50)	22	(0,58)	63 569	(0,31)	580	(0,48)
1995,1	167	(0,46)	4 875	(0,59)	323	(0,48)	807	(0,25)	121	(0,49)	245	(0,31)	12 635	(0,29)	213	(0,56)
1996	713	(0,65)	51 220	(0,42)	116	(0,51)	2 402	(0,24)	496	(0,57)	589	(0,45)	55 750	(0,39)	53	(0,91)
1997,1	4 557	(0,71)	27 729	(0,46)	1 088	(0,56)	3 268	(0,24)	208	(0,60)	3 442	(0,97)	38 605	(0,36)	46	(1,00)
1997	7 635	-	68 984	-	1 391	-	2 531	-	149	-	125	-	70 873	-	279	-
1998	375	(0,86)	4 630	(0,55)	365	(0,45)	2 587	(0,21)	310	(0,50)	2 860	(0,80)	7 606	(0,39)	52	(0,80)
1999	15	(1,00)	12 977	(0,32)	15	(0,41)	890	(0,22)	107	(0,61)	1 961	(0,53)	20 379	(0,26)	34	(0,78)
2000	240	(0,91)	19 114	(0,29)	314	(0,54)	1 744	(0,17)	560	(0,51)	1 594	(0,46)	25 052	(0,24)	275	(0,71)
2001	123	(0,68)	16 510	(0,29)	212	(0,76)	1 374	(0,63)	343	(0,46)	80	(0,53)	20 942	(0,25)	97	(0,47)
2002	1 189	(0,49)	78 646	(0,25)	531	(0,43)	2 930	(0,34)	120	(0,48)	1 625	(0,33)	85 797	(0,23)	745	(0,89)
2003	1 774	(0,51)	25 494	(0,33)	515	(0,42)	1 327	(0,27)	266	(0,43)	1 439	(0,33)	29 369	(0,28)	55	(0,51)
2004	174	(0,90)	12 263	(0,36)	974	(0,66)	1 026	(0,20)	586	(0,44)	2 193	(0,41)	15 324	(0,29)	41	(0,56)
2005	44	(0,84)	7 137	(0,32)	84	(0,41)	1 427	(0,10)	201	(0,40)	1 535	(0,51)	9 357	(0,27)	216	(0,80)
2006	44	(0,63)	9 622	(0,22)	188	(0,60)	1 674	(0,15)	475	(0,44)	2 275	(0,44)	13 434	(0,20)	134	(0,41)
2007	55	(0,50)	7 649	(0,30)	54	(0,34)	1 822	(0,18)	802	(0,74)	2 078	(0,35)	13 485	(0,35)	18	(0,62)
2008	22	(0,72)	3 703	(0,32)	257	(0,56)	1 295	(0,13)	132	(0,42)	945	(0,56)	5 636	(0,23)	17	(0,71)
2009	4	(0,89)	10 073	(0,28)	195	(0,68)	1 678	(0,23)	94	(0,50)	8 854	(0,64)	14 765	(0,24)	21	(0,81)
2010	22	(1,00)	2 354	(0,35)	204	(0,50)	1 628	(0,17)	157	(0,42)	1 420	(0,74)	13 526	(0,69)	79	(0,44)
2011	0	-	10 895	(0,76)	42	(0,45)	1 956	(0,21)	74	(1,00)	268	(0,56)	13 231	(0,63)	48	(0,80)
2012	13	(0,57)	17 295	(0,28)	434	(0,64)	2 983	(0,13)	21	(0,71)	35 480	(0,39)	21 586	(0,25)	3 086	(0,90)
2013	1	(0,82)	2 550	(0,48)	185	(0,46)	1 235	(0,12)	104	(0,72)	1 265	(0,31)	10 759	(0,36)	161	(0,48)
2014	113	(0,54)	7 446	(0,35)	113	(0,61)	2 677	(0,20)	86	(0,81)	9 366	(0,64)	9 896	(0,28)	4 732	(0,67)
2015	242	(0,80)	15 757	(0,25)	28	(0,54)	1 170	(0,26)	36	(1,00)	21 774	(0,36)	21 067	(0,19)	121	(0,51)
2016	216	(0,85)	5 079	(0,35)	178	(0,37)	950	(0,19)	19	(0,72)	1 706	(0,36)	9 314	(0,21)	69	(0,75)
2019	375	(0,60)	7 553	(0,41)	121	(0,61)	2 226	(0,21)	67	(0,79)	418	(0,31)	8 732	(0,38)	28	(0,55)
Avg. 07-16	69		8 280		169		1 739		152		8 316		13 326		835	

Table 12 (continued)

Survey	Hairtails		Barracudas		Snappers		Groupers		Grunts		Croakers		Seabreams		P.longirostris	
1985.4	2 568	(0.67)	253	(0.66)	0	-	1 253	(0.59)	5 706	(0.70)	10 235	(0.74)	18 407	(0.44)	58	(1.00)
1986.1	15 125	(0.40)	1 019	(0.34)	36	(1.00)	411	(0.50)	2 237	(0.41)	4 649	(0.31)	9 161	(0.28)	1 483	(0.60)
1986.2	1 089	(0.39)	1 117	(0.44)	0	-	518	(0.67)	5 301	(0.41)	4 510	(0.45)	13 819	(0.28)	0	-
1989.1	9 992	(0.33)	1 936	(0.68)	0	-	580	(0.46)	3 681	(0.52)	1 395	(0.40)	11 443	(0.30)	235	(0.62)
1989.2	2 128	(0.48)	701	(0.31)	20	(1.00)	3 093	(0.92)	1 126	(0.54)	2 972	(0.44)	12 167	(0.22)	667	(0.45)
1989.3	8 488	(0.74)	704	(0.38)	0	-	660	(0.96)	82	(0.60)	595	(0.71)	4 531	(0.33)	445	(0.89)
1991.1	7 664	(0.44)	583	(0.37)	106	(1.00)	176	(0.60)	425	(0.27)	2 048	(0.50)	9 068	(0.19)	10	(0.74)
1991.2	3 174	(0.27)	82	(0.46)	0	-	1 021	(0.57)	1 882	(0.52)	20 081	(0.83)	25 675	(0.21)	117	(0.66)
1992	11 105	(0.36)	89	(0.66)	0	-	1 140	(0.53)	765	(0.58)	1 546	(0.42)	25 033	(0.26)	106	(0.67)
1994	24 185	(0.90)	4	(1.00)	262	(1.00)	417	(0.37)	68	(0.49)	10 292	(0.59)	29 548	(0.22)	168	(0.42)
1995.1	3 885	(0.26)	2 113	(0.34)	113	(1.00)	376	(0.41)	3 105	(0.70)	15 510	(0.64)	14 161	(0.28)	258	(0.56)
1996	3 443	(0.23)	946	(0.44)	109	(1.00)	690	(0.47)	3 095	(0.33)	5 866	(0.27)	18 323	(0.16)	25	(0.80)
1997.1	21 454	(0.36)	496	(0.92)	0	-	233	(0.66)	1 592	(0.79)	9 033	(0.33)	21 952	(0.35)	1 087	(0.56)
1997.2	13 839	-	0	-	0	-	1 023	-	293	-	7 099	-	31 763	-	1 265	-
1998	29 020	(0.78)	454	(0.42)	0	-	198	(0.63)	9 117	(0.48)	8 609	(0.53)	63 225	(0.72)	186	(0.51)
1999	8 210	(0.41)	1 605	(0.31)	526	(0.95)	631	(0.46)	3 289	(0.54)	9 891	(0.53)	17 435	(0.23)	9	(0.54)
2000	11 002	(0.26)	3 321	(0.34)	98	(0.76)	882	(0.45)	6 824	(0.31)	5 391	(0.24)	19 310	(0.18)	290	(0.58)
2001	5 595	(0.33)	957	(0.25)	3	(1.00)	64	(0.66)	1 329	(0.33)	1 744	(0.41)	12 617	(0.32)	198	(0.81)
2002	8 190	(0.27)	667	(0.36)	0	(1.00)	233	(0.63)	2 982	(0.31)	6 334	(0.26)	22 198	(0.36)	402	(0.52)
2003	12 067	(0.32)	480	(0.32)	44	(1.00)	702	(0.45)	8 649	(0.70)	5 369	(0.21)	5 595	(0.19)	449	(0.47)
2004	12 405	(0.53)	401	(0.43)	42	(1.00)	175	(0.51)	3 494	(0.57)	6 602	(0.67)	9 583	(0.33)	969	(0.66)
2005	31 672	(0.52)	258	(0.39)	6	(1.00)	608	(0.50)	5 980	(0.48)	5 530	(0.33)	7 752	(0.19)	50	(0.52)
2006	6 453	(0.29)	991	(0.57)	35	(1.00)	446	(0.49)	4 082	(0.50)	4 850	(0.35)	11 187	(0.19)	178	(0.63)
2007	22 472	(0.57)	749	(0.24)	31	(0.88)	491	(0.51)	9 275	(0.53)	8 081	(0.66)	8 013	(0.22)	36	(0.47)
2008	5 098	(0.38)	1 224	(0.65)	11	(1.00)	151	(0.41)	5 926	(0.57)	3 668	(0.40)	5 763	(0.19)	233	(0.61)
2009	20 812	(0.51)	152	(0.55)	124	(1.00)	192	(0.33)	4 983	(0.32)	2 104	(0.32)	7 443	(0.18)	195	(0.68)
2010	7 315	(0.24)	350	(0.44)	69	(0.43)	284	(0.47)	7 676	(0.35)	2 661	(0.32)	8 732	(0.15)	183	(0.55)
2011	4 875	(0.74)	313	(0.41)	190	(1.00)	444	(0.33)	8 638	(0.66)	6 496	(0.50)	9 550	(0.22)	24	(0.47)
2012	8 349	(0.54)	132	(0.54)	0	-	992	(0.83)	15 517	(0.70)	3 315	(0.31)	7 297	(0.15)	386	(0.72)
2013	3 707	(0.33)	1 144	(0.59)	0	-	373	(0.63)	6 362	(0.27)	3 012	(0.32)	8 380	(0.27)	103	(0.68)
2014	3 079	(0.31)	167	(0.38)	0	-	655	(0.41)	5 426	(0.35)	4 332	(0.27)	16 519	(0.31)	75	(0.87)
2015	6 828	(0.41)	472	(0.72)	0	-	74	(0.52)	9 686	(0.36)	2 770	(0.26)	7 259	(0.19)	11	(0.73)
2016	3 064	(0.32)	1 152	(0.26)	0	-	149	(0.55)	6 080	(0.45)	2 352	(0.27)	8 691	(0.22)	141	(0.44)
2019	2 671	(0.36)	303	(0.50)	0	NA	100	(0.35)	2 907	(0.51)	4 431	(0.34)	11 647	(0.18)	94	(0.77)
Avg. 07-16	8 560		586		42		380		7 957		3 879		8 765		139	

Table 12 (continued)

Survey	Ommastrephidae		Sepiidae		D.macrophthalamus		D.angolensis		U.canariensis		B.auritus	
1985,4	0	-	0		6 123	(0,82)	2 697	(0,19)	6 271	(0,94)	5 065	(0,58)
1986,1	601	(1,00)	525	(0,37)	220	(0,77)	1 314	(0,69)	2 327	(0,53)	38 045	(0,30)
1986,2	0	-	1 252	(0,53)	1 268	(0,86)	4 010	(0,24)	2 018	(0,68)	21 342	(0,34)
1989,1	1 236	(0,51)	65	(0,57)	6 498	(0,40)	956	(0,28)	885	(0,52)	15 038	(0,46)
1989,2	750	(0,30)	1 242	(0,23)	1 115	(0,56)	3 628	(0,29)	1 130	(0,51)	50 016	(0,49)
1989,3	1 476	(0,58)	124	(0,64)	1 530	(0,89)	1 667	(0,33)	0	-	37 091	(0,29)
1991,1	344	(0,37)	237	(0,27)	2 210	(0,52)	1 212	(0,24)	1 160	(0,86)	19 833	(0,35)
1991,2	693	(0,42)	561	(0,52)	17 098	(0,32)	956	(0,24)	18 422	(0,91)	1 862	(0,44)
1992	2 163	(0,21)	159	(0,60)	18 182	(0,35)	1 514	(0,19)	1 023	(0,59)	27 200	(0,67)
1994	1 041	(0,34)	1 192	(0,37)	20 365	(0,31)	2 383	(0,27)	3 280	(0,76)	2 633	(0,68)
1995,1	2	(1,00)	590	(0,28)	7 719	(0,48)	1 877	(0,47)	11 538	(0,71)	27 645	(0,35)
1996	210	(0,31)	1 392	(0,22)	11 195	(0,26)	1 546	(0,26)	1 077	(0,59)	18 842	(0,36)
1997,1	1 324	(0,28)	1 411	(0,45)	12 220	(0,62)	1 497	(0,23)	4 599	(0,37)	6 964	(0,46)
1997,2	418	-	1 251	-	24 404	-	1 260	-	4 995	-	1 953	-
1998	377	(0,38)	1 315	(0,35)	50 924	(0,89)	1 990	(0,23)	2 239	(0,48)	22 014	(0,49)
1999	201	(0,76)	307	(0,29)	5 178	(0,47)	1 163	(0,24)	7 999	(0,64)	93 522	(0,38)
2000	586	(0,36)	575	(0,29)	6 060	(0,45)	1 639	(0,35)	2 499	(0,31)	56 245	(0,53)
2001	186	(0,57)	220	(0,45)	5 680	(0,43)	1 670	(0,26)	1 076	(0,61)	41 122	(0,43)
2002	2 363	(0,41)	275	(0,37)	11 512	(0,69)	923	(0,28)	3 492	(0,33)	66 053	(0,40)
2003	489	(0,58)	370	(0,36)	557	(0,40)	1 046	(0,30)	1 001	(0,31)	38 312	(0,28)
2004	310	(0,53)	261	(0,30)	3 525	(0,75)	1 015	(0,25)	5 700	(0,75)	26 743	(0,24)
2005	233	(0,36)	768	(0,12)	879	(0,35)	991	(0,23)	2 279	(0,39)	36 621	(0,43)
2006	136	(0,31)	905	(0,27)	2 802	(0,25)	1 982	(0,23)	4 329	(0,39)	33 546	(0,51)
2007	43	(0,32)	1 195	(0,24)	1 532	(0,53)	1 312	(0,38)	5 224	(0,86)	40 402	(0,32)
2008	327	(0,28)	285	(0,27)	1 496	(0,52)	1 135	(0,20)	1 801	(0,57)	17 736	(0,23)
2009	110	(0,49)	1 018	(0,34)	699	(0,37)	1 756	(0,33)	1 419	(0,32)	22 188	(0,50)
2010	179	(0,39)	776	(0,21)	572	(0,47)	2 250	(0,24)	1 097	(0,47)	8 156	(0,41)
2011	28	(0,71)	1 280	(0,24)	497	(0,71)	2 805	(0,30)	4 003	(0,71)	10 841	(0,46)
2012	477	(0,52)	1 713	(0,20)	887	(0,73)	1 725	(0,25)	2 652	(0,37)	18 724	(0,32)
2013	130	(0,30)	655	(0,21)	2 918	(0,71)	1 990	(0,24)	1 031	(0,36)	17 728	(0,33)
2014	414	(0,51)	1 181	(0,24)	8 145	(0,62)	3 744	(0,37)	2 295	(0,38)	10 332	(0,40)
2015	258	(0,59)	400	(0,32)	962	(0,34)	2 591	(0,37)	1 233	(0,29)	17 796	(0,31)
2016	218	(0,44)	500	(0,28)	1 170	(0,56)	1 280	(0,29)	898	(0,50)	13 863	(0,50)
2019	72,3	(0,31)	1046,3	(0,24)	786,6	(0,73)	2531,2	(0,19)	1633,9	(0,48)	22994,3	(0,81)
Avg. 07-16	218		900		1 888		2 059		2 165		17 777	

Biomass estimates of the most important species and groups on the slope of the central region of Angola are presented in Table 13.

The 2019 biomass estimate of Benguela hake (*M. polli*) was 11.0 kt. This is 93% higher than the preceding 10-yr mean. The size showed a wide, continuous span from 15 cm to 53 cm, with a length of 32.0 cm.

The estimated biomass of seabream was 491 t. This is about half of the 10-yr mean, but high than in 2015 and 2016 (196 t in both years). Estimates have fluctuated considerably since 2001. In addition, most estimates have relatively high CV which suggest that the estimated biomass of seabreams is quite uncertain. *D. macrophthalamus* was the most abundant species (293 t), followed by *D. angolensis* (137 t).

The *P. longirostris* biomass estimate of 475 t is lower than the 10-yr mean of 725 t and only slightly higher than the estimate of 2016. Several estimates have very high CVs and the time series should therefore be interpreted with caution.

The biomass estimated of *A. varidens* was 1488 t and the highest in the time series. The biomass has shown an increasing trend since 2002.

The estimated biomass of the non-commercially shrimp *N. africana* was 7.1 kt and slightly higher than the 10-yr mean.

Ommastrephidae had a biomass of 123 t, which is 62% of the 10-yr mean.

Table 13. Biomass estimates (tonnes) of important species on the slope (200-800m) in central Angola. CV values are indicated in brackets

Survey	M.polli		Shrimps		Cephalopod		Sharks		Hairtails		Seabreams	
1985,4	18 790	(0,42)	2 915	(0,49)	301	(0,47)	17	(1,00)	420	(0,69)	253	(0,55)
1986,1	17 757	(0,30)	6 306	(0,29)	1 003	(0,34)	557	(0,36)	16	(1,00)	972	(0,94)
1986,2	24 611	(0,00)	13 247	(0,00)	57	(0,00)	-		498 917	(0,00)	6 446	(0,00)
1989,1	2 803	(0,55)	1 008	(0,39)	39	(0,33)	65	(0,30)	60	(0,91)	804	(0,96)
1989,2	4 940	(0,33)	1 963	(0,34)	277	(0,59)	263	(0,51)	142	(0,24)	58	(0,71)
1989,3	12 633	(0,41)	1 546	(0,23)	410	(0,34)	3 247	(0,15)	35 703	(0,01)	435	(0,43)
1991,1	11 939	(0,14)	4 950	(0,14)	315	(0,20)	732	(0,23)	2 606	(0,90)	780	(0,91)
1991,2	10 540	(0,22)	3 016	(0,23)	114	(0,35)	1 487	(0,37)	395	(0,53)	488	(0,50)
1992	6 999	(0,12)	4 436	(0,24)	189	(0,22)	2 920	(0,38)	410	(0,56)	496	(0,45)
1994	3 803	(0,31)	3 457	(0,28)	219	(0,25)	707	(0,25)	1 213	(0,36)	1 188	(0,66)
1995,1	4 391	(0,16)	4 480	(0,27)	214	(0,31)	1 216	(0,39)	1 145	(0,22)	6 264	(0,55)
1995,2	4 781	(0,16)	4 295	(0,10)	153	(0,19)	1 064	(0,19)	2 234	(0,53)	1 291	(0,29)
1996	6 440	(0,31)	6 457	(0,25)	97	(0,35)	1 581	(0,37)	244	(0,25)	1 016	(0,21)
1997,1	10 375	(0,25)	6 969	(0,15)	538	(0,27)	1 214	(0,36)	902	(0,44)	1 858	(0,50)
1997,2	8 363	(0,15)	2 690	(0,24)	166	(0,12)	42	(0,54)	1 013	(0,09)	5 045	(0,55)
1998	9 991	(0,21)	9 048	(0,16)	428	(0,33)	812	(0,25)	1 840	(0,62)	1 643	(0,47)
1999	2 995	(0,31)	1 806	(0,20)	344	(0,27)	728	(0,37)	728	(0,26)	2 900	(0,36)
2000	5 482	(0,26)	2 445	(0,18)	717	(0,21)	639	(0,29)	871	(0,39)	2 059	(0,45)
2001	4 763	(0,34)	2 575	(0,30)	623	(0,29)	818	(0,78)	297	(0,43)	767	(0,63)
2002	3 012	(0,28)	3 749	(0,25)	469	(0,27)	212	(0,38)	269	(0,23)	2 418	(0,88)
2003	7 155	(0,39)	4 087	(0,34)	420	(0,28)	104	(0,37)	178	(0,54)	606	(0,69)
2004	16 127	(0,32)	7 350	(0,17)	444	(0,36)	476	(0,63)	1 581	(0,44)	10 840	(0,88)
2005	10 074	(0,24)	7 135	(0,15)	578	(0,46)	307	(0,19)	2 655	(0,68)	6 468	(0,93)
2006	6 967	(0,31)	7 180	(0,16)	623	(0,41)	366	(0,36)	954	(0,36)	2 422	(0,81)
2007	6 947	(0,41)	8 939	(0,14)	446	(0,49)	1 054	(0,38)	185	(0,42)	808	(0,18)
2008	6 032	(0,27)	6 490	(0,13)	363	(0,40)	389	(0,56)	762	(0,21)	2 003	(0,61)
2009	5 302	(0,20)	8 079	(0,14)	644	(0,50)	1 382	(0,50)	1 947	(0,34)	168	(0,00)
2010	3 837	(0,23)	8 072	(0,22)	179	(0,17)	350	(0,52)	2 387	(0,84)	2 416	(0,48)
2011	4 318	(0,59)	4 416	(0,31)	223	(0,39)	229	(0,14)	626	(0,80)	274	(0,00)
2012	4 230	(0,40)	9 063	(0,13)	741	(0,50)	228	(0,45)	883	(0,77)	2 738	(1,00)
2013	2 836	(0,18)	9 056	(0,16)	416	(0,30)	889	(0,44)	350	(0,33)	997	(0,46)
2014	8 775	(0,26)	9 627	(0,12)	461	(0,26)	407	(0,27)	125	(0,26)	426	(0,36)
2015	7 435	(0,37)	9 136	(0,17)	243	(0,22)	477	(0,24)	499	(0,44)	1 300	(0,72)
2015	6 385	(0,21)	9 191	(0,09)	551	(0,20)	387	(0,31)	291	(0,54)	196	(0,54)
2016	6 385	(0,21)	9 191	(0,09)	551	(0,20)	387	(0,31)	291	(0,54)	196	(0,54)
2019	10 963	(0,17)	9 725	(0,08)	296	(0,26)	708	(0,26)	490	(0,50)	491	(0,33)
Avg. 07-16	5 680		8 296		438		562		759		1 048	

Table 13 (continued)

Survey	P.longirostris		A.varidens		N.africanus		Ommastrephidae		D.macrophthalamus		D.angolensis	
1985,4	886	(0,62)	942	(0,84)	714	(0,49)	0	-	39	(1,00)	215	(0,62)
1986,1	653	(0,39)	492	(0,37)	3 173	(0,51)	971	(0,37)	499	(0,93)	474	(0,96)
1986,2	0	-	0	-	0	-	0	-	6 446	(0,00)	0	-
1989,1	181	(0,54)	194	(0,46)	592	(0,75)	39	(0,33)	804	(0,96)	0	-
1989,2	505	(0,36)	228	(0,30)	1 020	(0,59)	240	(0,73)	26	(1,00)	33	(1,00)
1989,3	375	(0,14)	194	(0,28)	958	(0,41)	409	(0,34)	324	(0,50)	110	(0,94)
1991,1	204	(0,33)	653	(0,09)	3 879	(0,18)	195	(0,33)	706	(0,92)	74	(0,79)
1991,2	190	(0,25)	105	(0,62)	2 659	(0,26)	114	(0,35)	249	(0,79)	239	(0,83)
1992	610	(0,42)	366	(0,25)	3 224	(0,31)	141	(0,27)	358	(0,63)	138	(0,82)
1994	579	(0,37)	647	(0,28)	2 199	(0,44)	168	(0,25)	1 113	(0,68)	40	(1,00)
1995,1	425	(0,41)	753	(0,19)	2 460	(0,51)	30	(0,59)	6 037	(0,57)	226	(0,43)
1995,2	479	(0,19)	698	(0,10)	2 763	(0,15)	85	(0,26)	1 196	(0,32)	95	(0,63)
1996	114	(0,23)	671	(0,15)	4 971	(0,30)	41	(0,28)	974	(0,21)	42	(1,00)
1997,1	685	(0,22)	305	(0,23)	4 093	(0,28)	476	(0,28)	1 700	(0,57)	158	(0,71)
1997,2	2 679	(0,24)	0	-	11	(1,00)	134	(0,11)	4 864	(0,55)	180	(0,48)
1998	556	(0,28)	1 192	(0,45)	7 000	(0,21)	389	(0,37)	1 549	(0,51)	94	(0,98)
1999	214	(0,37)	337	(0,43)	1 206	(0,30)	315	(0,26)	2 806	(0,38)	94	(0,70)
2000	455	(0,43)	379	(0,15)	1 043	(0,40)	426	(0,25)	1 954	(0,45)	105	(0,64)
2001	186	(0,19)	456	(0,25)	517	(0,95)	339	(0,47)	663	(0,75)	102	(1,00)
2002	341	(0,54)	243	(0,21)	3 039	(0,30)	261	(0,32)	2 307	(0,97)	111	(1,00)
2003	223	(0,19)	498	(0,43)	3 284	(0,41)	409	(0,28)	514	(0,87)	92	(1,00)
2004	419	(0,48)	576	(0,17)	6 204	(0,19)	350	(0,43)	10 265	(0,99)	572	(1,00)
2005	574	(0,30)	792	(0,17)	5 640	(0,19)	536	(0,47)	6 260	(0,97)	208	(0,63)
2006	1 330	(0,60)	359	(0,14)	5 351	(0,16)	457	(0,44)	2 138	(0,98)	284	(1,00)
2007	191	(0,58)	653	(0,07)	7 913	(0,16)	138	(0,57)	612	(0,48)	196	(1,00)
2008	415	(0,59)	880	(0,11)	5 085	(0,18)	138	(0,33)	1 681	(0,92)	322	(1,00)
2009	182	(0,43)	1 290	(0,16)	6 009	(0,21)	37	(0,48)	168	(0,00)	0	-
2010	479	(0,45)	746	(0,22)	6 806	(0,25)	40	(0,55)	1 803	(0,98)	613	(1,00)
2011	319	(0,09)	619	(0,08)	3 413	(0,39)	44	(0,14)	274	(0,00)	0	-
2012	1 563	(0,25)	1 077	(0,25)	6 086	(0,18)	675	(0,55)	2 738	(1,00)	0	-
2013	1 647	(0,66)	1 418	(0,23)	5 877	(0,15)	101	(0,26)	481	(0,70)	516	(0,72)
2014	816	(0,34)	1 615	(0,17)	6 810	(0,16)	364	(0,32)	229	(0,57)	197	(0,50)
2015	616	(0,37)	1 076	(0,28)	7 304	(0,21)	105	(0,30)	1 057	(1,00)	243	(0,55)
2016	413	(0,18)	942	(0,13)	7 549	(0,11)	106	(0,40)	113	(0,93)	83	(0,63)
2019	475	(0,39)	1 488	(0,12)	7 061	(0,11)	123	(0,31)	293	(0,56)	137	(0,72)
Avg. 07-16	725		971		6 200		200		1 027		223	

3.4.3 Tombua - Cunene shelf

A total of 22 valid trawl stations were sampled the southern region of Angola, 8 on the inner shelf, 10 on the outer shelf and 4 along the slope. It should be noted that the slope is very steep, uneven and rocky in the south, making it difficult to carry out 30-minute trawl hauls.

On the inner shelf, the mean catch rate of all species (including pelagics) was 5 790.1 kg/h (Annex XII), of which the pelagic group contributed to 82%. The total catch rate on the outer shelf was 5261.6 kg/h (Annex XII), with the pelagic group dominating (79%). On both the inner and outer shelves there were some extraordinarily high catches of *Trachurus traece* and *T. capensis,* respectively, where trawling had to be stopped after a short time (Annex VIII). Consequently, the catch rates of pelagic group and carangids should be interpreted with caution. Also, the estimated proportion (%) of the other groups will be very small because of these very high catches.

Table 14 provides the catch rates by main groups. The “Other group” gave the highest catch rate (397.8 kg/h) on the inner shelf, followed by the demersal group (290.5 kg/h), cephalopods (163.9 kg/h) and sharks (14.2 kg/h). No shrimps were caught on the shelf.

On the outer shelf, the demersal group gave the highest catch rate (675.5 kg/h), followed by cephalopods and sharks with about the same catch rates (~55 kh/h).

Along the slope, the estimates are based on only 4 hauls and should therefore be interpreted with caution. The total catch rate was 3 450.7 kg/h, of which the other group contributed with 82%, sharks with 9%, demersal with 7%, cephalopods with 2% and shrimps with 1%.

Among the pelagic groups, carangids totally dominated. The catch rate of clupeoids was 160.4 kg/h. However, consisting of schooling species, this result should also be interpreted with caution. Catch rates of the other pelagic groups were insignificant.

Seabreams dominated among the demersal groups both on the inner and outer shelf, with catch rates of 216.6 and 563.7 kg/h. Croakers were caught on both the inner and outer shelf, whereas grunts were only caught on the inner shelf and hake mainly on the outer shelf. Neither snappers nor groupers were caught on the shelf.

Along the slope, the catch rate of hakes was 226.0 kg/h. The catch rate of *A. varidens* was 15.5 kg/h and only 1.0 kg/h of *P. longirostris.* No seabreams were caught along the slope.

Table 14. Mean catch rates (kg/h) of main groups (pelagic group, demersal group and deep-water species/groups on the inner shelf, outer shelf and slope in southern Angola. Number of stations per stratum are presented under main groups, and mean depth (mean d.) of the trawl stations per interval under pelagic groups (inner and outer shelf) and under the deep-water groups (slope). Numbers in brackets indicate proportion (%) of total catch

Main groups

Stratum	No. of sta.	Cephal.		Demersal		Pelagic		Sharks		Shrimps		Other		Total
Inner shelf	8	163.9	(3)	290.5	(5)	4754.5	(82)	14.2	(0)	0.0	(0)	397.8	(7)	5 790.1
Outer shelf	10	55.5	(1)	675.5	(13)	3988.8	(76)	56.1	(1)	0.0	(0)	485.7	(9)	5 261.6
Slope	4	61.2	(2)	229.3	(7)	4.6	(0)	312.4	(9)	29.6	(1)	2813.6	(82)	3 450.7

Pelagic groups

Stratum	Mean d.	Barracuda		Carangidae		Clupeoids		Hairtails		Scombrids	
Inner shelf	44.4	0.0	(0)	4574.9	(79)	160.4	(3)	3.9	(0)	1.1	(0)
Outer shelf	110.8	0.0	(0)	3984.5	(76)	2.2	(0)	1.1	(0)	1.0	(0)

Demersal groups

Stratum	Croakers	Groupers		Grunts		Hake		Seabreams		Snappers	
Inner shelf	40.8 (1)	0.0	(0)	15.3	(0)	1.2	(0)	216.6	(4)	0.0	(0)
Outer shelf	59.2 (1)	0.0	(0)	0.0	(0)	48.4	(1)	563.7	(11)	0.0	(0)

Deep-water species/groups

Stratum	Mean d.	A. varidens		Hake		N. africana		P. longirostris		Seabreams	
Slope	478.9	15.2	(0)	226.0	(7)	12.6	(0)	1.0	(0)	0.0	(0)

3.4.4 Distribution

Notice that the areas that was survey stretched from Tamboa to Cunene River. The distribution of *D. macrophthalamus* in this area is presented in Figure 43. The species was found all along the shelf of the survey area. Highest concentrations were found near Cunene River in the south.

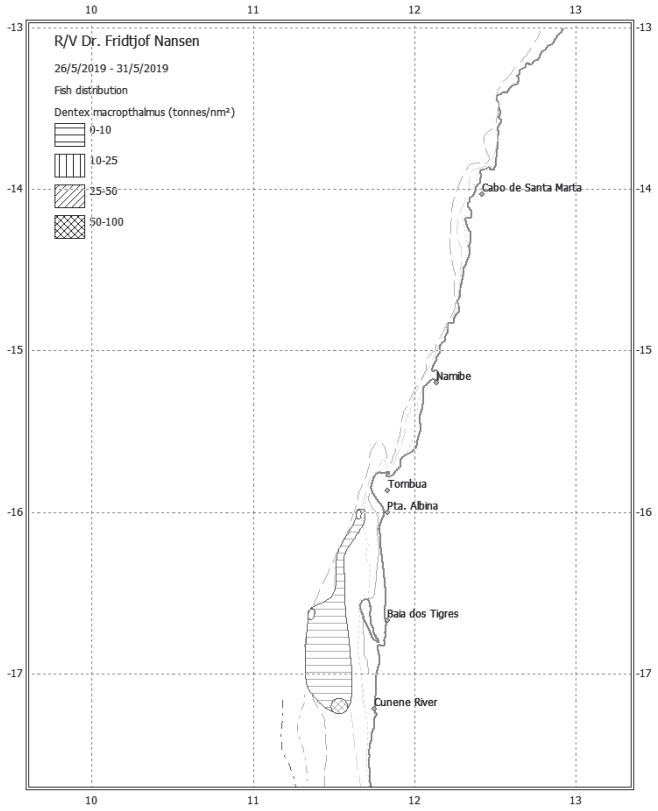


Figure 43. Distribution of Dentex macrophthalmus in the southern region of Angola, Cunene-Tombua. Depth contours at 20 m, 50 m, 100 m, 200 m, 500 m and 1 000 m.

Figure 44 shows the distribution of Cape hake (*Merluccius capensis*) and deep-water hake (*M. paradoxus*). The Cape hake was found on the outer shelf and upper part of the slope from Baia dos Tigres to Cuene River. The deep-water hake (*M. paradoxus*) was mainly found in a smaller area on the slope outside Cuene River.

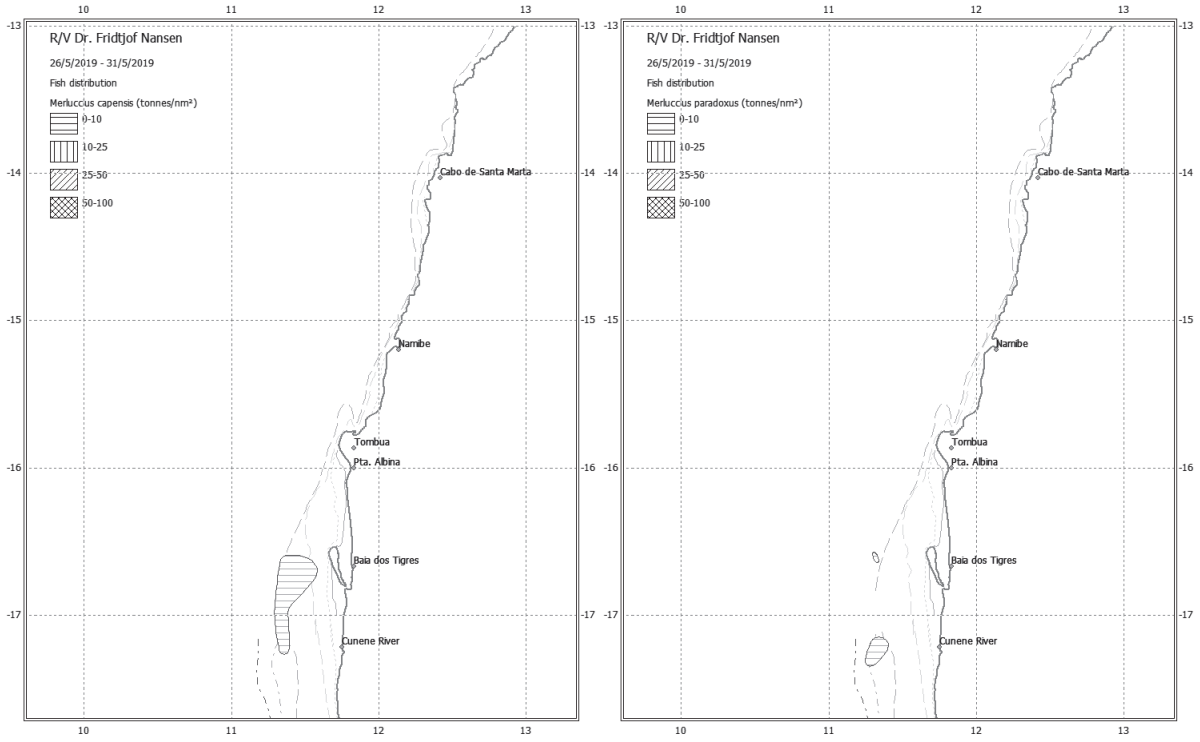


Figure 44. Distribution of Cape hake (Merluccius capensis; left) and deep-water hake (M. paradoxus) in the southern region, Tombua - Cunene. Depth contours at 20 m, 50 m, 100 m, 200 m, 500 m and 1 000 m

3.4.5 Biomass estimates

The biomass estimates of important species and groups on the shelf of southern Angola are presented in Table 15.

The total biomass of hakes was estimated at 1900 tonnes, with *Merluccius capensis* being the only species caught on the shelf. This estimate is well below the 10-yr mean of 7.4 kt. However, it should be noted that the mean estimate is largely driven by high estimates in 2009 and 2014. All specimens were larger than 23 cm and the mean length was 34.9 cm (Annex IX). In comparison, the mean length in 2013, 2014 and 2016 was 25, 26 and 29 cm, respectively. The absence of smaller individuals may indicate poor recruitment in recent years.

The estimated biomass of seabreams was 21 200tonnes, which is 47% higher than the 10-yr. mean. *D. macrophthalmus* contributed 86 % of the seabreams, and the estimate of 18 200 tonnes is 55% higher than the 10-yr mean. The mean length was 15.5 cm as compared to 9 cm in 2016. The length distribution showed two modal peaks, at 8 cm and one at 16 cm.

The estimates of canary drum (*U. canariensis)* have varied substantially over the years. Generally high CVs suggest that these estimates are uncertain. The 2019-estimate of 930 t is well above the 10-yr mean.

Table 15. Biomass estimates (tonnes) of important species on the shelf (20-200m) in southern Angola. CV values are indicated in brackets

Survey	Hake		T.treace		Horsemackerel		Cephalopod		Sharks		Clupeoids		Carangids		Scombrids		M. capensis	
1986,1	1 099	(0,32)	14 235	(0,35)	23 059	(0,26)	1 188	(0,55)	618	(0,38)	51	(1,00)	23 059	(0,26)	43	(0,58)	303	(0,79)
1986,2	3 709	(0,48)	69 542	(0,29)	78 132	(0,31)	1 555	(0,27)	2 593	(0,54)	0	NA	78 165	(0,31)	173	(0,53)	2 670	(0,66)
1989,1	349	(0,52)	2 883	(0,61)	15 681	(0,53)	776	(0,35)	188	(0,48)	0	NA	15 681	(0,53)	60	(0,45)	110	(0,42)
1989,2	1 121	(0,77)	979	(0,52)	13 706	(0,44)	6 114	(0,45)	12 200	(0,81)	0	NA	13 706	(0,44)	35	(0,62)	96	(0,44)
1989,3	6 739	NA	11 636	NA	39 225	NA	2 087	NA	551	NA	0	NA	39 225	NA	155	NA	3 861	NA
1991,1	2 920	(0,76)	21 429	(0,35)	50 458	(0,30)	732	(0,25)	4 005	(0,81)	6	(0,93)	50 459	(0,30)	106	(0,80)	2 716	(0,82)
1991,2	4 385	(0,40)	25 595	(0,33)	62 961	(0,34)	2 192	(0,93)	957	(0,31)	444	(0,95)	62 961	(0,34)	0	NA	4 378	(0,40)
1992	6 756	(0,27)	8 106	(0,50)	95 433	(0,24)	744	(0,35)	2 220	(0,38)	70	(0,91)	95 436	(0,24)	0	NA	6 684	(0,28)
1993	4 023	(0,24)	52 839	(0,52)	64 235	(0,43)	2 501	(0,44)	2 278	(0,42)	8	(0,85)	64 235	(0,43)	347	(0,61)	3 773	(0,22)
2000	3 559	(0,47)	185 345	(0,62)	218 410	(0,51)	1 934	(0,17)	2 051	(0,28)	43	(0,97)	218 473	(0,51)	28	(0,48)	350	(0,48)
2002	3 779	(0,48)	116 985	(0,71)	237 050	(0,35)	1 937	(0,57)	69	(0,55)	1217	(1,00)	237 058	(0,35)	711	(0,96)	3 779	(0,48)
2003	7 014	(0,38)	76 533	(0,44)	113 879	(0,42)	1 630	(0,47)	1 163	(0,69)	3601	(0,85)	114 293	(0,42)	546	(1,00)	6 744	(0,39)
2004	11 860	(0,38)	72 982	(0,31)	237 659	(0,47)	2 547	(0,42)	348	(0,43)	12998	(1,00)	237 659	(0,47)	5	(1,00)	11 850	(0,38)
2005	5 067	(0,39)	114	(1,00)	129 070	(0,31)	2 309	(0,36)	1 067	(0,22)	2410	(0,44)	129 088	(0,31)	1	(1,00)	5 067	(0,39)
2006	3 713	(0,23)	126 892	(0,27)	184 129	(0,28)	1 545	(0,37)	3 630	(0,77)	308909	(0,58)	184 129	(0,28)	2221	(0,98)	3 263	(0,28)
2007	3 006	(0,31)	100 468	(0,32)	107 896	(0,30)	1 459	(0,28)	2 016	(0,28)	1747	(0,44)	107 918	(0,30)	95	(0,80)	1 674	(0,45)
2008	1 722	(0,62)	169 349	(0,34)	215 813	(0,29)	3 235	(0,32)	278	(0,66)	43	(0,73)	215 813	(0,29)	1124	(0,50)	607	(0,52)
2009	31 018	(0,19)	322 270	(0,45)	322 460	(0,45)	1 017	(0,29)	271	(0,35)	2148	(1,00)	322 460	(0,45)	50	(1,00)	30 921	(0,19)
2010	2 495	(0,49)	76 870	(0,41)	286 228	(0,29)	1 732	(0,40)	190	(0,59)	100656	(0,68)	286 240	(0,29)	605	(0,61)	2 495	(0,49)
2011	4 827	(0,32)	32 076	(0,31)	104 890	(0,39)	1 683	(0,29)	2 054	(0,35)	65380	(0,53)	104 890	(0,39)	485	(0,40)	4 827	(0,32)
2012	3 551	(0,52)	29 627	(0,40)	30 978	(0,38)	1 532	(0,32)	2 616	(0,41)	27011	(0,91)	35 345	(0,45)	52	(0,82)	3 551	(0,52)
2013	2 297	(0,58)	64 782	(0,37)	74 092	(0,34)	3 410	(0,38)	1 931	(0,52)	5351	(0,49)	74 092	(0,34)	290	(0,87)	2 297	(0,58)
2014	18 432	(0,30)	72 569	(0,21)	73 178	(0,21)	4 741	(0,25)	3 233	(0,28)	2168	(0,95)	73 178	(0,21)	365	(0,78)	18 429	(0,30)
2015	3 786	(0,32)	72 897	(0,41)	84 776	(0,34)	2 116	(0,30)	3 186	(0,60)	128	(0,54)	84 776	(0,34)	16	(0,75)	3 764	(0,32)
2016	3 012	(0,57)	36 829	(0,28)	37 035	(0,28)	2 511	(0,25)	4 254	(0,44)	3213	(0,66)	37 503	(0,28)	170	(0,71)	3 012	(0,57)
2019	1 907	(0,64)	181 798	(0,37)	294 672	(0,45)	3 889	(0,51)	2 296	(0,54)	4036	(0,99)	294 866	(0,45)	77	(0,63)	1 812	(0,67)
Avg. 07-16	7 415		97 774		133 735		2 344		2 003		20784		134 222		325		7 158	

Table 15 (continued)

	Hairtails		Croakers		Seabreams		Ommastrephidae		Sepiidae		D.macrophthalamus		D.angolensis		U.canariensis	
1986,1	334	(0,51)	1 560	(0,51)	9 736	(0,20)	31	(0,38)	138	(0,49)	8 304	(0,20)	81	(0,68)	135	(0,74)
1986,2	1 694	(0,77)	3 960	(0,57)	19 201	(0,29)	0	NA	886	(0,33)	17 054	(0,32)	5	(1,00)	86	(0,82)
1989,1	965	(0,81)	1 492	(0,37)	17 853	(0,28)	61	(0,32)	159	(0,64)	17 020	(0,28)	139	(0,94)	361	(0,61)
1989,2	510	(0,58)	3 601	(0,55)	32 669	(0,26)	7	(1,00)	3 946	(0,52)	31 615	(0,26)	16	(1,00)	442	(0,45)
1989,3	1 746	NA	1 443	NA	15 594	NA	192	NA	17	NA	15 509	NA	27	NA	86	NA
1991,1	1 335	(0,40)	1 341	(0,30)	22 333	(0,20)	25	(0,65)	59	(0,38)	20 180	(0,22)	6	(1,00)	118	(0,51)
1991,2	255	(0,36)	567	(0,30)	22 536	(0,25)	25	(0,54)	31	(0,58)	21 994	(0,26)	7	(1,00)	102	(0,65)
1992	13	(0,78)	576	(0,54)	32 666	(0,32)	428	(0,64)	150	(0,39)	31 822	(0,33)	118	(1,00)	30	(0,58)
1993	361	(0,82)	2 744	(0,35)	58 399	(0,31)	145	(0,23)	182	(0,67)	57 722	(0,30)	238	(0,94)	496	(0,51)
2000	1 008	(0,86)	3 623	(0,36)	61 693	(0,56)	9	(1,00)	514	(0,20)	58 636	(0,60)	63	(0,76)	305	(0,43)
2002	0	NA	1 046	(0,65)	24 802	(0,59)	21	(1,00)	1 378	(0,71)	23 819	(0,58)	0	NA	12	(1,00)
2003	48	(0,64)	1 115	(0,23)	15 856	(0,22)	397	(0,41)	1 166	(0,64)	13 313	(0,22)	0	NA	172	(0,48)
2004	1	(1,00)	518	(0,69)	26 946	(0,41)	549	(0,47)	937	(0,89)	24 702	(0,44)	1	(1,00)	8	(1,00)
2005	274	(0,84)	6 164	(0,40)	12 654	(0,30)	1 655	(0,51)	327	(0,38)	12 121	(0,30)	221	(1,00)	330	(0,71)
2006	26	(0,95)	923	(0,32)	11 470	(0,18)	98	(0,54)	1 182	(0,48)	11 058	(0,19)	0	NA	229	(0,63)
2007	93	(0,73)	4 168	(0,66)	15 520	(0,21)	555	(0,61)	722	(0,28)	14 579	(0,22)	70	(1,00)	563	(0,54)
2008	85	(0,43)	404	(0,54)	9 147	(0,22)	6	(1,00)	1 561	(0,43)	7 276	(0,26)	113	(1,00)	44	(0,56)
2009	27	(0,42)	695	(0,40)	9 804	(0,31)	371	(0,51)	315	(0,39)	9 618	(0,31)	1	(1,00)	118	(0,71)
2010	148	(0,76)	321	(0,51)	9 218	(0,22)	46	(0,60)	659	(0,38)	8 118	(0,23)	0	NA	99	(0,83)
2011	649	(0,39)	768	(0,62)	15 964	(0,22)	57	(0,76)	305	(0,47)	15 671	(0,23)	3	(1,00)	179	(0,56)
2012	659	(0,31)	3 713	(0,93)	8 704	(0,33)	136	(0,65)	996	(0,25)	5 151	(0,42)	0	NA	13	(0,61)
2013	246	(0,61)	3 087	(0,40)	8 363	(0,28)	1 619	(0,37)	358	(0,55)	6 859	(0,33)	22	(1,00)	82	(0,45)
2014	14	(1,00)	4 050	(0,29)	25 168	(0,20)	53	(1,00)	2 103	(0,42)	17 747	(0,22)	0	NA	72	(0,54)
2015	22	(0,69)	2 326	(0,37)	29 972	(0,38)	401	(0,48)	743	(0,44)	24 526	(0,43)	0	NA	339	(0,97)
2016	137	(0,49)	3 407	(0,41)	12 822	(0,37)	251	(0,78)	1 451	(0,43)	8 311	(0,50)	0	NA	417	(0,65)
2019	115	(0,88)	3 589	(0,53)	21 278	(0,45)	273	(0,60)	376	(0,86)	18 212	(0,50)	0	NA	930	(0,97)
Avg. 07-16	208		2 294		14 468		349		921		11 785		21		193	

Estimates of croakers have varied considerably between previous surveys. The 2019 estimate of 3 600 tonnes is 57% higher than the 10-yr mean.

The biomass estimate of the Cunene horse mackerel (*T. trecae*) was 181 800 tonnes, which is almost twice as high as the 10-yr mean. However, this estimate is highly uncertain due to some very high catches in a few hauls. This also affects the group estimates of horse mackerel and carangids.

The biomass estimate of cephalopods was 3900 tonnes (10-yr mean – 2.3 kt), Ommastrephidae 273 t (10-yr mean – 349 t) and of Sepidae 376 t (10-yr mean – 921 t).

The biomass estimated for sharks (which includes Chimaeriformes) was 2 300 tonnes, which is slightly higher than the 10-yr mean.

The estimates of the pelagic groups, clupeoids, scombrids, and hairtails, are all uncertain as reflected in high CVs.

The estimates of the big eye grunt (*U. canariensis)* have varied substantially over the years. Generally high CVs suggest that these estimates are uncertain. The 2019-estimate of 930 t is well above the 10-yr mean.

Table 16 shows the estimated biomasses of different species and groups along the slope of southern Angola. The estimates are based on only 4 stations taken in three depth ranges (300-400 m, 400-500 m and 500-600 m), but are however calculated using the entire area between the 200 m and 600 m depth contour. The CV for each of the estimates is high due to the relatively low number of stations. The estimates must therefore be interpreted with caution.

The combined biomass estimated for hakes was 2 500 tonnes, which is 52% higher than the 10-yr mean. The deep-water hake, *M. paradoxus,* was the dominating species. The size distribution of the deep-water hake showed one modal peak at 49 cm. The high variability in the time series is probably a result of low sampling effort, combined with the varying environmental conditions created by the dynamic Angola-Benguela front.

The biomass of horse mackerel (*T. trecae*) has fluctuated substantially, probably because of the low number of stations and high variability in the distribution pattern of this species. The 2019 estimate was 6 tonnes.

The estimated biomass for *A. varidens* was 125 tonnes, which is lower than the 10-yr mean of 180 tonnes.

The total cephalopod biomass was estimated to 411 tonnes, which is by far the highest estimate in the time series.

Sharks biomass was estimated to 2 600 tonnes, which is the second highest in the time series, and well above the 10-yr mean of 587 tonnes.

Table 16. Biomass estimates (tonnes) of important species on the slope (200-600 m) in southern Angola. CV values are indicated in brackets

Survey	Hake		Horse mackerel		Shrimps		Cephalopod		Sharks		Seabreams		P.longirostris		A.varidens	
1986,1	2 754	(0,84)	26	(1,00)	182	(0,16)	15	(1,00)	66	(0,40)	1 261	(0,95)	0	NA	106	(1,00)
1991,1	3 285	(0,52)	62	(0,02)	47	(0,43)	43	(0,14)	463	(0,33)	325	(0,83)	21	(0,77)	0	NA
1991,2	19 798	(0,62)	549	(0,48)	0	NA	0	NA	506	(0,68)	2 669	(0,08)	0	NA	0	NA
1992	10 793	(0,82)	58	(1,00)	235	(0,88)	0	NA	49	(0,19)	2 035	(1,00)	15	(1,00)	161	(1,00)
1997,2	3 411	NA	13	NA	13	NA	0	NA	917	NA	413	NA	13	NA	0	NA
2000	3 358	(0,86)	0	NA	44	(0,84)	0	NA	73	(0,47)	0	NA	44	(0,84)	0	NA
2002	1 245	NA	0	NA	20	NA	14	NA	104	NA	0	NA	0	NA	0	NA
2003	454	(1,00)	0	NA	156	(0,91)	0	NA	226	(0,34)	0	NA	79	(1,00)	0	NA
2004	5 749	(0,53)	50	(0,62)	97	(0,40)	34	(0,93)	40	(0,97)	579	(0,57)	57	(0,75)	30	(1,00)
2005	882	(0,48)	24	(0,84)	134	(0,71)	15	(1,00)	56	(0,62)	0	NA	3	(0,55)	57	(0,87)
2006	4 507	(0,96)	169	(0,66)	72	(1,00)	0	NA	5	(1,00)	0	NA	0	NA	0	NA
2007	1 528	NA	0	NA	27	NA	0	NA	4 323	NA	0	NA	0	NA	0	NA
2008	964	(0,38)	563	(1,00)	280	(0,61)	9	(1,00)	188	(0,42)	232	(1,00)	45	(1,00)	225	(1,00)
2009	2 751	(0,69)	0	NA	705	(0,03)	51	(0,38)	192	(0,93)	0	NA	0	NA	607	(0,13)
2010	2 336	(0,36)	921	(1,00)	729	(1,00)	36	(0,55)	4	(1,00)	0	NA	0	NA	196	(1,00)
2011	3 902	(0,09)	48	(0,06)	198	(0,41)	5	(1,00)	104	(0,79)	45	(0,47)	12	(1,00)	0	NA
2012	1 959	(0,80)	0	NA	33	(1,00)	30	(1,00)	47	(1,00)	0	NA	0	NA	25	(1,00)
2013	229	(0,47)	12	(1,00)	411	(0,44)	10	(1,00)	43	(0,40)	0	NA	21	(0,86)	362	(0,55)
2014	1 666	(0,22)	22	(1,00)	80	(0,77)	62	(0,54)	116	(0,74)	6	(1,00)	0	(1,00)	66	(1,00)
2015	680	(0,53)	41	(1,00)	159	(0,60)	48	(0,54)	386	(0,69)	0	(1,00)	0	(1,00)	51	(1,00)
2016	622	(0,73)	0	NA	282	(0,93)	12	(1,00)	468	(0,95)	0	NA	0	NA	269	(0,98)
2019	2524	(0,34)	56	(1,00)	191	(0,38)	411	(0,71)	2550	(0,57)	0	NA	12	(1,00)	125	(0,55)
Avg. 07-16	1 664	0	161	1	290	1	26	1	587	1	28	1	8	1	180	1

3.5 Food safety

In the northern region of Angola (Leg 2.5), fish were sampled for analyses of food safety and parasites. The number of samples for food safety are given in Table 17, and number of samples and preliminary results from the parasite studies are represented in Table 18.

Table 17. Number of fish sampled for food safety investigations. Whole fish tissue was homogenized for all samples

Species	Station	Total number of fish
Brachydeuterus auritus	114	75
Trachurus trecae	124	75
Brachydeuterus auritus	125	75
Trachurus trecae	132	75
Pseudotolithus senegalensis	133	30
Sardinella aurita	142	90
Trachurus trecae	155	30
Trachurus trecae	157	120
Brachydeuterus auritus	169	30
Trachurus trecae	177	150

Table 18. No of fish sampled for anisakids and Kudoa spp. parasites

Species	Station	No. of fish	Tissue examined	Parasite investigated	No. of infected
Dentex angolensis	107	15	Filet/viscera	*Anisakids*	0
Dentex angolensis	116	15	Filet/viscera	*Anisakids*	0
Dentex angolensis	148	10	Filet/viscera	*Anisakids*	0
Merluccius polli	109	5	Filet/viscera	*Anisakids*	3
Merluccius polli	140	15	Filet/viscera	*Anisakids*	9
Pseudotolithus senegalensis	126	10	Filet/viscera	*Anisakids*	0
Pseudotolithus senegalensis	133	10	Filet/viscera	*Anisakids*	0
Umbrina canariensis	164	10	Filet/viscera	*Anisakids*	0
Sphyraena guachancho	104	20	Filet	*Kudoa* spp.	0
Sphyraena guachancho	134	8	Filet	Kudoa spp.	0
Sphyraena guachancho	143	22	Filet	Kudoa spp.	0
Zenopsis conchifer	108	9	Filet	Kudoa spp.	0
Merluccius polli	109	15	Filet	Kudoa spp.	4
Merluccius polli	118	15	Filet	Kudoa spp.	0
Merluccius polli	127	12	Filet	Kudoa spp.	0
Merluccius polli	150	25	Filet	Kudoa spp.	1
Merluccius polli	159	10	Filet	Kudoa spp.	0
Trachurus trecae	115	25	Filet	Kudoa spp.	0
Trachurus trecae	116	10	Filet	Kudoa spp.	0
Pseudotolithus senegalensis	126	12	Filet	Kudoa spp.	0
Pagellus bellotti	156	17	Filet	Kudoa spp.	4

CHAPTER 4. CONCLUDING REMARKS

This report describes methods and data collected during leg 2.4 (in part) and leg 2.5 by the R/V *Dr Fridtjof Nansen* in 2019. Some preliminary analyses are presented for catch rates and biomass estimates. Much of the data collected, however, will be analysed in the context of the EAF-Nansen Science Plan themes.

4.1 Hydrographical conditions

The results from this survey reflect typical seasonal conditions during May-June. As the southeasterly trade winds intensify off Namibia, the Angola-Benguela Front retracts northwards. The oceanographic conditions observed off the Cunene River (17 15 S) were typical to the northern Benguela upwelling, whereas those off Namibe (15 10 S) where dominated by the southward advection of tropical water. The presence of the two opposite flowing currents implied a confluence and frontal zone formation between them. However, over the region covered with this survey, limited to inner continental shelf waters, the presence of this confluence was not observed.

Light winds and conditions typical to remotely forced upwelling dominated in observations from the central and northern Angola. Internal waves, observed in the central regions, further enhanced intensity of this form of upwelling. Coastal currents were generally alongshore oriented northward. The periods of the northward flow observed during most of the survey were interrupted by the two "Angola Current Episodes" when the current turned abruptly southward and persisted for the next two-three days. Associated to one of those reversals (on 9 June) was a formation of an offshore filament characterized by enhanced primary productivity.

The current observations in the upper 350 m across the Congo River Canyon (in the Democratic Republic of the Congo) disclosed a layered circulation pattern with currents flowing into the Canyon below 100 m depth and flowing out of it above this level.

4.2 Biomass estimates

4.2.1 General trends

The Angolan shelf and slope waters harbour a great diversity of fish and invertebrate marine species, which on their own have a relatively low biomass, but together form an important fishery. Abundance trends of stocks with low and patchy densities may show great variability from year to year due to relatively low sampling frequency and large variability in catch rates that consequently are reflected in high coefficients of variability (CV) of the biomass estimate.

4.2.2 Seabreams

Seabreams is one of the most important commercial demersal fish group in Angola. The biomass estimate for the northern and central regions in 2019 was 30 500 tonnes. This is 34%

higher than the 10-yr mean and the second highest in the preceding 10 years. As in previous years, *D. angolensis* was the dominant seabream species on the shelf in the northern and central region, whereas in the southern regions *D. macrophthalmus* dominated.

4.2.3 Hakes

M. polli was mostly found in juvenile stage on the shelf of the northern and central regions. The total biomass estimate of *M. polli* on the shelf and slope of northern and central regions was 16 500 tonnes, which is 55% higher than the 10-yr mean and the highest during the preceding 10 years. The size distribution of the central-northern stock was wide, with the majority measuring between 15 cm and 55 cm. The total biomass of hakes on the southern shelf was 1 900 tonnes, which is well below the 10-yr mean of 7 400 tonnes. *M. capensis* was the dominating species.

4.2.4 Shrimps

The two commercially important shrimp species *P. longirostris* and *A. varidens* are caught in higher numbers in the northern and central regions compared to the southern region. *P. longirostris* is mainly distributed on the upper slope and *A. varidens* on the lower slope. The 2019 biomass estimate of *P. longirostris* was 2 100 tonnes in the northern and central regions, which is slightly higher than the 10-yr mean of 1 900 tonnes. The estimated biomass of *A. varidens* was about 2 500 tonnes. This is 55 % higher than the 10-yr mean.

4.2.5 Grunts

The biomass estimate of grunts (*Pomadasys incisus*, *P. jubelini*, *P. rogeri* and *P. peroteti*) in the central and northern regions was 6.4 kt. The 2019 the biomass estimate of big -eye grunt (*B. auritus*) in the central and northern regions was 33 600 tonnes, which corresponds to 76% of the 10-yr mean.

4.2.6 Croakers

The estimated biomass of croakers in 2019 was 10 000 tonnes in the central and northern regions. This is slightly higher than the 10-yr mean of 9 200 tonnes *U. canariensis* was the most common croaker in the central and northern regions and contributed 42% to the total croaker biomass. The 2016 estimate of this species was 4 100 tonnes, which is slightly lower than the 10-yr mean of 4 800 tonnes.

4.2.7 Groupers and snappers

The trend in the biomass of groupers has been decreasing over the time series. The 2019 survey gave an estimated biomass of 651 t, which is lower than the 10-yr mean of 817 t. Groupers are coastal dwellers and prefer rocky habitats that are more difficult to sample with a bottom trawl. Furtehrmore, their entire distribution is not covered, and the biomass estimates of this group may not adequately reflect the state of these resources.

As in 2019, only few snappers were caught. This group of fish are rarely caught as also are they rocky dwellers, hence the biomass estimates of snappers may not adequately reflect the state of the stock.

CHAPTER 5. REGIONAL SYNTHESIS

5.1 Merluccius capensis

Cape hake occurred from Cape Town to northern Namibia. The trawl data, with all size classes aggregated, indicate three possible separate stocks; off central Namibia, the Orange River basin and southwards and off Cape Point (Figure 45).

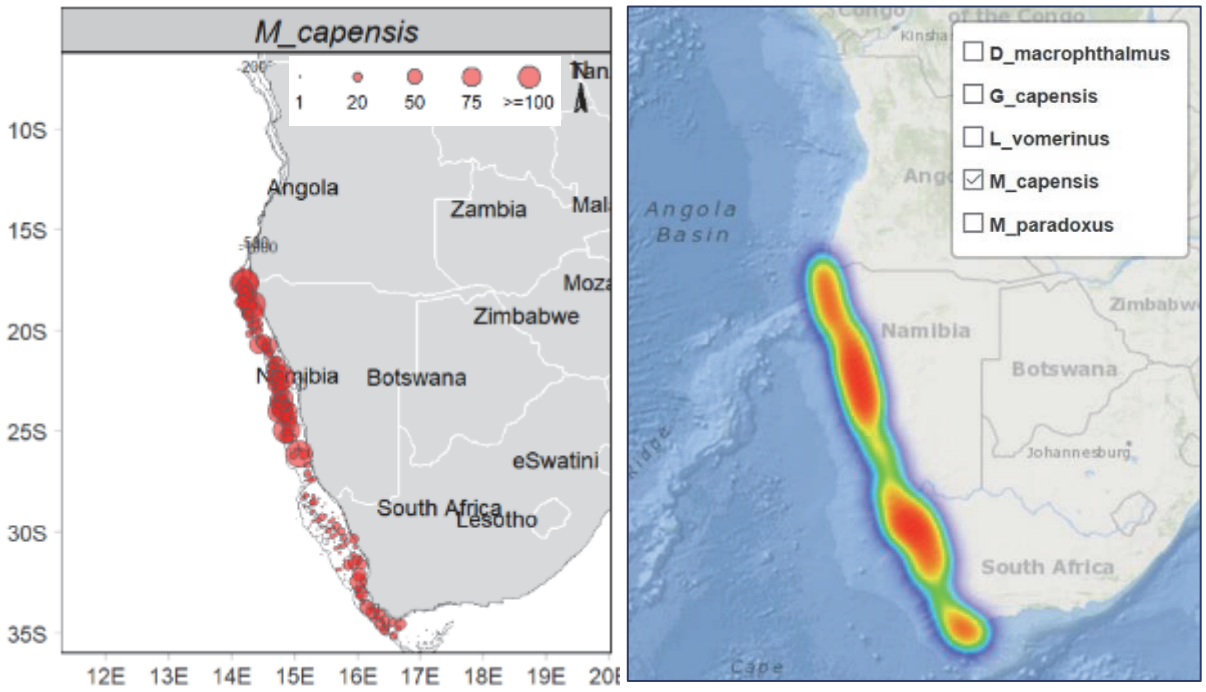


Figure 45. Distribution map for *Merluccius capensis* showing trawl catch rates (CPUE) in tonnes/NM^2 (left panel) and as a density heat-map (right panel)

Presenting these data in 10 cm length-classes (Figure 46) seems to support the pattern of three separate stocks. The smallest fish, in the <10 cm length-class (upper left panel), were found in small areas at the core of these three distributional areas (central Namibia, the Orange River basin and off Cape Point). As the fish grow/age these areas expand, until by the time the fish are in the 31-40 cm length-class the distribution is widespread throughout the area from Cape Point to the Cunene River (top right and middle panels). However, even at this stage there still seems to be a separation between the areas, although it would seem entirely possible that there is a transfer of fish between areas. The older fish, >41 cm (two lower panels), then seem to return to the core of these three areas, although these larger fish were less common off Cape Point.

Note that a single trawl in Angolan waters, offshore of Baia dos Tigres, contained a small quantity of *M. capensis* (5 kg/NM^2) in the size range 21-55 cm. Hence, based on these data, while technically this may qualify this species as shared with Angola, for management

purposes this would not normally be considered, especially if such low densities in Angolan waters are recorded in other surveys.

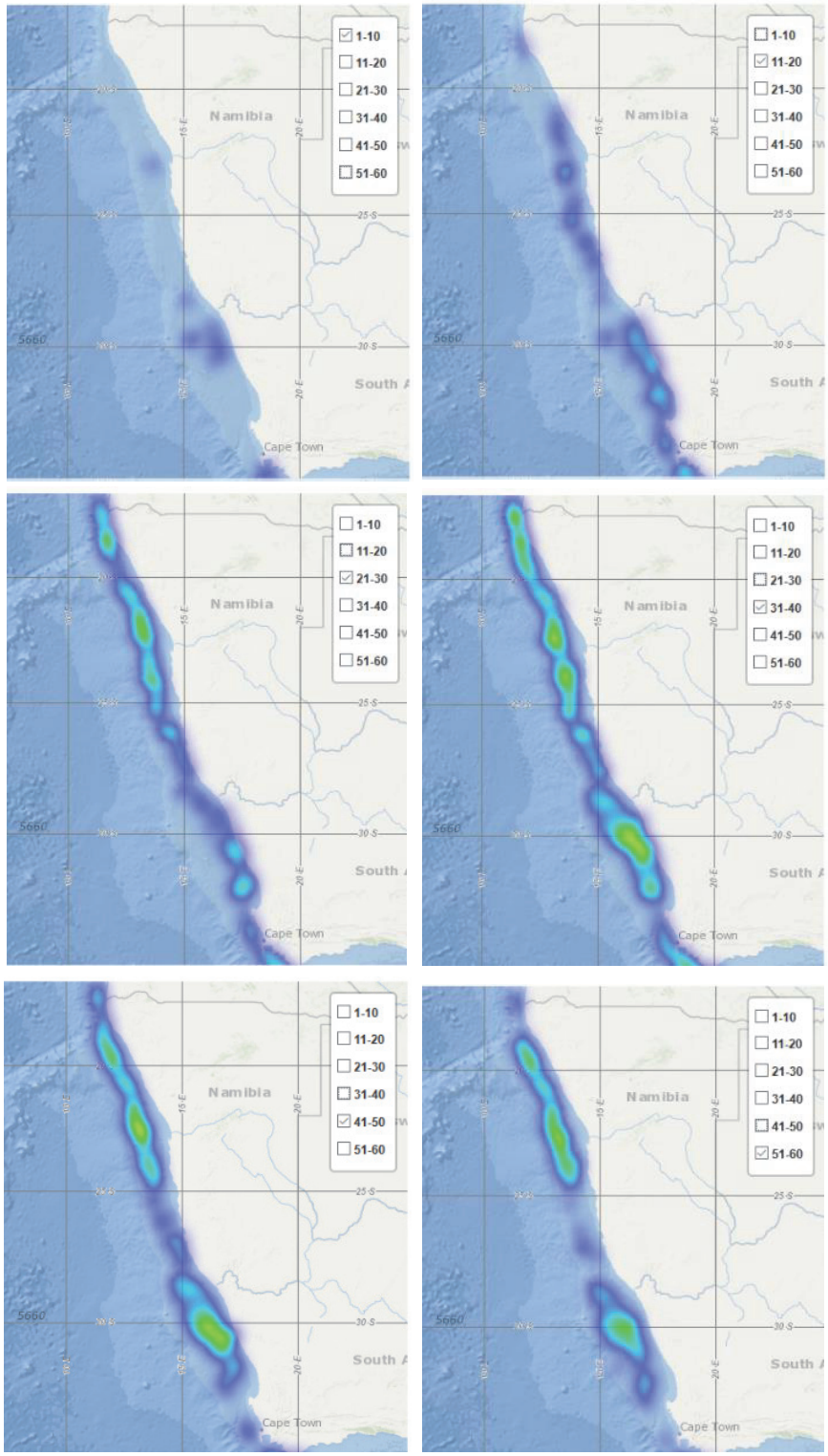


Figure 46. *Merluccius capensis* distribution in 10 cm length classes. Base map data sources: GEBCO, NOAA, CHS, OSU, CSUMB, National Geographic, DeLorme, NAVTEQ and Esri

In summary, the data collected during the March-May 2019 surveys would seem to lend some support the hypothesis that Cape hake occur as three stocks. The two southernmost areas seem to be essentially within the South African EEZ while the northern area is entirely within the Namibian zone, hence any issues of managing shared stocks may not be a concern of this species. However, more data are needed to properly assess the stock structure and migration of this species.

5.2 Merluccius paradoxus

Deepwater hake occurred from Cape Town to northern Namibia. The trawl data, presented with all size classes aggregated, suggest that this constitutes a single stock (Figure 47).

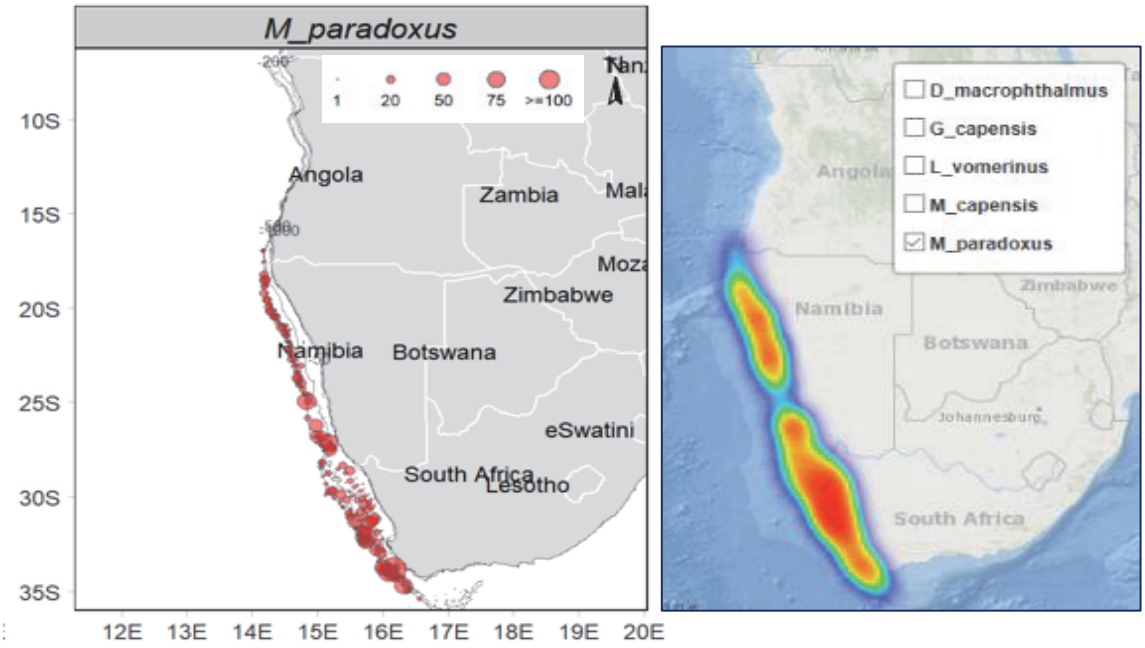


Figure 47. Distribution map for *Merluccius paradoxus* showing trawl catch rates (CPUE) in tonnes/NM^2 (left panel) and as a density heat-map (right panel)

When the data are analysed in more depth, by length-classes (Figure 48), a clear migration pattern emerges. All small fish, less than 11 cm, were found in South African waters, widespread between the Orange River and Cape Columbine. As the fish grew they dispersed both northwards and southwards, although few fish in the size class 11-20 cm occurred north of the Orange River border. Fish larger than this were widely spread throughout Namibia and the South African West coast.

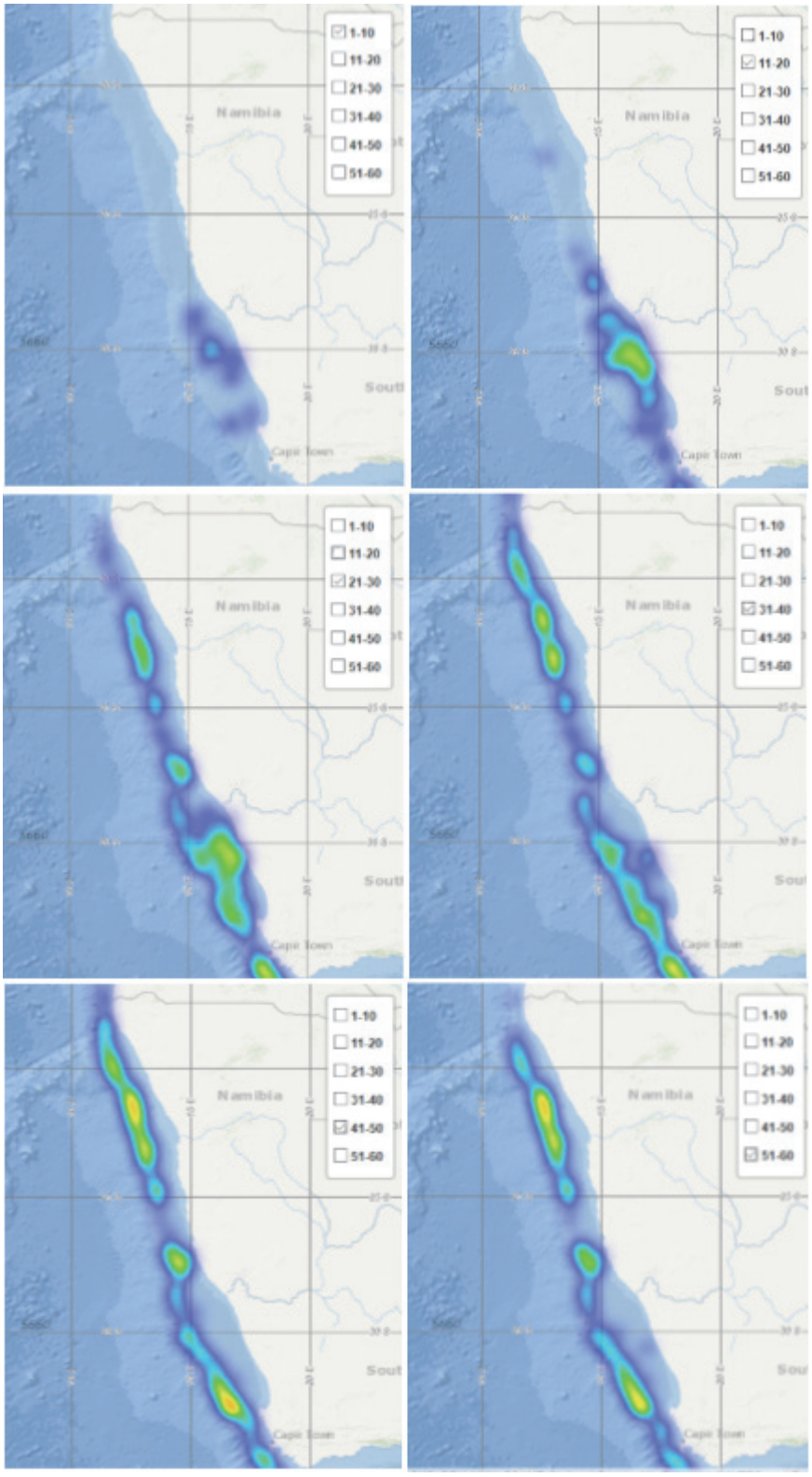


Figure 48. *Merluccius paradoxus* distribution in 10 cm length classes. Base map data sources: GEBCO, NOAA, CHS, OSU, CSUMB, National Geographic, DeLorme, NAVTEQ and Esri

This is consistent with the theory that *M. paradoxus* spawns in South Africa and then disperses into Namibia as the fish grow. However, the theory also predicts that larger fish migrate to the spawning grounds in South Africa. These data show no evidence of this.

Note that three trawls in Angolan waters, all offshore of Baía dos Tigres, contained small quantities of *M. paradoxus* (between 2 and 5 kg/NM^2) in the size range 31-55 cm. While technically this may qualify this stock as shared with Angola, for management purposes such low rates of movement across the border would not normally make shared management protocols necessary. However, more data need to be analysed to ascertain whether these densities in Angola rates are typical.

In summary, the data strongly support the hypothesis that deepwater hake occur as a single stock in the Benguela region, shared between Namibia and South Africa. It would therefore seem important for the long-term sustainability of the stock that ongoing efforts are strengthened for collaborative research and management between these countries.

5.3 Kingklip

Kingklip occurred from Cape Town to central Namibia. The trawl data, with all size classes aggregated show no clear patterns within this area of distribution beyond a dense region around 30°S to 33°S and decreasing densities to the north and south of this (Figure 49).

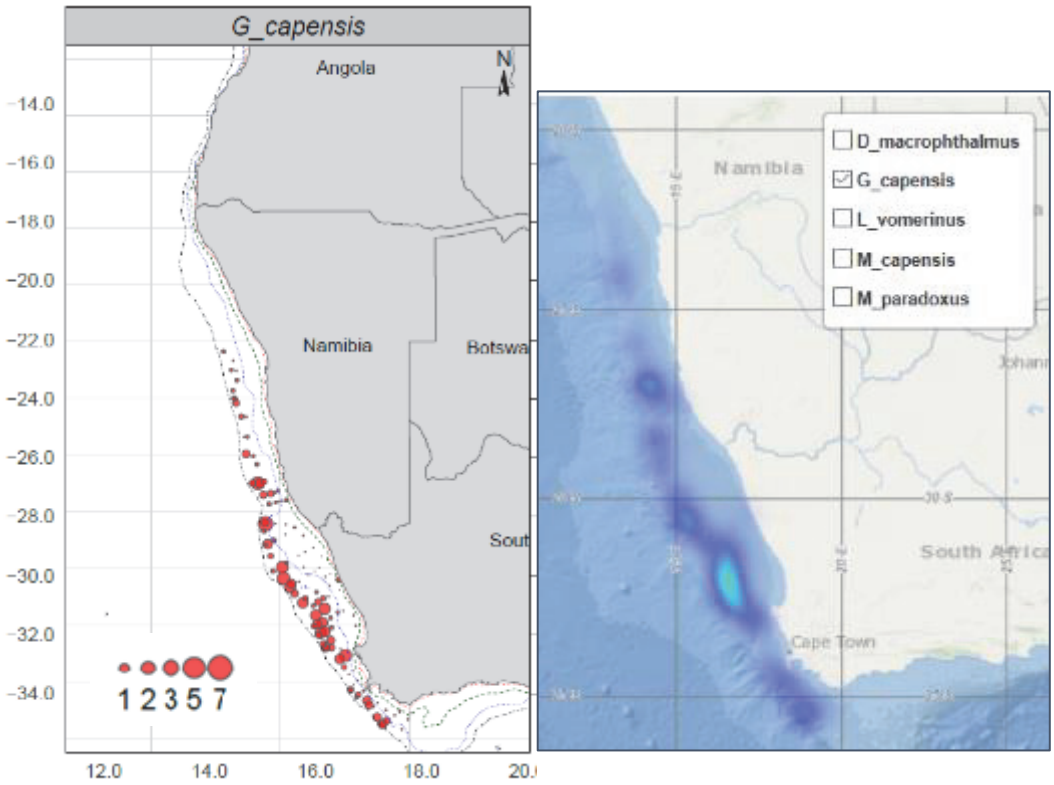


Figure 49. Distribution map for *Genypterus capensis* showing trawl catch rates (CPUE) in tonnes/NM^2 (left panel) and as a density heat-map (right panel)

When the data are presented in 10 cm length-classes (Figure 50) several possible patterns emerge. The smallest fish captured, in the 11-20 cm length-class, were found off the Orange River. By the time the fish had grown to 21-30 cm and 31-40 cm a second area, off Cape Point, was evident, suggestive of that the Orange River may be a spawning and/or recruitment area, some of these fish then recruiting to Cape Point. By the time the fish reached 41 cm and larger the population had expanded into the central West Coast region and also northwards into central Nambia. This species, based on the limited evidence presented here, appears to be a shared stock, albeit mostly occuring in South African waters.

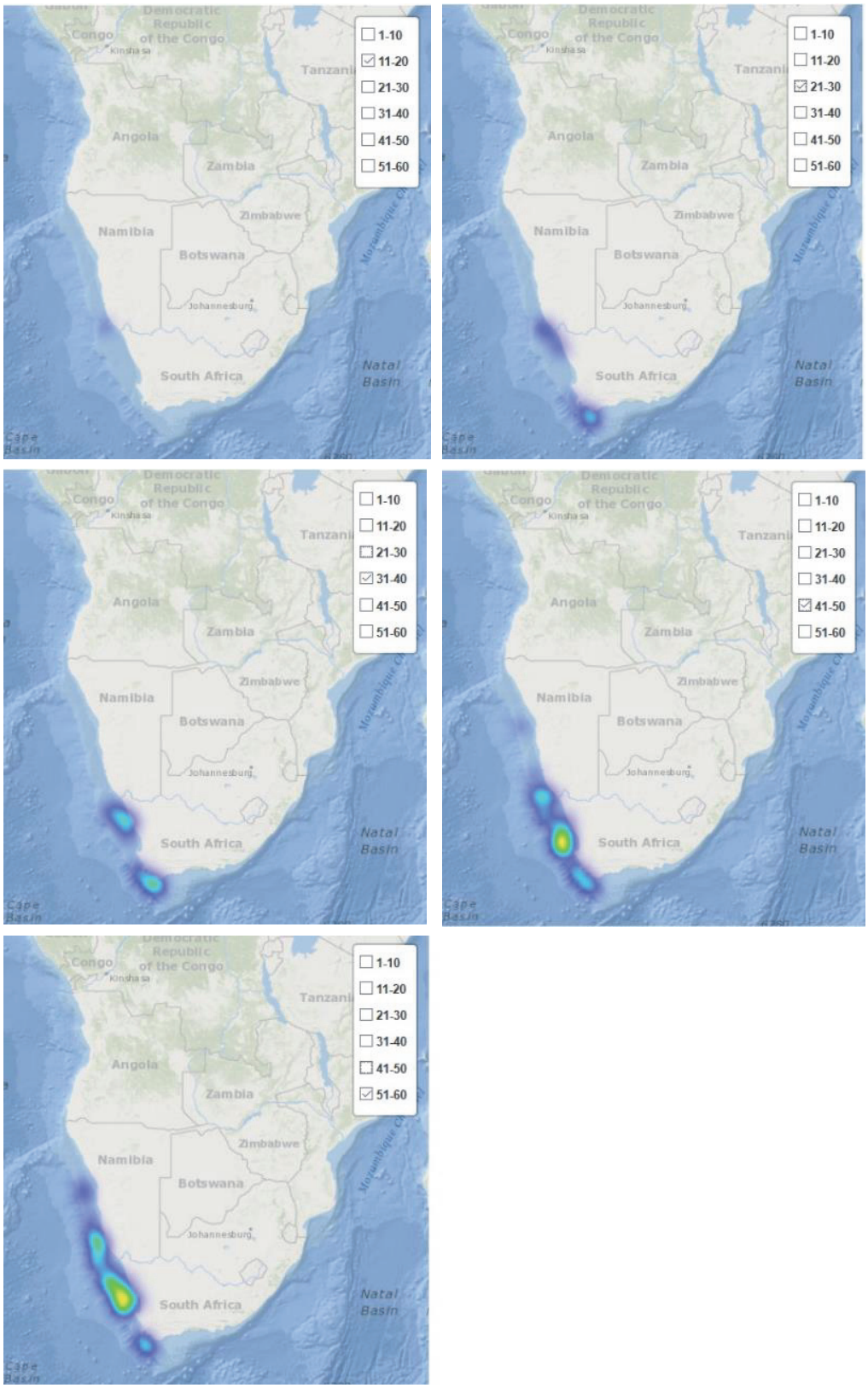


Figure 50. *Genypterus capensis* distribution in 10 cm length classes. Base map data sources: GEBCO, NOAA, CHS, OSU, CSUMB, National Geographic, DeLorme, NAVTEQ and Esri

5.4 Monk

Monk seems to have a continuous distribution from Cape Town to northern Namibia, although a lower density around the Lüderitz upwelling cell could indicate some stock separation (Figure 51).

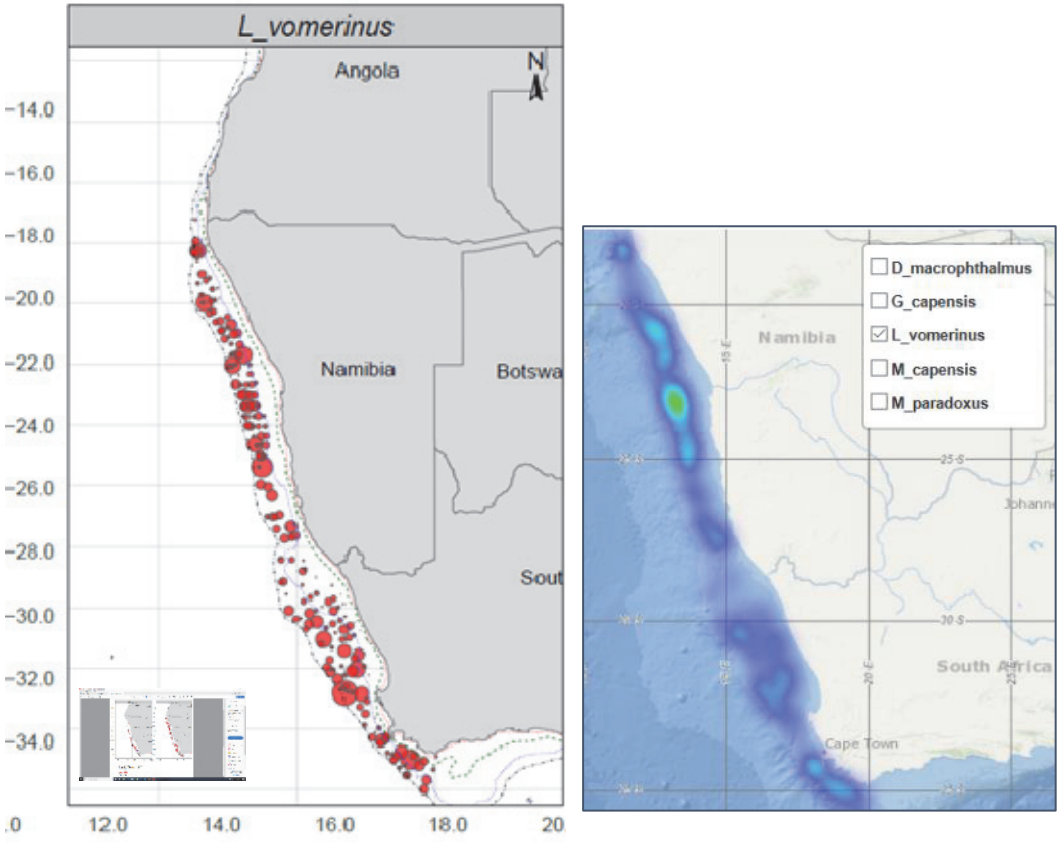


Figure 51. Distribution map for *Lophius vomerinus* showing trawl catch rates (CPUE) in tonnes/NM^2 (left panel) and as a density heat-map (right panel)

When the data are presented in 10 cm length-classes (Figure 52) two possible zones of recruitment seem to be present; one in central Namibia and a second off the South African West coast (upper two panels). These expand as the fish mature, with monk greater than 31 cm found throughout the Namibian and South African coasts. Whether this expansion of range results in a mixing of fish from these two recruitment areas, and hence this represents a single stock, is of course unknown. As this has consequences for management of this species further investigation should be undertaken.

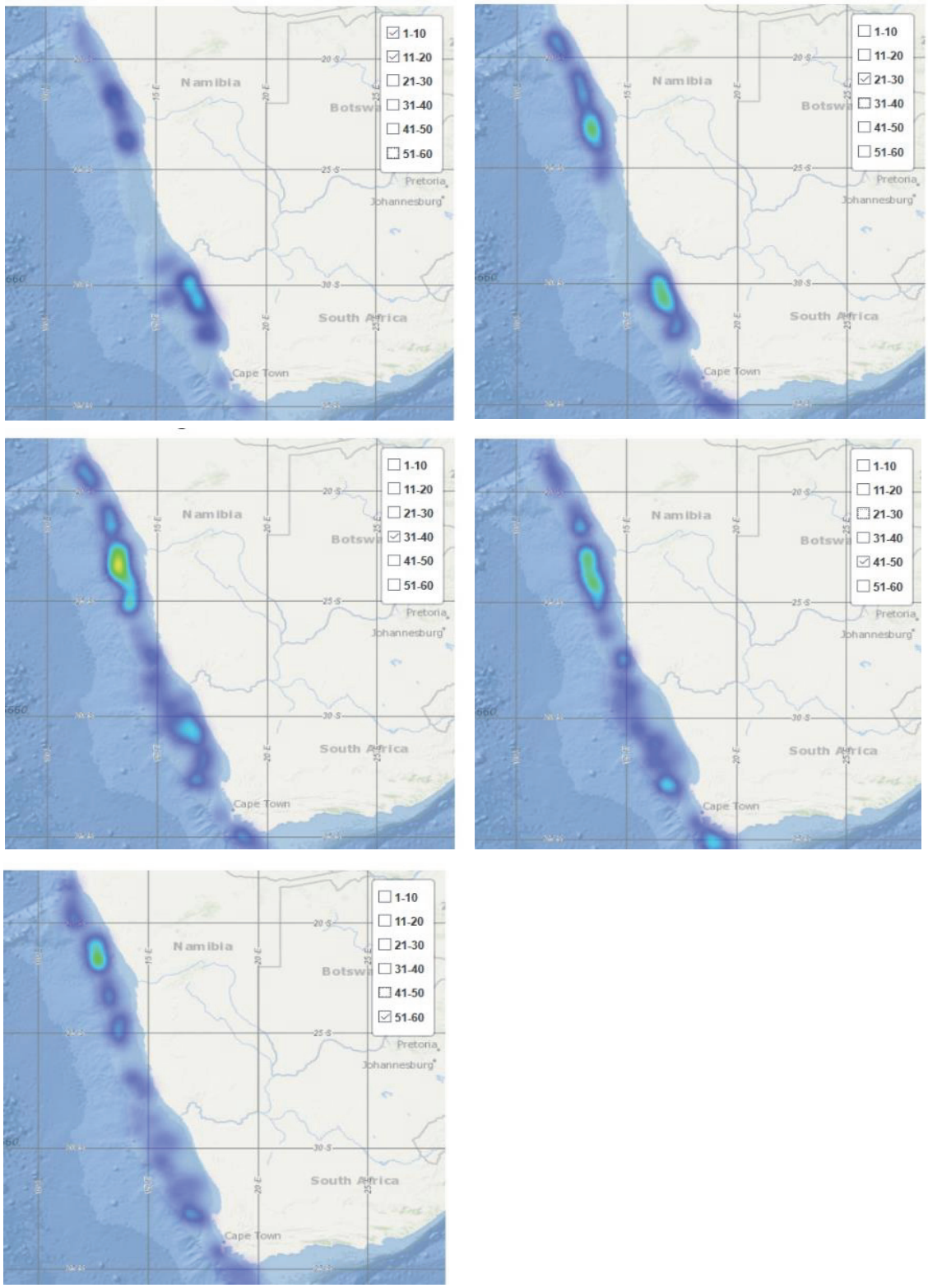


Figure 52. *Lophius vomerinus* distribution in 10 cm length classes. Base map data sources: GEBCO, NOAA, CHS, OSU, CSUMB, National Geographic, DeLorme, NAVTEQ and Esri

5.5 Dentex

The large-eye dentex (*Dentex macrophthalmus*) occurred from the coast line up to 300 m along the Angolan coast as far north as Luanda. The highest concentration was observed in the southernmost part of Angola and northern Namibia, indicating that the species is not only typical of the Benguela System, but clearly has a transboundary distribution (Figure 53).

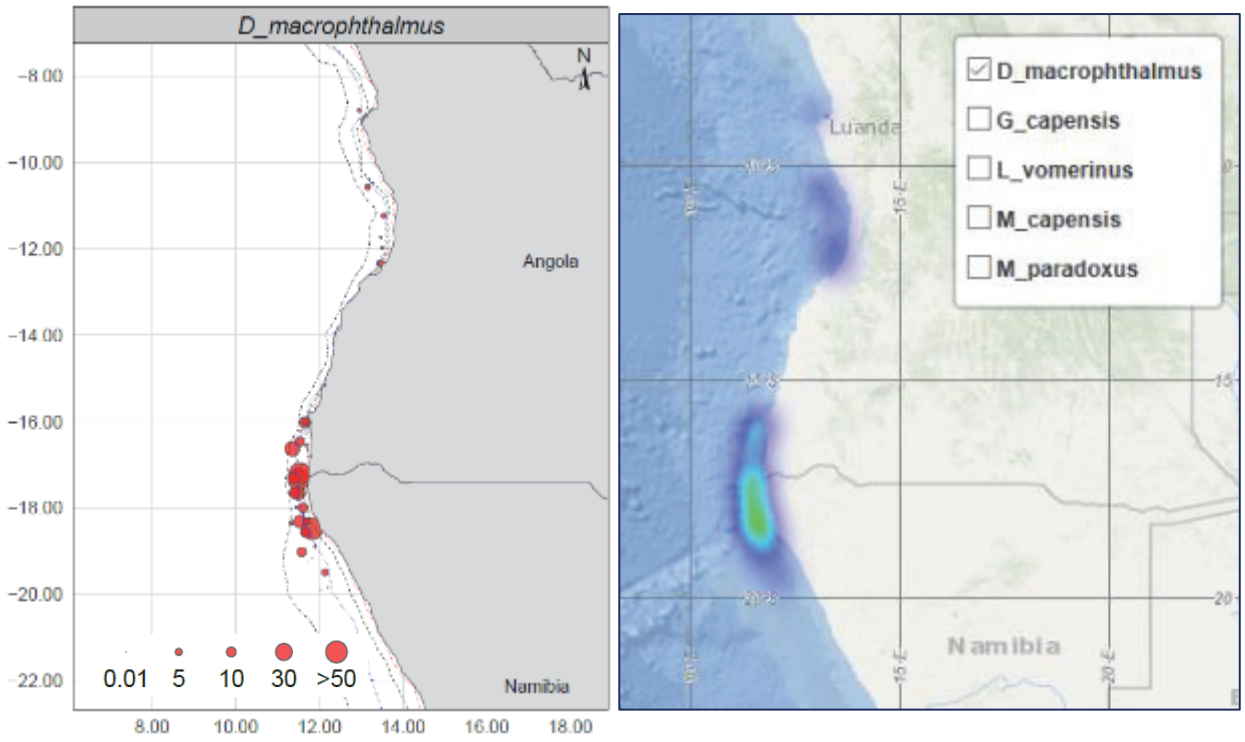


Figure 53. Distribution map for *Dentex macrophthalmus* showing trawl catch rates (CPUE) in tonnes/NM^2 (left panel) and as a density heat-map (right panel)

The CPUE data are presented in 5 cm length-classes (Figure 54, note that other species are presented in 10 cm length-classes). The smallest fish, less than 15 cm (upper left and central panels) were only observed in northern Namibia and the southern part of Angola. As the fish became larger greater and greater densities occurred in central Angola, and less in southern Angola and northern Namibia (top right panel and left and central panels in middle row). Virtually all the fish occurred off central Angola by the time they had reached 31 cm, although at a low density.

This pattern could indicate that the northern part of the Namibian coast and southern Angola is a nursery area for Dentex, with larger fish migrating northwards as they grow. These data do not suggest that large fish return southwards to spawn in the nursery area. Further analysis of these and other data are needed to investigate how the young fish arrive at the nursery area.

Large-eyed dentex is an important target fish species for the artisanal and industrial fisheries of Angola. If Namibia were to start encouraging harvesting of dentex, then this could have an important impact on the sustainability of this transboundary stock. Hence understanding the dynamics of any cross-border movements is important.

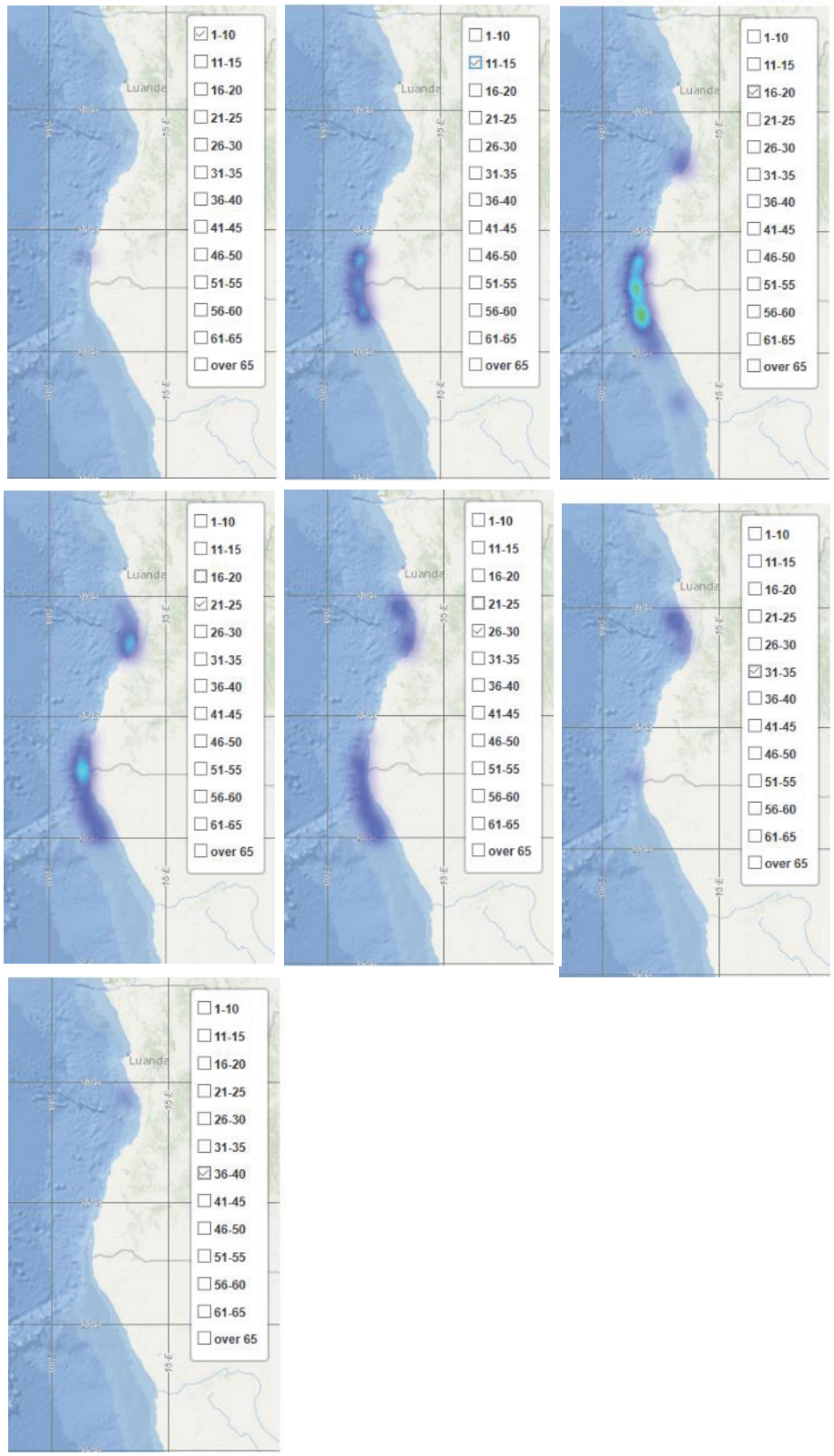


Figure 54. *Dentex macrophthalmus* distribution in 5 cm length classes. Base map data sources: GEBCO, NOAA, CHS, OSU, CSUMB, National Geographic, DeLorme, NAVTEQ and Esri

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ANNEX I. CTD BOTTLE DEPTHS AT SUPER STATIONS

Shallow stations with depth 30 m	Intermediate stations with depth 100 m	Deep stations with depth 500 m
25	100	500
5	75	400
*FLU max	50	300
	25	200
	5	150
	*FLU max	100
		75
		50
		25
		5
		*FLU max

ANNEX II. 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	43-3087*	SBE 43 7000m	21.07.2017
Oxygen Sensor	43-3525*	SBE43 7000m	02.02.2019
Submersible pump	05-2147	SBE 5T	2014
Submersible pump	05-4196	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	08.2005
Par sensor	1123	PAR-LOG ICSW	12.10.2017

*Oxygen sensor SBE 43-3087 was removed after station 608 and replaced with SBE 43-3525

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
Fluorometer	257S	9702011 WETStar	20.04.2015	02.01.2019

Thermosalinograph sensors 6 m water dropkeel

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)	878	SBE38	31.03.2016	04.04.2019

pH and total alkalinity samples were measured in triplicate:

Parameter	Sample count	Standard Deviation
pH	296	0.003
Total alkalinity	296	2.16
Nutrients	387	N/A

*Erroneous values removed

Fluorometric standard measurements were performed to quality check chlorophyll a measurements:

Parameter	Low Standard	High Standard
Standard Measurement Count	8	8
Standard Average	492	4242
Standard Standard Deviation	7	63
Standard Average Drift	-3	-60
	Collected	**Measured***
Chlorophyll a	107	50

*Because of a lack of personnel on board with laboratory experience, only 50 of the 107 samples collected were measured before the samples exceeded their shelf life for quality.

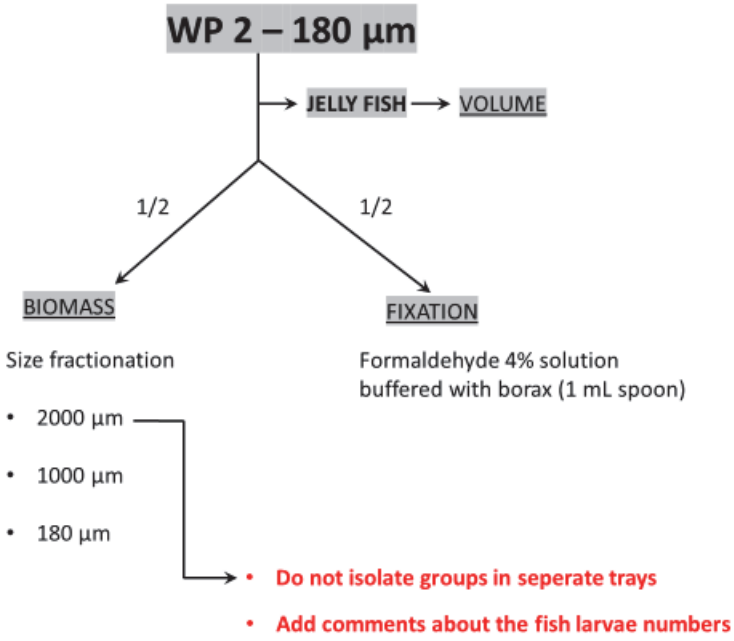
CTD dissolved oxygen and salinity value validity statistics

Parameter	Sample Count	Offset from factory calibration
Dissolved Oxygen	28	-1.6%*
Salinity	0	**

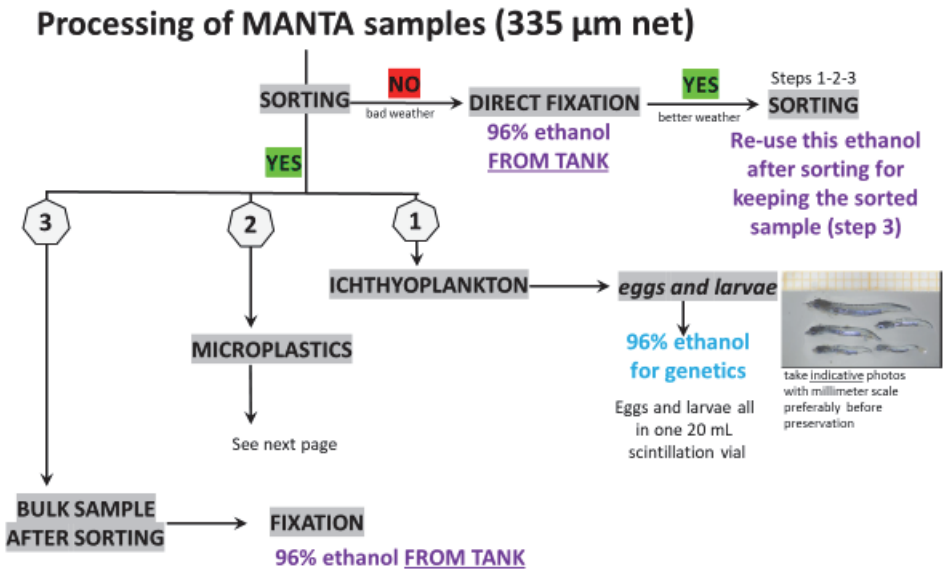
*Oxygen sensor SBE 43-3087 was removed after station 608 and replaced with SBE 43-3525. The offset data presented here is for sensor SBE 43-3525. The sensor change is documented but titration data for SBE 43-3087 during 2019406 cannot be found at the time of this writing. However, titration data from 2019405 does show a possible 15% offset, which would give statistical reasoning for the sensor change.

**The salinometer was unoperational during the survey and thus, no samples were collected for salinity sensor validations

ANNEX III. OVERVIEW OF SAMPLING PROCEDURES IN THE PLANKTON LAB

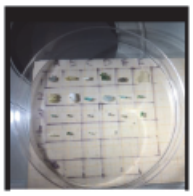


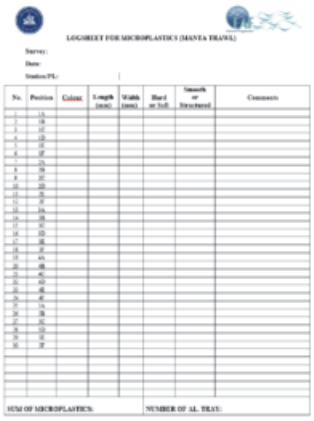
All manta samples should be sorted on board
Sorting of manta samples can be done even after preservation



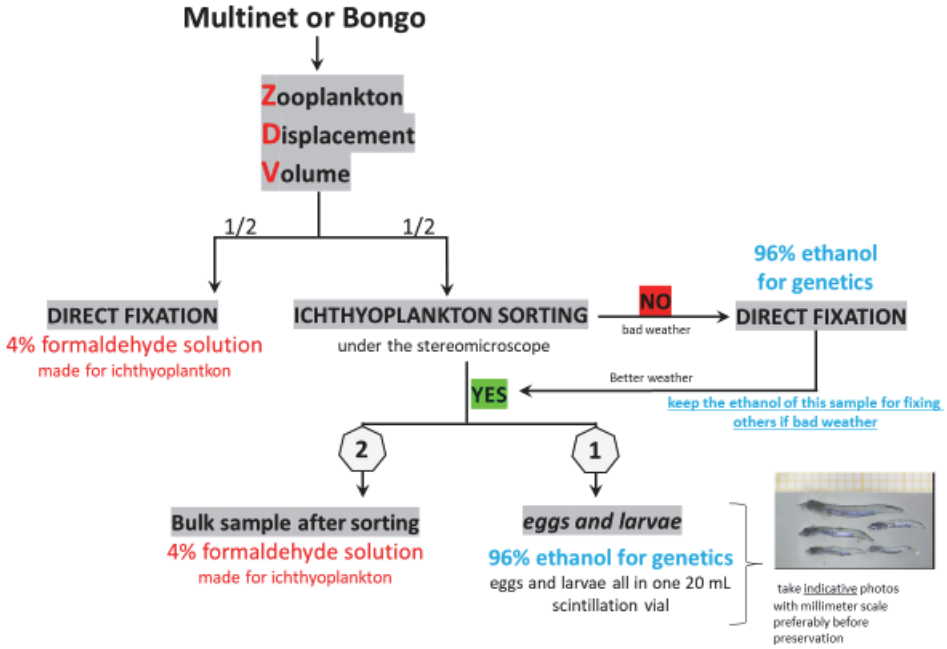
Microplastics

1. Put the sorted items in a small petri dish with **fresh water**
2. Put a **lid (labelled with station number)** and keep it safe until processing (you may do it the day after)
3. Place the items on a gridded petri dish
4. Take a photo of the entire dish with the **millimiter paper** below
5. Measure the dimensions of each item and fil the loghseet
6. Pour all items in the aluminum tray with fresh wáter
7. Put the tray in the oven 60° to dry (away from the fan)
8. Cover **individually** each try with aluminum foil and put it in the box in freezer





Processing of ichthyoplankton samples (405 µm net)



Zooplankton Displacement Volume (ZDV)

- Pour the sample into a 250 or 500 ml graduated cylinder (depending on the volume of plankton present)
- Fill up the cylinder with **sea water** up to max (250 or 500 mL)
- Pour the sample through a 180 um sieve, and collect the sea water in a second cylinder to measure its volume

  Allow the sample to drain well before measuring the volume of water!
  Do not add extra water to rinse plankon any remainings in the cylinder!

- The difference between the two volume measurements is the Zooplankton Displacement Volume. Note it down in the comments of the sampling logsheet
- **Collect all the zooplankton**, both form the seive and the remainings in the first cylinder and continue with the SAMPLE PROCESSING

ANNEX IV. DESCRIPTION OF ACOUSTIC 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 conducted 11'th and 12'th May in Walvis Bay at 20 m bottom depth 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
Absorption coeff.	8.3 dB/km
Pulse duration	medium (1,024ms)
Bandwidth	2.43 kHz
Max power	2000 Watt
2way beam angle	20,6dB
gain	26,62 dB
SA correction	0.03 dB
Angle sensitivity	21.9
3 dB beamwidth	6.25º along ship
	6.38 athwart ship
Alongship offset	0.01º
Athwardship offset	0.06º

Bottom detection menu Minimum level 50 dB

Fishing gear

The vessel has one small four-panel Åkrahamn pelagic trawl, one MultPelt 624 trawl (Figure IV.1, new in 2017) and one ‘Gisund super bottom trawl’. The Gisund trawl was the only gear used during the survey.

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 m2 and weigh 2000 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.

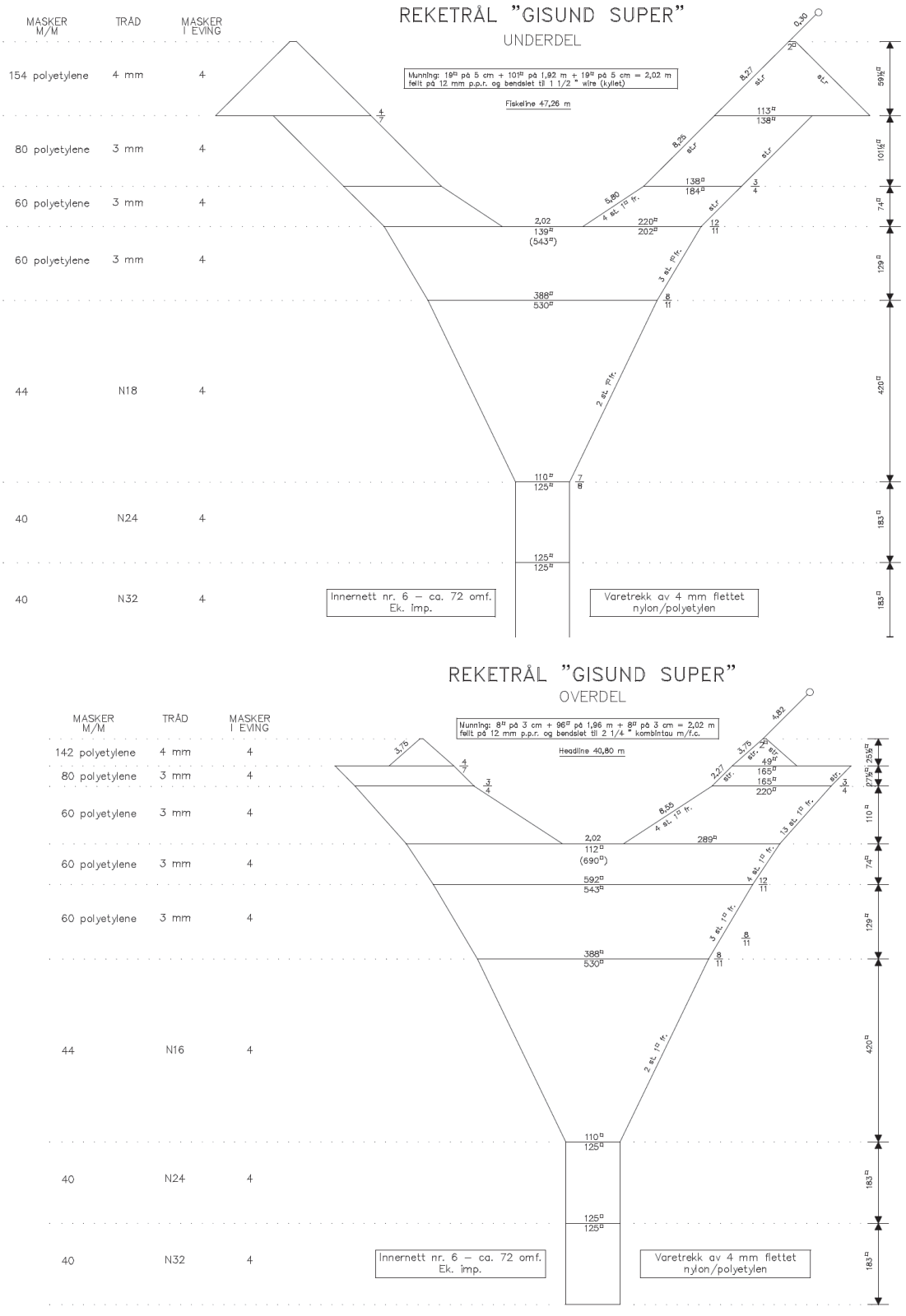


Figure IV.1. Schematic drawing of the Super Gisund bottom trawl

ANNEX V. BIOLOGY SCALES

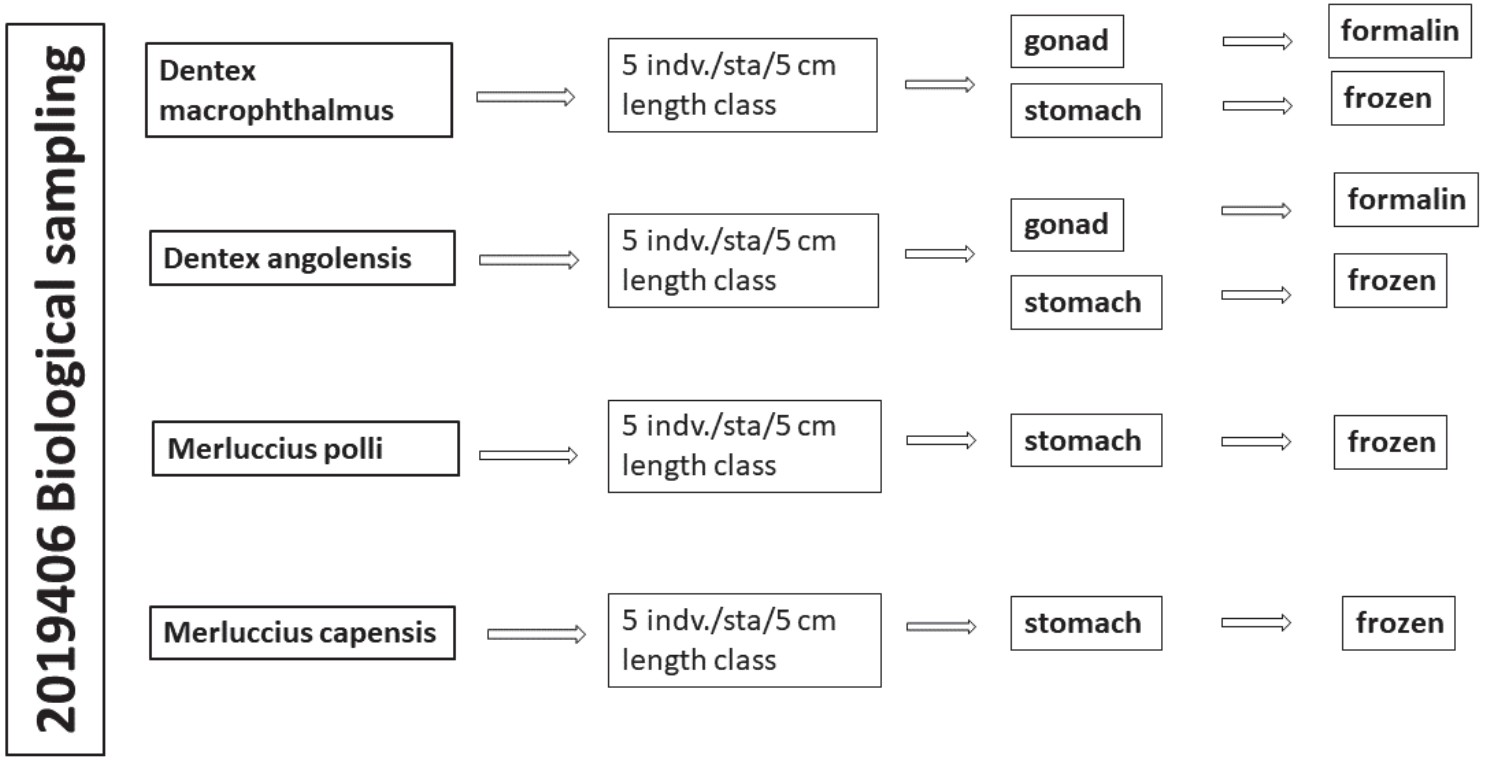
Sexual maturity

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 contents

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 VI. OVERVIEW OF SAMPLING PROCEDURES IN THE FISH LAB



ANNEX VII. OVERVIEW OF SAMPLES AND INSTITUTIONS

Leg 2.4

Sample Type	Analysis	Preservation	Quantity # of samples	Location	Port of offloading	Transport method	Receiving country	Receiving institution	Responsible at Receiving Institution
Fin clips	Genetics	Ethanol	146		Tema	Air freight	Norway	IMR, Strandgaten 196, Bergen	Geir Dahle
Fish	Identification	Frozen	2				Norway	IMR, Strandgaten 196, Bergen	Peter Psomadakis
Small Dentex sp	Stomach contents	Frozen	25	Offloaded	Luanda	car	Angola	INIP	Filomena Vaz Velho (menavelho@gmail.com)
Stomach	Stomach contents	Frozen	249	Offloaded	Luanda	car	Angola	INIP	Filomena Vaz Velho (menavelho@gmail.com)
Gonads	Maturity	Formalin	174	Offloaded	Luanda	car	Angola		Filomena Vaz Velho (menavelho@gmail.com)
Invertebrates	Identification	Frozen	6	Offloaded	Tema		Namibia	NatMirc	Johnny Gamatham
Juvenile M.polli		Frozen	176	Offloaded	Tema		Namibia	NatMirc	Johnny Gamatham
Jellyfish	Genetics	Ethanol	21		Las Palmas	Air freight	South Africa	UWC	Mark Gibbons
Jellyfish	Species ID	Formaldehyde	18		Las Palmas	Air freight	South Africa	UWC	Mark Gibbons
Plankton (100ml WP2)	Species ID	Formaldehyde	48	Offloaded	Luanda	car	Angola	INIP	Filomena Vaz Velho (menavelho@gmail.com)
Plankton (Bongo right net)	Species ID	Formaldehyde	21	Offloaded	Luanda	car	Angola	INIP	Filomena Vaz Velho

Sample Type	Analysis	Preservation	Quantity # of samples	Location	Port of offloading	Transport method	Receiving country	Receiving institution	Responsible at Receiving Institution
									(menavelho@gmail.com)
Plankton (Bongo right net, scinitlation vial)	Species ID	ethanol	17	Offloaded	Luanda	car	Angola	INIP	Filomena Vaz Velho (menavelho@gmail.com)
Plankton (Bongo left net)	Species ID	Formaldehyde	21	Offloaded	Luanda	car	Angola	INIP	Filomena Vaz Velho (menavelho@gmail.com)
Plankton (WP2 0n aluminum trays)	Biomass	dried	66	Offloaded	Tema	Air freight	Norway	IMR, Strandgaten 196, Bergen	Stamatina Isari
Microplastics (manta trawl alu. trays)	ID & weight	dry	19		Tema	Air freight	Norway	IMR, Strandgaten 196, Bergen	Bjørn Einar Grøsvik
Neuston (manta trawl)	neuston community	ethanol	22		Las Palmas		South Africa	UWC	Mark Gibbons
Ichthyoplankton (manta trawl)	Genetics	Ethanol	18		Tema	Air freight	Norway	IMR, Strandgaten 196, Bergen	Stamatina Isari
Nutrients (CTD lab)		0.2 ml chloroform (keep cool)	271		Las Palmas	Air freight	Norway	IMR, Strandgaten 196, Bergen	David Cervantes
Box corer	sediments	Frozen	31		Las Palmas		Monaco	IAEA	Beat Gasser
CTD water samples			49		Las Palmas		Monaco	IAEA	Beat Gasser

Leg 2.5

Sample Type	Analysis	Preservation	Quantity # of samples	Location	Port of offloading	Transport method	Receiving country	Receiving institution	Responsible at Receiving Institution
Fin clips	Genetics	Ethanol	335	DFN	Tema	Air freight	Norway	IMR, Strandgaten 196, Bergen	Geir Dahle
Fish	Identification	Frozen	3		Las Palmas	Air freight	Norway	IMR, Strandgaten 196, Bergen	Peter Psomadakis
Small Dentex sp	Stomach contents	Frozen					Angola	INIP	Filomena Vaz Velho (menavelho@gmail.com)
Stomach	Stomach contents	Frozen					Angola	INIP	Filomena Vaz Velho (menavelho@gmail.com)
Gonads	Maturity	Formalin					Angola		Filomena Vaz Velho (menavelho@gmail.com)
Invertebrates	Identification	Frozen					Namibia	NatMirc	Johnny Gamatham
Juvenile M.polli		Frozen					Namibia	NatMirc	Johnny Gamatham
Jellyfish	Genetics	Ethanol					South Africa	UWC	Mark Gibbons
Jellyfish	Species ID	Formaldehyde					South Africa	UWC	Mark Gibbons
Plankton (100ml WP2)	Species ID	Formaldehyde	25	Offloaded	Luanda	car	Angola	INIP	Filomena Vaz Velho (menavelho@gmail.com)
Plankton (Bongo right net)	Species ID	Formaldehyde	15	Offloaded	Luanda	car	Angola	INIP	Filomena Vaz Velho (menavelho@gmail.com)

Sample Type	Analysis	Preservation	Quantity # of samples	Location	Port of offloading	Transport method	Receiving country	Receiving institution	Responsible at Receiving Institution
Plankton (Bongo right net, scinitlation vial)	Species ID	ethanol	18	Offloaded	Luanda	car	Angola	INIP	Filomena Vaz Velho (menavelho@gmail.com)
Plankton (Bongo left net)	Species ID	Formaldehyde	15	Offloaded	Luanda	car	Angola	INIP	Filomena Vaz Velho (menavelho@gmail.com)
Niskin samples	Phytoplankton	Formaldehyde	123	Offloaded	Luanda	Car	Angola	INIP	Filomena Vaz Velho (menavelho@gmail.com)
Plankton (WP2 0n aluminum trays)	Biomass	dried	33	DFN	Las Palmas	Air freight	Norway	IMR, Strandgaten 196, Bergen	Stamatina Isari
Microplastics (manta trawl alu. trays)	ID & weight	dry	11	Offloaded		Air freight	Norway	IMR, Strandgaten 196, Bergen	Bjørn Einar Grøsvik
Neuston (manta trawl)	neuston community	ethanol	20	DFN	Las Palmas		South Africa	UWC	Mark Gibbons
Ichthyoplankton (manta trawl)	Genetics	Ethanol	18	DFN	Las Palmas	Air freight	Norway	IMR, Strandgaten 196, Bergen	Stamatina Isari
Nutrients (CTD lab)	Tot N&P	chilled	40	DFN	Las Palmas	Air freight	Norway	IMR, Strandgaten 196, Bergen	David Cervantes
Box corer	sediments	Frozen					Monaco	IAEA	Beat Gasser
CTD water samples							Monaco	IAEA	Beat Gasser
Nutrients (CTD lab)	Nutrients	0.2 ml chloroform (keep cool)	227	DFN	Las Palmas	Air freight	Norway	IMR, Strandgaten 196, Bergen	David Cervantes

ANNEX VIII. RECORDS OF FISHING STATIONS

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 1
DATE :26/05/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 17°13.58
start stop duration Lon E 11°43.59
TIME :09:55:35 10:19:45 24.2 (min) Purpose : 3
LOG : 3506.41 3507.90 1.5 Region : 4050
FDEPTH: 26 22 Gear cond.: 0
BDEPTH: 26 22 Validity : 0
Towing dir: 0° Wire out : 130 m Speed : 3.7 kn
Sorted : 99 Total catch: 2010.40 Catch/hour: 4988.59

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	3032.80	78449	60.79	1
Etrumeus whiteheadi	345.83	14730	6.93	
Chrysaora hysoscella	253.42	777	5.08	
Trachurus capensis	153.70	6129	3.08	
Argyrosomus inodorus	150.02	35	3.01	
Turtle	148.88	2	2.98	
Chelidonichthys capensis	123.50	184	2.48	2
Stromateus fiatola	109.78	275	2.20	
Galeichthys feliceps	107.05	365	2.15	
Chelonia mydas	99.26	2	1.99	
Callorhinchus capensis	83.25	45	1.67	
Selene dorsalis	56.72	960	1.14	
Pomatomus saltatrix	43.00	320	0.86	
Raja miraletus	41.17	45	0.83	
Dicologoglossa cuneata	33.85	687	0.68	
Thyrsites atun	32.93	45	0.66	
Chrysaora sp.	32.93	136	0.66	
Lepidopus caudatus	29.28	732	0.59	
TRIAKIDAE	27.74	2	0.56	
PORTUNIDAE	21.96	2104	0.44	
Astropecten sp.	17.39	0	0.35	
Myliobatis aquila	14.09	2	0.28	
Deepwater fish mixture	13.72	3385	0.28	
Pomadasys perotaei	7.32	45	0.15	
Sardinops sagax	6.40	136	0.13	
Scomber japonicus	2.75	45	0.06	
Total	4988.76		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 2
DATE :26/05/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 17°12.16
start stop duration Lon E 11°32.06
TIME :15:34:13 15:39:16 5.0 (min) Purpose : 1
LOG : 3523.36 3523.65 0.3 Region : 4050
FDEPTH: 119 120 Gear cond.: 0
BDEPTH: 119 120 Validity : 0
Towing dir: 0° Wire out : 350 m Speed : 3.4 kn
Sorted : 97 Total catch: 3140.00 Catch/hour: 37380.95

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus capensis	32466.90	989774	86.85	3
Dentex macrophthalmus	2843.36	94655	7.61	5
Trachurus trecae	1954.81	40179	5.23	4
Dicologoglossa cuneata	54.08	1155	0.14	
Pagellus bellottii	38.63	381	0.10	
Zeus faber	23.18	381	0.06	
Total	37380.96		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 3
DATE :26/05/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 17°13.31
start stop duration Lon E 11°21.07
TIME :20:07:46 20:38:22 30.6 (min) Purpose : 3
LOG : 3536.20 3537.69 1.5 Region : 4050
FDEPTH: 348 344 Gear cond.: 0
BDEPTH: 348 344 Validity : 0
Towing dir: 0° Wire out : 790 m Speed : 2.9 kn
Sorted : 90 Total catch: 1140.00 Catch/hour: 2234.56

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Helicolenus dactylopterus	509.79	7582	22.81	8
Merluccius capensis	389.75	55	17.44	7
Nezumia micronychodon	344.55	12563	15.42	
Coelorinchus polli	249.31	6367	11.16	
Chaceon maritae	232.79	437	10.42	11
Malacocephalus laevis	104.97	1311	4.70	
Laemonema laureysi	104.01	2260	4.65	
Lophius vaillanti	43.71	25	1.96	9
Galeus polli	38.40	437	1.72	
Merluccius paradoxus	37.42	73	1.67	6
Squalus megalops	30.62	24	1.37	
Aristeus varidens	27.21	3636	1.22	13
Bathynectes piperitus	27.21	24	1.22	
Ebinania costaecanarie	21.88	73	0.98	
Deepwater fish mixture	21.39	0	0.96	
Trachurus capensis	18.46	98	0.83	12
Chlorophthalmus agassizi	9.72	243	0.44	
Todarodes sagittatus	8.74	49	0.39	
Pterothrissus belloci	6.31	24	0.28	
Lophius vomerinus	3.21	2	0.14	10
Nematocarcinus africanus	2.92	73	0.13	
MYCTOPHIDAE	0.98	194	0.04	
Epigonus macrops	0.73	73	0.03	
'Spider crab'	0.49	49	0.02	
Total	2234.57		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 4
DATE :27/05/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 17°0.45
start stop duration Lon E 11°20.48
TIME :12:09:35 12:39:42 30.1 (min) Purpose : 3
LOG : 3589.60 3591.07 1.5 Region : 4050
FDEPTH: 153 150 Gear cond.: 0
BDEPTH: 153 150 Validity : 0
Towing dir: 0° Wire out : 340 m Speed : 2.9 kn
Sorted : 93 Total catch: 390.00 Catch/hour: 776.89

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Merluccius capensis	299.23	2633	38.52	14
Dentex macrophthalmus	158.37	584	20.38	15
Pterothrissus belloci	92.88	1022	11.96	
Helicolenus dactylopterus	81.37	713	10.47	16
Synagrops microlepis	24.64	2739	3.17	
Chelidonichthys capensis	18.48	32	2.38	
Zeus faber	18.32	74	2.36	
Chaceon maritae	14.70	14	1.89	20
B I V A L V E S	10.37	301	1.34	
Scorpaena elongata	9.40	82	1.21	
Miscellaneous fishes	7.13	0	0.92	
Zenopsis conchifer	6.97	114	0.90	
Octopus vulgaris	5.30	2	0.68	
Trigla lyra	4.70	40	0.61	
Todarodes angolensis	4.54	32	0.58	
Atractoscion aequidens	3.86	4	0.50	18
Pontinus accraensis	3.24	40	0.42	
Bathynectes piperitus	2.59	56	0.33	
Merluccius polli	2.27	66	0.29	19
Arnoglossus imperialis	1.94	56	0.25	
Demos porifera	1.78	32	0.23	
Synaptura lusitanica	1.62	129	0.21	
Lepidopus caudatus	0.97	8	0.13	
Brotula barbata	0.72	4	0.09	
Dicologoglossa cuneata	0.65	8	0.08	
Lophius vaillanti	0.44	2	0.06	17
G A S T R O P O D S	0.16	16	0.02	
PAGUROIDEA	0.16	16	0.02	
Sea urchin	0.08	2	0.01	
Total	776.89		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 5
DATE :27/05/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 16°59.11
start stop duration Lon E 11°35.32
TIME :14:48:39 14:52:58 4.3 (min) Purpose : 1
LOG : 3606.83 3607.08 0.3 Region : 4050
FDEPTH: 89 89 Gear cond.: 6
BDEPTH: 89 89 Validity : 5
Towing dir: 0° Wire out : 260 m Speed : 3.5 kn
Sorted : 20 Total catch: 200.00 Catch/hour: 2777.78

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dead shells	1160.24	0	41.77	
Trachurus trecae	793.25	20319	28.56	21
Chelidonichthys capensis	254.07	986	9.15	
Sepia officinalis	223.01	569	8.03	
Raja miraletus	115.74	278	4.17	
Dicologoglossa cuneata	79.04	708	2.85	
Trachurus capensis	73.40	2819	2.64	22
Carlarius parkii	33.88	139	1.22	
Dentex macrophthalmus	22.58	847	0.81	23
Illex coindetii	22.58	139	0.81	
Total	2777.79		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 6
DATE :27/05/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 16°58.51
start stop duration Lon E 11°40.81
TIME :16:38:57 16:44:40 5.7 (min) Purpose : 1
LOG : 3613.96 3614.24 0.3 Region : 4050
FDEPTH: 34 34 Gear cond.: 0
BDEPTH: 34 34 Validity : 1
Towing dir: 0° Wire out : 110 m Speed : 2.9 kn
Sorted : 33 Total catch: 1840.00 Catch/hour: 19334.50

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	17296.18	2982105	89.46	24
Chrysaora sp.	1013.26	0	5.24	
Engraulis encrasicolus	930.79	91250	4.81	25
Calappa pelii	35.35	8249	0.18	
Illex coindetii	35.35	5306	0.18	
Starfish	11.78	2354	0.06	
Maja squinado	5.89	1177	0.03	
Scomber colias	5.89	588	0.03	
Total	19334.50		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 7
DATE :27/05/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 16°34.99
start stop duration Lon E 11°18.40
TIME :21:21:14 21:52:12 31.0 (min) Purpose : 3
LOG : 3648.44 3649.94 1.5 Region : 4050
FDEPTH: 639 639 Gear cond.: 0
BDEPTH: 639 639 Validity : 0
Towing dir: 0° Wire out : 1320 m Speed : 2.9 kn
Sorted : 61 Total catch: 1050.00 Catch/hour: 2034.88

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Bajacalifornia megalops	466.82	1816	22.94	
Chaceon maritae	325.78	950	16.01	27
Trachyrincus scabrus	202.42	1012	9.95	
Centroscymnus crepidater	200.50	570	9.85	
Centroscymnus crepidater	102.48	285	5.04	0
Todarodes sagittatus	89.19	254	4.38	31
Centrophorus squamosus	77.81	95	3.82	
Merluccius paradoxus	73.33	83	3.60	26
Ebinania costaecanarie	58.20	31	2.86	
Yarrella blackfordi	50.60	2663	2.49	
Helicolenus dactylopterus	48.08	35	2.36	28
Deepwater fish mixture	44.92	0	2.21	
Nezumia micronychodon	34.79	870	1.71	
Nematocarcinus africanus	32.89	5481	1.62	
Rajella barnardi	30.37	64	1.49	
Lophius vaillanti	27.87	2	1.37	
Hoplostethus cadenati	21.51	2151	1.06	
Anemones, white	19.61	64	0.96	
Anemones, pink	18.35	31	0.90	
Deania calcea	15.81	64	0.78	
Aristeus varidens	15.81	1360	0.78	29
Vitreledonella richardi	9.50	31	0.47	
Etmopterus pusillus	9.50	31	0.47	
Lamprogrammus exutus	8.86	316	0.44	
Deania profundorum	8.22	31	0.40	
Ijimaia loppei	6.82	2	0.34	
Rossia enigmatica	5.70	31	0.28	
Halosaurus ovenii	5.70	64	0.28	
Synaphobranchus kaupii	4.75	285	0.23	
Thysanoteuthis rhombus	3.80	64	0.19	
Aristeus varidens	3.80	1045	0.19	30
Glyphus marsupialis	2.54	64	0.12	
Triplophos hemingi	2.54	380	0.12	
Histioteuthis reversa	1.90	31	0.09	
Bathylagus antarcticus	1.90	190	0.09	
Paraliparis australis	0.64	31	0.03	
Eggs of ray	0.64	31	0.03	
Heterocarpus grimaldii	0.64	31	0.03	
Stomias boa boa	0.31	64	0.02	
Total	2034.88		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 8
DATE :27/05/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 16°35.68
start stop duration Lon E 11°18.46
TIME :23:17:06 23:47:16 30.2 (min) Purpose : 3

LOG : 3653.66 3655.11 1.4 Region : 4050
FDEPTH: 562 580 Gear cond.: 0
BDEPTH: 562 580 Validity : 0
Towing dir: 0° Wire out : 1240 m Speed : 2.9 kn
Sorted : 118 Total catch: 1020.00 Catch/hour: 2028.51

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Trachyrincus scabrus	596.36	3560	29.40	
Centroscymnus crepidater	402.64	1271	19.85	
Bajacalifornia megalops	257.44	634	12.69	
Todarodes sagittatus	108.74	255	5.36	38
Merluccius paradoxus	102.62	131	5.06	32
Centrophorus squamosus	87.19	95	4.30	
Chaceon maritae	75.13	300	3.70	34
Helicolenus dactylopterus	54.53	523	2.69	37
Apristurus saldanha	52.62	80	2.59	
Ebinania costaecanarie	51.05	48	2.52	
Chaceon maritae	35.50	207	1.75	33
Deepwater fish mixture	29.15	0	1.44	
Deania calcea	25.97	4	1.28	
Lophius vaillanti	23.51	4	1.16	39
Centroscymnus coelolepis	22.51	48	1.11	
Nematocarcinus africanus	14.58	3645	0.72	
Cruriraja parcomaculata	12.37	16	0.61	
Nezumia sp.	12.37	300	0.61	
Anemones, white	11.73	32	0.58	
Hoplostethus cadenati	10.14	587	0.50	
Aristeus varidens	9.51	730	0.47	35
Yarrella blackfordi	5.07	159	0.25	
Lamprogrammus exutus	4.12	32	0.20	
CENTROLOPHIDAE	4.12	16	0.20	
Aristeus varidens	3.80	887	0.19	36
Bathyuroconger vicinus	2.84	64	0.14	
Starfish	2.55	175	0.13	
Halosaurus ovenii	2.23	32	0.11	
Synaphobranchus kaupii	1.91	64	0.09	
Plastic	1.59	0	0.08	
Triplophos hemingi	1.59	284	0.08	
PARAPAGURIDAE	1.27	16	0.06	
Melanocetus johnsoni	0.32	48	0.02	
Laemonema laureysi	0.32	16	0.02	
Epigonus telescopus	0.32	16	0.02	
Stomias boa boa	0.32	64	0.02	
Eggs of ray	0.32	32	0.02	
Nemichthys scolopaceus	0.16	16	0.01	
Total	2028.51		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 9
DATE :28/05/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 16°37.74
start stop duration Lon E 11°20.85
TIME :05:51:08 06:21:23 30.3 (min) Purpose : 3
LOG : 3663.40 3664.89 1.5 Region : 4050
FDEPTH: 177 157 Gear cond.: 0
BDEPTH: 177 157 Validity : 0
Towing dir: 0° Wire out : 400 m Speed : 3.0 kn
Sorted : 160 Total catch: 1230.00 Catch/hour: 2439.67

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Dentex macrophthalmus	680.85	4860	27.91	42
Zenopsis conchifer	399.41	1573	16.37	
Squalus megalops	293.06	397	12.01	
Merluccius capensis	148.21	490	6.08	40
Pterothrissus belloci	140.57	809	5.76	
Zeus faber	135.07	442	5.54	
Trachurus capensis	124.99	305	5.12	44
Helicolenus dactylopterus	116.74	0	4.78	
Synagrops microlepis	90.15	7426	3.70	
Trigla lyra	63.26	536	2.59	
Pontinus leda	58.37	3453	2.39	
Malacocephalus occidentalis	45.23	1743	1.85	
Octopus vulgaris	30.56	30	1.25	
Atractoscion aequidens	27.20	16	1.11	
Raja miraletus	17.42	16	0.71	
Trachyscorpia sp.	14.36	182	0.59	
Chlorophthalmus atlanticus	12.84	397	0.53	
Scomber japonicus	10.39	16	0.43	
Todarodes sagittatus	8.86	61	0.36	
Merluccius polli	6.42	123	0.26	41
Syacium micrurum	5.50	321	0.23	
Brotula barbata	4.58	30	0.19	
Cynoglossus browni	2.14	214	0.09	
Peristedion cataphractum	0.61	46	0.03	
Sepia elegans	0.61	61	0.03	
Eumunida squamifera	0.61	123	0.03	
Miscellaneous fishes	0.31	0	0.01	
Bembrops heterurus	0.31	16	0.01	
G A S T R O P O D S	0.31	107	0.01	
Parapandalus narval	0.31	198	0.01	
PAGUROIDEA	0.31	61	0.01	
E C H I N O D E R M A T A	0.15	61	0.01	
Total	2439.67		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 10
DATE :28/05/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 16°37.18
start stop duration Lon E 11°19.41
TIME :07:36:26 08:07:56 31.5 (min) Purpose : 3
LOG : 3672.14 3673.65 1.5 Region : 4050
FDEPTH: 363 356 Gear cond.: 0
BDEPTH: 363 356 Validity : 0
Towing dir: 0° Wire out : 800 m Speed : 2.9 kn
Sorted : 184 Total catch: 3940.00 Catch/hour: 7504.76

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Helicolenus dactylopterus	5835.50	67848	77.76	47
Lophius vaillanti	654.01	448	8.71	48
Priacanthus arenatus	182.67	857	2.43	
Galeus polli	175.33	1469	2.34	
Merluccius polli	166.36	368	2.22	45
Chlorophthalmus atlanticus	135.37	2977	1.80	
Merluccius paradoxus	134.55	326	1.79	46
Chaceon maritae	101.93	368	1.36	51
Ebinania costaecanarie	39.96	40	0.53	
Laemonema laureysi	19.57	368	0.26	
Illex coindetii	17.13	82	0.23	
Coelorinchus polli	15.49	82	0.21	
Trigla lyra	13.05	40	0.17	
Bathynectes piperitus	6.52	82	0.09	
Parapenaeus longirostris	4.08	530	0.05	50
SOFT SPONGES	1.63	40	0.02	
Aristeus varidens	0.82	82	0.01	
G A S T R O P O D S	0.82	0	0.01	
Total	7504.76		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 11
DATE :28/05/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 16°41.92
start stop duration Lon E 11°33.71
TIME :10:15:55 10:21:38 5.7 (min) Purpose : 1
LOG : 3688.99 3689.25 0.3 Region : 4050
FDEPTH: 99 99 Gear cond.: 0
BDEPTH: 99 99 Validity : 3
Towing dir: 0° Wire out : 270 m Speed : 2.8 kn
Sorted : 43 Total catch: 138.00 Catch/hour: 1450.09

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Chrysaora fulgida	644.55	0	44.45	
Dentex macrophthalmus	281.71	10392	19.43	53
Deepwater fish mixture	140.84	0	9.71	
SEPIIDAE	111.34	137	7.68	
Dicologoglossa cuneata	72.44	0	5.00	
Todarodes sagittatus	39.91	63	2.75	57
Merluccius capensis	27.50	137	1.90	52
G A S T R O P O D S	24.82	4960	1.71	
B I V A L V E S	22.80	5706	1.57	
Raja miraletus	16.77	63	1.16	
Chelidonichthys capensis	14.08	137	0.97	56
Sea pens	13.42	4455	0.93	
Chrysaora fulgida	12.75	63	0.88	0
Zeus faber	10.06	32	0.69	
LOLIGINIDAE	8.05	137	0.56	
Brotula barbata	3.35	105	0.23	
OPHICHTHIDAE	2.68	63	0.18	
BOTHIDAE	1.68	231	0.12	
SEAWEED	1.35	0	0.09	
Total	1450.09		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 12
DATE :28/05/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 16°41.77
start stop duration Lon E 11°39.54
TIME :11:47:04 11:52:13 5.2 (min) Purpose : 1
LOG : 3696.88 3697.13 0.3 Region : 4050
FDEPTH: 45 45 Gear cond.: 0
BDEPTH: 45 45 Validity : 1
Towing dir: 0° Wire out : 160 m Speed : 3.0 kn
Sorted : 33 Total catch: 1280.00 Catch/hour: 14883.72

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Trachurus trecae	12878.72	12849	86.53	58
Chrysaora fulgida	676.93	233	4.55	
ARCHTOCEPHALUS SP	608.14	12	4.09	
Loligo reynaudi	488.42	2140	3.28	
Chrysaora hysoscella	205.65	0	1.38	
Myliobatis aquila	11.40	12	0.08	
Ophiuroidea indetCV1	8.57	1709	0.06	
Maja squinado	4.28	2023	0.03	
Cruriraja sp.	1.63	430	0.01	
Total	14883.73		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 13
DATE :28/05/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 16°29.03
start stop duration Lon E 11°45.28
TIME :13:55:02 14:25:15 30.2 (min) Purpose : 3
LOG : 3713.53 3715.52 2.0 Region : 4050
FDEPTH: 19 20 Gear cond.: 0
BDEPTH: 19 20 Validity : 0
Towing dir: 0° Wire out : 115 m Speed : 3.9 kn
Sorted : 77 Total catch: 330.00 Catch/hour: 655.20

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Chrysaora sp.	384.94	0	58.75	
SOFT SPONGES	93.18	5827	14.22	
Loligo reynaudi	91.54	768	13.97	
PORTUNIDAE	39.87	4430	6.08	
Chelidonichthys capensis	13.58	28	2.07	
Sepia officinalis	13.58	20	2.07	
Fistularia petimba	5.56	244	0.85	
Miscellaneous fishes	4.74	0	0.72	
G A S T R O P O D S	2.94	449	0.45	
Pagellus bellottii	1.63	73	0.25	59
Sphoeroides trichocephalus	0.87	139	0.13	
Doclea sp.	0.57	8	0.09	
Spondyliosoma cantharus	0.52	4	0.08	
Ascidans	0.49	50	0.07	
Zeus faber	0.48	6	0.07	
Sea pens	0.16	58	0.02	
Starfish	0.16	42	0.02	
Dicologoglossa cuneata	0.16	8	0.02	
Eggs of ray	0.08	24	0.01	
Algaes	0.08	50	0.01	
Maja sp.	0.08	24	0.01	
Total	655.21		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 14
DATE :28/05/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 16°27.79
start stop duration Lon E 11°31.87
TIME :16:12:06 16:42:09 30.1 (min) Purpose : 3
LOG : 3730.03 3731.63 1.6 Region : 4050
FDEPTH: 95 99 Gear cond.: 0
BDEPTH: 95 99 Validity : 0
Towing dir: 0° Wire out : 250 m Speed : 3.2 kn
Sorted : 66 Total catch: 610.00 Catch/hour: 1217.97

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Pagellus bellottii	343.65	1819	28.21	61
Dentex macrophthalmus	314.20	2420	25.80	60
Rhinoptera marginata	221.85	36	18.21	
Umbrina canariensis	146.80	982	12.05	62
Squalus megalops	61.08	110	5.01	
Spondyliosoma cantharus	49.30	128	4.05	
Trigla lyra	23.92	146	1.96	
Atractoscion aequidens	23.72	36	1.95	63
Trachurus trecae	8.83	72	0.72	
Scorpaena angolensis	6.99	18	0.57	
Dentex barnardi	5.15	36	0.42	
Chrysaora sp.	3.67	0	0.30	
Starfish, mixed	2.94	0	0.24	
Chelidonichthys capensis	2.22	18	0.18	
Loligo reynaudi	1.84	54	0.15	
Etrumeus whiteheadi	1.48	18	0.12	
G A S T R O P O D S	0.36	0	0.03	
Total	1217.97		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 15
DATE :29/05/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 16°11.33
start stop duration Lon E 11°43.95
TIME :05:41:05 05:56:59 15.9 (min) Purpose : 3
LOG : 3789.00 3789.82 0.8 Region : 4050
FDEPTH: 46 45 Gear cond.: 0
BDEPTH: 46 45 Validity : 0
Towing dir: 0° Wire out : 135 m Speed : 3.1 kn
Sorted : 37 Total catch: 720.00 Catch/hour: 2718.69

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Trachurus trecae	2475.82	82550	91.07	64
Loligo vulgaris	162.97	2643	5.99	
Starfish	18.58	6362	0.68	

Dicologoglossa cuneata	12.88	929	0.47	
Atractoscion aequidens	10.35	38	0.38	65
Chelidonichthys capensis	9.67	53	0.36	
Pteromylaeus bovinus	7.78	8	0.29	
Carlarius parkii	6.80	8	0.25	
Stromateus fiatola	4.23	8	0.16	
Sepia officinalis	2.79	4	0.10	
Lagocephalus laevigatus	2.64	23	0.10	
Mustelus mustelus	1.66	4	0.06	
Spondyliosoma cantharus	1.06	11	0.04	
Thyrsites atun	0.91	4	0.03	
Pomatomus saltatrix	0.53	4	0.02	
Trachinocephalus myops	0.08	4	0.00	
Total	2718.73		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 16
DATE :29/05/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 16°10.60
start stop duration Lon E 11°36.09
TIME :07:07:53 07:37:05 29.2 (min) Purpose : 3
LOG : 3798.93 3800.53 1.6 Region : 4050
FDEPTH: 71 72 Gear cond.: 0
BDEPTH: 71 72 Validity : 0
Towing dir: 0° Wire out : 220 m Speed : 3.3 kn
Sorted : 178 Total catch: 178.03 Catch/hour: 365.82

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	280.52	8712	76.68	66
Mustelus mustelus	23.22	8	6.35	
Loligo vulgaris	12.95	173	3.54	
Illex coindetii	8.75	265	2.39	
Pagellus bellottii	5.84	51	1.60	67
Zeus faber	5.63	23	1.54	
Sphyrna zygaena	4.27	2	1.17	
Sepia officinalis	4.27	4	1.17	
Dentex macrophthalmus	3.86	327	1.06	68
Octopus vulgaris	3.21	4	0.88	
Chelidonichthys capensis	2.22	4	0.61	
Squalus megalops	1.93	2	0.53	
G A S T R O P O D S	1.81	0	0.49	
Dentex barnardi	1.44	10	0.39	69
Starfish	1.11	425	0.30	
Dicologoglossa cuneata	1.03	62	0.28	
Fistularia petimba	0.78	2	0.21	
Atractoscion aequidens	0.74	2	0.20	
Raja miraletus	0.70	2	0.19	
Spondyliosoma cantharus	0.66	4	0.18	
Hermits, mixed	0.37	58	0.10	
Trigla lyra	0.23	6	0.06	
Sea pens	0.14	14	0.04	
Citharus linguatula	0.06	6	0.02	
Sepiella sp.	0.04	2	0.01	
Trichiurus lepturus	0.02	4	0.01	
Arnoglossus imperialis	0.02	4	0.01	
Total	365.82		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 17
DATE :29/05/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 16°13.21
start stop duration Lon E 11°32.56
TIME :08:32:24 09:02:44 30.3 (min) Purpose : 3
LOG : 3806.37 3808.03 1.7 Region : 4050
FDEPTH: 105 106 Gear cond.: 0
BDEPTH: 105 106 Validity : 0
Towing dir: 0° Wire out : 290 m Speed : 3.3 kn
Sorted : 95 Total catch: 460.00 Catch/hour: 909.69

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	700.50	198	77.00	70
Zeus faber	50.66	105	5.57	
Squalus megalops	46.20	45	5.08	
Pagellus bellottii	29.32	51	3.22	72
Atractoscion aequidens	25.19	40	2.77	74
Dentex macrophthalmus	22.82	67	2.51	73
Etrumeus whiteheadi	20.23	297	2.22	
Loligo vulgaris	3.34	38	0.37	
Illex coindetii	3.15	10	0.35	
Dicologoglossa cuneata	2.78	28	0.31	
Dentex barnardi	1.86	10	0.20	71
Pontinus accraensis	1.23	2	0.13	
Monolene microstoma	0.93	28	0.10	
Todaropsis eblanae	0.74	10	0.08	
G A S T R O P O D S	0.74	0	0.08	
Total	909.70		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 18
DATE :29/05/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 16°0.96
start stop duration Lon E 11°38.74
TIME :11:08:17 11:19:34 11.3 (min) Purpose : 3
LOG : 3822.33 3822.83 0.5 Region : 4050
FDEPTH: 110 111 Gear cond.: 0
BDEPTH: 110 111 Validity : 0
Towing dir: 0° Wire out : 280 m Speed : 2.6 kn
Sorted : 103 Total catch: 790.00 Catch/hour: 4202.13

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	3435.00	4090	81.74	75
Atractoscion aequidens	354.15	1021	8.43	77
Dentex macrophthalmus	330.43	5888	7.86	76
Zeus faber	31.06	122	0.74	
Spondyliosoma cantharus	16.38	43	0.39	
Pterothrissus belloci	12.29	330	0.29	
Pagellus bellottii	8.99	80	0.21	
Dicologoglossa cuneata	7.34	202	0.17	
Umbrina canariensis	4.47	47	0.11	
Loligo vulgaris	1.65	128	0.04	
G A S T R O P O D S	0.43	43	0.01	
Total	4202.18		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 19
DATE :29/05/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 16°0.29
start stop duration Lon E 11°40.67
TIME :12:23:43 12:50:50 27.1 (min) Purpose : 3
LOG : 3829.47 3830.87 1.4 Region : 4050
FDEPTH: 77 61 Gear cond.: 0
BDEPTH: 77 61 Validity : 0
Towing dir: 0° Wire out : 240 m Speed : 3.1 kn
Sorted : 68 Total catch: 520.00 Catch/hour: 1150.44

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	638.90	44562	55.54	78
Dentex macrophthalmus	237.31	23801	20.63	
Sepia orbignyana	52.92	64	4.60	
Raja miraletus	39.81	62	3.46	
Chrysaora sp.	36.05	345	3.13	
Atractoscion aequidens	23.72	111	2.06	83
Brotula barbata	19.42	283	1.69	
Spondyliosoma cantharus	17.87	15	1.55	
Loligo vulgaris	17.53	626	1.52	
Citharus linguatula	16.30	1458	1.42	
Pagellus bellottii	11.59	111	1.01	80
Merluccius polli	9.40	814	0.82	
Octopus vulgaris	8.67	18	0.75	
Dicologoglossa cuneata	5.33	157	0.46	
Chelidonichthys capensis	3.45	250	0.30	
GOBIIDAE	2.51	971	0.22	
Trichiurus lepturus	1.57	31	0.14	
G A S T R O P O D S	1.57	580	0.14	
Dentex barnardi	1.57	31	0.14	82
Squalus megalops	1.29	2	0.11	
Sphoeroides marmoratus	0.94	111	0.08	
Starfish	0.63	142	0.05	
Saurida brasiliensis	0.63	111	0.05	
Umbrina canariensis	0.63	15	0.05	81
Scorpaena normani	0.31	46	0.03	
Calappa sp.	0.31	31	0.03	
Maja squinado	0.16	15	0.01	
Total	1150.40		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 20
DATE :29/05/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 15°56.30
start stop duration Lon E 11°43.73
TIME :13:44:57 14:12:09 27.2 (min) Purpose : 3
LOG : 3835.93 3837.74 1.8 Region : 4050
FDEPTH: 21 24 Gear cond.: 0
BDEPTH: 21 24 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 4.0 kn
Sorted : 32 Total catch: 96.30 Catch/hour: 212.42

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Chrysaora fulgida	122.03	172	57.45	
Trachurus trecae	59.36	794	27.95	84
Loligo vulgaris	18.77	437	8.84	
Raja miraletus	6.20	13	2.92	
Pagellus bellottii	2.76	232	1.30	85
Fistularia petimba	1.45	46	0.68	
Lithognathus mormyrus	1.32	7	0.62	
Dead coral & starfish	0.39	40	0.19	
Boops boops	0.13	7	0.06	
Total	212.42		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 21
DATE :30/05/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 14°4.93
start stop duration Lon E 12°18.83
TIME :19:43:37 20:13:46 30.1 (min) Purpose : 3
LOG : 4018.36 4019.84 1.5 Region : 4050
FDEPTH: 99 95 Gear cond.: 0
BDEPTH: 99 95 Validity : 2
Towing dir: 0° Wire out : 265 m Speed : 3.0 kn
Sorted : 62 Total catch: 550.00 Catch/hour: 1094.89

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pagellus bellottii	365.46	4439	33.38	88
Chelidonichthys capensis	222.40	3267	20.31	
Citharus linguatula	80.93	573	7.39	
Squatina aculeata	69.00	36	6.30	
Squalus megalops	61.82	48	5.65	
Boops boops	56.40	621	5.15	
Dentex macrophthalmus	46.84	382	4.28	86
Sepia orbignyana	44.93	50	4.10	
OPHICHTHIDAE	35.05	510	3.20	
Zeus faber	34.73	48	3.17	
Trichiurus lepturus	9.79	16	0.89	
Dentex congoensis	9.24	96	0.84	87
Lagocephalus laevigatus	8.60	16	0.79	
Trachurus trecae	7.01	446	0.64	89
Octopus vulgaris	6.37	48	0.58	
Brachioteuthis sp.	6.05	16	0.55	
Umbrina canariensis	5.74	32	0.52	90
Trigla lyra	4.46	36	0.41	
G A S T R O P O D S	4.14	382	0.38	
Saurida brasiliensis	3.82	191	0.35	
Branchiostegus japonicus	3.51	32	0.32	
Laemonema sp.	2.23	66	0.20	
Deepwater fish mixture	1.59	16	0.15	
Loligo sp.	1.27	593	0.12	
Ephippion guttifer	0.96	32	0.09	
Illex coindetii	0.96	16	0.09	
Sepiella ornata	0.64	80	0.06	
Maja squinado	0.32	16	0.03	
Arnoglossus imperialis	0.32	32	0.03	
LITHODIDAE	0.32	82	0.03	
Total	1094.89		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 22
DATE :30/05/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 14°4.93
start stop duration Lon E 12°20.60
TIME :20:54:04 21:24:21 30.3 (min) Purpose : 3
LOG : 4022.54 4024.14 1.6 Region : 4050
FDEPTH: 30 31 Gear cond.: 0
BDEPTH: 30 31 Validity : 2
Towing dir: 0° Wire out : 115 m Speed : 3.2 kn
Sorted : 39 Total catch: 1200.00 Catch/hour: 2377.02

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Lithognathus mormyrus	849.55	13270	35.74	
Sepia officinalis	418.40	174	17.60	
Pagellus bellottii	404.49	1739	17.02	91
Boops boops	202.82	11533	8.53	
Dasyatis marmorata	115.90	117	4.88	
Pomadasys incisus	114.73	2434	4.83	
Atractoscion aequidens	99.68	117	4.19	
Gymnura altavela	99.04	4	4.17	
Umbrina canariensis	42.31	174	1.78	92
Syacium micrurum	6.95	57	0.29	
Trachurus trecae	6.95	289	0.29	
Pseudupeneus prayensis	5.80	57	0.24	
Chilomycterus spinosus mauretanicus	4.79	2	0.20	
Bothus podas	3.49	57	0.15	
Saurida brasiliensis	1.17	289	0.05	
Sardinella maderensis	0.57	117	0.02	
Apogon affinis	0.40	57	0.02	
Fishing gears	0.00	4	0.00	
Total	2377.04		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 23
DATE :01/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 12°19.82
start stop duration Lon E 13°23.76
TIME :14:14:42 14:43:00 28.3 (min) Purpose : 3
LOG : 4269.86 4271.38 1.5 Region : 4040
FDEPTH: 106 105 Gear cond.: 0
BDEPTH: 106 105 Validity : 0
Towing dir: 0° Wire out : 280 m Speed : 3.2 kn
Sorted : 63 Total catch: 710.00 Catch/hour: 1505.30

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

Boops boops	1214.84	218835	80.70
Chelidonichthys gabonensis	99.84	1052	6.63
Sphoeroides pachygaster	42.02	119	2.79
Zeus faber	41.55	144	2.76
Deepwater fish mixture	28.18	0	1.87
Saurida brasiliensis	21.48	2436	1.43
Dentex macrophthalmus	13.38	119	0.89	93
Trachurus trecae	11.94	502	0.79	94
Sepia officinalis	10.98	144	0.73
Sea urchin	4.77	240	0.32
Batrachoides sp.	4.77	23	0.32
G A S T R O P O D S	4.30	621	0.29
Citharus linguatula	3.35	119	0.22
Torpedo torpedo	1.61	2	0.11
Chaetodon hoefleri	1.31	6	0.09
Illex coindetii	0.95	49	0.06
Total	1505.28		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 24
DATE :01/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 12°20.31
start stop duration Lon E 13°27.12
TIME :15:25:19 15:55:28 30.2 (min) Purpose : 3
LOG : 4275.47 4277.06 1.6 Region : 4040
FDEPTH: 89 90 Gear cond.: 0
BDEPTH: 89 90 Validity : 0
Towing dir: 0° Wire out : 230 m Speed : 3.2 kn
Sorted : 100 Total catch: 370.00 Catch/hour: 736.07

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dentex macrophthalmus	156.56	404	21.27	95
Umbrina canariensis	150.24	603	20.41	97
Trichiurus lepturus	129.11	420	17.54
Dentex barnardi	47.09	557	6.40	96
Brotula barbata	43.11	30	5.86
Boops boops	41.48	109	5.64
Atractoscion aequidens	36.94	22	5.02	107
Trachurus trecae	32.67	117	4.44	98
ECHINOMETRIDAE	12.06	772	1.64
Lagocephalus laevigatus	11.02	22	1.50
Zeus faber	10.29	22	1.40
Pomatomus saltatrix	9.85	8	1.34
Sepia orbignyana	9.85	82	1.34
Alloteuthis africana	9.41	4237	1.28
Citharus linguatula	8.81	161	1.20
Trigla lyra	8.24	74	1.12
Deepwater fish mixture	4.58	0	0.62
Illex coindetii	3.82	14	0.52
Pontinus accraensis	3.38	36	0.46
Octopus vulgaris	2.51	8	0.34
Chaetodon hoefleri	1.45	8	0.20
Fistularia petimba	1.39	8	0.19
Anthias anthias	0.88	14	0.12
G A S T R O P O D S	0.80	147	0.11
Saurida brasiliensis	0.44	88	0.06
Uranoscopus polli	0.15	8	0.02
Plastic	0.00	6	0.00
Fishing gears	0.00	2	0.00
Total	736.10		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 25
DATE :01/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 12°22.20
start stop duration Lon E 13°30.05
TIME :16:39:47 17:09:39 29.9 (min) Purpose : 3
LOG : 4281.54 4283.11 1.6 Region : 4040
FDEPTH: 55 56 Gear cond.: 0
BDEPTH: 55 56 Validity : 0
Towing dir: 0° Wire out : 180 m Speed : 3.2 kn
Sorted : 69 Total catch: 620.00 Catch/hour: 1245.81

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pagellus bellottii	381.44	3904	30.62	100
Boops boops	189.99	380	15.25
Pomadasys incisus	142.12	997	11.41	99
Citharus linguatula	98.62	5293	7.92
Bembrops heterurus	65.63	979	5.27
Raja miraletus	54.03	90	4.34
Brachydeuterus auritus	39.16	599	3.14	104
Sepia officinalis	33.72	707	2.71
Trichiurus lepturus	29.38	563	2.36
Atractoscion aequidens	26.83	163	2.15	103
Plastic	20.09	0	1.61
Octopus vulgaris	19.21	36	1.54
Brotula barbata	18.12	127	1.45
Umbrina canariensis	15.95	145	1.28	106
Chelidonichthys sp2	14.51	109	1.16
Pontinus kuhlii	14.15	253	1.14
Chaetodon auriga	11.23	54	0.90
Sardinella maderensis	11.23	852	0.90	102
Pseudupeneus prayensis	10.15	109	0.81
Torpedo torpedo few spots	6.89	18	0.55
Conger conger	6.89	54	0.55
Trachurus trecae	6.17	90	0.50	101
Dentex barnardi	5.45	199	0.44
Centrarchops chapini	4.64	109	0.37
Alloteuthis africana	3.62	1087	0.29
TETRAODONTIDAE	3.62	436	0.29
GOBIIDAE	2.89	26	0.23
Deepwater fish mixture	2.65	0	0.21
Saurida brasiliensis	2.17	436	0.17
Metal waste	2.01	0	0.16
Monolene microstoma	1.45	72	0.12
Fistularia petimba	1.45	18	0.12
Dentex angolensis	0.36	18	0.03	105
Fishing gears	0.00	4	0.00
Plastic cans-jars etc	0.00	20	0.00
Total	1245.81		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 26
DATE :02/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 12°22.21
start stop duration Lon E 13°17.73
TIME :00:20:45 00:51:07 30.4 (min) Purpose : 3
LOG : 4304.63 4306.07 1.4 Region : 4040
FDEPTH: 676 679 Gear cond.: 0
BDEPTH: 676 679 Validity : 0
Towing dir: 0° Wire out : 1480 m Speed : 2.9 kn
Sorted : 31 Total catch: 75.64 Catch/hour: 149.49

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Aristeus varidens	36.82	152	24.63	108
Yarrella blackfordi	24.96	581	16.70
Stomias boa boa	16.25	34	10.87
Hoplostethus cadenati	8.81	4	5.90
Lamprogrammus exutus	7.75	40	5.18
Chaceon maritae	6.01	30	4.02	109
Talismania longifilis	5.81	150	3.89
Halosaurus ovenii	4.45	77	2.97
Merluccius polli	4.45	10	2.97
Nezumia micronychodon	4.35	136	2.91
Triplophos hemingi	3.77	453	2.53
Bajacalifornia megalops	2.51	93	1.68
Luciobrotula nolfi	2.51	10	1.68
Wood, paper, cardboard	2.51	0	1.68
Bassanago albescens	2.13	43	1.43
Laemonema laureysi	2.13	4	1.43
Synaphobranchus kaupii	2.04	24	1.36
Chlorophthalmus sp.	1.44	40	0.97
Glyphus marsupialis	1.26	30	0.85
S H A R K S	1.17	10	0.78
Lophius vaillanti	1.07	34	0.71
Plesiopenaeus edwardsianus	0.77	107	0.52
OPHICHTHIDAE	0.77	10	0.52
Dead coral	0.77	0	0.52
Borostomias sp.	0.77	24	0.52
Ebinania costaecanarie	0.67	14	0.45
Small shrimps	0.67	14	0.45
Xenodermichthys copei	0.57	10	0.38
Gonostoma denudatum	0.47	67	0.32
Stereomastis sp.	0.47	83	0.32
PORIFERA (Sponges)	0.40	0	0.26
Loligo vulgaris	0.30	4	0.20
Nemichthys scolopaceus	0.20	4	0.13
Scopelosaurus meadi	0.14	10	0.09
Rajella barnardi	0.10	208	0.07
Dicrolene nigricaudis	0.10	4	0.07
Dibranchus atlanticus	0.04	10	0.03
Plastic	0.04	4	0.03
Total	149.45		99.97

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 27
DATE :02/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 12°22.24
start stop duration Lon E 13°16.98
TIME :02:06:42 02:40:13 33.5 (min) Purpose : 3
LOG : 4309.70 4311.44 1.7 Region : 4040
FDEPTH: 734 736 Gear cond.: 0
BDEPTH: 734 736 Validity : 0
Towing dir: 0° Wire out : 1570 m Speed : 3.1 kn
Sorted : 25 Total catch: 88.26 Catch/hour: 158.03

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nezumia micronychodon	40.11	1010	25.38
Aristeus varidens	17.32	1268	10.96	111
Miscellaneous fishes	14.45	0	9.14
Bathyuroconger vicinus	12.96	170	8.20
Lamprogrammus exutus	9.72	41	6.15
Hoplostethus cadenati	9.47	136	5.99
Yarrella blackfordi	7.97	204	5.05
Stomias boa boa	7.85	197	4.97
Halosaurus ovenii	6.98	102	4.41
Aristeus varidens	3.80	569	2.40	112
Bathyraja hesperafricana	3.74	7	2.36
Luciobrotula sp.	2.37	7	1.50
Gonostoma denudatum	2.24	156	1.42
Glyphus marsupialis	2.24	136	1.42
J E L L Y F I S H	1.87	14	1.18
Plastic	1.62	0	1.03
Talismania longifilis	1.62	68	1.03
Bajacalifornia megalops	1.62	54	1.03
Centroscymnus sp.	1.50	7	0.95
Synaphobranchus kaupii	1.37	14	0.87
Plesionika edwardsii	1.12	102	0.71
Triplophos hemingi	0.87	109	0.55
Caristius groenlandicus	0.87	7	0.55
Laemonema laureysi	0.75	7	0.47
OPHICHTHIDAE	0.62	7	0.39
Xenodermichthys copei	0.50	20	0.31
Malacosteus sp.	0.50	54	0.31
Etmopterus pusillus	0.37	7	0.24
Dicrolene intronigra	0.25	14	0.16
Etmopterus sp.	0.25	7	0.16
Stereomastis sp.	0.25	68	0.16
Benthodesmus tenuis	0.25	7	0.16
Chaceon maritae	0.13	14	0.08	110
Melanocetus johnsoni	0.13	20	0.08
OPHIDIIDAE	0.13	14	0.08
Nemichthys scolopaceus	0.13	13	0.08
SEPIOLIDAE	0.13	7	0.08
Total	158.03		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 28
DATE :02/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 12°2.44
start stop duration Lon E 13°38.87
TIME :09:49:41 10:19:41 30.0 (min) Purpose : 3
LOG : 4364.80 4366.41 1.6 Region : 4040
FDEPTH: 54 58 Gear cond.: 0
BDEPTH: 54 58 Validity : 0
Towing dir: 0° Wire out : 150 m Speed : 3.2 kn
Sorted : 94 Total catch: 201.44 Catch/hour: 402.88

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pagellus bellottii	152.43	154	37.84	113
Pomadasys incisus	40.87	140	10.15	114
Trachurus trecae	33.35	166	8.28	115
Rhinobatos irvinei	21.08	10	5.23
Dasyatis marmorata	19.46	6	4.83
Sepia officinalis	19.12	22	4.75
Raja miraletus	17.69	30	4.39
Lagocephalus laevigatus	15.43	48	3.83
Pseudupeneus prayensis	11.89	110	2.95
Dentex barnardi	9.03	106	2.24	117
Citharus linguatula	7.38	334	1.83
Zeus faber	5.95	12	1.48
Trichiurus lepturus	4.89	22	1.21
Pomatomus saltatrix	4.89	8	1.21
Octopus vulgaris	4.60	2	1.14
Grammoplites gruveli	4.59	98	1.14
Sardinella aurita	4.14	46	1.03	116
Lithognathus mormyrus	4.14	18	1.03
Sphyraena sphyraena	3.24	16	0.80
Fistularia petimba	2.76	196	0.69
Boops boops	2.33	42	0.58
Deepwater fish mixture	2.11	0	0.52
Pomadasys rogeri	1.96	4	0.49
Serranus accraensis	1.58	26	0.39
Dasyatis marmorata	1.51	4	0.37	0
Atractoscion aequidens	1.40	2	0.35
Brotula barbata	0.98	8	0.24
Argyrosomus inodorus	0.96	2	0.24
Alloteuthis africana	0.75	196	0.19
Scorpaena stephanica	0.75	8	0.19
Chilomycterus spinosus mauretanicus	0.72	4	0.18
Lepidotrigla carolae	0.45	12	0.11
Sepia orbignyana	0.30	12	0.07
Arnoglossus imperialis	0.15	8	0.04
Total	402.88		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 29
DATE :02/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°58.61
start stop duration Lon E 13°32.07
TIME :11:46:28 12:16:24 29.9 (min) Purpose : 3
LOG : 4375.33 4376.87 1.5 Region : 4040
FDEPTH: 102 103 Gear cond.: 0

BDEPTH: 102 103 Validity : 0
Towing dir: 0° Wire out : 270 m Speed : 3.1 kn
Sorted : 73 Total catch: 73.44 Catch/hour: 147.22

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Dentex barnardi	57.45	160	39.03	118
Lagocephalus laevigatus	10.10	20	6.86	
Zeus faber	9.98	26	6.78	
Lepidotrigla carolae	9.42	52	6.40	
Dentex angolensis	7.06	28	4.79	119
Pagellus bellottii	6.41	20	4.36	142
Atractoscion aequidens	6.05	4	4.11	
Raja miraletus	6.05	8	4.11	
Anthias anthias	4.83	38	3.28	
G A S T R O P O D S	4.25	527	2.89	
Erythrocles monodi	3.25	4	2.21	
Miscellaneous fishes	3.21	0	2.18	
Sarda sarda	3.15	2	2.14	
Umbrina canariensis	2.85	10	1.93	120
Torpedo marmorata	2.77	2	1.88	
Dentex gibbosus	1.76	2	1.20	
Chaetodon hoefleri	1.68	10	1.14	
Uranoscopus polli	1.60	4	1.09	
Dentex macrophthalmus	1.28	6	0.87	143
Citharus linguatula	0.96	40	0.65	
Sepia orbignyana	0.88	8	0.60	
Octopus vulgaris	0.68	2	0.46	
Sepia officinalis	0.56	2	0.38	
Chelidonichthys capensis	0.48	4	0.33	
Gorgorians yellow	0.24	0	0.16	
Scorpaena normani	0.12	2	0.08	
Sea urchin, weak spines	0.08	0	0.05	
Arnoglossus imperialis	0.04	2	0.03	
Total	147.22		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 30
DATE :02/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°58.92
start stop duration Lon E 13°29.85
TIME :13:28:03 13:57:46 29.7 (min) Purpose : 3
LOG : 4381.24 4382.73 1.5 Region : 4040
FDEPTH: 242 224 Gear cond.: 0
BDEPTH: 242 224 Validity : 0
Towing dir: 0° Wire out : 600 m Speed : 3.0 kn
Sorted : 102 Total catch: 1350.00 Catch/hour: 2725.44

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Synagrops microlepis	1191.84	77707	43.73	
Merluccius polli	523.79	2497	19.22	152
Chlorophthalmus atlanticus	382.21	13760	14.02	
Zenopsis conchifer	195.36	1571	7.17	
Pterothrissus belloci	102.74	985	3.77	
Rajella leopardus	66.52	52	2.44	
Bembrops heterurus	51.64	533	1.89	
Parapenaeus longirostris	45.24	7399	1.66	132
Dentex macrophthalmus	35.13	81	1.29	122
Malacocephalus occidentalis	26.61	266	0.98	
Sphoeroides cf. pachygaster	25.01	52	0.92	
Coelorinchus caelorhincus	11.71	293	0.43	
Lophiodes kempi	11.18	26	0.41	
Scorpaena normani	10.64	52	0.39	
Miracorvina angolensis	10.64	279	0.39	
Brotula barbata	8.52	26	0.31	
Miscellaneous fishes	7.45	0	0.27	
Laemonema laureysi	4.78	81	0.18	
Trigla lyra	4.78	26	0.18	
Mystriophis rostellatus	3.19	26	0.12	
Gephyroberyx darwini	3.19	81	0.12	
Syacium micrurum	1.59	52	0.06	
Illex coindetii	1.07	26	0.04	
Bathyuroconger vicinus	0.52	26	0.02	
Total	2725.38		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 31
DATE :02/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°57.48
start stop duration Lon E 13°28.25
TIME :15:03:17 15:33:23 30.1 (min) Purpose : 3
LOG : 4386.99 4388.52 1.5 Region : 4040
FDEPTH: 333 326 Gear cond.: 0
BDEPTH: 333 326 Validity : 0
Towing dir: 0° Wire out : 750 m Speed : 3.1 kn
Sorted : 62 Total catch: 1070.00 Catch/hour: 2132.18

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius polli	831.03	4599	38.98	123
Synagrops microlepis	383.23	37534	17.97	
Pterothrissus belloci	192.99	1277	9.05	
Hymenocephalus italicus	180.64	71235	8.47	
Nematocarcinus africanus	151.11	61008	7.09	
Zenopsis conchifer	118.82	275	5.57	
Laemonema laureysi	59.76	996	2.80	
Malacocephalus laevis	55.64	584	2.61	
Chlorophthalmus atlanticus	37.78	972	1.77	
Bassanago albescens	30.23	996	1.42	
Etmopterus spinax	21.96	137	1.03	
Miscellaneous fishes	13.73	0	0.64	
Myctophidae sp. X	9.62	893	0.45	
Aristeus varidens	8.25	962	0.39	124
Galeus polli	8.25	343	0.39	
Hoplostethus cadenati	6.87	171	0.32	
Lophius vaillanti	4.80	104	0.23	147
Coelorinchus sp.	4.12	343	0.19	
Parapenaeus longirostris	3.43	1510	0.16	133
Dicologoglossa cuneata	2.05	104	0.10	
Chaunax cf. pictus	2.05	171	0.10	
G A S T R O P O D S	1.37	379	0.06	
Trichiurus lepturus	1.37	171	0.06	
Eumunida squamifera	0.68	137	0.03	
Myctophidae sp. X	0.68	34	0.03	0
Peristedion cataphractum	0.68	205	0.03	
Solenocera africana	0.68	137	0.03	
Sudis sp.	0.34	34	0.02	
Total	2132.18		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 32
DATE :02/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°57.30
start stop duration Lon E 13°24.42
TIME :17:18:00 17:48:21 30.4 (min) Purpose : 3
LOG : 4395.49 4397.05 1.6 Region : 4040
FDEPTH: 439 429 Gear cond.: 0
BDEPTH: 439 429 Validity : 0
Towing dir: 0° Wire out : 1020 m Speed : 3.1 kn
Sorted : 48 Total catch: 230.00 Catch/hour: 454.70

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Stomias boa boa	135.62	3300	29.83	
Nematocarcinus africanus	106.17	190106	23.35	
Merluccius polli	92.97	24	20.45	125
Laemonema laureysi	22.95	2740	5.05	
Yarrella blackfordi	17.60	793	3.87	
Aristeus varidens	13.01	26145	2.86	127
Hoplostethus cadenati	12.62	6650	2.78	
Lophius vaillanti	11.09	20	2.44	126
Lamprogrammus exutus	10.71	3827	2.36	
Malacocephalus laevis	9.18	285	2.02	
Deepwater fish mixture	4.78	0	1.05	
Bathyurocongrus sp.	2.87	64053	0.63	
Trichiurus lepturus	2.10	71	0.46	
Todaropsis eblanae	2.01	2	0.44	
Callinectes sp.	1.63	97	0.36	
Xenodermichthys copei	1.53	285	0.34	
Coelorinchus sp.	1.34	18	0.29	
Halosaurus ovenii	1.34	2024	0.29	
Chlorophthalmus atlanticus	1.15	18	0.25	
Glyphus marsupialis	1.15	2706	0.25	
Triplophos hemingi	0.96	1046	0.21	
Conger conger	0.96	18	0.21	
Myctophum sp.	0.77	0	0.17	
Bufoceratias wedli	0.19	2	0.04	
Total	454.70		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 33
DATE :02/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°55.89
start stop duration Lon E 13°22.57
TIME :18:55:22 19:25:30 30.1 (min) Purpose : 3
LOG : 4401.99 4403.52 1.5 Region : 4040
FDEPTH: 512 507 Gear cond.: 0
BDEPTH: 512 507 Validity : 0
Towing dir: 0° Wire out : 1120 m Speed : 3.0 kn
Sorted : 29 Total catch: 315.00 Catch/hour: 627.07

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	166.61	64788	26.57	
Hoplostethus cadenati	105.48	35060	16.82	
Stomias boa boa	86.30	2678	13.76	
Aristeus varidens	75.92	739	12.11	128
Yarrella blackfordi	41.95	1837	6.69	
Trichiurus lepturus	33.56	539	5.35	
Lophius vaillanti	20.42	4	3.26	131
Lamprogrammus exutus	18.38	301	2.93	
Bathyurocongrus sp.	16.38	798	2.61	
Benthodesmus tenuis	7.99	20	1.27	
Chaceon maritae	7.56	30	1.21	129
Laemonema laureysi	7.19	380	1.15	
Etmopterus sp.	6.79	60	1.08	
Malacocephalus laevis	5.59	40	0.89	
Halosaurus ovenii	4.80	301	0.76	
Deepwater fish mixture	3.60	0	0.57	
Dicrolene intronigra	3.60	20	0.57	
Glyphus marsupialis	2.00	460	0.32	
Chlorophthalmus atlanticus	2.00	60	0.32	
Epigonus telescopus	2.00	20	0.32	
Xenodermichthys copei	1.60	199	0.25	
Triplophos hemingi	1.60	199	0.25	
Merluccius polli	1.55	2	0.25	130
Plesiopenaeus edwardsianus	0.80	20	0.13	
POLYCHAELIDAE	0.80	100	0.13	
Bufoceratias wedli	0.80	119	0.13	
Ariomma bondi	0.80	20	0.13	
Ebinania costaecanarie	0.40	20	0.06	
Bathynectes piperitus	0.40	40	0.06	
Bajacalifornia megalops	0.20	40	0.03	
Total	627.08		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 34
DATE :02/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°56.36
start stop duration Lon E 13°21.13
TIME :21:16:40 21:46:47 30.1 (min) Purpose : 3
LOG : 4410.34 4411.93 1.6 Region : 4040
FDEPTH: 608 605 Gear cond.: 0
BDEPTH: 608 605 Validity : 0
Towing dir: 0° Wire out : 1300 m Speed : 3.2 kn
Sorted : 36 Total catch: 205.00 Catch/hour: 408.37

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
PANDALIDAE	153.86	40173	37.68	
Hoplostethus cadenati	58.22	2211	14.26	
Stomias boa boa	54.34	1337	13.31	
Lophius vaillanti	19.64	2	4.81	135
Lamprogrammus exutus	18.98	120	4.65	
Yarrella blackfordi	18.76	474	4.59	
Chaceon maritae	14.45	76	3.54	136
Triplophos hemingi	13.15	1649	3.22	
Aristeus varidens	12.72	1090	3.12	137
Gonostoma denudatum	7.33	582	1.80	
Deepwater fish mixture	6.89	0	1.69	
Stereomastis sp.	4.75	594	1.16	
Merluccius polli	3.63	4	0.89	134
Nezumia sp.	3.02	215	0.74	
Melichthys niger	2.37	151	0.58	
Xenodermichthys copei	2.37	151	0.58	
Bathyuroconger vicinus	2.16	64	0.53	
Chlorophthalmus atlanticus	1.51	32	0.37	
SEAWEED	1.29	0	0.32	
Ophisurus serpens	1.19	10	0.29	
MELANONIDAE	1.08	10	0.26	
Talismania longifilis	1.08	129	0.26	
Centrophorus squamosus	0.86	44	0.21	
Bajacalifornia megalops	0.86	54	0.21	
Porogadus sp.	0.65	98	0.16	
Nemichthys scolopaceus	0.43	44	0.11	
GONOSTOMATIDAE	0.43	10	0.11	
Ebinania costaecanarie	0.43	22	0.11	
Glyphus marsupialis	0.43	32	0.11	
Ommastrephes bartrami	0.43	10	0.11	
UNIDENTIFIED FISH	0.40	2	0.10	
Plesionika martia	0.22	64	0.05	
Dibranchus atlanticus	0.22	22	0.05	
Halosaurus ovenii	0.22	10	0.05	
Total	408.37		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 35
DATE :02/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°51.43
start stop duration Lon E 13°18.39
TIME :23:14:23 23:44:54 30.5 (min) Purpose : 3
LOG : 4417.99 4419.63 1.6 Region : 4040
FDEPTH: 724 717 Gear cond.: 0
BDEPTH: 724 717 Validity : 0
Towing dir: 0° Wire out : 1600 m Speed : 3.2 kn
Sorted : 19 Total catch: 127.35 Catch/hour: 250.44

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Lamprogrammus exutus	31.13	102	12.43	
J E L L Y F I S H	28.20	0	11.26	
Bathyuroconger vicinus	25.72	326	10.27	
Yarrella blackfordi	23.01	700	9.19	
Etmopterus spinax	22.79	181	9.10	
Nezumia sp.	21.44	541	8.56	
Hoplostethus cadenati	16.70	338	6.67	
Stomias boa boa	14.22	417	5.68	

Deepwater fish mixture	9.24	0	3.69	
Aristeus varidens	7.91	486	3.16	139
Bajacalifornia megalops	7.91	147	3.16	
Chaceon maritae	6.45	35	2.58	138
Stereomastis sp.	5.41	960	2.16	
Aristeus varidens	4.07	486	1.63	140
Dicrolene intronigra	3.38	236	1.35	
Gonostoma denudatum	2.71	226	1.08	
MELANONIDAE	2.48	22	0.99	
Malacosteus niger	2.48	112	0.99	
Halosaurus ovenii	2.48	450	0.99	
Bathophilus sp.	2.03	22	0.81	
Nezumia sp.	2.03	12	0.81	0
Eggs of ray	1.57	12	0.63	
Triplophos hemingi	1.12	136	0.45	
Porogadus sp.	1.12	181	0.45	
Plesionika sp.	0.90	67	0.36	
Munidopsis chuni	0.90	553	0.36	
S H R I M P S	0.67	22	0.27	
Glyphus marsupialis	0.67	22	0.27	
Synaphobranchus kaupii	0.45	12	0.18	
Dibranchus atlanticus	0.22	33	0.09	
Lampanyctus australis	0.22	22	0.09	
Plesiopenaeus edwardsianus	0.22	22	0.09	
Argyropelecus sp.	0.12	12	0.05	
Lampanyctodes hectoris	0.12	12	0.05	
Melanocetus johnsoni	0.12	22	0.05	
Bufoceratias wedli	0.12	12	0.05	
PAGUROIDEA	0.12	12	0.05	
Metal waste	0.02	4	0.01	
Total	250.44		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 36
DATE :03/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°41.51
start stop duration Lon E 13°18.06
TIME :02:17:09 02:48:05 30.9 (min) Purpose : 3
LOG : 4427.93 4429.38 1.4 Region : 4040
FDEPTH: 654 651 Gear cond.: 0
BDEPTH: 654 651 Validity : 0
Towing dir: 0° Wire out : 1390 m Speed : 2.8 kn
Sorted : 24 Total catch: 180.00 Catch/hour: 349.18

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Stomias boa boa	74.72	1717	21.40	
Aristeus varidens	60.81	0	17.42	157
Hoplostethus cadenati	33.89	1187	9.71	
Lamprogrammus exutus	28.96	217	8.29	
Yarrella blackfordi	20.85	347	5.97	
Ebinania costaecanarie	19.40	29	5.56	
Nezumia sp1	13.91	580	3.98	
Zameus (Scymnodon) squamulosus	13.91	101	3.98	
Bathyuroconger vicinus	12.74	405	3.65	
Bajacalifornia megalops	9.27	477	2.66	
Talismania antillarum	8.69	464	2.49	
Astronesthes niger	7.82	535	2.24	
Stereomastis sculpta	7.24	1117	2.07	
Deepwater fish mixture	6.65	0	1.91	
Halosaurus ovenii	5.22	58	1.49	
Triplophos hemingi	4.93	522	1.41	
Chaceon maritae	4.89	41	1.40	156
Gonostoma denudatum	3.18	246	0.91	
Porogadus sp.	2.89	289	0.83	
Xenodermichthys copei	1.75	101	0.50	
Lophius vaillanti	1.26	4	0.36	141
Heterocarpus ensifer	1.16	204	0.33	
Benthodesmus tenuis	0.87	29	0.25	
Glyphus marsupialis	0.87	159	0.25	
Nemichthys scolopaceus	0.87	58	0.25	
Dicrolene intronigra	0.87	87	0.25	
EGGS	0.58	14	0.17	
Munidopsis chuni	0.29	101	0.08	
Bufoceratias wedli	0.29	29	0.08	
Dibranchus atlanticus	0.29	29	0.08	
Bathynectes sp.	0.14	29	0.04	
Total	349.23		100.02	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 37
DATE :03/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°41.58
start stop duration Lon E 13°19.34
TIME :03:57:35 04:27:41 30.1 (min) Purpose : 3
LOG : 4433.01 4434.52 1.5 Region : 4040
FDEPTH: 537 533 Gear cond.: 0
BDEPTH: 537 533 Validity : 0
Towing dir: 0° Wire out : 1160 m Speed : 3.0 kn
Sorted : 40 Total catch: 404.92 Catch/hour: 807.15

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Lamprogrammus exutus	479.42	9580	59.40	
Stomias boa boa	92.83	1399	11.50	
Nematocarcinus africanus	70.03	24024	8.68	
Aristeus varidens	43.61	3684	5.40	148
Lophius vaillanti	22.41	20	2.78	150
Todaropsis eblanae	18.00	60	2.23	
Chaceon maritae	17.60	120	2.18	149
Merluccius polli	14.79	20	1.83	151
Hoplostethus cadenati	10.80	560	1.34	
Centrophorus granulosus	7.93	2	0.98	
Laemonema laureysi	6.80	80	0.84	
Miscellaneous fishes	3.59	0	0.44	
Dicrolene intronigra	3.19	140	0.40	
Coelorinchus acanthiger	2.79	40	0.35	
Ariomma bondi	1.99	60	0.25	
Bathyuroconger vicinus	1.59	159	0.20	
Yarrella blackfordi	1.59	140	0.20	
Stereomastis sp.	1.20	540	0.15	
Selachophidium sp.	0.80	140	0.10	
Xenodermichthys copei	0.80	80	0.10	
Bufoceratias wedli	0.80	60	0.10	
Plesiopenaeus edwardsianus	0.80	40	0.10	
J E L L Y F I S H	0.40	60	0.05	
Dicrolene sp.	0.40	20	0.05	
Triplophos hemingi	0.40	60	0.05	
Bathynectes sp.	0.40	159	0.05	
Nemichthys scolopaceus	0.40	60	0.05	
Halosaurus ovenii	0.40	20	0.05	
Pteroctopus sp.	0.40	20	0.05	
Chlorophthalmus atlanticus	0.40	40	0.05	
Arnoglossus imperialis	0.40	20	0.05	
MYCTOPHIDAE	0.20	100	0.02	
Total	807.15		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 38
DATE :03/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°45.02
start stop duration Lon E 13°21.20
TIME :05:46:14 06:17:03 30.8 (min) Purpose : 3
LOG : 4437.73 4439.32 1.6 Region : 4040
FDEPTH: 438 440 Gear cond.: 0
BDEPTH: 438 440 Validity : 0
Towing dir: 0° Wire out : 990 m Speed : 3.1 kn
Sorted : 69 Total catch: 430.00 Catch/hour: 837.12

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Merluccius polli	282.48	356	33.74	144
Lophius vaillanti	189.11	261	22.59	146
Nematocarcinus africanus	111.65	39878	13.34	
Hoplostethus cadenati	73.88	3290	8.83	
Malacocephalus laevis	28.50	202	3.40	
Laemonema laureysi	26.13	1402	3.12	
Etmopterus sp.	16.14	273	1.93	
Neoharriotta pinnata	13.90	14	1.66	
Yarrella blackfordi	13.76	498	1.64	
Dicrolene intronigra	13.06	475	1.56	
Aristeus varidens	10.69	950	1.28	145
Stomias boa boa	10.20	310	1.22	
Hymenocephalus italicus	8.78	785	1.05	
Ariomma bondi	7.85	214	0.94	
Glyphus marsupialis	6.40	2375	0.77	
Zameus (Scymnodon) squamulosus	6.40	35	0.77	
Dibranchus atlanticus	3.11	226	0.37	
Bassanago albescens	2.38	95	0.28	
Amphioctopus aegina	2.12	12	0.25	
Bathynectes piperitus	1.89	35	0.23	
Miscellaneous fishes	1.89	0	0.23	
Benthodesmus tenuis	1.19	47	0.14	
Coelorinchus sp.	0.93	47	0.11	
Todaropsis eblanae	0.93	23	0.11	
Trichiurus lepturus	0.72	12	0.09	
SCORPAENIDAE	0.70	12	0.08	
Nemichthys scolopaceus	0.70	119	0.08	
Halosaurus ovenii	0.70	72	0.08	
Chlorophthalmus atlanticus	0.47	23	0.06	
Xenodermichthys copei	0.23	35	0.03	
Total	836.90		99.97	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 39
DATE :03/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°45.28
start stop duration Lon E 13°23.59
TIME :07:19:40 07:50:27 30.8 (min) Purpose : 3
LOG : 4443.27 4444.81 1.5 Region : 4040
FDEPTH: 331 331 Gear cond.: 0
BDEPTH: 331 331 Validity : 0
Towing dir: 0° Wire out : 750 m Speed : 3.0 kn
Sorted : 32 Total catch: 630.00 Catch/hour: 1227.67

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Chlorophthalmus atlanticus	362.26	10985	29.51	
Merluccius polli	200.05	945	16.30	153
Lophius vaillanti	166.22	437	13.54	154
Pterothrissus belloci	125.13	910	10.19	
Laemonema laureysi	83.66	910	6.81	
Hymenocephalus italicus	63.29	17421	5.16	
Zenopsis conchifer	45.29	88	3.69	
Synagrops microlepis	34.18	2874	2.78	
Nematocarcinus africanus	34.18	15385	2.78	
Eumunida squamifera	24.01	5456	1.96	
Pontinus sp.	21.10	0	1.72	
Deepwater fish mixture	19.64	0	1.60	
Malacocephalus laevis	13.82	146	1.13	
Plesionika longirostris	5.83	399	0.47	155
Illex coindetii	5.09	37	0.41	
Trichiurus lepturus	5.03	6	0.41	
Bathynectes sp.	4.37	37	0.36	
Helicolenus dactylopterus	3.64	37	0.30	
Calappa pelii	3.64	37	0.30	
Bassanago albescens	2.90	37	0.24	
MYCTOPHIDAE	2.18	1128	0.18	
Todaropsis eblanae	2.18	692	0.18	
Total	1227.69		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 40
DATE :03/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°43.86
start stop duration Lon E 13°25.19
TIME :08:53:20 09:24:30 31.1 (min) Purpose : 3
LOG : 4447.78 4449.32 1.5 Region : 4040
FDEPTH: 252 251 Gear cond.: 0
BDEPTH: 252 251 Validity : 0
Towing dir: 0° Wire out : 600 m Speed : 2.9 kn
Sorted : 71 Total catch: 1180.00 Catch/hour: 2272.87

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Synagrops microlepis	1298.22	87902	57.12	
Merluccius polli	277.62	1633	12.21	158
Trichiurus lepturus	183.43	277	8.07	
Pterothrissus belloci	112.64	93	4.96	
Laemonema laureysi	70.79	370	3.11	
Bembrops greyi	65.87	586	2.90	
Scorpaena normani	59.09	277	2.60	
UNIDENTIFIED FISH	49.25	953	2.17	
Brotula barbata	45.57	44	2.01	
Parapenaeus longirostris	34.48	4093	1.52	161
TETRAODONTIDAE	22.77	31	1.00	
Zenopsis conchifer	20.80	48	0.92	
Loligo vulgaris	8.61	616	0.38	
Malacocephalus occidentalis	7.99	154	0.35	
Syacium micrurum	4.93	277	0.22	
Deepwater fish mixture	4.31	0	0.19	
Lophius vaillanti	3.93	6	0.17	160
Dentex macrophthalmus	1.77	4	0.08	159
Zeus faber	0.77	2	0.03	
Total	2272.85		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 41
DATE :03/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°44.39
start stop duration Lon E 13°28.26
TIME :10:11:06 10:28:00 16.9 (min) Purpose : 3
LOG : 4453.36 4454.28 0.9 Region : 4040
FDEPTH: 164 161 Gear cond.: 0
BDEPTH: 164 161 Validity : 0
Towing dir: 0° Wire out : 430 m Speed : 3.2 kn
Sorted : 35 Total catch: 1085.00 Catch/hour: 3852.07

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Synagrops microlepis	3201.31	374627	83.11	
TETRAODONTIDAE	199.14	320	5.17	
Zenopsis conchifer	145.61	213	3.78	
Zeus faber	139.19	430	3.61	
Torpedo torpedo	47.11	107	1.22	
Dentex angolensis	34.72	82	0.90	162
Brotula barbata	25.63	57	0.67	
Dentex macrophthalmus	25.28	103	0.66	163
Trichiurus lepturus	18.96	25	0.49	
Lepidotrigla carolae	12.85	107	0.33	
Umbrina canariensis	2.27	7	0.06	164
Total	3852.07		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 42
DATE :03/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°47.62
start stop duration Lon E 13°40.66

TIME :13:22:04 13:52:22 30.3 (min) Purpose : 3
LOG : 4469.73 4471.59 1.9 Region : 4040
FDEPTH: 66 63 Gear cond.: 0
BDEPTH: 66 63 Validity : 0
Towing dir: 0° Wire out : 210 m Speed : 3.7 kn
Sorted : 68 Total catch: 380.00 Catch/hour: 752.23

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	229.11	6449	30.46	
Trachurus trecae	117.25	2096	15.59	166
Pagellus bellottii	93.28	1198	12.40	165
Pseudupeneus prayensis	46.34	649	6.16	
Sphyraena sphyraena	45.23	420	6.01	
Boops boops	37.35	820	4.97	
Rhinobatos albomaculatus	33.22	14	4.42	
Citharus linguatula	22.76	1299	3.03	
Raja miraletus	21.18	48	2.82	
Lagocephalus laevigatus	16.37	59	2.18	
Lithognathus mormyrus	13.58	40	1.81	
Sepia orbignyana	13.14	16	1.75	
Zeus faber	10.59	20	1.41	
Fistularia petimba	6.85	8	0.91	
Grammoplites gruveli	6.39	180	0.85	
Miscellaneous fishes	6.20	0	0.82	
Dentex barnardi	5.60	59	0.74	167
Pomadasys incisus	4.59	20	0.61	
Serranus cabrilla	4.39	69	0.58	
Octopus vulgaris	3.21	4	0.43	
Engraulis encrasicolus	2.99	538	0.40	
Alloteuthis africana	2.79	723	0.37	
Lepidotrigla carolae	2.20	79	0.29	
Dentex congoensis	1.80	99	0.24	
Scomber japonicus	1.41	10	0.19	
Chaetodon hoefleri	1.21	10	0.16	
Saurida brasiliensis	0.99	170	0.13	
Sardinella aurita	0.99	10	0.13	
Sepia officinalis	0.79	30	0.11	
Chelidonichthys gabonensis	0.40	10	0.05	
Total	752.21		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 43
DATE :03/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°44.21
start stop duration Lon E 13°44.04
TIME :14:39:07 15:09:44 30.6 (min) Purpose : 3
LOG : 4475.96 4477.87 1.9 Region : 4040
FDEPTH: 33 34 Gear cond.: 0
BDEPTH: 33 34 Validity : 0
Towing dir: 0° Wire out : 130 m Speed : 3.7 kn
Sorted : 72 Total catch: 205.00 Catch/hour: 401.70

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	127.23	7082	31.67	169
Pagellus bellottii	80.08	2338	19.94	171
Trachurus trecae	79.20	1585	19.72	170
Sepia officinalis	41.56	78	10.35	
Pseudupeneus prayensis	34.41	703	8.57	
Lagocephalus laevigatus	8.82	27	2.20	
Pomadasys incisus	5.47	45	1.36	172
Zeus faber	4.92	45	1.22	
Fistularia petimba	4.92	6	1.22	
Miscellaneous fishes	3.47	0	0.86	
Citharus linguatula	3.23	229	0.80	
Sardinella aurita	2.02	39	0.50	174
Dentex barnardi	1.78	33	0.44	173
Bembrops heterurus	1.78	106	0.44	
Cynoglossus canariensis	1.57	12	0.39	
Psettodes belcheri	0.90	12	0.22	
Syacium micrurum	0.22	18	0.05	
Loligo vulgaris	0.12	45	0.03	
Total	401.70		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 44
DATE :03/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°33.10
start stop duration Lon E 13°35.51
TIME :16:34:27 17:04:47 30.3 (min) Purpose : 3
LOG : 4490.50 4492.13 1.6 Region : 4040
FDEPTH: 62 60 Gear cond.: 0
BDEPTH: 62 60 Validity : 0
Towing dir: 0° Wire out : 230 m Speed : 3.2 kn
Sorted : 76 Total catch: 230.00 Catch/hour: 454.85

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pagellus bellottii	195.66	583	43.02	187
Sepia orbignyana	44.34	30	9.75	
Bembrops anatirostris	25.79	787	5.67	
Pseudupeneus prayensis	25.19	607	5.54	
Citharus linguatula	21.93	1370	4.82	
Boops boops	16.10	1319	3.54	
Lagocephalus lagocephalus	14.81	36	3.26	
Raja miraletus	13.07	24	2.87	
Miscellaneous fishes	11.79	0	2.59	
Pomadasys incisus	9.57	24	2.10	180
Dentex angolensis	8.86	275	1.95	178
Serranus cabrilla	8.17	6	1.80	
Dasyatis marmorata	6.92	2	1.52	
Pomatomus saltatrix	6.76	6	1.49	
Alloteuthis africana	5.95	2555	1.31	
Dentex barnardi	5.14	57	1.13	176
Cynoglossus browni	4.07	140	0.90	
Fistularia petimba	3.97	4	0.87	
Brotula barbata	3.74	6	0.82	
Chelidonichthys gabonensis	3.03	36	0.67	
G A S T R O P O D S	2.81	431	0.62	
Octopus vulgaris	2.57	6	0.57	
Pseudotolithus typus	2.53	4	0.56	
Umbrina canariensis	2.33	18	0.51	177
Sphyraena sphyraena	2.14	8	0.47	
Trachurus trecae	1.64	24	0.36	179
Argyrosomus hololepidotus	1.54	4	0.34	
Atractoscion aequidens	1.50	2	0.33	
Saurida brasiliensis	0.93	152	0.20	
Branchiostegus semifasciatus	0.93	6	0.20	
Sepiola atlantica	0.57	57	0.13	
Syacium gunteri	0.47	30	0.10	
Total	454.85		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 45
DATE :03/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°31.50
start stop duration Lon E 13°29.59
TIME :18:05:41 18:35:48 30.1 (min) Purpose : 3
LOG : 4499.12 4500.60 1.5 Region : 4040
FDEPTH: 104 103 Gear cond.: 0
BDEPTH: 104 103 Validity : 0
Towing dir: 0° Wire out : 275 m Speed : 3.0 kn
Sorted : 82 Total catch: 250.00 Catch/hour: 498.01

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Citharus linguatula	91.77	1705	18.43	
Brotula barbata	83.53	88	16.77	
Pterothrissus belloci	82.59	753	16.58	
Trigla lyra	48.47	329	9.73	
Octopus vulgaris	36.71	88	7.37	
Dentex angolensis	34.12	235	6.85	175
Raja miraletus	31.41	48	6.31	
Torpedo torpedo	20.00	60	4.02	
Chelidonichthys capensis	16.47	88	3.31	
Squatina oculata	13.17	6	2.64	
Scorpaena normani	9.88	100	1.98	
Sepia officinalis	8.23	100	1.65	
Zeus faber	5.30	24	1.06	
Conger conger	4.94	36	0.99	
Pagellus bellottii	3.53	18	0.71	181
Bembrops greyi	1.99	141	0.40	
Deepwater fish mixture	1.77	0	0.36	
Umbrina canariensis	0.82	6	0.16	182
Boops boops	0.82	64	0.16	
Conger sp.	0.70	36	0.14	
Pontinus sp.	0.70	36	0.14	
G A S T R O P O D S	0.60	135	0.12	
Laemonema laureysi	0.36	6	0.07	
Lagocephalus laevigatus	0.06	6	0.01	
Squilla mantis	0.06	6	0.01	
Total	497.99		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 46
DATE :03/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°30.07
start stop duration Lon E 13°23.43
TIME :20:13:19 20:43:26 30.1 (min) Purpose : 3
LOG : 4509.83 4511.40 1.6 Region : 4040
FDEPTH: 280 285 Gear cond.: 0
BDEPTH: 280 285 Validity : 0
Towing dir: 0° Wire out : 725 m Speed : 3.1 kn
Sorted : 31 Total catch: 295.00 Catch/hour: 587.45

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Merluccius polli	302.79	1738	51.54	188
Laemonema laureysi	74.39	1010	12.66	
Chlorophthalmus atlanticus	49.72	785	8.46	
Hoplostethus cadenati	21.31	579	3.63	
Parapenaeus longirostris	20.93	4299	3.56	
Pterothrissus belloci	20.93	225	3.56	
Bembrops heterurus	19.81	392	3.37	
Deepwater fish mixture	13.08	0	2.23	
Galeus polli	11.22	205	1.91	
Zenopsis conchifer	11.22	56	1.91	
Scorpaena normani	10.47	149	1.78	
S H R I M P S	6.73	504	1.15	
Aristeus varidens	5.61	486	0.95	
Epigonus telescopus	3.36	94	0.57	
Dicrolene intronigra	2.99	18	0.51	
Coelorinchus caelorhincus	2.99	76	0.51	
Calappa pelii	2.24	38	0.38	
Venefica proboscidea	1.87	18	0.32	
MYCTOPHIDAE	1.50	822	0.25	
Synagrops microlepis	1.12	94	0.19	
Glyphus marsupialis	1.12	468	0.19	
Hymenocephalus italicus	1.12	579	0.19	
Bathyuroconger sp.	0.75	18	0.13	
Peristedion cataphractum	0.19	38	0.03	
Total	587.45		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 47
DATE :03/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°29.63
start stop duration Lon E 13°22.00
TIME :21:39:47 22:10:55 31.1 (min) Purpose : 3
LOG : 4515.07 4516.62 1.6 Region : 4040
FDEPTH: 380 385 Gear cond.: 0
BDEPTH: 380 385 Validity : 0
Towing dir: 0° Wire out : 855 m Speed : 3.0 kn
Sorted : 30 Total catch: 520.00 Catch/hour: 1002.25

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	329.18	78187	32.84	
Yarrella blackfordi	166.89	4520	16.65	
Merluccius polli	89.28	141	8.91	183
Hoplostethus cadenati	87.99	3793	8.78	
Laemonema laureysi	86.77	1517	8.66	
Stomias boa boa	77.06	1486	7.69	
Aristeus varidens	62.51	4946	6.24	184
Malacocephalus occidentalis	22.47	303	2.24	
Chlorophthalmus atlanticus	12.74	364	1.27	
Etmopterus sp.	12.43	638	1.24	
Chaunax pictus	10.33	607	1.03	
Halosaurus ovenii	7.29	545	0.73	
Coelorinchus polli	6.67	274	0.67	
Epigonus telescopus	6.07	60	0.61	
Benthodesmus tenuis	4.26	91	0.43	
Bathyuroconger vicinus	3.64	333	0.36	
Munidopsis sp.	3.03	638	0.30	
Lamprogrammus exutus	3.03	31	0.30	
Bathynectes piperitus	2.12	91	0.21	
Xenodermichthys copei	1.81	212	0.18	
MYCTOPHIDAE	1.81	1093	0.18	
Nemichthys scolopaceus	1.81	121	0.18	
Galeus polli	1.81	31	0.18	
Triplophos hemingi	0.60	91	0.06	
Acanthephyra sp.	0.31	152	0.03	
BOTHIDAE	0.31	31	0.03	
Metal waste	0.04	2	0.00	
Total	1002.25		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 48
DATE :04/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°30.21
start stop duration Lon E 13°21.07
TIME :00:07:42 00:35:35 27.9 (min) Purpose : 3
LOG : 4523.51 4524.88 1.4 Region : 4040
FDEPTH: 426 434 Gear cond.: 0
BDEPTH: 426 434 Validity : 0
Towing dir: 0° Wire out : 960 m Speed : 3.0 kn
Sorted : 35 Total catch: 320.00 Catch/hour: 688.91

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Stomias boa boa	403.87	7651	58.62	
Nematocarcinus africanus	116.89	31165	16.97	
Aristeus varidens	30.68	2777	4.45	186
Laemonema laureysi	29.13	2078	4.23	
Yarrella blackfordi	27.96	1358	4.06	
Lamprogrammus exutus	18.64	525	2.71	
Xenodermichthys copei	6.99	1087	1.01	
Malacocephalus occidentalis	5.83	97	0.85	
Hoplostethus cadenati	5.44	291	0.79	
Bathynectes piperitus	5.04	136	0.73	
Miscellaneous fishes	4.27	0	0.62	
Ommastrephes bartrami	4.26	19	0.62	
Trachipterus trachypterus	4.13	6	0.60	
Nemichthys scolopaceus	3.88	252	0.56	
Chlorophthalmus atlanticus	3.49	116	0.51	
Lophius vaillanti	3.44	11	0.50	185
Triplophos hemingi	3.11	426	0.45	

Bathyuroconger vicinus	1.98	194	0.29
Benthodesmus tenuis	1.94	58	0.28
Solenocera africana	1.16	155	0.17
Halosaurus ovenii	1.16	116	0.17
Bassanago albescens	1.16	19	0.17
Plesionika martia	1.16	194	0.17
BOTHIDAE	1.16	39	0.17
MYCTOPHIDAE	0.78	719	0.11
Malacosteus niger	0.78	39	0.11
Plesiopenaeus edwardsianus	0.39	19	0.06
Sergestes sp.	0.19	19	0.03
Total	688.91		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 49
DATE :04/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°27.89
start stop duration Lon E 13°21.21
TIME :02:27:41 02:58:00 30.3 (min) Purpose : 3
LOG : 4531.08 4532.59 1.5 Region : 4040
FDEPTH: 546 554 Gear cond.: 0
BDEPTH: 546 554 Validity : 0
Towing dir: 0° Wire out : 1230 m Speed : 3.0 kn
Sorted : 24 Total catch: 165.00 Catch/hour: 326.41

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	129.63	40506	39.72	
Aristeus varidens	66.42	5185	20.35	190
Stomias boa boa	62.22	1555	19.06	
Lophius vaillanti	20.26	2	6.21	
Lamprogrammus exutus	7.90	186	2.42	
Triplophos hemingi	6.17	803	1.89	
Yarrella blackfordi	4.69	136	1.44	
Chlorophthalmus agassizi	3.70	99	1.13	
Hoplostethus cadenati	3.70	186	1.13	
Chaceon maritae	2.77	18	0.85	189
POLYCHAELIDAE	2.47	235	0.76	
Merluccius polli	2.29	2	0.70	
Bassanago albescens	1.48	24	0.45	
Bathyuroconger vicinus	1.48	73	0.45	
Glyphus marsupialis	1.23	495	0.38	
Laemonema laureysi	0.99	12	0.30	
Halosaurus ovenii	0.99	38	0.30	
JELLYFISH	0.99	0	0.30	
Myctophidae sp. small/mix	0.99	506	0.30	
Xenodermichthys copei	0.99	148	0.30	
Dicrolene intronigra	0.74	24	0.23	
Nezumia milleri	0.74	99	0.23	
Trachipterus trachypterus	0.63	2	0.19	
Plesiopenaeus edwardsianus	0.49	38	0.15	
Benthodesmus tenuis	0.49	12	0.15	
Heterocarpus grimaldii	0.49	87	0.15	
Ebinania costaecanarie	0.49	12	0.15	
Bathynectes piperitus	0.25	73	0.08	
Plesionika sp.	0.25	38	0.08	
Dibranchus atlanticus	0.12	24	0.04	
Bufoceratias wedli	0.12	12	0.04	
Nemichthys scolopaceus	0.12	136	0.04	
Plastic	0.06	2	0.02	
Metal waste	0.02	2	0.01	
Total	326.41		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 50
DATE :04/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°13.68
start stop duration Lon E 13°27.85
TIME :05:32:09 06:02:45 30.6 (min) Purpose : 3
LOG : 4546.78 4548.38 1.6 Region : 4040
FDEPTH: 522 520 Gear cond.: 0
BDEPTH: 522 520 Validity : 0
Towing dir: 0° Wire out : 1220 m Speed : 3.1 kn
Sorted : 35 Total catch: 170.00 Catch/hour: 333.33

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	167.82	44347	50.35	
Laemonema laureysi	53.10	257	15.93	
Aristeus varidens	34.51	3518	10.35	
Stomias boa boa	15.75	378	4.72	
Lamprogrammus exutus	11.37	351	3.41	
Ariomma bondi	9.10	247	2.73	
Hoplostethus cadenati	5.88	257	1.76	
Yarrella blackfordi	5.12	171	1.54	
Triplophos hemingi	4.27	247	1.28	
Scyllaridae	3.22	427	0.96	
Chlorophthalmus atlanticus	2.65	67	0.79	
Heterocarpus grimaldii	2.47	712	0.74	
Todaropsis eblanae	2.47	10	0.74	
Glyphus marsupialis	2.08	712	0.62	
SOLEIDAE	2.08	133	0.62	
Chaceon maritae	1.51	10	0.45	
MYCTOPHIDAE	1.14	1043	0.34	
Nemichthys scolopaceus	1.14	47	0.34	
Dicrolene intronigra	1.14	47	0.34	
Plastic	0.98	2	0.29	
HISTIOTEUTHIDAE	0.94	10	0.28	
Xenodermichthys copei	0.94	104	0.28	
Halosaurus ovenii	0.57	37	0.17	
Waste General	0.39	2	0.12	
Synagrops microlepis	0.37	29	0.11	
Bathyuroconger vicinus	0.37	20	0.11	
Bathynectes piperitus	0.37	94	0.11	
Parapandalus narval	0.37	57	0.11	
Nezumia sp.	0.20	29	0.06	
Ebinania costaecanarie	0.20	10	0.06	
Etmopterus sp.	0.20	10	0.06	
Caristius groenlandicus	0.20	20	0.06	
Coelorinchus acanthiger	0.10	10	0.03	
Bassanago albescens	0.10	10	0.03	
Bufoceratias wedli	0.10	10	0.03	
Chaunax cf. pictus	0.10	10	0.03	
Total	333.29		99.99	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 51
DATE :04/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°12.26
start stop duration Lon E 13°29.62
TIME :07:04:55 07:33:54 29.0 (min) Purpose : 3
LOG : 4552.28 4553.68 1.4 Region : 4040
FDEPTH: 413 415 Gear cond.: 0
BDEPTH: 413 415 Validity : 0
Towing dir: 0° Wire out : 920 m Speed : 2.9 kn
Sorted : 29 Total catch: 390.00 Catch/hour: 807.17

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	258.73	71164	32.05	
Stomias boa boa	125.01	2562	15.49	
Yarrella blackfordi	62.50	1921	7.74	
Halosaurus ovenii	61.99	923	7.68	
Synagrops microlepis	57.38	4508	7.11	
Laemonema laureysi	35.35	410	4.38	
Aristeus varidens	29.20	2306	3.62	197
Merluccius polli	25.25	48	3.13	195
Neoharriotta pinnata	21.36	17	2.65	
Hymenocephalus italicus	17.42	1691	2.16	
Chaceon maritae	17.42	52	2.16	198
Dicrolene intronigra	12.81	410	1.59	
Illex coindetii	9.99	103	1.24	
Etmopterus sp.	9.73	1020	1.21	
Lophius vaillanti	9.23	19	1.14	196
Glyphus marsupialis	9.22	4201	1.14	
Triplophos hemingi	8.71	3688	1.08	
Benthodesmus tenuis	6.15	205	0.76	
Plesiopenaeus edwardsianus	4.61	153	0.57	
Hoplostethus cadenati	4.61	153	0.57	
Miscellaneous fishes	4.61	0	0.57	
Malacocephalus laevis	3.59	0	0.44	
Galeus polli	2.56	25	0.32	
Coelorinchus acanthiger	2.56	77	0.32	
Chlorophthalmus atlanticus	1.54	52	0.19	
MYCTOPHIDAE	1.54	590	0.19	
Solenocera africana	1.54	128	0.19	
Nemichthys scolopaceus	1.54	180	0.19	
Bathynectes piperitus	0.77	77	0.10	
Nezumia milleri	0.26	25	0.03	
Total	807.18		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 52
DATE :04/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°15.48
start stop duration Lon E 13°31.31
TIME :08:57:01 09:26:53 29.9 (min) Purpose : 3
LOG : 4557.24 4558.61 1.4 Region : 4040
FDEPTH: 329 333 Gear cond.: 0
BDEPTH: 329 333 Validity : 0
Towing dir: 0° Wire out : 760 m Speed : 2.7 kn
Sorted : 48 Total catch: 760.00 Catch/hour: 1527.13

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Merluccius polli	763.17	4300	49.97	199
Hymenocephalus italicus	134.68	37401	8.82	
Synagrops microlepis	127.09	7051	8.32	
Plesiopenaeus edwardsianus	113.18	37557	7.41	
Etmopterus sp.	92.95	7145	6.09	
Parapenaeus longirostris	87.26	12109	5.71	201
Pterothrissus belloci	53.74	412	3.52	
Malacocephalus occidentalis	19.60	315	1.28	
Miscellaneous fishes	18.97	0	1.24	
Laemonema laureysi	18.34	916	1.20	
Gephyroberyx darwini	15.17	32	0.99	
Zenopsis conchifer	12.38	16	0.81	
Chlorophthalmus atlanticus	8.85	380	0.58	
Centrophorus sp.	8.04	2	0.53	
Lophius vaillanti	7.57	127	0.50	200
MYCTOPHIDAE	6.95	2023	0.46	
Coelorinchus polli	6.32	189	0.41	
Gadella imberbis	6.32	253	0.41	
Heptranchias perlo	5.02	2	0.33	
Eumunida squamifera	3.79	1169	0.25	
OPHICHTHIDAE	3.79	32	0.25	
Bassanago albescens	3.79	315	0.25	
SCYLIORHINIDAE	3.16	32	0.21	
Peristedion cataphractum	1.90	442	0.12	
Ommastrephes bartrami	1.26	32	0.08	
Nemichthys scolopaceus	1.26	62	0.08	
Bathynectes piperitus	0.95	94	0.06	
Solenocera africana	0.63	62	0.04	
Chaunax pictus	0.63	62	0.04	
Venefica proboscidea	0.32	32	0.02	
Metal waste	0.00	2	0.00	
Total	1527.10		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 53
DATE :04/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°14.12
start stop duration Lon E 13°32.46
TIME :10:33:51 11:04:02 30.2 (min) Purpose : 3
LOG : 4563.38 4564.90 1.5 Region : 4040
FDEPTH: 271 272 Gear cond.: 0
BDEPTH: 271 272 Validity : 0
Towing dir: 0° Wire out : 670 m Speed : 3.0 kn
Sorted : 125 Total catch: 810.00 Catch/hour: 1610.34

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Zenopsis conchifer	537.86	2783	33.40	
Merluccius polli	365.06	1922	22.67	202
Bembrops greyi	127.35	1223	7.91	
Pterothrissus belloci	96.14	924	5.97	
Scorpaena normani	89.89	0	5.58	
Dentex macrophthalmus	83.65	175	5.19	203
Laemonema laureysi	81.65	624	5.07	
Synagrops microlepis	49.94	2783	3.10	
Coelorinchus polli	36.71	823	2.28	
Parapenaeus longirostris	23.97	2483	1.49	204
Brotula barbata	23.42	18	1.45	
Trichiurus lepturus	13.48	26	0.84	
MYCTOPHIDAE	11.49	3833	0.71	
Chlorophthalmus atlanticus	11.24	461	0.70	
Lophius vaillanti	10.97	4	0.68	216
Miscellaneous fishes	9.99	0	0.62	
Lophiodes kempi	8.99	16	0.56	215
Malacocephalus occidentalis	6.74	62	0.42	
Saurida brasiliensis	4.99	12	0.31	
Ruvettus pretiosus	4.57	2	0.28	
Conger conger	3.75	76	0.23	
OPHICHTHIDAE	2.75	12	0.17	
Epigonus telescopus	2.00	26	0.12	
Syacium micrurum	1.75	76	0.11	
Ommastrephes sp.	1.25	50	0.08	
Calappa pelii	0.75	12	0.05	
Total	1610.34		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 54
DATE :04/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°11.07
start stop duration Lon E 13°35.91
TIME :12:19:21 12:49:29 30.1 (min) Purpose : 3
LOG : 4570.43 4571.93 1.5 Region : 4040
FDEPTH: 153 145 Gear cond.: 0
BDEPTH: 153 145 Validity : 0
Towing dir: 0° Wire out : 380 m Speed : 3.0 kn
Sorted : 29 Total catch: 270.00 Catch/hour: 537.85

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pterothrissus belloci	129.40	910	24.06	
Zenopsis conchifer	102.37	759	19.03	
Zeus faber	53.77	137	10.00	
Merluccius polli	49.51	637	9.21	207
Brotula barbata	45.06	90	8.38	
Dentex angolensis	44.86	139	8.34	206
Bembrops greyi	28.86	365	5.37	
Raja miraletus	17.62	16	3.28	
Scorpaena normani	12.76	137	2.37	
Sepia orbignyana	9.42	46	1.75	
Deepwater fish mixture	8.20	0	1.52	
Torpedo torpedo	6.68	46	1.24	
Ommastrephes bartrami	6.38	137	1.19	
Umbrina canariensis	5.16	16	0.96	217

Lepidotrigla carolae	4.25	30	0.79	
Syacium micrurum	2.73	151	0.51	
Lophiodes kempi	2.03	6	0.38	205
Dentex macrophthalmus	1.67	4	0.31	
G A S T R O P O D S	1.52	424	0.28	
Thorogobius angolensis	1.52	303	0.28	
Trichiurus lepturus	1.24	2	0.23	
Lagocephalus laevigatus	0.91	16	0.17	
Saurida brasiliensis	0.91	137	0.17	
Sea urchin, weak spines	0.61	46	0.11	
Pagellus bellottii	0.40	2	0.07	
Total	537.84		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 55
DATE :04/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°13.80
start stop duration Lon E 13°40.24
TIME :13:39:34 14:08:33 29.0 (min) Purpose : 3
LOG : 4577.10 4578.56 1.4 Region : 4040
FDEPTH: 67 66 Gear cond.: 0
BDEPTH: 67 66 Validity : 0
Towing dir: 0° Wire out : 200 m Speed : 3.0 kn
Sorted : 59 Total catch: 674.99 Catch/hour: 1397.49

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	834.89	15106	59.74	212
Citharus linguatula	170.66	9133	12.21	
Alloteuthis africana	86.71	34872	6.20	
Dentex angolensis	68.26	830	4.88	213
Pterothrissus belloci	52.13	1108	3.73	
Zeus faber	35.05	93	2.51	
Grammoplites gruveli	29.52	416	2.11	
G A S T R O P O D S	19.38	484	1.39	
Pagellus bellottii	18.22	139	1.30	218
Rhinobatos albomaculatus	16.02	6	1.15	
Deepwater fish mixture	13.83	0	0.99	
Sepia orbignyana	11.88	17	0.85	
Octopus vulgaris	10.04	14	0.72	
Dentex barnardi	9.69	68	0.69	214
Chelidonichthys gabonensis	5.07	23	0.36	
Raja miraletus	4.62	576	0.33	
Fistularia petimba	4.14	14	0.30	
Pseudupeneus prayensis	1.84	46	0.13	
TETRAODONTIDAE	1.84	46	0.13	
Lepidotrigla sp.	1.84	68	0.13	
Starfish (pentagon)	0.93	0	0.07	
Monolene microstoma	0.46	46	0.03	
Syacium micrurum	0.46	23	0.03	
Plastic	0.00	6	0.00	
Total	1397.49		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 56
DATE :04/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°16.03
start stop duration Lon E 13°41.99
TIME :14:58:45 15:21:24 22.6 (min) Purpose : 3
LOG : 4582.66 4584.17 1.5 Region : 4040
FDEPTH: 22 22 Gear cond.: 0
BDEPTH: 22 22 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 4.0 kn
Sorted : 100 Total catch: 100.16 Catch/hour: 265.32

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pagellus bellottii	150.01	1515	56.54	208
Lagocephalus laevigatus	26.44	66	9.96	
Pseudupeneus prayensis	18.91	151	7.13	
Lithognathus mormyrus	12.87	64	4.85	
Balistes capriscus	10.65	21	4.01	
Zeus faber	9.17	11	3.45	
Fistularia petimba	5.25	95	1.98	
Sepia officinalis	5.14	5	1.94	
Trachinocephalus myops	4.08	19	1.54	
Raja miraletus	3.87	5	1.46	
Caranx rhonchus	3.44	48	1.30	
Octopus vulgaris	2.60	3	0.98	
Chloroscombrus orqueta	1.91	11	0.72	
Pomadasys incisus	1.75	11	0.66	210
Deepwater fish mixture	1.43	0	0.54	
Torpedo torpedo	1.27	3	0.48	
Alloteuthis africana	1.27	315	0.48	
Trachurus trecae	0.90	11	0.34	211
Rypticus saponaceus	0.79	5	0.30	
Citharus linguatula	0.74	29	0.28	
TETRAODONTIDAE	0.64	5	0.24	
Dentex barnardi	0.58	3	0.22	
Brachydeuterus auritus	0.48	13	0.18	
Caranx cryos	0.40	3	0.15	
Sphyraena sphyraena	0.37	3	0.14	
Trachinus arenatus	0.37	5	0.14	
Total	265.32		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 57
DATE :04/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°6.82
start stop duration Lon E 13°40.30
TIME :16:29:31 16:40:23 10.9 (min) Purpose : 3
LOG : 4592.79 4593.35 0.6 Region : 4040
FDEPTH: 98 98 Gear cond.: 0
BDEPTH: 98 98 Validity : 0
Towing dir: 0° Wire out : 300 m Speed : 3.1 kn
Sorted : 33 Total catch: 400.00 Catch/hour: 2209.94

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Synagrops microlepis	1518.40	1012232	68.71	
Zeus faber	140.72	337	6.37	
Pterothrissus belloci	123.31	669	5.58	
Raja miraletus	121.93	199	5.52	
Bristle worms	92.49	0	4.18	
Torpedo torpedo few spots	45.58	66	2.06	
Dentex angolensis	33.48	66	1.51	
Sepia orbignyana	26.80	271	1.21	
Brachydeuterus auritus	21.44	133	0.97	
GOBIIDAE	18.78	5630	0.85	
G A S T R O P O D S	18.78	0	0.85	
Argyrosomus hololepidotus	14.75	66	0.67	
Brotula barbata	10.72	66	0.48	
Scorpaena normani	8.07	66	0.36	
Dicrolene intronigra	6.69	133	0.30	
SOLEIDAE	2.71	271	0.12	
Octopus vulgaris	2.71	66	0.12	
Deepwater fish mixture	2.71	873	0.12	
Total	2210.06		100.01	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 58
DATE :04/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°2.62
start stop duration Lon E 13°36.06
TIME :17:51:54 18:22:25 30.5 (min) Purpose : 3
LOG : 4599.21 4600.83 1.6 Region : 4040
FDEPTH: 133 135 Gear cond.: 0
BDEPTH: 133 135 Validity : 0
Towing dir: 0° Wire out : 380 m Speed : 3.2 kn
Sorted : 67 Total catch: 190.00 Catch/hour: 373.40

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pagellus bellottii	109.66	808	29.37	
Scorpaena normani	78.01	464	20.89	
Brotula barbata	62.19	45	16.65	
Bembrops heterurus	28.99	161	7.76	
Uranoscopus polli	14.83	73	3.97	
Torpedo torpedo	11.84	22	3.17	
Trigla lyra	10.29	354	2.76	
Deepwater fish mixture	9.63	0	2.58	
Citharus linguatula	9.18	189	2.46	
Raja miraletus	8.52	12	2.28	
Peristedion cataphractum	4.98	171	1.33	
Synagrops microlepis	3.65	344	0.98	
GOBIIDAE	3.43	448	0.92	
Zeus faber	3.43	12	0.92	
Zenopsis conchifer	3.21	39	0.86	
Brachydeuterus auritus	2.99	16	0.80	220
Octopus vulgaris	2.43	22	0.65	
Conger conger	2.43	45	0.65	
Dentex angolensis	1.44	12	0.39	219
Umbrina canariensis	1.00	6	0.27	221
Conger sp.	0.44	6	0.12	
Sepia orbignyana	0.33	6	0.09	
Solenocera africana	0.22	55	0.06	
G A S T R O P O D S	0.11	110	0.03	
Lagocephalus laevigatus	0.11	6	0.03	
Illex coindetii	0.06	6	0.01	
Plastic	0.00	2	0.00	
Total	373.40		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 59
DATE :04/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°3.21
start stop duration Lon E 13°32.99
TIME :19:10:55 19:41:05 30.2 (min) Purpose : 3
LOG : 4605.21 4606.75 1.5 Region : 4040
FDEPTH: 218 217 Gear cond.: 0
BDEPTH: 218 217 Validity : 0
Towing dir: 0° Wire out : 500 m Speed : 3.1 kn
Sorted : 82 Total catch: 210.00 Catch/hour: 417.63

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Merluccius polli	127.02	795	30.41	222
Bembrops greyi	102.54	897	24.55	
Zenopsis conchifer	41.23	235	9.87	
Pagellus bellottii	39.89	346	9.55	
Brotula barbata	27.74	56	6.64	
MYCTOPHIDAE	19.49	12121	4.67	
Synagrops microlepis	11.93	622	2.86	
Chlorophthalmus atlanticus	9.90	955	2.37	
Coelorinchus caelorhincus	8.15	137	1.95	
Bothus podas	5.51	123	1.32	
Raja miraletus	5.21	6	1.25	
Illex coindetii	3.68	26	0.88	
Gephyroberyx darwini	2.65	6	0.63	
Lophius gastrophysus	2.05	6	0.49	
Monolene sp.	1.63	101	0.39	
Parapenaeus longirostris	1.43	694	0.34	
Torpedo torpedo	1.23	10	0.30	
Calappa pelii	1.11	209	0.27	
Deepwater fish mixture	1.01	0	0.24	
Octopus vulgaris	0.91	6	0.22	
Scorpaena normani	0.82	20	0.20	
Peristedion cataphractum	0.62	20	0.15	
Trichiurus lepturus	0.52	6	0.12	
G A S T R O P O D S	0.52	0	0.12	
Scyliorhinus cervigoni	0.43	2	0.10	
Bathyuroconger vicinus	0.20	6	0.05	
COLOCONGRIDAE	0.10	6	0.02	
GOBIIDAE	0.10	6	0.02	
Total	417.63		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 60
DATE :04/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°4.58
start stop duration Lon E 13°30.88
TIME :20:55:03 21:26:11 31.1 (min) Purpose : 3
LOG : 4610.73 4612.30 1.6 Region : 4040
FDEPTH: 329 327 Gear cond.: 0
BDEPTH: 329 327 Validity : 0
Towing dir: 0° Wire out : 790 m Speed : 3.0 kn
Sorted : 35 Total catch: 312.00 Catch/hour: 601.35

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Merluccius polli	225.00	729	37.42	223
Nematocarcinus africanus	100.21	38968	16.66	
Chlorophthalmus agassizi	90.49	2513	15.05	
Pterothrissus belloci	74.19	572	12.34	
Laemonema laureysi	41.96	1023	6.98	
CONGRIDAE	18.02	503	3.00	0
Parapenaeus longirostris	9.37	2878	1.56	225
Etmopterus sp.	9.37	10	1.56	
Chaunax pictus	9.02	677	1.50	
MICROSTOMATIDAE	7.63	825	1.27	
Coelorinchus polli	4.16	58	0.69	
Malacocephalus occidentalis	3.12	52	0.52	
Lophius vaillanti	2.78	35	0.46	224
Bathynectes piperitus	1.73	52	0.29	
Epigonus pandionis	1.04	75	0.17	
Gadella imberbis	0.69	17	0.12	
Venefica proboscidea	0.69	35	0.12	
Lepidotrigla carolae	0.35	35	0.06	
Aristeus varidens	0.35	17	0.06	
Hoplostethus cadenati	0.35	17	0.06	
Hymenocephalus italicus	0.35	121	0.06	
Synagrops microlepis	0.17	17	0.03	
Eumunida squamifera	0.17	35	0.03	
Polyipnus sp.	0.17	17	0.03	
Fishing gears	0.00	0	0.00	
Total	601.39		100.01	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 61
DATE :04/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°4.79
start stop duration Lon E 13°28.75
TIME :22:39:16 23:09:28 30.2 (min) Purpose : 3
LOG : 4617.14 4618.66 1.5 Region : 4040
FDEPTH: 448 429 Gear cond.: 0
BDEPTH: 448 429 Validity : 0
Towing dir: 0° Wire out : 990 m Speed : 3.0 kn
Sorted : 29 Total catch: 280.00 Catch/hour: 556.29

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	239.72	80640	43.09	
Aristeus varidens	72.49	1492	13.03	227
Stomias boa boa	57.01	1341	10.25	
Yarrella blackfordi	42.66	3568	7.67	
Hoplostethus cadenati	42.28	1492	7.60	
Lamprogrammus exutus	37.75	906	6.79	
Laemonema laureysi	17.37	888	3.12	

MYCTOPHIDAE	7.55	3775	1.36	
Deepwater fish mixture	7.17	0	1.29	
Triplophos hemingi	4.15	981	0.75	
Bathyuroconger vicinus	3.77	397	0.68	
Chaceon maritae	3.40	20	0.61	
Halosaurus ovenii	3.02	209	0.54	
UNIDENTIFIED FISH	2.64	189	0.47	
Merluccius polli	2.26	4	0.41	226
Bathynectes piperitus	1.89	95	0.34	
Pterothrissus belloci	1.51	20	0.27	
Benthodesmus tenuis	1.51	38	0.27	
Malacocephalus laevis	1.14	38	0.21	
Solenocera africana	1.13	133	0.20	
Galeus polli	1.13	264	0.20	
Cubiceps sp.	0.75	20	0.14	
CRANCHIIDAE	0.75	20	0.14	
Xenodermichthys copei	0.75	95	0.14	
Chaunax pictus	0.57	38	0.10	
Acanthephyra sp.	0.38	95	0.07	
Ebinania costaecanarie	0.38	20	0.07	
Plesiopenaeus edwardsianus	0.38	236	0.07	
Nemichthys scolopaceus	0.38	58	0.07	
Diceratias pileatus	0.19	38	0.03	
Gadella imberbis	0.19	20	0.03	
Total	556.29		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 62
DATE :05/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°5.09
start stop duration Lon E 13°27.35
TIME :00:49:34 01:19:36 30.0 (min) Purpose : 3
LOG : 4623.45 4624.97 1.5 Region : 4040
FDEPTH: 558 558 Gear cond.: 0
BDEPTH: 558 558 Validity : 0
Towing dir: 0° Wire out : 1220 m Speed : 3.0 kn
Sorted : 32 Total catch: 310.00 Catch/hour: 619.17

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	247.33	75731	39.95	
Stomias boa boa	174.31	4754	28.15	
Lamprogrammus exutus	69.27	509	11.19	
Aristeus varidens	31.62	2339	5.11	231
Hoplostethus cadenati	26.36	887	4.26	
Alepocephalus sp.	10.93	793	1.76	
Yarrella blackfordi	10.55	322	1.70	
Stereomastis sp.	9.03	1206	1.46	
Deepwater fish mixture	6.77	0	1.09	
Ebinania costaecanarie	4.13	208	0.67	
MYCTOPHIDAE	3.40	2716	0.55	
Bathyuroconger vicinus	2.64	152	0.43	
Gonostoma denudatum	2.64	208	0.43	
Chaceon maritae	2.60	12	0.42	230
Merluccius polli	1.68	2	0.27	228
Plesiopenaeus edwardsianus	1.50	152	0.24	
Triplophos hemingi	1.50	226	0.24	
Metal waste	1.40	4	0.23	
Neoharriotta pinnata	1.40	2	0.23	
Waste General	1.40	2	0.23	
NOTOSUDIDAE	1.14	38	0.18	
Galeus polli	1.14	132	0.18	
Xenodermichthys copei	1.14	114	0.18	
Nemichthys scolopaceus	1.14	114	0.18	
Caristius sp.	0.76	18	0.12	0
Nezumia sp.	0.76	132	0.12	
Lophius vaillanti	0.76	4	0.12	229
Diceratias pileatus	0.76	94	0.12	
Cubiceps sp.	0.38	18	0.06	
Acanthephyra sp.	0.38	114	0.06	
Benthodesmus tenuis	0.38	18	0.06	
Plastic	0.02	4	0.00	
Total	619.17		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 63
DATE :05/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°4.49
start stop duration Lon E 13°26.16
TIME :02:33:40 03:03:56 30.3 (min) Purpose : 3
LOG : 4628.78 4630.19 1.4 Region : 4040
FDEPTH: 649 649 Gear cond.: 0
BDEPTH: 649 649 Validity : 0
Towing dir: 0° Wire out : 1315 m Speed : 2.8 kn
Sorted : 32 Total catch: 265.00 Catch/hour: 525.27

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	203.69	42759	38.78	
Lamprogrammus exutus	100.30	582	19.09	
Stomias boa boa	49.40	1427	9.40	
Bajacalifornia megalops	27.91	1043	5.31	
Aristeus varidens	17.80	1318	3.39	232
Yarrella blackfordi	15.34	460	2.92	
Chaceon maritae	14.75	38	2.81	233
Hoplostethus cadenati	12.57	444	2.39	
OPISTHOTEUTHIDAE	12.27	16	2.34	
Nezumia sp.	8.90	492	1.69	
Bathyuroconger sp.	8.29	291	1.58	
POLYCHAELIDAE	7.59	722	1.45	
PAGUROIDEA	6.74	30	1.28	
Triplophos hemingi	5.53	735	1.05	
THYSANOTEUTHIDAE	4.60	16	0.88	
OPHICHTHIDAE	3.37	722	0.64	
RAJIDAE	3.03	6	0.58	
Ebinania costaecanarie	2.97	2	0.57	
Illex coindetii	2.76	16	0.52	
PANDALIDAE	1.84	168	0.35	
Laemonema sp.	1.53	16	0.29	
Chrysaora sp.	1.39	2	0.26	
Bathyraya sp.	1.23	16	0.23	
Zamaus (Scymnodon) squamulosus	1.15	4	0.22	
Ebinania costaecanarie	0.91	30	0.17	0
Chlorophthalmus agassizi	0.91	30	0.17	
MYCTOPHIDAE	0.91	906	0.17	
Etmopterus sp.	0.77	30	0.15	
Nemichthys scolopaceus	0.61	46	0.12	
Glyphus marsupialis	0.61	139	0.12	
Benthodesmus tenuis	0.61	16	0.12	
SOLEIDAE	0.30	30	0.06	
Plesionika martia	0.30	30	0.06	
Bufoceratias wedli	0.30	30	0.06	
Metal waste	0.02	2	0.00	
Total	521.19		99.22	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 64
DATE :05/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°4.91
start stop duration Lon E 13°24.97
TIME :04:50:36 05:21:35 31.0 (min) Purpose : 3
LOG : 4633.81 4635.37 1.6 Region : 4040
FDEPTH: 742 744 Gear cond.: 0
BDEPTH: 742 744 Validity : 0
Towing dir: 0° Wire out : 1630 m Speed : 3.0 kn
Sorted : 34 Total catch: 236.00 Catch/hour: 457.07

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Lamprogrammus exutus	123.85	461	27.10	
Nematocarcinus africanus	107.26	22332	23.47	
POLYCHAELIDAE	34.65	1898	7.58	
Nezumia sp.	31.08	738	6.80	
Bajacalifornia megalops	23.18	606	5.07	
Opisthoteuthis agassizi	19.23	14	4.21	
Bathyuroconger vicinus	18.19	368	3.98	
Yarrella blackfordi	17.66	513	3.86	
Stomias boa boa	12.38	291	2.71	
Etmopterus sp.	10.81	79	2.36	
Xenodermichthys copei	10.54	39	2.31	
Chaceon maritae	10.19	23	2.23	
Hoplostethus cadenati	8.17	170	1.79	
Triplophos hemingi	8.17	963	1.79	
Aristeus varidens	3.68	211	0.81	
Dicrolene sp.	3.43	658	0.75	
Ebinania costaecanarie	3.14	6	0.69	
Dibranchus atlanticus	2.63	277	0.58	
MYCTOPHIDAE	1.84	1369	0.40	
SEPIOLIDAE	1.84	27	0.40	
Munidopsis chuni	1.05	606	0.23	
PAGUROIDEA	0.79	27	0.17	
Ariomma bondi	0.52	14	0.11	
Sudis sp.	0.52	14	0.11	
Pasiphaea multidentata	0.52	39	0.11	
Todaropsis eblanae	0.52	14	0.11	
Nemichthys scolopaceus	0.39	39	0.08	
IPNOPIDAE	0.27	14	0.06	
Glyphus marsupialis	0.27	66	0.06	
Bufoceratias wedli	0.14	14	0.03	
Halosaurus ovenii	0.14	14	0.03	
Total	457.05		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 65
DATE :05/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 10°58.68
start stop duration Lon E 13°25.72
TIME :06:41:23 07:11:57 30.6 (min) Purpose : 3
LOG : 4641.23 4642.63 1.4 Region : 4040
FDEPTH: 510 515 Gear cond.: 0
BDEPTH: 510 515 Validity : 0
Towing dir: 0° Wire out : 1100 m Speed : 2.8 kn
Sorted : 37 Total catch: 290.00 Catch/hour: 569.19

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Stomias boa boa	132.78	3492	23.33	
Nematocarcinus africanus	114.96	45484	20.20	
Lamprogrammus exutus	77.23	2184	13.57	
Aristeus varidens	71.29	6656	12.52	234
Cubiceps sp.	68.32	1768	12.00	
Yarrella blackfordi	34.45	1990	6.05	
Hoplostethus cadenati	12.48	534	2.19	
POLYCHAELIDAE	8.60	1040	1.51	
Deepwater fish mixture	6.54	75	1.15	
Dicrolene intronigra	6.50	267	1.14	
Triplophos hemingi	5.34	638	0.94	
Miscellaneous fishes	5.20	0	0.91	
Merluccius polli	5.14	4	0.90	236
Neoharriotta pinnata	3.65	4	0.64	
Lophius vaillanti	2.71	2	0.48	235
Xenodermichthys copei	1.49	133	0.26	
Dibranchus atlanticus	1.49	224	0.26	
Barbourisia rufa	1.33	2	0.23	
Illex coindetii	1.20	16	0.21	
Munidopsis chuni	1.20	773	0.21	
Laemonema laureysi	1.20	16	0.21	
Nemichthys scolopaceus	0.88	120	0.16	
Bathyuroconger vicinus	0.88	120	0.16	
Sudis sp.	0.59	16	0.10	
Benthodesmus tenuis	0.59	16	0.10	
PHRONIMIDAE	0.59	45	0.10	
Plesiopenaeus edwardsianus	0.59	61	0.10	
Deania sp.	0.29	16	0.05	
Chaceon maritae	0.29	16	0.05	
CARISTIIDAE	0.29	16	0.05	
Chaunax cf. pictus	0.16	16	0.03	
Heterocarpus grimaldii	0.16	29	0.03	
Glyphus marsupialis	0.16	45	0.03	
Bathynectes sp.	0.16	16	0.03	
Lampadena pontifex	0.16	16	0.03	
Bufoceratias wedli	0.16	45	0.03	
Halosaurus ovenii	0.16	29	0.03	
Metal waste	0.00	2	0.00	
Total	569.19		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 66
DATE :05/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 10°54.76
start stop duration Lon E 13°24.16
TIME :09:59:48 10:29:43 29.9 (min) Purpose : 3
LOG : 4648.24 4649.76 1.5 Region : 4040
FDEPTH: 428 434 Gear cond.: 0
BDEPTH: 428 434 Validity : 0
Towing dir: 0° Wire out : 940 m Speed : 3.1 kn
Sorted : 31 Total catch: 570.00 Catch/hour: 1143.43

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	305.18	84766	26.69	
Lamprogrammus exutus	222.89	1232	19.49	
Merluccius polli	161.64	106	14.14	237
Plesionika martia	83.51	30369	7.30	
Yarrella blackfordi	70.29	1952	6.15	
MYCTOPHIDAE	60.68	15498	5.31	
Neoharriotta pinnata	46.02	24	4.02	
Deepwater fish mixture	44.43	0	3.89	
Aristeus varidens	30.63	1412	2.68	241
Hymenocephalus italicus	19.82	1683	1.73	
Laemonema laureysi	19.22	301	1.68	
Hoplostethus cadenati	13.82	451	1.21	
CONGRIDAE	13.22	150	1.16	
Dibranchus atlanticus	9.01	542	0.79	
Stomias boa boa	6.60	181	0.58	
Centrophorus granulosus	6.02	2	0.53	
Lepidopus caudatus	6.00	181	0.52	
Ommastrephes bartrami	4.81	30	0.42	
Chaunax pictus	3.61	120	0.32	
Malacocephalus occidentalis	3.61	60	0.32	
Macroparalepis affinis	3.61	150	0.32	
Halosaurus ovenii	3.01	181	0.26	
Sergestes sp.	1.81	2012	0.16	
Coelorinchus polli	1.20	60	0.11	
Nemichthys scolopaceus	0.60	60	0.05	
Bathyuroconger vicinus	0.60	60	0.05	
Plesiopenaeus edwardsianus	0.60	30	0.05	
Lophius vaillanti	0.36	2	0.03	238
Stereomastis sp.	0.30	30	0.03	
Solenocera africana	0.30	30	0.03	
Plastic	0.02	2	0.00	
Total	1143.43		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 67
DATE :05/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 10°55.06
start stop duration Lon E 13°25.68

TIME :11:32:50 12:03:03 30.2 (min) Purpose : 3
LOG : 4653.52 4655.01 1.5 Region : 4040
FDEPTH: 364 364 Gear cond.: 0
BDEPTH: 364 364 Validity : 0
Towing dir: 0° Wire out : 820 m Speed : 3.0 kn
Sorted : 29 Total catch: 370.00 Catch/hour: 734.61

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	255.13	78506	34.73	
MYCTOPHIDAE	130.88	47599	17.82	
Merluccius polli	112.24	228	15.28	239
Zenopsis conchifer	41.46	30	5.64	
Trichiurus lepturus	39.73	195	5.41	
Malacocephalus occidentalis	30.97	137	4.22	
Chlorophthalmus atlanticus	25.31	546	3.45	
Hymenocephalus italicus	23.37	2591	3.18	
Deepwater fish mixture	10.52	0	1.43	
Laemonema laureysi	10.13	234	1.38	
Chaunax pictus	10.13	993	1.38	
Etmopterus sp.	9.73	1616	1.32	
CONGRIDAE	9.73	155	1.32	
Ommastrephes bartrami	5.06	4	0.69	
Centrophorus granulosus	4.39	2	0.60	
LOLIGINIDAE	4.29	1267	0.58	
Macroparalepis affinis	3.12	117	0.42	
Gephyroberyx darwini	2.66	2	0.36	
Dibranchus atlanticus	1.55	137	0.21	
Solenocera africana	1.17	175	0.16	
Coelorinchus polli	1.17	20	0.16	
Halosaurus ovenii	0.77	77	0.11	
Gadella imberbis	0.40	20	0.05	
Epigonus telescopus	0.40	20	0.05	
Bembrops heterurus	0.20	20	0.03	
Lophius vaillanti	0.12	2	0.02	240
Total	734.61		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 68
DATE :05/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 10°53.40
start stop duration Lon E 13°26.64
TIME :13:11:06 13:41:03 29.9 (min) Purpose : 3
LOG : 4658.36 4659.79 1.4 Region : 4040
FDEPTH: 251 252 Gear cond.: 0
BDEPTH: 251 252 Validity : 0
Towing dir: 0° Wire out : 600 m Speed : 2.9 kn
Sorted : 107 Total catch: 1529.45 Catch/hour: 3064.01

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Merluccius polli	1115.84	2674	36.42	242
Chlorophthalmus atlanticus	913.96	16323	29.83	
Synagrops microlepis	291.05	21105	9.50	
Zenopsis conchifer	254.80	603	8.32	
Laemonema laureysi	129.42	1094	4.22	
Pterothrissus belloci	116.19	891	3.79	
Scorpaena normani	101.81	747	3.32	
Trichiurus lepturus	33.36	114	1.09	
Bembrops greyi	28.77	288	0.94	
Ophisurus serpens	26.46	86	0.86	
Coelorinchus polli	11.50	403	0.38	
Brotula barbata	11.50	28	0.38	
Gephyroberyx darwini	9.78	28	0.32	
Parapenaeus longirostris	9.78	1180	0.32	
Calappa pelii	3.45	58	0.11	
Illex coindetii	2.88	28	0.09	
Syacium micrurum	2.88	144	0.09	
Lophius vaillanti	0.58	28	0.02	243
Metal waste	0.00	2	0.00	
Total	3064.01		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 69
DATE :05/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 10°49.29
start stop duration Lon E 13°36.53
TIME :16:17:32 16:47:30 30.0 (min) Purpose : 3
LOG : 4670.53 4672.22 1.7 Region : 4040
FDEPTH: 85 77 Gear cond.: 0
BDEPTH: 85 77 Validity : 0
Towing dir: 0° Wire out : 270 m Speed : 3.4 kn
Sorted : 63 Total catch: 142.95 Catch/hour: 286.28

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pterothrissus belloci	124.57	234	43.51	
Citharus linguatula	26.74	427	9.34	
Torpedo torpedo few spots	25.19	82	8.80	
Zeus faber	19.77	72	6.90	
Trachurus trecae	19.31	308	6.74	244
Brachydeuterus auritus	16.04	140	5.60	247
Saurida brasiliensis	8.33	1668	2.91	
Dentex angolensis	8.33	50	2.91	245
Lagocephalus laevigatus	7.79	18	2.72	
Raja miraletus	6.99	10	2.44	
Sepia orbignyana	4.81	70	1.68	
Alloteuthis africana	3.99	1460	1.39	
Deepwater fish mixture	3.77	0	1.32	
Zenopsis conchifer	3.08	4	1.08	
Trigla lyra	2.08	10	0.73	
Illex coindetii	1.36	28	0.48	
Brotula barbata	1.08	10	0.38	
GOBIIDAE	0.72	140	0.25	
G A S T R O P O D S	0.64	254	0.22	
Bembrops greyi	0.64	4	0.22	
Scorpaena sp.	0.46	10	0.16	
Fistularia petimba	0.36	4	0.13	
Argyrosomus hololepidotus	0.28	4	0.10	246
Total	286.32		100.01	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 70
DATE :05/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 10°47.21
start stop duration Lon E 13°42.25
TIME :18:03:23 18:33:21 30.0 (min) Purpose : 3
LOG : 4678.88 4680.46 1.6 Region : 4040
FDEPTH: 40 35 Gear cond.: 0
BDEPTH: 40 35 Validity : 0
Towing dir: 0° Wire out : 125 m Speed : 3.2 kn
Sorted : 101 Total catch: 660.00 Catch/hour: 1321.76

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pagellus bellottii	430.15	1152	32.54	253
Umbrina canariensis	167.04	1089	12.64	252
Pteroscion peli	150.32	29	11.37	
Brachydeuterus auritus	121.16	9785	9.17	251
Pomadasys incisus	118.38	953	8.96	248
Argyrosomus hololepidotus	54.75	240	4.14	249
Bembrops heterurus	50.19	1256	3.80	
Trichiurus lepturus	40.55	1204	3.07	
Rhinobatos albomaculatus	38.01	24	2.88	
Sepia orbignyana	35.99	140	2.72	
Pseudotolithus senegalensis	31.94	190	2.42	250
Citharus linguatula	26.36	899	1.99	
Ephippion guttifer	25.09	12	1.90	
Raja miraletus	8.37	12	0.63	
Cynoglossus senegalensis	7.93	164	0.60	
G A S T R O P O D S	4.81	12	0.36	
Conger conger	2.78	50	0.21	
Torpedo torpedo	2.28	26	0.17	
SEA URCHINS	2.28	0	0.17	
Penaeus notialis	1.52	38	0.12	
Ilisha africana	1.26	12	0.10	
Chilomycterus spinosus mauretanicus	0.36	2	0.03	
Octopus vulgaris	0.26	12	0.02	
Total	1321.80		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 71
DATE :05/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 10°45.39
start stop duration Lon E 13°13.88
TIME :23:36:27 00:06:19 29.9 (min) Purpose : 3
LOG : 4712.24 4713.66 1.4 Region : 4040
FDEPTH: 450 452 Gear cond.: 0
BDEPTH: 450 452 Validity : 0
Towing dir: 0° Wire out : 1000 m Speed : 2.9 kn
Sorted : 19 Total catch: 290.00 Catch/hour: 582.52

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	302.13	67392	51.87	
Laemonema laureysi	65.12	2352	11.18	
Hoplostethus cadenati	37.98	1539	6.52	
Aristeus varidens	37.98	2593	6.52	256
Lamprogrammus exutus	27.14	121	4.66	
Dibranchus atlanticus	17.50	1145	3.00	
Hymenocephalus italicus	16.89	1569	2.90	
Yarrella blackfordi	16.29	482	2.80	
Stomias boa boa	15.69	512	2.69	
Chaceon maritae	10.08	64	1.73	255
Coelorinchus polli	8.44	301	1.45	
Bathynectes piperitus	7.23	362	1.24	
Deepwater fish mixture	3.64	0	0.62	
Malacocephalus occidentalis	3.62	30	0.62	
Chaunax pictus	3.01	121	0.52	
Bassanago albescens	1.81	151	0.31	
Halosaurus ovenii	1.81	60	0.31	
Lophius vaillanti	1.65	6	0.28	254
Cubiceps sp.	1.21	30	0.21	
MYCTOPHIDAE	1.21	994	0.21	
Myctophum sp.	1.21	90	0.21	
Solenocera africana	0.60	90	0.10	
Acanthephyra sp.	0.30	60	0.05	
Total	582.52		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 72
DATE :06/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 10°44.14
start stop duration Lon E 13°15.19
TIME :01:12:21 01:42:29 30.1 (min) Purpose : 3
LOG : 4717.73 4719.21 1.5 Region : 4040
FDEPTH: 351 351 Gear cond.: 0
BDEPTH: 351 351 Validity : 0
Towing dir: 0° Wire out : 820 m Speed : 2.9 kn
Sorted : 59 Total catch: 640.00 Catch/hour: 1274.90

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Merluccius polli	419.22	2048	32.88	257
Chlorophthalmus atlanticus	353.43	6821	27.72	
Laemonema laureysi	135.96	1351	10.66	
Nematocarcinus africanus	129.42	42076	10.15	
Hymenocephalus italicus	82.81	19719	6.50	
Malacocephalus occidentalis	46.63	480	3.66	
Chaunax pictus	29.20	1394	2.29	
MYCTOPHIDAE	16.12	13444	1.26	
Etmopterus sp.	12.21	371	0.96	
Dibranchus atlanticus	9.14	631	0.72	
Bathynectes piperitus	7.41	131	0.58	
Hoplostethus cadenati	6.97	195	0.55	
Chaceon maritae	6.97	22	0.55	
Nezumia aequalis	4.36	88	0.34	
Eumunida squamifera	3.49	914	0.27	
Benthodesmus tenuis	3.05	88	0.24	
Deepwater fish mixture	2.63	0	0.21	
Scorpaena normani	2.17	22	0.17	
Epigonus telescopus	2.17	88	0.17	
Parapenaeus longirostris	0.44	44	0.03	
Nemichthys scolopaceus	0.44	44	0.03	
Venefica sp.	0.44	22	0.03	
Solenocera africana	0.22	44	0.02	
Total	1274.90		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 73
DATE :06/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 10°43.41
start stop duration Lon E 13°17.04
TIME :03:11:29 03:41:36 30.1 (min) Purpose : 3
LOG : 4723.60 4725.17 1.6 Region : 4040
FDEPTH: 257 251 Gear cond.: 0
BDEPTH: 257 251 Validity : 0
Towing dir: 0° Wire out : 595 m Speed : 3.1 kn
Sorted : 70 Total catch: 200.00 Catch/hour: 398.41

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Chlorophthalmus atlanticus	220.32	3424	55.30	
Bembrops greyi	48.29	586	12.12	
Merluccius polli	25.20	149	6.33	258
Pontinus accraensis	14.92	165	3.75	
Zenopsis conchifer	14.36	88	3.60	
MYCTOPHIDAE	12.81	6988	3.21	
Gephyroberyx darwini	11.39	12	2.86	
Pagellus bellottii	10.60	430	2.66	
Laemonema laureysi	7.07	72	1.77	
Brotula barbata	6.73	12	1.69	
Ophididae 'spot nose'	5.48	16	1.38	
Dicrolene intronigra	4.86	34	1.22	
Parapenaeus longirostris	2.87	835	0.72	259
Deepwater fish mixture	2.87	0	0.72	
OPHICHTHIDAE	2.27	6	0.57	
Lophius gastrophysus	1.65	6	0.41	
Dibranchus atlanticus	1.22	100	0.30	
Trichiurus lepturus	0.88	6	0.22	
Synagrops microlepis	0.88	78	0.22	
Todaropsis eblanae	0.78	6	0.20	
Metal waste	0.78	2	0.20	
Citharus linguatula	0.66	38	0.17	
Coelorinchus caelorhincus	0.66	16	0.17	
CONGRIDAE	0.22	12	0.06	
G A S T R O P O D S	0.22	6	0.06	
Loligo vulgaris	0.12	38	0.03	
Epigonus telescopus	0.12	16	0.03	
Hymenocephalus italicus	0.12	22	0.03	
Peristedion cataphractum	0.06	6	0.01	
Total	398.39		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 74
DATE :06/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 10°42.17
start stop duration Lon E 13°20.41

TIME :05:00:54 05:31:29 30.6 (min) Purpose : 3
LOG : 4730.49 4731.99 1.5 Region : 4040
FDEPTH: 140 141 Gear cond.: 0
BDEPTH: 140 141 Validity : 0
Towing dir: 0° Wire out : 330 m Speed : 2.9 kn
Sorted : 167 Total catch: 167.38 Catch/hour: 328.30

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trichiurus lepturus	112.78	887	34.35	
Dentex angolensis	63.88	198	19.46	260
Bembrops greyi	29.42	214	8.96	
Peristedion cataphractum	19.22	357	5.85	
Uranoscopus cadenati	15.81	49	4.82	
Pterothrissus belloci	15.42	86	4.70	
Torpedo torpedo few spots	9.92	27	3.02	
Citharus linguatula	9.10	127	2.77	
Zenopsis conchifer	8.83	16	2.69	
Trigla lyra	8.04	57	2.45	
Brotula barbata	7.37	31	2.25	
Monolene microstoma	7.14	263	2.17	
Raja miraletus	5.26	6	1.60	
Zeus faber	3.57	12	1.09	
Lagocephalus laevigatus	3.30	10	1.00	
Deepwater fish mixture	2.35	0	0.72	
Illex coindetii	1.96	25	0.60	
Branchiostegus semifasciatus	1.61	2	0.49	
Lophius vaillanti	1.49	2	0.45	
Sepia officinalis	1.14	10	0.35	
Octopus vulgaris	0.31	2	0.10	
Callinectes sp.	0.16	2	0.05	
E C H I N O D E R M A T A	0.08	4	0.02	
GOBIIDAE	0.08	12	0.02	
G A S T R O P O D S	0.04	0	0.01	
HOMOLIDAE	0.02	2	0.01	
Total	328.30		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 75
DATE :06/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 10°37.98
start stop duration Lon E 13°30.26
TIME :07:05:50 07:36:18 30.5 (min) Purpose : 3
LOG : 4743.32 4745.03 1.7 Region : 4040
FDEPTH: 73 73 Gear cond.: 0
BDEPTH: 73 73 Validity : 0
Towing dir: 0° Wire out : 210 m Speed : 3.4 kn
Sorted : 167 Total catch: 167.14 Catch/hour: 329.23

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	144.58	2535	43.92	264
Lagocephalus laevigatus	38.73	65	11.76	
Selene dorsalis	32.03	278	9.73	265
Raja miraletus	15.92	30	4.83	
Dentex barnardi	15.36	118	4.67	261
Citharus linguatula	13.08	676	3.97	
Zeus faber	9.38	30	2.85	
Pagellus bellottii	8.82	65	2.68	263
Atractoscion aequidens	8.51	6	2.58	268
Trigla lyra	7.09	63	2.15	
Chaetodon hoefleri	5.79	32	1.76	
Dentex angolensis	5.44	98	1.65	262
Rhinobatos albomaculatus	5.44	4	1.65	
Pseudupeneus prayensis	3.15	33	0.96	
Torpedo torpedo few spots	3.07	6	0.93	
Deepwater fish mixture	2.56	0	0.78	
Sardinella aurita	2.17	14	0.66	266
Alloteuthis africana	1.50	794	0.45	
Bembrops greyi	1.38	20	0.42	
Umbrina canariensis	1.26	4	0.38	267
Pterothrissus belloci	1.26	16	0.38	
Fistularia petimba	0.67	4	0.20	
Peristedion cataphractum	0.63	12	0.19	
Saurida brasiliensis	0.47	85	0.14	
Serranus cabrilla	0.35	6	0.11	
Sepia orbignyana	0.28	12	0.08	
Illex coindetii	0.24	10	0.07	
Trichiurus lepturus	0.08	2	0.02	
Total	329.23		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 76
DATE :06/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 10°34.16
start stop duration Lon E 13°35.12
TIME :08:46:15 09:16:21 30.1 (min) Purpose : 3
LOG : 4753.12 4754.90 1.8 Region : 4040
FDEPTH: 38 36 Gear cond.: 0
BDEPTH: 38 36 Validity : 0
Towing dir: 0° Wire out : 140 m Speed : 3.5 kn
Sorted : 95 Total catch: 130.00 Catch/hour: 259.14

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	72.04	253	27.80	269
Brachydeuterus auritus	69.59	36	26.85	
Rhinobatos albomaculatus	39.35	16	15.18	
Raja miraletus	26.25	44	10.13	
Carlarius parkii	7.04	10	2.72	
Lagocephalus laevigatus	5.34	22	2.06	
Dasyatis margarita	5.12	8	1.98	
Ephippion guttifer	4.90	2	1.89	
Citharus linguatula	4.03	142	1.55	
Pseudotolithus senegalensis	3.05	10	1.18	
Sardinella maderensis	2.95	20	1.14	
Stromateus fiatola	2.89	6	1.12	
Zeus faber	2.23	2	0.86	
Trichiurus lepturus	2.17	30	0.84	
Cynoglossus canariensis	1.79	8	0.69	
Selene dorsalis	1.69	30	0.65	
Alloteuthis africana	1.20	341	0.46	
Sea pens	1.14	8	0.44	
Syacium micrurum	1.14	8	0.44	
Grammoplites gruveli	1.04	22	0.40	
Deepwater fish mixture	0.98	0	0.38	
Pagellus bellottii	0.92	8	0.35	270
Dicologoglossa cuneata	0.72	10	0.28	
Pteroscion peli	0.44	6	0.17	
Torpedo torpedo few spots	0.38	8	0.15	
Galeoides decadactylus	0.38	2	0.15	
Pseudupeneus prayensis	0.22	22	0.08	
Sphyraena sphyraena	0.16	2	0.06	
Total	259.14		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 77
DATE :06/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 10°25.21
start stop duration Lon E 13°30.99
TIME :10:29:07 10:59:20 30.2 (min) Purpose : 3
LOG : 4762.96 4764.65 1.7 Region : 4040
FDEPTH: 23 25 Gear cond.: 0
BDEPTH: 23 25 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.4 kn
Sorted : 74 Total catch: 590.00 Catch/hour: 1171.80

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	488.56	9571	41.69	271
Ilisha africana	214.92	6812	18.34	
Pteroscion peli	115.09	3875	9.82	
Trichiurus lepturus	107.17	1410	9.15	
Pseudotolithus typus	54.32	0	4.64	
Gymnura micrura	46.36	2	3.96	
Sardinella maderensis	20.56	558	1.75	
Galeoides decadactylus	13.80	133	1.18	
Sepia orbignyana	12.35	16	1.05	
Selene dorsalis	11.46	191	0.98	
Torpedo marmorata	10.86	30	0.93	
Raja miraletus	10.27	30	0.88	
Cynoglossus senegalensis	9.95	10	0.85	
Miscellaneous fishes	8.52	0	0.73	
Carlarius parkii	6.75	44	0.58	
Chloroscombrus chrysurus	5.58	177	0.48	
DIODONTIDAE	4.73	2	0.40	
Pomadasys incisus	4.41	44	0.38	
Penaeus notialis	4.13	73	0.35	272
Rhinobatos albomaculatus	4.09	6	0.35	
Dicologoglossa cuneata	3.97	103	0.34	
Chirodropus gorilla	2.94	30	0.25	
Chilomycterus spinosus mauretanicus	2.64	14	0.23	
Dasyatis marmorata	2.05	14	0.17	
Sphyraena sphyraena	2.05	30	0.17	
Drepane africana	1.59	2	0.14	
Pisodonophis semicinctus	1.31	4	0.11	
Citharus linguatula	0.87	30	0.07	
Maja sp.	0.30	87	0.03	
Penaeus kerathurus	0.20	2	0.02	
Total	1171.80		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 78
DATE :06/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 10°25.35
start stop duration Lon E 13°22.60
TIME :12:20:03 12:50:06 30.0 (min) Purpose : 3
LOG : 4773.86 4775.43 1.6 Region : 4040
FDEPTH: 72 74 Gear cond.: 0
BDEPTH: 72 74 Validity : 0
Towing dir: 0° Wire out : 250 m Speed : 3.1 kn
Sorted : 130 Total catch: 129.98 Catch/hour: 259.61

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	72.66	1566	27.99	273
Raja miraletus	58.56	128	22.56	
Lepidotrigla carolae	25.33	248	9.76	
Lagocephalus laevigatus	18.30	28	7.05	
Zeus faber	11.62	30	4.48	
Citharus linguatula	11.38	485	4.39	
Miscellaneous fishes	6.95	0	2.68	
Pagellus bellottii	5.79	124	2.23	275
Dentex angolensis	5.71	124	2.20	274
Pseudupeneus prayensis	5.71	82	2.20	
Dentex barnardi	5.11	60	1.97	
Rhinobatos albomaculatus	5.07	4	1.95	
Chaetodon hoefleri	2.76	14	1.06	
Torpedo torpedo	2.64	6	1.02	
Fistularia petimba	2.48	18	0.95	
Octopus vulgaris	2.20	2	0.85	
Starfish	2.20	0	0.85	
Serranus accraensis	2.00	30	0.77	
Pomadasys jubelini	1.96	2	0.75	
Sepia officinalis	1.60	22	0.62	
Sphyraena guachancho	1.56	2	0.60	
Alloteuthis africana	1.48	431	0.57	
Grammoplites gruveli	1.36	24	0.52	
Atractoscion aequidens	1.12	2	0.43	
Brachydeuterus auritus	0.84	8	0.32	277
Sardinella maderensis	0.48	2	0.18	276
Metal waste	0.44	0	0.17	
Saurida brasiliensis	0.44	78	0.17	
Sphyraena sphyraena	0.40	2	0.15	
Trichiurus lepturus	0.36	2	0.14	
Selene dorsalis	0.36	2	0.14	
Chelidonichthys gabonensis	0.28	2	0.11	
Brotula barbata	0.16	2	0.06	
GOBIIDAE	0.08	4	0.03	
Dicologoglossa hexophthalma	0.08	2	0.03	
Boops boops	0.08	4	0.03	
Sphoeroides sp.	0.04	8	0.02	
Monolene microstoma	0.04	8	0.02	
Total	259.61		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 79
DATE :06/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 10°32.85
start stop duration Lon E 13°9.88
TIME :15:02:10 15:32:33 30.4 (min) Purpose : 3
LOG : 4791.97 4793.76 1.8 Region : 4040
FDEPTH: 185 185 Gear cond.: 0
BDEPTH: 185 185 Validity : 0
Towing dir: 0° Wire out : 550 m Speed : 3.5 kn
Sorted : 36 Total catch: 210.00 Catch/hour: 414.75

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dentex angolensis	117.00	105	28.21	278
Synagrops microlepis	91.18	12681	21.99	
Merluccius polli	48.39	140	11.67	281
Umbrina canariensis	36.46	20	8.79	280
Dentex macrophthalmus	26.07	97	6.29	279
Bembrops greyi	20.98	170	5.06	0
Spicara alta	19.82	69	4.78	
Pterothrissus belloci	11.80	101	2.84	
Torpedo torpedo few spots	7.64	14	1.84	
Schedophilus pemarco	7.62	2	1.84	
Lophius vaillanti	5.61	10	1.35	
Erythrocles monodi	3.95	4	0.95	
Zenopsis conchifer	3.67	43	0.89	
Illex coindetii	3.39	53	0.82	
Sepia orbignyana	2.51	20	0.61	
Bembrops greyi	1.93	67	0.47	
Raja miraletus	1.74	4	0.42	
Pontinus kuhlii	1.26	4	0.30	
Lagocephalus sp.	0.97	4	0.23	
Uranoscopus cadenati	0.97	4	0.23	
Deepwater fish mixture	0.77	0	0.19	
Peristedion cataphractum	0.58	10	0.14	
Chlorophthalmus atlanticus	0.19	107	0.05	
G A S T R O P O D S	0.19	87	0.05	
HOMOLIDAE	0.05	4	0.01	
Total	414.75		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 80
DATE :06/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 10°34.16
start stop duration Lon E 13°9.36
TIME :16:21:50 16:52:08 30.3 (min) Purpose : 3
LOG : 4796.81 4798.36 1.6 Region : 4040
FDEPTH: 249 249 Gear cond.: 0
BDEPTH: 249 249 Validity : 0
Towing dir: 0° Wire out : 620 m Speed : 3.1 kn
Sorted : 38 Total catch: 1325.00 Catch/hour: 2622.90

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Synagrops microlepis	780.73	75714	29.77	
Merluccius polli	707.13	6178	26.96	283
Chlorophthalmus atlanticus	554.67	14524	21.15	
Zenopsis conchifer	152.46	1314	5.81	
Dentex macrophthalmus	117.70	184	4.49	282
Parapenaeus longirostris	114.36	15904	4.36	284
Pterothrissus belloci	95.95	920	3.66	
Schedophilus velaini	43.37	65	1.65	
Bembrops greyi	28.92	527	1.10	
Calappa pelii	6.57	65	0.25	
Illex coindetii	5.27	65	0.20	
Monolene microstoma	3.94	329	0.15	
Coelorinchus sp.	3.94	65	0.15	
Trichiurus lepturus	3.94	65	0.15	
Pontinus sp.	1.31	65	0.05	
MYCTOPHIDAE	1.31	198	0.05	
Peristedion cataphractum	1.31	65	0.05	
Total	2622.88		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 81
DATE :06/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 10°33.79
start stop duration Lon E 13°7.88
TIME :18:09:03 18:39:46 30.7 (min) Purpose : 3
LOG : 4802.16 4803.71 1.6 Region : 4040
FDEPTH: 330 327 Gear cond.: 0
BDEPTH: 330 327 Validity : 0
Towing dir: 0° Wire out : 860 m Speed : 3.0 kn
Sorted : 67 Total catch: 880.00 Catch/hour: 1718.75

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Chlorophthalmus atlanticus	653.58	13686	38.03	
Merluccius polli	625.23	2578	36.38	285
Laemonema laureysi	150.51	3428	8.76	
Scorpaena normani	69.58	1006	4.05	
Malacocephalus laevis	45.36	336	2.64	
Pterothrissus belloci	44.84	283	2.61	
Nematocarcinus africanus	25.77	10111	1.50	
Lophius vaillanti	24.22	180	1.41	286
Zenopsis conchifer	19.07	51	1.11	
Hymenocephalus italicus	10.82	2861	0.63	
MYCTOPHIDAE	10.31	4051	0.60	
CHIROSTYLIDAE	10.31	1727	0.60	
Callinectes sp.	9.28	180	0.54	
Coelorinchus caelorhincus	6.70	154	0.39	
Chaunax cf. pictus	5.15	104	0.30	
Epigonus telescopus	4.12	104	0.24	
Parapenaeus longirostris	2.06	154	0.12	
Aristeus varidens	0.51	25	0.03	
Hoplostethus cadenati	0.51	25	0.03	
Peristedion cataphractum	0.51	78	0.03	
Solenocera africana	0.26	25	0.01	
Total	1718.73		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 82
DATE :06/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 10°37.51
start stop duration Lon E 13°8.99
TIME :19:43:33 20:23:35 40.0 (min) Purpose : 3
LOG : 4807.69 4809.38 1.7 Region : 4040
FDEPTH: 437 433 Gear cond.: 0
BDEPTH: 437 433 Validity : 0
Towing dir: 0° Wire out : 1010 m Speed : 2.5 kn
Sorted : 30 Total catch: 350.00 Catch/hour: 524.61

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	216.03	48001	41.18	
Laemonema laureysi	89.47	1259	17.05	
Lophius vaillanti	80.97	67	15.43	289
Aristeus varidens	29.26	2449	5.58	290
Chaunax pictus	22.45	153	4.28	
Hoplostethus cadenati	17.69	595	3.37	
MYCTOPHIDAE	14.63	14629	2.79	
Stomias boa boa	11.90	273	2.27	
Dibranchus atlanticus	9.19	510	1.75	
Yarrella blackfordi	5.79	153	1.10	
Merluccius polli	4.08	3	0.78	287
Hymenocephalus italicus	3.40	324	0.65	
Lamprogrammus exutus	3.40	0	0.65	
Bathynectes piperitus	3.06	51	0.58	
Malacocephalus laevis	2.38	16	0.45	
Bassanago albescens	2.38	34	0.45	
Chaceon maritae	2.07	12	0.39	288
Benthodesmus tenuis	1.69	67	0.32	
Coelorinchus polli	1.69	51	0.32	
Halosaurus ovenii	1.02	85	0.19	
Glyphus marsupialis	0.67	204	0.13	
Triplophos hemingi	0.67	153	0.13	
Eumunida squamifera	0.67	102	0.13	
Total	524.58		99.99	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 83
DATE :06/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 10°40.65
start stop duration Lon E 13°6.24
TIME :22:22:03 22:52:19 30.3 (min) Purpose : 3
LOG : 4816.69 4818.20 1.5 Region : 4040
FDEPTH: 734 724 Gear cond.: 0
BDEPTH: 734 724 Validity : 0
Towing dir: 0° Wire out : 1500 m Speed : 3.0 kn
Sorted : 27 Total catch: 205.00 Catch/hour: 406.48

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Anemone - purple	61.35	101	15.09	
Nezumia micronychodon	57.86	1279	14.23	
Dibranchus atlanticus	39.54	2181	9.73	
Anemones, pink	31.41	131	7.73	
Yarrella blackfordi	27.62	698	6.80	
Stereomastis sp.	26.45	1729	6.51	
Lamprogrammus exutus	19.77	87	4.86	
Zameus (Scymnodon) squamulosus	18.90	73	4.65	
Hoplostethus cadenati	18.32	117	4.51	
Miscellaneous fishes	17.11	0	4.21	
Thysanoteuthis rhombus	15.70	73	3.86	
Anemones, white	11.34	44	2.79	
Bathyuroconger vicinus	11.04	101	2.72	
Stomias boa boa	7.85	174	1.93	
Alepocephalus sp.	7.28	58	1.79	
Munidopsis chuni	4.94	4085	1.21	
Merluccius polli	4.48	4	1.10	291
Plesiopenaeus edwardsianus	3.19	276	0.79	
Raja sp.	3.19	14	0.79	
Ebinania costaecanarie	2.91	14	0.72	
Aristeus varidens	2.91	145	0.72	292
Chaceon maritae	2.10	4	0.52	
Nephropsis atlantica	1.45	87	0.36	
Triplophos hemingi	1.17	145	0.29	
NETTASTOMATIDAE	1.17	14	0.29	
Sea urchin	1.17	101	0.29	
MYCTOPHIDAE	1.17	161	0.29	
Halosaurus ovenii	0.87	14	0.21	
Synaphobranchus kaupii	0.87	30	0.21	
Plastic	0.79	24	0.20	
Malacocephalus occidentalis	0.73	14	0.18	
Bathynectes piperitus	0.58	14	0.14	
Acanthephyra sp.	0.58	44	0.14	
Lophius vaillanti	0.36	2	0.09	
CONGRIDAE	0.30	14	0.07	
Total	406.48		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 84
DATE :07/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 10°20.54
start stop duration Lon E 12°55.18
TIME :04:44:05 05:14:36 30.5 (min) Purpose : 3
LOG : 4849.98 4851.69 1.7 Region : 4040
FDEPTH: 511 535 Gear cond.: 0
BDEPTH: 511 535 Validity : 0
Towing dir: 0° Wire out : 1190 m Speed : 3.3 kn
Sorted : 29 Total catch: 200.00 Catch/hour: 393.31

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	186.41	483	47.40	
Aristeus varidens	58.33	1599	14.83	293
Lamprogrammus exutus	35.54	1127	9.04	
Stomias boa boa	29.97	240	7.62	
Hoplostethus cadenati	19.35	755	4.92	
Laemonema laureysi	13.79	265	3.50	
Lophius vaillanti	12.43	4	3.16	
Chaunax cf. pictus	7.43	92	1.89	
Glyphus marsupialis	4.37	92	1.11	
POLYCHAELIDAE	4.25	319	1.08	
Dibranchus atlanticus	2.65	120	0.68	
Bathynectes piperitus	2.65	53	0.68	
Dicrolene intronigra	2.38	92	0.60	
Sudis hyalina	2.12	53	0.54	
Nemichthys scolopaceus	1.85	106	0.47	
Xenodermichthys copei	1.32	53	0.34	
Etmopterus sp.	1.06	14	0.27	
Munidopsis chuni	1.06	769	0.27	
Illex coindetii	1.06	14	0.27	
PASIPHAEIDAE	0.79	26	0.20	
Eggs of ray	0.79	14	0.20	
Nephropsis atlantica	0.79	26	0.20	
Triplophos hemingi	0.53	106	0.14	
BATHYTEUTHIDAE	0.53	14	0.14	
Yarrella blackfordi	0.53	14	0.14	
Cynoglossoides sp.	0.26	14	0.07	
Starfish	0.26	14	0.07	
Lampanyctus australis	0.14	14	0.04	
MICROSTOMATIDAE	0.14	14	0.04	
Plesiopenaeus nitidus	0.14	26	0.04	
Bufoceratias wedli	0.14	39	0.04	
Bathycongrus sp.	0.14	14	0.04	
Metal waste	0.10	2	0.03	
Total	393.27		99.99	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 85
DATE :07/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 10°20.87
start stop duration Lon E 12°57.79
TIME :06:31:12 07:01:28 30.3 (min) Purpose : 3
LOG : 4857.03 4858.58 1.6 Region : 4040
FDEPTH: 410 416 Gear cond.: 0
BDEPTH: 410 416 Validity : 0
Towing dir: 0° Wire out : 910 m Speed : 3.1 kn
Sorted : 34 Total catch: 490.00 Catch/hour: 971.58

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	215.12	48761	22.14	
Merluccius polli	119.72	182	12.32	294
Hymenocephalus italicus	85.58	7356	8.81	
Dibranchus atlanticus	82.80	393	8.52	
Chaunax pictus	76.34	1249	7.86	
Lophius vaillanti	72.93	26	7.51	295
Stomias boa boa	53.20	1041	5.48	
Laemonema laureysi	44.42	579	4.57	
Etmopterus sp.	39.80	462	4.10	
Aristeus varidens	30.99	1596	3.19	
Yarrella blackfordi	27.76	809	2.86	
Glyphus marsupialis	22.66	12652	2.33	
Synagrops microlepis	15.72	1551	1.62	
Dicrolene intronigra	13.42	208	1.38	
Plesiopenaeus edwardsianus	13.42	510	1.38	
Illex coindetii	9.26	139	0.95	
Raja clavata	6.48	46	0.67	
Chaceon maritae	6.11	16	0.63	
Coelorinchus sp.	6.01	163	0.62	
Bassanago albescens	5.10	93	0.52	
Chlorophthalmus atlanticus	4.62	184	0.48	
Neoharriotta pinnata	4.16	2	0.43	
Malacocephalus laevis	3.23	46	0.33	
Anemones, white	2.78	24	0.29	
POLYCHAELIDAE	2.32	208	0.24	
MYCTOPHIDAE	1.84	4001	0.19	
Venefica proboscidea	1.84	46	0.19	
Nemichthys scolopaceus	1.39	115	0.14	
Xenodermichthys copei	0.93	254	0.10	
Benthodesmus tenuis	0.46	139	0.05	
Halosaurus ovenii	0.46	24	0.05	
Triplophos hemingi	0.46	69	0.05	
Bathynectes piperitus	0.24	24	0.02	
Plastic	0.00	2	0.00	
Total	971.56		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 86
DATE :07/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 10°19.67
start stop duration Lon E 13°0.20
TIME :08:35:35 09:03:35 28.0 (min) Purpose : 3
LOG : 4866.64 4868.23 1.6 Region : 4040
FDEPTH: 218 237 Gear cond.: 0
BDEPTH: 218 237 Validity : 0
Towing dir: 0° Wire out : 560 m Speed : 3.4 kn
Sorted : 68 Total catch: 940.00 Catch/hour: 2013.57

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Synagrops microlepis	796.73	51974	39.57	
Zenopsis conchifer	521.41	2969	25.89	
Merluccius polli	319.26	1227	15.86	296
Pterothrissus belloci	99.95	829	4.96	
Malacocephalus laevis	74.82	600	3.72	
Dentex angolensis	40.27	88	2.00	297
Bembrops greyi	38.26	257	1.90	
Lagocephalus sp.	23.99	28	1.19	
Torpedo torpedo	20.56	28	1.02	
Brotula barbata	17.22	13	0.86	
Chlorophthalmus atlanticus	13.71	401	0.68	
Illex coindetii	12.85	114	0.64	
Dibranchus sp.	12.57	829	0.62	
E C H I N O D E R M A T A	7.43	144	0.37	
Scorpaena sp.	3.43	28	0.17	
Dentex macrophthalmus	3.00	4	0.15	298
Etmopterus polli	2.85	58	0.14	

Bathyurocongrus sp.	2.29	28	0.11
Parapenaeus longirostris	1.71	144	0.09
Spicara alta	1.24	4	0.06
Total	2013.57		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 87
DATE :07/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 10°16.76
start stop duration Lon E 13°6.89
TIME :10:29:08 10:59:20 30.2 (min) Purpose : 3
LOG : 4876.91 4878.41 1.5 Region : 4040
FDEPTH: 107 106 Gear cond.: 0
BDEPTH: 107 106 Validity : 0
Towing dir: 0° Wire out : 310 m Speed : 3.0 kn
Sorted : 73 Total catch: 220.00 Catch/hour: 437.09

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Trachurus trecae	158.66	3232 36.30	299
Lepidotrigla carolae	109.71	761 25.10	
Dentex angolensis	51.56	431 11.80	300
Boops boops	33.38	632 7.64	
Dentex congoensis	16.03	177 3.67	301
Raja miraletus	12.62	18 2.89	
Lagocephalus laevigatus	10.61	12 2.43	
Miscellaneous fishes	8.84	0 2.02	
Citharus linguatula	8.84	278 2.02	
Zeus faber	4.61	18 1.05	
Ommastrephes bartrami	4.49	171 1.03	
Torpedo torpedo	3.89	6 0.89	
E C H I N O D E R M A T A	3.06	129 0.70	
Sarda sarda	2.70	2 0.62	
Uranoscopus polli	2.36	6 0.54	
Rajella leopardus	1.35	2 0.31	
Starfish small	1.05	6 0.24	
Pagellus bellottii	1.05	18 0.24	302
Ariomma bondi	0.72	12 0.16	
Scorpaena normani	0.72	12 0.16	
Sepia officinalis	0.36	6 0.08	
Todarodes sagittatus	0.36	6 0.08	
Nudibranchs	0.12	6 0.03	
Plastic	0.00	2 0.00	
Total	437.09		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 88
DATE :07/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 10°12.75
start stop duration Lon E 13°12.72
TIME :13:19:04 13:50:01 30.9 (min) Purpose : 3
LOG : 4893.86 4895.56 1.7 Region : 4040
FDEPTH: 82 73 Gear cond.: 0
BDEPTH: 82 73 Validity : 0
Towing dir: 0° Wire out : 210 m Speed : 3.3 kn
Sorted : 84 Total catch: 183.35 Catch/hour: 355.44

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Trachurus trecae	134.73	2346 37.91	303
Lepidotrigla carolae	68.34	750 19.23	
Lagocephalus laevigatus	46.53	68 13.09	
Zeus faber	20.22	48 5.69	
Umbrina canariensis	11.07	19 3.11	304
Octopus vulgaris	9.96	4 2.80	
Pagellus bellottii	9.95	112 2.80	307
Alloteuthis africana	7.95	1888 2.24	
Starfish small	5.21	1824 1.47	
Dentex angolensis	4.98	105 1.40	305
Squatina oculata	4.96	2 1.40	
Miscellaneous fishes	4.32	0 1.22	
Citharus linguatula	4.09	149 1.15	
Serranus accraensis	3.53	56 0.99	
Pseudupeneus prayensis	3.30	41 0.93	
Raja miraletus	3.12	4 0.88	
Selene dorsalis	2.73	4 0.77	
Saurida brasiliensis	2.09	349 0.59	
Waste General	1.94	2 0.55	
Sepia orbignyana	1.05	23 0.29	
Dentex barnardi	1.05	16 0.29	306
Grammoplites gruveli	0.79	12 0.22	
Fistularia petimba	0.72	27 0.20	
Sardinella aurita	0.72	4 0.20	
Chaetodon hoefleri	0.72	4 0.20	
Scorpaena normani	0.64	4 0.18	
Dicologoglossa hexophthalma	0.33	8 0.09	
Illex coindetii	0.23	4 0.07	
Sea pens	0.08	8 0.02	
PECTINIDAE	0.04	4 0.01	
Nudibranchs	0.04	0 0.01	
Total	355.42		99.99

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 89
DATE :07/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 10°10.91
start stop duration Lon E 13°18.26
TIME :14:41:59 14:53:02 11.1 (min) Purpose : 3
LOG : 4900.51 4901.15 0.6 Region : 4040
FDEPTH: 45 44 Gear cond.: 0
BDEPTH: 45 44 Validity : 0
Towing dir: 0° Wire out : 160 m Speed : 3.5 kn
Sorted : 92 Total catch: 1410.00 Catch/hour: 7656.11

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Brachydeuterus auritus	6122.69	6119 79.97	311
Ilisha africana	450.84	5761 5.89	
Chloroscombrus chrysurus	228.76	2590 2.99	
Galeoides decadactylus	205.36	2335 2.68	
Pagellus bellottii	163.76	1754 2.14	310
Trachurus trecae	115.22	2172 1.50	309
Pseudupeneus prayensis	70.13	1254 0.92	
Raja miraletus	50.06	81 0.65	
Selene dorsalis	45.07	918 0.59	
Trichiurus lepturus	35.08	331 0.46	
Pseudotolithus senegalensis	31.71	81 0.41	
Lagocephalus laevigatus	31.71	81 0.41	
Pomadasys incisus	30.03	168 0.39	
Sardinella maderensis	30.03	250 0.39	308
Dentex barnardi	15.04	168 0.20	
Ephippion guttifer	14.01	5 0.18	
Megalops atlanticus	9.99	81 0.13	
Citharus linguatula	3.34	168 0.04	
Grammoplites gruveli	3.34	81 0.04	
Total	7656.17		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 90
DATE :07/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 10°2.14
start stop duration Lon E 13°10.93
TIME :16:10:04 16:40:33 30.5 (min) Purpose : 3
LOG : 4911.99 4913.62 1.6 Region : 4040
FDEPTH: 58 59 Gear cond.: 0
BDEPTH: 58 59 Validity : 0
Towing dir: 0° Wire out : 220 m Speed : 3.2 kn
Sorted : 120 Total catch: 335.00 Catch/hour: 659.45

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Trichiurus lepturus	202.42	965 30.70	
Trachurus trecae	178.78	1673 27.11	316
Lagocephalus laevigatus	72.93	179 11.06	
Pagellus bellottii	47.09	551 7.14	312
Dentex barnardi	39.13	376 5.93	313
Pseudupeneus prayensis	37.72	480 5.72	
Saurida brasiliensis	15.26	1128 2.31	
Bembrops heterurus	11.99	250 1.82	
Citharus linguatula	7.19	795 1.09	
Waste General	6.44	2 0.98	
Sardinella maderensis	5.45	33 0.83	315
Alectis alexandrinus	3.35	2 0.51	
Sardinella aurita	3.17	22 0.48	314
Priacanthus arenatus	3.17	6 0.48	
Raja miraletus	3.05	12 0.46	
Brachydeuterus auritus	2.62	43 0.40	319
Chloroscombrus chrysurus	2.50	16 0.38	
Pseudotolithus senegalensis	2.48	4 0.38	318
Brotula barbata	2.07	16 0.31	
Serranus cabrilla	1.75	37 0.27	
Stromateus fiatola	1.69	2 0.26	
Zeus faber	1.63	6 0.25	
Selene dorsalis	1.63	22 0.25	
Fistularia petimba	1.42	6 0.21	
Dicologoglossa cuneata	1.08	6 0.16	
Umbrina canariensis	0.87	6 0.13	320
Scorpaena stephanica	0.65	12 0.10	
Parapenaeus longirostris	0.65	98 0.10	317
Dentex angolensis	0.65	12 0.10	321
Trigla lyra	0.22	12 0.03	
Sepia officinalis	0.22	6 0.03	
Alloteuthis africana	0.12	142 0.02	
Monolene maculipinna	0.06	16 0.01	
Total	659.43		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 91
DATE :07/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 9°59.72
start stop duration Lon E 13°12.88
TIME :18:59:02 19:29:09 30.1 (min) Purpose : 3
LOG : 4919.85 4921.41 1.6 Region : 4040
FDEPTH: 35 36 Gear cond.: 0
BDEPTH: 35 36 Validity : 0
Towing dir: 0° Wire out : 115 m Speed : 3.1 kn
Sorted : 36 Total catch: 135.00 Catch/hour: 268.92

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Pteroscion peli	110.78	4960 41.19	
Galeoides decadactylus	44.30	546 16.47	
Dasyatis marmorata	21.04	8 7.82	
Raja miraletus	20.56	32 7.64	
Brachydeuterus auritus	14.28	4 5.31	322
Ephippion guttifer	12.53	8 4.66	
Ilisha africana	8.03	209 2.99	
Sardinella maderensis	7.71	0 2.87	326
Pomadasys incisus	4.00	48 1.49	323
Trichiurus lepturus	3.84	32 1.43	
Pseudotolithus senegalensis	2.89	24 1.07	324
Torpedo torpedo	2.89	56 1.07	
Citharus linguatula	2.73	120 1.01	
Bembrops greyi	2.25	297 0.84	
Sepia orbignyana	1.93	8 0.72	
Zenopsis conchifer	1.61	16 0.60	
Pisodonophis semicinctus	1.61	8 0.60	
Lagocephalus laevigatus	1.45	8 0.54	
Trachinotus ovatus	0.96	8 0.36	
Cynoglossus cadenati	0.96	16 0.36	
Selene dorsalis	0.64	8 0.24	
Penaeus notialis	0.64	16 0.24	
Argyrosomus hololepidotus	0.48	8 0.18	325
Squilla mantis	0.48	0 0.18	
Saurida brasiliensis	0.16	32 0.06	
GOBIIDAE	0.16	112 0.06	
Total	268.92		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 92
DATE :07/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 10°5.34
start stop duration Lon E 12°57.32
TIME :23:24:04 23:54:08 30.1 (min) Purpose : 3
LOG : 4941.60 4943.34 1.7 Region : 4040
FDEPTH: 118 120 Gear cond.: 0
BDEPTH: 118 120 Validity : 0
Towing dir: 0° Wire out : 330 m Speed : 3.5 kn
Sorted : 92 Total catch: 190.00 Catch/hour: 379.12

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Brotula barbata	67.06	66 17.69	
Lepidotrigla carolae	39.91	379 10.53	
Dentex angolensis	37.35	198 9.85	327
Scorpaena normani	33.66	349 8.88	
Umbrina canariensis	28.21	66 7.44	328
Pterothrissus belloci	18.60	108 4.91	
Raja miraletus	16.62	24 4.38	
Boops boops	16.62	247 4.38	
Citharus linguatula	15.64	317 4.13	
Chelidonichthys capensis	12.91	74 3.41	
Miscellaneous fishes	12.75	0 3.36	
Gephyroberyx darwini	9.96	12 2.63	
Octopus vulgaris	9.80	8 2.58	
Sphoeroides pachygaster	8.64	24 2.28	
Zenopsis conchifer	8.48	4 2.24	
Uranoscopus polli	8.48	66 2.24	
G A S T R O P O D S	5.19	441 1.37	
Physiculus sp.	5.11	62 1.35	
Dicologoglossa hexophthalma	3.45	46 0.91	
Torpedo torpedo	3.33	12 0.88	
Sepia officinalis	2.71	38 0.72	
Peristedion cataphractum	2.63	38 0.69	
Pagellus bellottii	2.39	8 0.63	
CONGRIDAE	2.21	12 0.58	
Trichiurus lepturus	1.74	8 0.46	
Scorpaena angolensis	1.64	2 0.43	
OPHIDIIDAE	1.56	46 0.41	
Zeus faber	0.90	4 0.24	
Arnoglossus imperialis	0.58	54 0.15	
MYCTOPHIDAE	0.42	124 0.11	
Parapandalus narval	0.32	46 0.08	
Opistobranch	0.16	140 0.04	
Small crabs	0.08	16 0.02	
Total	379.12		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 93
DATE :08/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 10°7.00
start stop duration Lon E 12°53.77
TIME :01:14:27 01:44:54 30.4 (min) Purpose : 3
LOG : 4948.75 4950.27 1.5 Region : 4040
FDEPTH: 281 291 Gear cond.: 0
BDEPTH: 281 291 Validity : 0
Towing dir: 0° Wire out : 680 m Speed : 3.0 kn
Sorted : 100 Total catch: 470.00 Catch/hour: 926.41

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Chlorophthalmus agassizi	193.80	3905	20.92	
Gephyroberyx darwini	176.67	268	19.07	
Merluccius polli	162.65	341	17.56	329
Brotula barbata	158.61	93	17.12	
Bembrops greyi	58.40	645	6.30	
Laemonema laureysi	46.79	386	5.05	
Pterothrissus belloci	26.53	203	2.86	
Zenopsis conchifer	22.10	73	2.39	
Malacocephalus occidentalis	16.58	93	1.79	
MYCTOPHIDAE	14.92	6217	1.61	
Ophisurus serpens	9.58	28	1.03	
Neoharriotta pinnata	9.03	2	0.97	
Torpedo torpedo	8.10	10	0.87	
Parapenaeus longirostris	5.34	714	0.58	330
Synagrops microlepis	3.51	268	0.38	
Coelorinchus polli	3.13	65	0.34	
Miscellaneous fishes	2.76	0	0.30	
B I V A L V E S	1.83	296	0.20	
Calappa pelii	1.83	37	0.20	
Bathynectes piperitus	1.28	28	0.14	
Citharus linguatula	1.10	18	0.12	
Syacium micrurum	0.73	37	0.08	
G A S T R O P O D S	0.37	93	0.04	
Gadella imberbis	0.37	10	0.04	
Stomias boa boa	0.18	10	0.02	
Bembrops heterurus	0.18	10	0.02	
Plastic	0.00	4	0.00	
Total	926.39		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 94
DATE :08/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 10°7.38
start stop duration Lon E 12°52.61
TIME :02:46:25 03:16:46 30.3 (min) Purpose : 3
LOG : 4953.75 4955.34 1.6 Region : 4040
FDEPTH: 380 380 Gear cond.: 0
BDEPTH: 380 380 Validity : 0
Towing dir: 0° Wire out : 930 m Speed : 3.2 kn
Sorted : 39 Total catch: 340.00 Catch/hour: 672.38

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	269.29	65824	40.05	
Merluccius polli	133.31	332	19.83	332
Laemonema laureysi	62.33	483	9.27	
Chaunax pictus	49.66	967	7.39	
Hymenocephalus italicus	36.33	3000	5.40	
Malacocephalus laevis	19.32	200	2.87	
Lophius vaillanti	15.15	8	2.25	331
MYCTOPHIDAE	14.34	8949	2.13	
Dibranchus atlanticus	14.34	1133	2.13	
Chlorophthalmus atlanticus	12.00	334	1.79	
Scorpaena normani	10.32	16	1.54	
Aristeus varidens	9.67	933	1.44	334
Bassanago albescens	8.66	67	1.29	
Stomias boa boa	5.99	117	0.89	
Zenopsis conchifer	4.98	2	0.74	
Neoharriotta pinnata	3.01	2	0.45	
Hoplostethus cadenati	1.66	49	0.25	
Synagrops microlepis	1.01	101	0.15	
Yarrella blackfordi	0.67	16	0.10	
Raja clavata	0.16	16	0.02	
Bathyuroconger vicinus	0.16	16	0.02	
Total	672.36		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 95
DATE :08/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 10°7.97
start stop duration Lon E 12°51.93
TIME :04:18:49 04:49:06 30.3 (min) Purpose : 3
LOG : 4959.12 4960.83 1.7 Region : 4040
FDEPTH: 449 469 Gear cond.: 0
BDEPTH: 449 469 Validity : 0
Towing dir: 0° Wire out : 1050 m Speed : 3.4 kn
Sorted : 25 Total catch: 250.00 Catch/hour: 495.21

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	337.48	113887	68.15	
Aristeus varidens	68.95	5784	13.92	
Hoplostethus cadenati	17.23	594	3.48	
Chlorophthalmus atlanticus	14.18	1858	2.86	
Stomias boa boa	11.11	325	2.24	
MYCTOPHIDAE	11.11	12775	2.24	
Laemonema laureysi	6.89	517	1.39	
Chaceon maritae	5.98	40	1.21	
Chaunax cf. pictus	4.60	57	0.93	
Dibranchus atlanticus	3.45	440	0.70	
Lampanyctus australis	2.67	172	0.54	
Yarrella blackfordi	2.30	77	0.46	
Neoharriotta pinnata	1.58	2	0.32	
Aristeidae	1.19	192	0.24	
Bajacalifornia megalops	0.77	20	0.16	
Hymenocephalus italicus	0.77	77	0.16	
Lamprogrammus exutus	0.38	38	0.08	
Stemonosudis macrura	0.38	20	0.08	
Cynoglossus canariensis	0.38	20	0.08	
Plesiopenaeus edwardsianus	0.38	38	0.08	
Bathynectes piperitus	0.38	57	0.08	
Glyphus marsupialis	0.38	172	0.08	
Solenocera africana	0.38	38	0.08	
Coelorinchus polli	0.38	20	0.08	
Nezumia milleri	0.38	38	0.08	
POLYCHAELIDAE	0.38	230	0.08	
Halosaurus ovenii	0.38	20	0.08	
Triplophos hemingi	0.38	57	0.08	
Nemichthys scolopaceus	0.20	20	0.04	
Xenodermichthys copei	0.20	20	0.04	
Total	495.19		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 96
DATE :08/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 9°51.63
start stop duration Lon E 12°51.04
TIME :09:52:05 10:22:19 30.2 (min) Purpose : 3
LOG : 4981.37 4982.95 1.6 Region : 4040
FDEPTH: 207 213 Gear cond.: 0
BDEPTH: 207 213 Validity : 0
Towing dir: 0° Wire out : 520 m Speed : 3.1 kn
Sorted : 126 Total catch: 580.00 Catch/hour: 1150.79

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Merluccius polli	452.92	1760	39.36	335
Synagrops microlepis	298.44	15565	25.93	
Zenopsis conchifer	111.68	456	9.70	
Dentex angolensis	79.01	183	6.87	336
Branchiostegus semifasciatus	35.58	28	3.09	
Brotula barbata	31.57	36	2.74	
Uranoscopus polli	27.00	81	2.35	
Bembrops heterurus	21.71	165	1.89	
Pterothrissus belloci	16.79	147	1.46	
Trichiurus lepturus	16.43	56	1.43	
Illex coindetii	11.13	228	0.97	
Sphoeroides pachygaster	8.57	10	0.74	
Miscellaneous fishes	6.75	0	0.59	
Parapenaeus longirostris	4.74	0	0.41	337
Syacium micrurum	4.56	127	0.40	
Scorpaena angolensis	4.38	10	0.38	
Rajella leopardus	3.47	10	0.30	
Torpedo torpedo	3.29	10	0.29	
Umbrina canariensis	3.10	10	0.27	
Spicara alta	2.92	10	0.25	
Mystriophis rostellatus	1.65	18	0.14	
Nezumia micronychodon	1.47	28	0.13	
G A S T R O P O D S	1.28	393	0.11	
Chlorophthalmus atlanticus	1.27	119	0.11	
Parasudis fraserbrunneri	0.73	101	0.06	
Bathyuroconger vicinus	0.36	10	0.03	
Total	1150.79		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 97
DATE :08/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 9°49.54
start stop duration Lon E 12°57.44
TIME :11:54:20 12:24:54 30.6 (min) Purpose : 3
LOG : 4991.70 4993.43 1.7 Region : 4040
FDEPTH: 109 110 Gear cond.: 0
BDEPTH: 109 110 Validity : 0
Towing dir: 0° Wire out : 320 m Speed : 3.4 kn
Sorted : 78 Total catch: 150.00 Catch/hour: 294.41

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Lepidotrigla carolae	122.77	993	41.70	
Dentex angolensis	53.05	497	18.02	338
Zeus faber	19.73	59	6.70	
Trachurus trecae	19.67	355	6.68	343
Citharus linguatula	13.52	463	4.59	
Dentex congoensis	8.32	120	2.83	339
Umbrina canariensis	5.89	8	2.00	342
Pagellus bellottii	5.77	33	1.96	340
Dentex barnardi	5.42	14	1.84	341
Raja miraletus	5.42	12	1.84	
Uranoscopus polli	4.46	14	1.51	
Miscellaneous fishes	4.32	0	1.47	
Zenopsis conchifer	4.20	2	1.43	
Illex coindetii	3.81	281	1.29	
Lagocephalus laevigatus	3.06	4	1.04	
Lophiodes kempi	2.77	4	0.94	
Scorpaena normani	2.26	29	0.77	
Brotula barbata	1.98	4	0.67	
G A S T R O P O D S	1.83	157	0.62	
Sepia orbignyana	1.10	4	0.37	
Sea pens	0.88	33	0.30	
Trichiurus lepturus	0.86	2	0.29	
Sea urchin, weak spines	0.80	51	0.27	
Todaropsis eblanae	0.73	26	0.25	
Sepia officinalis	0.59	14	0.20	
Dicologoglossa hexophthalma	0.43	4	0.15	
Saurida brasiliensis	0.29	51	0.10	
Boops boops	0.22	8	0.07	
GOBIIDAE	0.14	8	0.05	
Arnoglossus imperialis	0.14	4	0.05	
Total	294.41		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 98
DATE :08/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 9°46.49
start stop duration Lon E 13°2.87
TIME :13:35:39 14:05:50 30.2 (min) Purpose : 3
LOG : 5002.47 5003.99 1.5 Region : 4040
FDEPTH: 82 83 Gear cond.: 0
BDEPTH: 82 83 Validity : 0
Towing dir: 0° Wire out : 220 m Speed : 3.0 kn
Sorted : 100 Total catch: 175.00 Catch/hour: 347.91

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	67.30	1328	19.34	352
Dentex angolensis	63.76	555	18.33	348
Dentex congoensis	32.56	288	9.36	349
Lepidopus caudatus	27.30	239	7.85	
Pagellus bellottii	25.98	205	7.47	350
Lagocephalus laevigatus	22.39	42	6.43	
Monolene microstoma	21.55	74	6.19	
Citharus linguatula	10.26	304	2.95	
Trichiurus lepturus	9.98	24	2.87	
Raja miraletus	7.61	14	2.19	
Branchiostegus semifasciatus	7.42	14	2.13	
Octopus vulgaris	7.42	28	2.13	
Umbrina canariensis	7.34	10	2.11	
Deepwater fish mixture	6.30	0	1.81	
Brotula barbata	5.96	10	1.71	
Zeus faber	5.05	18	1.45	
Dentex barnardi	2.70	24	0.78	351
B I V A L V E S	2.56	284	0.74	
Pseudupeneus prayensis	2.43	32	0.70	
Fistularia petimba	2.15	24	0.62	
Uranoscopus polli	1.53	4	0.44	
Sepia australis	1.39	101	0.40	
Alloteuthis africana	1.17	471	0.34	
Dicologoglossa hexophthalma	1.11	28	0.32	
Scorpaena angolensis	1.11	6	0.32	
Saurida brasiliensis	0.83	173	0.24	
Sea pens	0.76	42	0.22	
Illex coindetii	0.70	6	0.20	
Priacanthus arenatus	0.56	4	0.16	
PAGUROIDEA	0.42	48	0.12	
TETRAODONTIDAE	0.20	34	0.06	
SEA URCHINS	0.06	6	0.02	
Nudibranchs	0.04	4	0.01	
Total	347.89		99.99	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 99
DATE :08/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 9°43.59
start stop duration Lon E 13°9.61
TIME :15:19:21 15:48:05 28.7 (min) Purpose : 3
LOG : 5012.48 5014.26 1.8 Region : 4040
FDEPTH: 31 32 Gear cond.: 0
BDEPTH: 31 32 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.7 kn
Sorted : 92 Total catch: 280.00 Catch/hour: 584.96

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	169.89	756	29.04	355
Galeoides decadactylus	151.43	1558	25.89	354
Pomadasys incisus	48.41	430	8.28	356
Pagellus bellottii	39.18	326	6.70	353
Ilisha africana	38.28	545	6.54	
Selene dorsalis	24.05	560	4.11	357
Trachurus trecae	22.84	416	3.90	
Pteroscion peli	17.40	234	2.97	
Trichiurus lepturus	14.22	121	2.43	
Caranx rhonchus	10.89	399	1.86	
Sphyraena sphyraena	10.29	38	1.76	
Carlarius parkii	8.90	2	1.52	

Octopus vulgaris	7.31	6	1.25
Sphyraena guachancho	4.54	23	0.78
Pseudupeneus prayensis	4.08	38	0.70
Stromateus fiatola	3.48	8	0.59
Sepia officinalis	2.87	8	0.49
ANTENNARIIDAE	2.57	8	0.44
Plastic	1.36	2	0.23
G A S T R O P O D S	0.91	107	0.15
Scomber colias	0.67	4	0.11
Sardinella aurita	0.54	4	0.09
Bembrops greyi	0.45	8	0.08
Citharus linguatula	0.30	29	0.05
Trachinocephalus myops	0.08	0	0.01
Total	584.96		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 100
DATE :08/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 9°31.36
start stop duration Lon E 13°5.19
TIME :17:05:09 17:22:23 17.2 (min) Purpose : 3
LOG : 5025.47 5026.44 1.0 Region : 4040
FDEPTH: 32 30 Gear cond.: 0
BDEPTH: 32 30 Validity : 0
Towing dir: 0° Wire out : 130 m Speed : 3.4 kn
Sorted : 73 Total catch: 280.00 Catch/hour: 974.48

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pomadasys incisus	448.17	4632	45.99	345
Pagellus bellottii	189.49	1608	19.44	346
Boops boops	119.50	14137	12.26	
J E L L Y F I S H	62.54	0	6.42	
Trigla lyra	37.26	240	3.82	
Balistes capriscus	28.48	38	2.92	
Pseudupeneus prayensis	23.68	626	2.43	
Syacium micrurum	15.44	146	1.58	
Dentex barnardi	9.58	188	0.98	347
Raja miraletus	9.31	14	0.96	
Sphyraena sphyraena	8.25	14	0.85	
Galeoides decadactylus	6.39	14	0.66	
Rhinobatos albomaculatus	4.94	3	0.51	
Dasyatis margarita	4.26	14	0.44	
Sphyraena guachancho	3.19	14	0.33	
Chloroscombrus chrysurus	2.93	38	0.30	
Anthias anthias	0.53	132	0.05	
Alloteuthis sp.	0.26	146	0.03	
Penaeus notialis	0.26	14	0.03	
Metal waste	0.00	3	0.00	
Total	974.45		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 101
DATE :08/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 9°30.08
start stop duration Lon E 12°54.33
TIME :19:12:52 19:43:07 30.3 (min) Purpose : 3
LOG : 5038.34 5039.89 1.5 Region : 4040
FDEPTH: 96 99 Gear cond.: 0
BDEPTH: 96 99 Validity : 0
Towing dir: 0° Wire out : 230 m Speed : 3.1 kn
Sorted : 55 Total catch: 240.00 Catch/hour: 476.03

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pterothrissus belloci	151.88	847	31.91	
Chelidonichthys gabonensis	58.89	294	12.37	
Scorpaena normani	42.48	363	8.92	
Pagellus bellottii	37.13	389	7.80	358
Citharus linguatula	32.12	458	6.75	
Brotula barbata	26.25	165	5.51	
Octopus vulgaris	21.93	60	4.61	
Brachydeuterus auritus	13.99	121	2.94	362
Waste General	11.92	0	2.50	
Raja miraletus	11.92	26	2.50	
Argyrosomus hololepidotus	10.02	34	2.10	363
CONGRIDAE	9.33	216	1.96	
Dentex angolensis	8.81	44	1.85	359
Uranoscopus polli	7.08	44	1.49	
Parapenaeus longirostris	6.04	4110	1.27	
Trichiurus lepturus	4.66	18	0.98	
Bajacalifornia megalops	4.23	18	0.89	
Torpedo torpedo few spots	3.45	8	0.73	
Saurida brasiliensis	2.94	407	0.62	
Dentex barnardi	2.42	18	0.51	361
Sardinella maderensis	1.90	8	0.40	360
Sepia orbignyana	1.90	18	0.40	
GOBIIDAE	1.56	147	0.33	
Illex coindetii	1.38	18	0.29	
Bembrops greyi	0.86	8	0.18	
ANTENNARIIDAE	0.52	18	0.11	
Lagocephalus sp.	0.17	26	0.04	
G A S T R O P O D S	0.17	34	0.04	
Plesionika martia	0.09	18	0.02	
Total	476.03		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 102
DATE :08/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 9°33.43
start stop duration Lon E 12°46.34
TIME :21:14:13 21:44:43 30.5 (min) Purpose : 3
LOG : 5049.38 5050.97 1.6 Region : 4040
FDEPTH: 180 177 Gear cond.: 0
BDEPTH: 180 177 Validity : 0
Towing dir: 0° Wire out : 435 m Speed : 3.1 kn
Sorted : 55 Total catch: 108.32 Catch/hour: 213.09

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dentex angolensis	25.02	65	11.74	364
Rajella leopardus	25.02	65	11.74	
Parapenaeus longirostris	19.51	279	9.16	366
Brotula barbata	17.11	35	8.03	
Synagrops microlepis	17.04	812	7.99	
Venefica proboscidea	13.24	51	6.21	
Pterothrissus belloci	13.00	81	6.10	
Merluccius polli	11.23	39	5.27	365
Raja miraletus	8.68	12	4.07	
Bembrops greyi	7.75	112	3.64	
Zenopsis conchifer	7.28	31	3.42	
Malacocephalus occidentalis	5.96	73	2.80	
Umbrina canariensis	5.04	8	2.36	367
Gephyroberyx darwini	4.49	4	2.10	
MYCTOPHIDAE	3.80	2215	1.78	
Lophiodes kempi	3.72	4	1.74	368
PAGUROIDEA	3.64	561	1.71	
Thorogobius angolensis	3.09	321	1.45	
Torpedo torpedo few spots	2.87	4	1.35	
Syacium micrurum**	2.79	100	1.31	
Chlorophthalmus atlanticus	2.56	268	1.20	
Octopus vulgaris	1.85	12	0.87	
Trichiurus lepturus	1.63	16	0.77	
Synbranchus sp.	1.55	16	0.73	
Miscellaneous fishes	1.08	0	0.51	
Pagellus bellottii	0.92	4	0.43	
Sardinella maderensis	0.85	4	0.40	
OPHIDIIDAE	0.55	4	0.26	0
Brachydeuterus auritus	0.47	4	0.22	
Scorpaena normani	0.39	4	0.18	
OPHIDIIDAE	0.31	20	0.15	
Illex coindetii	0.24	4	0.11	
Starfish	0.16	8	0.07	
Calappa sp.	0.08	43	0.04	
Maja sp.	0.08	24	0.04	
LEUCOSIIDAE	0.04	12	0.02	
Nudibranchs	0.04	4	0.02	
Total	213.09		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 103
DATE :09/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 9°14.26
start stop duration Lon E 12°46.72
TIME :00:06:49 00:37:02 30.2 (min) Purpose : 3
LOG : 5069.50 5071.12 1.6 Region : 4040
FDEPTH: 116 116 Gear cond.: 0
BDEPTH: 116 116 Validity : 0
Towing dir: 0° Wire out : 320 m Speed : 3.2 kn
Sorted : 83 Total catch: 260.00 Catch/hour: 516.39

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Lepidotrigla carolae	87.77	844	17.00	
Pterothrissus belloci	57.00	457	11.04	
Dentex angolensis	39.78	256	7.70	369
Uranoscopus polli	38.75	199	7.50	
Scorpaena normani	32.83	234	6.36	
Umbrina canariensis	32.15	64	6.23	370
Zenopsis conchifer	27.59	28	5.34	
Citharus linguatula	25.54	667	4.95	
Brotula barbata	24.95	24	4.83	
Octopus vulgaris	16.86	12	3.27	
Trachurus trecae	15.01	18	2.91	
Venefica proboscidea	14.48	536	2.80	
Syacium micrurum**	13.68	6	2.65	
MYCTOPHIDAE	12.99	3609	2.52	
Gephyroberyx darwini	11.98	12	2.32	
Trichiurus lepturus	8.02	16	1.55	
Calappa sp.	7.29	661	1.41	
Miscellaneous fishes	6.83	0	1.32	
Boops boops	6.16	119	1.19	
Rajella leopardus	5.32	2	1.03	
Synbranchus sp.	5.24	582	1.02	
Saurida brasiliensis	5.02	719	0.97	
Bembrops greyi	3.30	46	0.64	
Dicologoglossa sp.	3.30	64	0.64	
Cynoponticus ferox	3.26	2	0.63	
Peristedion cataphractum	2.84	191	0.55	
Tetradonthidae**	2.62	6	0.51	
Sardinella maderensis	2.40	12	0.47	
Illex coindetii	1.83	46	0.35	
Zeus faber	1.03	6	0.20	
Monolene microstoma	0.44	46	0.08	
Squilla mantis	0.12	6	0.02	
Total	516.39		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 104
DATE :14/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 9°6.26
start stop duration Lon E 12°57.54
TIME :14:42:31 15:22:41 40.2 (min) Purpose : 3
LOG : 5303.44 5305.51 2.1 Region : 4040
FDEPTH: 23 22 Gear cond.: 0
BDEPTH: 23 22 Validity : 0
Towing dir: 0° Wire out : 80 m Speed : 3.1 kn
Sorted : 0 Total catch: 271.06 Catch/hour: 404.77

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pteroscion peli	128.03	9900	31.63	
Jellyfish	99.99	1850	24.70	
Ilisha africana ***	25.89	694	6.40	
Pomadasys incisus	19.89	381	4.91	372
Galeoides decadactylus	16.93	157	4.18	377
Pseudotolithus typus	16.13	40	3.98	374
Sphyraena guachancho	14.60	72	3.61	371
Rhinobatos albomaculatus	11.14	3	2.75	
Scorpaena angolensis	8.33	224	2.06	
Brachydeuterus auritus	7.79	152	1.93	376
Coral - mixed	7.79	0	1.93	
Trichiurus lepturus	7.08	278	1.75	
Pomadasys jubelini	6.00	22	1.48	375
Dicologoglossa cuneata	4.75	31	1.17	
Stromateus fiatola	3.67	9	0.91	
Coral - small	3.40	103	0.84	
Pseudupeneus prayensis	3.23	58	0.80	
Chaetodon robustus	2.42	31	0.60	
Chilomycterus spinosus mauretanicus	1.97	4	0.49	
Grammoplites gruveli	1.79	63	0.44	
Sphoeroides marmoratus	1.79	188	0.44	
Dasyatis margarita	1.52	4	0.38	
Ephippion guttifer	1.49	1	0.37	
Trachinus araneus	1.43	4	0.35	
Tetradonthidae**	1.28	1	0.32	
Plectorhinchus mediterraneus	1.25	4	0.31	
Penaeus notialis	0.81	90	0.20	
Cynoglossus browni	0.72	1	0.18	373
Citharichthys stampflii	0.63	4	0.15	
Sepiella ornata	0.54	18	0.13	
Pisodonophis semicinctus	0.39	1	0.10	
Cronius ruber	0.36	31	0.09	
Selene dorsalis	0.36	139	0.09	
Prognathodes marcellae	0.27	13	0.07	
Chaetodon hoefleri	0.27	4	0.07	
Serranus accraensis	0.18	9	0.04	
APOGONIDAE	0.18	4	0.04	
Lagocephalus laevigatus	0.18	4	0.04	
SOLEIDAE	0.09	4	0.02	
Penaeus kerathurus	0.09	4	0.02	
Bothus podas	0.09	4	0.02	
Total	404.77		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 105
DATE :15/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 9°5.77
start stop duration Lon E 12°37.58
TIME :00:55:05 01:26:36 31.5 (min) Purpose : 3
LOG : 5332.30 5333.85 1.6 Region : 4040
FDEPTH: 653 646 Gear cond.: 0
BDEPTH: 653 646 Validity : 0
Towing dir: 0° Wire out : 1470 m Speed : 2.9 kn
Sorted : 56 Total catch: 260.74 Catch/hour: 496.34

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	191.95	32996	38.67	
Lamprogrammus exutus	165.51	2035	33.35	
Yarrella blackfordi	20.35	571	4.10	
Nezumia micronychodon	17.32	402	3.49	
Stereomastis sp.	16.69	2509	3.36	
**	15.27	0	3.08	
Hoplostethus cadenati	9.29	322	1.87	
ALEPOCEPHALIDAE	9.02	455	1.82	
Stomias boa boa	7.86	152	1.58	
Bathyuroconger vicinus	7.33	223	1.48	

Rajella barnardi	7.23	17	1.46	
Xenodermichthys copei	4.55	126	0.92	
Serranus accraensis	3.31	53	0.67	
Lophiodes kempi	2.95	17	0.59	
Talismania sp.	2.59	196	0.52	
Dibranchus atlanticus	2.42	116	0.49	
Triplophos hemingi	1.87	242	0.38	
Chaceon maritae	1.60	27	0.32	
Aristeus varidens	1.33	179	0.27	
Chaunax pictus	1.16	10	0.23	
Dicrolene intronigra	1.07	268	0.21	
Bajacalifornia megalops	1.07	89	0.21	
Etmopterus sp.	0.89	10	0.18	
Alepocephalus sp.	0.63	44	0.13	0
Halosaurus ovenii	0.63	17	0.13	
Laemonema laureysi	0.53	268	0.11	
Plastic	0.46	0	0.09	
Melanocetus johnsoni	0.27	27	0.05	
Gonostoma denudatum	0.27	17	0.05	
SOLEIDAE	0.27	36	0.05	
Nemichthys scolopaceus	0.17	10	0.03	
Bathynectes piperitus	0.17	44	0.03	
Metal waste	0.12	0	0.02	
Bathypterois phenax *	0.10	10	0.02	
Waste General	0.09	0	0.02	
Total	496.34		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 106
DATE :15/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 9°4.95
start stop duration Lon E 12°36.77
TIME :03:40:25 04:10:49 30.4 (min) Purpose : 3
LOG : 5340.85 5342.36 1.5 Region : 4040
FDEPTH: 736 740 Gear cond.: 0
BDEPTH: 736 740 Validity : 0
Towing dir: 0° Wire out : 1610 m Speed : 3.0 kn
Sorted : 0 Total catch: 252.52 Catch/hour: 498.23

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Plastic cans-jars etc	98.65	2	19.80	
Nezumia sp.	75.01	1876	15.06	
Lamprogrammus exutus	43.64	114	8.76	
Anemones, white	34.29	53	6.88	
Yarrella blackfordi	26.42	773	5.30	
Stereomastis sp.	22.35	558	4.49	
Talismania sp.	20.44	237	4.10	
Bristle worms (straws)	15.31	310	3.07	
Lophius vaillanti	13.55	8	2.72	
Dibranchus atlanticus	11.72	734	2.35	
Garbage	11.64	0	2.34	
Munida sp.	11.17	7448	2.24	
ANTHOZOA (Sea anemones)	10.63	45	2.13	
Bathyraja smithii	9.73	8	1.95	
Bajacalifornia megalops	9.41	375	1.89	
JELLYFISH	8.80	8	1.77	
Luciobrotula nolfi	8.42	8	1.69	
Bathyuroconger vicinus	8.03	114	1.61	
Chaceon maritae	6.67	8	1.34	
PARAPAGURIDAE	5.82	77	1.17	
Starfish small	5.13	245	1.03	
Centroscymnus crepidater	4.76	24	0.95	
Melanocetus johnsoni	4.20	8	0.84	
MYCTOPHIDAE	4.20	32	0.84	
Halosaurus ovenii	3.51	53	0.70	
Raja sp.	2.76	32	0.55	
Hoplostethus cadenati	2.45	69	0.49	
Aristeus varidens	2.23	237	0.45	
Lithodes ferox	1.93	2	0.39	
Triplophos hemingi	1.76	276	0.35	
OMMASTREPHIDAE	1.54	8	0.31	
Stomias sp.	1.54	114	0.31	
Bathypterois sp.	1.46	260	0.29	
Monomitopus metriostoma	1.46	130	0.29	
Octopoteuthis sicula	1.30	8	0.26	
Photonectes sp.	1.22	24	0.25	
Ebinania costaecanarie	1.07	16	0.21	
Shrimps, small, non comm.	1.03	322	0.21	
Nephropsis atlantica	0.61	45	0.12	
ARISTEIDAE	0.57	8	0.11	
Scale worms	0.32	160	0.06	
Cynoglossoides sp.	0.24	24	0.05	
Glyphus marsupialis	0.22	53	0.04	
Xenodermichthys copei	0.16	8	0.03	
Gonostoma denudatum	0.16	16	0.03	
CERATIIDAE	0.16	8	0.03	
Shark eggs	0.16	8	0.03	
Dicrolene sp.	0.12	16	0.02	
Unidentified	0.10	16	0.02	
Chauliodus sloani	0.08	8	0.02	
Sternoptyx sp.	0.08	32	0.02	
Nemichthys scolopaceus	0.04	8	0.01	
Total	498.27		100.01	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 107
DATE :15/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 8°45.78
start stop duration Lon E 13°1.40
TIME :09:42:18 09:48:31 6.2 (min) Purpose : 1
LOG : 5377.51 5377.67 0.2 Region : 4054
FDEPTH: 159 160 Gear cond.: 0
BDEPTH: 159 160 Validity : 0
Towing dir: 0° Wire out : 375 m Speed : 1.6 kn
Sorted : 29 Total catch: 58.02 Catch/hour: 559.68

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Lepidotrigla carolae	212.99	1312	38.06	
Dentex angolensis	126.56	482	22.61	378
Pterothrissus belloci	97.23	521	17.37	
Bembrops heterurus	33.38	367	5.96	
Pontinus accraensis	23.15	174	4.14	
Zeus faber	13.70	58	2.45	
Garbage	11.38	0	2.03	
Pythonichthys microphthalmus	8.68	116	1.55	
Brotula barbata	7.14	19	1.28	
Zenopsis conchifer	6.37	19	1.14	
Torpedo torpedo	4.05	19	0.72	
Munidopsis sp.	3.09	3395	0.55	
MURICIDAE	2.70	1717	0.48	
Dibranchus atlanticus	2.51	251	0.45	
GOBIIDAE	2.51	540	0.45	
Monolene microstoma	1.93	116	0.34	
Parapenaeus longirostris	1.16	830	0.21	
Raja sp.	0.58	19	0.10	
Small crabs	0.39	135	0.07	
Sphoeroides trichocephalus	0.19	19	0.03	
Total	559.68		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 108
DATE :15/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat N 8°47.79
start stop duration Lon E 12°57.15
TIME :11:26:05 11:56:23 30.3 (min) Purpose : 3
LOG : 5377.67 5379.19 1.5 Region : 4054
FDEPTH: 260 267 Gear cond.: 0
BDEPTH: 260 267 Validity : 0
Towing dir: 0° Wire out : 660 m Speed : 3.0 kn
Sorted : 0 Total catch: 1539.81 Catch/hour: 3048.12

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Synagrops microlepis	1266.22	64965	41.54	
MYCTOPHIDAE	540.30	223562	17.73	
Chlorophthalmus atlanticus	339.99	6432	11.15	
Zenopsis conchifer	247.46	404	8.12	
Merluccius polli	242.85	1099	7.97	
Trichiurus lepturus	114.48	289	3.76	
Pontinus accraensis	72.85	346	2.39	
Dentex macrophthalmus	47.41	57	1.56	
Aristeus varidens	46.40	6891	1.52	
Bembrops heterurus	41.81	321	1.37	
Lophiodes kempi	23.12	57	0.76	
Brotula barbata	19.44	12	0.64	
Laemonema laureysi	18.85	598	0.62	
Coelorinchus caelorhincus	16.55	321	0.54	
Lepidotrigla cadmani	10.12	46	0.33	
Pterothrissus belloci	8.73	46	0.29	
Illex coindetii	6.89	91	0.23	
Epigonus telescopus	3.21	46	0.11	
Todaropsis eblanae	0.91	184	0.03	
Total	3067.56		100.64	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 109
DATE :15/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 8°46.99
start stop duration Lon E 12°54.61
TIME :14:25:53 14:56:00 30.1 (min) Purpose : 3
LOG : 5398.22 5399.63 1.4 Region : 4054
FDEPTH: 368 370 Gear cond.: 0
BDEPTH: 368 370 Validity : 0
Towing dir: 0° Wire out : 840 m Speed : 2.8 kn
Sorted : 29 Total catch: 350.00 Catch/hour: 697.44

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Merluccius polli	145.11	401	20.81	380
Nematocarcinus africanus	90.89	807	13.03	
Hymenocephalus italicus	75.16	668	10.78	
Synagrops microlepis	70.92	630	10.17	
Etmopterus polli	67.01	594	9.61	0
Etmopterus polli	42.96	381	6.16	
Chaunax pictus	38.72	343	5.55	
Bassanago albescens	24.93	221	3.57	
Trichiurus lepturus	22.52	30	3.23	
Parapenaeus longirostris	16.26	143	2.33	
Chlorophthalmus atlanticus	15.92	141	2.28	
Laemonema laureysi	8.85	78	1.27	
MYCTOPHIDAE	8.13	72	1.17	
Dicrolene intronigra	6.54	58	0.94	
Aristeus varidens	6.36	56	0.91	
Munidopsis sp.	5.84	52	0.84	
Malacocephalus laevis	5.48	48	0.79	
Triplophos hemingi	5.48	0	0.79	
Acanthephyra sp.	5.30	48	0.76	
Zenopsis conchifer	4.72	6	0.68	
Illex coindetii	4.42	40	0.63	
CENTROLOPHIDAE	3.97	4	0.57	
Benthodesmus tenuis	3.71	34	0.53	
Solenocera africana	2.83	26	0.41	
Hoplostethus cadenati	2.47	22	0.35	
Shrimps unidentified	2.29	20	0.33	
Halosaurus ovenii	2.11	18	0.30	
Dibranchus atlanticus	2.11	18	0.30	
Bembrops greyi	1.24	12	0.18	
OMMASTREPHIDAE	1.24	12	0.18	
Chascanopsetta lugubris	1.24	12	0.18	
Trachipterus sp.	0.84	0	0.12	
SOLEIDAE	0.54	4	0.08	
Black paralepidae	0.36	4	0.05	
Nezumia sp.	0.36	4	0.05	
Stomias sp.	0.18	2	0.03	
Histioteuthis sp.	0.14	2	0.02	
OPHIDIIDAE	0.12	2	0.02	
Peristedion cataphractum	0.08	0	0.01	
MORIDAE	0.06	0	0.01	
Total	697.38		99.99	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 110
DATE :15/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 8°47.77
start stop duration Lon E 12°50.24
TIME :16:51:23 17:21:30 30.1 (min) Purpose : 3
LOG : 5409.95 5411.45 1.5 Region : 4054
FDEPTH: 491 487 Gear cond.: 0
BDEPTH: 491 487 Validity : 0
Towing dir: 0° Wire out : 1080 m Speed : 3.0 kn
Sorted : 50 Total catch: 420.00 Catch/hour: 836.65

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	462.19	132062	55.24	
Lamprogrammus exutus	200.00	1173	23.90	
Yarrella blackfordi	31.27	978	3.74	
Aristeus varidens	23.13	2102	2.76	
Malacocephalus laevis	16.77	261	2.00	
Hoplostethus cadenati	15.48	554	1.85	
Ariomma bondi	13.84	261	1.65	
Stereomastis sp.	12.05	1139	1.44	
Chaceon maritae	9.70	26	1.16	
Stomias sp.	8.78	227	1.05	
Centrophorus granulosus	7.21	2	0.86	
Halosaurus ovenii	5.22	277	0.62	
Etmopterus polli	3.75	538	0.45	
Nezumia sp.	3.09	488	0.37	
Triplophos hemingi	2.77	522	0.33	
Zenopsis conchifer	2.03	2	0.24	
Neoharriotta pinnata	1.71	2	0.20	
MYCTOPHIDAE	1.63	683	0.20	
Merluccius polli	1.47	2	0.18	
Glyphus marsupialis	1.29	16	0.15	
G A S T R O P O D S	1.24	602	0.15	
Xenodermichthys copei	1.14	114	0.14	
Gadella sp.	1.14	16	0.14	
Centroscymnus crepidater	1.14	16	0.14	
Nemichthys curvirostris	0.82	32	0.10	
Hymenocephalus italicus	0.82	114	0.10	
PARALEPIDIDAE	0.82	32	0.10	
CENTROLOPHIDAE	0.72	2	0.09	
SOLEIDAE	0.66	16	0.08	
Dibranchus atlanticus	0.66	147	0.08	
Benthodesmus tenuis	0.66	16	0.08	
Chlorophthalmus atlanticus	0.66	16	0.08	
Bassanago albescens	0.50	16	0.06	
Melanocetus johnsoni	0.34	82	0.04	
Chaunax pictus	0.32	98	0.04	
Scopelosaurus sp.	0.32	16	0.04	
Bathynectes piperitus	0.24	32	0.03	
Plesiopenaeus edwardsianus	0.22	16	0.03	
Acanthephyra sp.	0.22	16	0.03	
Cranchia sp.	0.16	16	0.02	
OPHIDIIDAE	0.16	50	0.02	
Cynoglossus senegalensis	0.16	16	0.02	

Setarches guentheri	0.16	16	0.02
Total	836.63		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 111
DATE :15/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 8°47.66
start stop duration Lon E 12°49.58
TIME :20:53:05 21:23:41 30.6 (min) Purpose : 3
LOG : 5419.98 5421.57 1.6 Region : 4054
FDEPTH: 526 519 Gear cond.: 0
BDEPTH: 526 519 Validity : 0
Towing dir: 0° Wire out : 1200 m Speed : 3.1 kn
Sorted : 51 Total catch: 350.00 Catch/hour: 686.27

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	399.25	99814	58.18	
Lamprogrammus exutus	152.41	796	22.21	
Lophius vaillanti	36.41	41	5.31	
Chaceon maritae	22.92	67	3.34	
Stomias boa boa	13.90	324	2.03	
Stereomastis sp.	13.22	23	1.93	
Hoplostethus cadenati	9.31	257	1.36	
Yarrella blackfordi	7.27	229	1.06	
Halosaurus ovenii	5.67	175	0.83	
Laemonema laureysi	5.67	96	0.83	
Bathyuroconger vicinus	3.24	149	0.47	
Centroscymnus owstonii	3.10	14	0.45	
Malacocephalus occidentalis	2.96	27	0.43	
OMMASTREPHIDAE	2.02	14	0.29	
Fishing gears	1.10	0	0.16	
Galeus polli	1.08	67	0.16	
Hydrolagus sp.	1.08	14	0.16	
Neoharriotta pinnata	0.67	14	0.10	
Benthodesmus tenuis	0.67	27	0.10	
Nezumia sp.	0.55	108	0.08	
Gonostoma denudatum	0.55	27	0.08	
Bajacalifornia megalops	0.41	27	0.06	
Triplophos hemingi	0.41	149	0.06	
Dibranchus atlanticus	0.41	27	0.06	
SOLEIDAE	0.41	41	0.06	
Acanthephyra sp.	0.27	80	0.04	
Aristeus varidens	0.27	27	0.04	
Nemichthys scolopaceus	0.27	55	0.04	
Gadella imberbis	0.27	14	0.04	
Plastic	0.14	6	0.02	
Xenodermichthys copei	0.14	14	0.02	
MYCTOPHIDAE	0.14	80	0.02	
Plastic cans-jars etc	0.10	2	0.01	
Total	686.29		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 112
DATE :15/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 8°35.10
start stop duration Lon E 12°49.49
TIME :23:46:08 00:17:54 31.8 (min) Purpose : 3
LOG : 5432.82 5434.33 1.5 Region : 4054
FDEPTH: 709 709 Gear cond.: 0
BDEPTH: 709 709 Validity : 0
Towing dir: 0° Wire out : 1610 m Speed : 2.8 kn
Sorted : 47 Total catch: 370.00 Catch/hour: 698.99

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	176.56	44140	25.26	
Opisthoteuthis agassizi	88.43	104	12.65	
Stereomastis sp.	85.58	6973	12.24	
Waste General	61.95	30	8.86	
Chaceon maritae	34.27	104	4.90	
Talismania longifilis	29.17	493	4.17	
Lamprogrammus exutus	27.98	149	4.00	
Aristeus varidens	24.84	1107	3.55	
Bajacalifornia megalops	24.84	314	3.55	
Nezumia micronychodon	20.80	450	2.98	
Stomias boa boa	17.81	359	2.55	
Yarrella blackfordi	14.07	4549	2.01	
Hoplostethus cadenati	12.71	255	1.82	
Bathyuroconger vicinus	10.77	195	1.54	
Wood, paper, cardboard	10.77	15	1.54	
Dibranchus atlanticus	8.39	508	1.20	
Miscellaneous fishes	7.93	0	1.14	
Monomitopus metriostoma	7.33	465	1.05	
Alepocephalus sp.	3.44	195	0.49	
Munidopsis chuni	3.14	1781	0.45	
Triplophos hemingi	2.78	329	0.40	
Centroscymnus owstonii	2.55	15	0.36	
Rajella barnardi	2.25	30	0.32	
Halosaurus ovenii	2.10	60	0.30	
ENOPLOTEUTHIDAE	2.10	15	0.30	
Acanthephyra sp.	1.79	179	0.26	
Heterocarpus grimaldii	1.64	60	0.24	
Plastic	1.49	45	0.21	
SCOPELARCHIDAE	1.49	195	0.21	
OMMASTREPHIDAE	1.34	30	0.19	
Bathypterois phenax	1.34	195	0.19	
SOLEIDAE	1.04	104	0.15	
Plastic cans-jars etc	0.91	15	0.13	
MYCTOPHIDAE	0.76	329	0.11	
GALATHEIDAE	0.76	225	0.11	
Dicrolene intronigra	0.60	91	0.09	
Melanocetus johnsoni	0.60	60	0.09	
Starfish white 5 arms	0.60	15	0.09	
Synaphobranchus kaupii	0.45	15	0.06	
Metal waste	0.30	30	0.04	
Melanonus sp.	0.30	15	0.04	
Chauliodus sloani	0.30	15	0.04	
CARISTIIDAE	0.30	15	0.04	
Gymnoscopelus sp.	0.15	15	0.02	
Avocettina acuticeps	0.15	45	0.02	
Xenodermichthys copei	0.15	15	0.02	
Total	699.05		100.01	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 113
DATE :16/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 8°35.28
start stop duration Lon E 12°51.25
TIME :02:15:13 02:40:22 25.2 (min) Purpose : 3
LOG : 5438.85 5439.99 1.1 Region : 4054
FDEPTH: 527 530 Gear cond.: 0
BDEPTH: 527 530 Validity : 0
Towing dir: 0° Wire out : 1150 m Speed : 2.7 kn
Sorted : 44 Total catch: 235.00 Catch/hour: 560.41

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	352.89	81537	62.97	
Chaceon maritae	62.15	179	11.09	
Lamprogrammus exutus	31.45	651	5.61	
Stomias boa boa	23.01	486	4.11	
Aristeus varidens	22.89	2058	4.09	
Chaunax pictus	11.11	26	1.98	
Stereomastis sp.	10.49	1331	1.87	
Yarrella blackfordi	7.54	217	1.34	
Lophius vaillanti	7.15	12	1.28	
Miscellaneous fishes	2.93	0	0.52	
Bathyuroconger vicinus	2.69	153	0.48	
Acanthephyra sp.	2.55	410	0.46	
Malacocephalus laevis	2.43	64	0.43	
Nezumia sp.	2.05	103	0.37	
Hoplostethus cadenati	1.79	64	0.32	
Triplophos hemingi	1.79	269	0.32	
Munidopsis chuni	1.29	742	0.23	
Dibranchus atlanticus	1.29	129	0.23	
Ebinania costaecanarie	1.29	26	0.23	
MYCTOPHIDAE	1.22	434	0.22	
SOLEIDAE	1.03	76	0.18	
Monomitopus metriostoma	0.91	153	0.16	
Bristle worms (straws)	0.91	167	0.16	
Gonostoma denudatum	0.91	50	0.16	
Melanonus zugmayeri	0.76	12	0.14	
Dicrolene intronigra	0.76	129	0.14	
Starfish	0.64	38	0.11	
THYSANOTEUTHIDAE	0.64	26	0.11	
Dicologoglossa cuneata	0.64	12	0.11	
Gadella imberbis	0.64	26	0.11	
Xenodermichthys copei	0.38	26	0.07	
CARISTIIDAE	0.38	12	0.07	
Halosaurus ovenii	0.38	12	0.07	
Photonectes sp.	0.26	38	0.05	
Galeus polli	0.26	38	0.05	
UNIDENTIFIED FISH	0.26	12	0.05	
GALATHEIDAE	0.12	38	0.02	
Paragagurus sp.	0.12	12	0.02	
Cranchia sp.	0.12	12	0.02	
Melanocetus johnsoni	0.12	12	0.02	
Total	560.27		99.97	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 114
DATE :16/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 8°37.13
start stop duration Lon E 13°18.81
TIME :07:04:02 07:33:17 29.2 (min) Purpose : 3
LOG : 5471.44 5473.08 1.6 Region : 4054
FDEPTH: 32 30 Gear cond.: 0
BDEPTH: 32 30 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.4 kn
Sorted : 148 Total catch: 148.41 Catch/hour: 304.53

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	136.58	0	44.85	
Arius parkii **	21.09	23	6.93	
Trichiurus lepturus	20.48	819	6.72	
Penaeus notialis	16.87	755	5.54	395
Stromateus fiatola	15.84	37	5.20	
**	14.53	0	4.77	
Grammoplites gruveli	14.34	0	4.71	
Pseudotolithus typus	9.05	43	2.97	
Ephippion guttifer	7.96	6	2.61	
Sepia officinalis	5.95	31	1.95	
GOBIIDAE	5.91	2421	1.94	
Brotula barbata	3.94	72	1.29	
Ilisha africana	3.59	57	1.18	
Pteroscion peli	3.12	135	1.02	
Sponges	2.95	2	0.97	
Torpedo torpedo num. spots	2.85	16	0.94	
Selene dorsalis	1.97	23	0.65	
Raja miraletus	1.62	6	0.53	
Citharus linguatula	1.50	47	0.49	
Pagellus bellottii	1.46	10	0.48	
Cymbium sp.	1.44	10	0.47	
Trachurus trecae	1.37	25	0.45	
P O L Y C H A E T A	1.19	144	0.39	
Sea anemone sp	1.13	8	0.37	
Fishing gears	1.05	0	0.34	
Cynoglossus sp.	1.05	21	0.34	
Chloroscombrus chrysurus	0.98	8	0.32	
Pisodonophis semicinctus	0.92	8	0.30	
C R A B S	0.70	507	0.23	
Plastic	0.51	0	0.17	
Bassanago albescens**	0.51	8	0.17	
Wood, paper, cardboard	0.35	2	0.11	
Epinephelus aeneus	0.33	2	0.11	
Sardinella maderensis	0.31	2	0.10	
Squilla mantis	0.23	25	0.07	
Sphyraena guachancho	0.18	0	0.06	
Pythonichthys microphthalmus	0.16	2	0.05	
Eucinostomus melanopterus	0.14	2	0.05	
Galeorhinus galeus	0.12	2	0.04	
Boops boops	0.10	2	0.03	
Nemichthys scolopaceus	0.06	16	0.02	
Scyllarides herklotsii	0.04	8	0.01	
Medorippe sp	0.02	6	0.01	
Rochinia sp.	0.02	10	0.01	
Total	304.53		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 115
DATE :16/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 8°36.60
start stop duration Lon E 13°11.33
TIME :09:05:26 09:12:49 7.4 (min) Purpose : 1
LOG : 5481.84 5482.19 0.3 Region : 4054
FDEPTH: 73 74 Gear cond.: 0
BDEPTH: 73 74 Validity : 0
Towing dir: 0° Wire out : 210 m Speed : 2.9 kn
Sorted : 26 Total catch: 1000.00 Catch/hour: 8130.08

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	2758.13	21902	33.92	386
Trachurus trecae	2603.90	47821	32.03	387
Trichiurus lepturus	2215.20	10179	27.25	
Garbage	191.30	0	2.35	
CORAL	154.23	0	1.90	
Dentex angolensis	104.88	618	1.29	388
Pterothrissus belloci	43.17	309	0.53	
G A S T R O P O D S	33.90	9870	0.42	
Citharus linguatula	15.45	618	0.19	
Saurida brasiliensis	3.09	309	0.04	
GOBIIDAE	3.09	618	0.04	
Rochinia sp.	3.09	2163	0.04	
Shark eggs	0.33	309	0.00	
C R A B S	0.33	309	0.00	
Total	8130.08		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 116
DATE :16/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 8°36.29
start stop duration Lon E 13°1.15
TIME :11:08:30 11:29:38 21.1 (min) Purpose : 3
LOG : 5493.42 5494.48 1.1 Region : 4054
FDEPTH: 148 146 Gear cond.: 0
BDEPTH: 148 146 Validity : 0
Towing dir: 0° Wire out : 380 m Speed : 3.0 kn
Sorted : 151 Total catch: 330.00 Catch/hour: 937.06

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Spicara alta	444.68	2138	47.45	
Dentex angolensis	95.69	31	10.21	389
Sphoeroides pachygaster	54.24	74	5.79	
Erythrocles monodi	51.40	168	5.48	

Trachurus trecae	43.45	62	4.64	390
Uranoscopus cadenati	40.61	131	4.33	
Zenopsis conchifer	24.99	26	2.67	
Anthias anthias	23.57	298	2.52	
Lepidotrigla cadmani	20.16	162	2.15	
Pontinus kuhlii	18.17	105	1.94	
Bembrops heterurus	17.32	168	1.85	
Pterothrissus belloci	16.75	142	1.79	
Garbage	12.21	0	1.30	
Monolene microstoma	11.93	599	1.27	
Zeus faber	10.51	37	1.12	
Illex coindetii	9.94	341	1.06	
Octopus vulgaris	9.09	26	0.97	
Torpedo torpedo num. spots	7.38	11	0.79	
Brotula barbata	4.83	20	0.52	
Raja miraletus	4.26	6	0.45	
Miracorvina angolensis	3.98	6	0.42	
Antennarius sp.	3.04	3	0.32	
Trichiurus lepturus	2.84	11	0.30	
Citharus linguatula	1.70	37	0.18	
Umbrina canariensis	1.42	6	0.15	
G A S T R O P O D S	1.14	185	0.12	
Saurida brasiliensis	0.57	62	0.06	
Ariomma sp.	0.28	6	0.03	
Sea urchin, weak spines	0.28	3	0.03	
Sea pens	0.28	20	0.03	
Ariomma bondi	0.28	6	0.03	
Peristedion cataphractum	0.09	11	0.01	
Total	937.06		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 117
DATE :16/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 8°23.10
start stop duration Lon E 12°56.20
TIME :13:10:54 13:40:07 29.2 (min) Purpose : 3
LOG : 5507.72 5509.13 1.4 Region : 4054
FDEPTH: 164 164 Gear cond.: 0
BDEPTH: 164 164 Validity : 0
Towing dir: 0° Wire out : 410 m Speed : 2.9 kn
Sorted : 80 Total catch: 126.38 Catch/hour: 259.60

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dentex angolensis	72.01	195	27.74	
Bembrops heterurus	46.90	456	18.07	
Brotula barbata	27.26	29	10.50	
Lophiodes kempi	11.28	29	4.35	
Monolene microstoma	10.79	550	4.16	
Illex coindetii	10.14	557	3.91	
Sphoeroides pachygaster	9.29	12	3.58	
Lepidotrigla cadmani	7.83	55	3.02	
Octopus vulgaris	7.53	6	2.90	
Pontinus kuhlii	7.37	49	2.84	
Pterothrissus belloci	6.65	60	2.56	
Zenopsis conchifer	6.23	10	2.40	
Miscellaneous fishes	5.64	0	2.17	
Zeus faber	5.45	16	2.10	
Trichiurus lepturus	3.62	4	1.39	
Uranoscopus cadenati	3.62	29	1.39	
Miracorvina angolensis	3.13	4	1.21	
Parapenaeus longirostris	2.84	1598	1.09	
Torpedo torpedo	2.48	6	0.95	
G A S T R O P O D S	1.86	616	0.72	
Dead coral	1.83	0	0.70	
Peristedion cataphractum	1.14	23	0.44	
Unidentified Bivalve	1.14	166	0.44	
Plastic	1.04	10	0.40	
GOBIIDAE	0.95	84	0.36	
Saurida brasiliensis	0.52	60	0.20	
Waste General	0.39	4	0.15	
Dicrolene intronigra	0.16	6	0.06	
'Calappa baby'	0.13	51	0.05	
Dicologoglossa hexophthalma	0.13	4	0.05	
Calappa pelii	0.10	6	0.04	
Unidentified crab	0.07	60	0.03	
C R A B S	0.03	39	0.01	
E C H I N O D E R M A T A	0.03	4	0.01	
Total	259.60		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 118
DATE :16/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 8°25.85
start stop duration Lon E 12°54.82
TIME :15:53:12 16:23:58 30.8 (min) Purpose : 3
LOG : 5517.63 5519.16 1.5 Region : 4054
FDEPTH: 229 228 Gear cond.: 0
BDEPTH: 229 228 Validity : 0
Towing dir: 0° Wire out : 550 m Speed : 3.0 kn
Sorted : 48 Total catch: 580.00 Catch/hour: 1130.97

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Synagrops japonicus	553.87	58243	48.97	
Brotula barbata	135.52	172	11.98	
Merluccius polli	73.47	447	6.50	
Bembrops heterurus	68.46	581	6.05	
MYCTOPHIDAE	52.75	21563	4.66	
Pterothrissus belloci	50.04	468	4.42	
Chlorophthalmus atlanticus	43.72	1911	3.87	
Dentex angolensis	37.91	68	3.35	391
Coelorinchus caelorhincus	35.23	655	3.11	
Trichiurus lepturus	32.52	57	2.88	
Umbrina ronchus	9.94	19	0.88	392
Parapenaeus longirostris	8.31	1798	0.73	
Rajella leopardus	7.49	4	0.66	
Pontinus accraensis	4.33	57	0.38	
Illex coindetii	3.97	113	0.35	
Malacocephalus occidentalis	2.71	113	0.24	
APOGONIDAE	2.35	411	0.21	
Zenopsis conchifer	2.17	37	0.19	
Torpedo torpedo few spots	1.52	2	0.13	
Citharus linguatula	1.44	150	0.13	
G A S T R O P O D S	1.26	263	0.11	
Gephyroberyx darwini	0.90	37	0.08	
Peristedion cataphractum	0.72	19	0.06	
Soft corals	0.36	19	0.03	
Total	1130.97		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 119
DATE :16/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 8°27.68
start stop duration Lon E 12°53.43
TIME :18:21:29 18:51:36 30.1 (min) Purpose : 3
LOG : 5528.68 5530.16 1.5 Region : 4054
FDEPTH: 307 306 Gear cond.: 0
BDEPTH: 307 306 Validity : 0
Towing dir: 0° Wire out : 780 m Speed : 2.9 kn
Sorted : 60 Total catch: 230.00 Catch/hour: 458.32

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Chlorophthalmus atlanticus	273.94	183	59.77	
Merluccius polli	66.28	40	14.46	393
Lophius vaillanti	55.64	28	12.14	
Parapenaeus longirostris	14.01	32	3.06	
Pontinus accraensis	13.28	26	2.90	
Laemonema laureysi	12.69	6	2.77	
Gephyroberyx darwini	8.15	6	1.78	
Malacocephalus occidentalis	3.35	98	0.73	
Bembrops heterurus	2.83	0	0.62	
Coelorinchus caelorhincus	2.17	60	0.47	
Lophiodes kempi	1.36	2	0.30	
Rajella leopardus	1.14	2	0.25	
Gadella imberbis	1.12	6	0.24	
Bassanago albescens	0.66	52	0.14	
Pterothrissus belloci	0.66	6	0.14	
Synagrops microlepis	0.39	60	0.09	
Fistularia petimba	0.34	2	0.07	
Acanthocarpus brevipinnis	0.33	145	0.07	
Total	458.32		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 120
DATE :16/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 8°29.42
start stop duration Lon E 12°50.11
TIME :21:16:23 21:46:32 30.1 (min) Purpose : 3
LOG : 5541.28 5542.72 1.4 Region : 4054
FDEPTH: 448 453 Gear cond.: 0
BDEPTH: 448 453 Validity : 0
Towing dir: 0° Wire out : 1050 m Speed : 2.9 kn
Sorted : 25 Total catch: 350.00 Catch/hour: 696.52

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	317.83	78462	45.63	
Yarrella blackfordi	97.65	3037	14.02	
Chaunax pictus	40.06	366	5.75	
Aristeus varidens	32.20	3037	4.62	
Lophius vaillanti	31.20	18	4.48	
Laemonema laureysi	29.58	838	4.25	
Triplophos hemingi	22.52	3220	3.23	
Dibranchus atlanticus	19.90	1047	2.86	
**	15.45	0	2.22	
Hoplostethus cadenati	14.14	549	2.03	
Stereomastis sp.	12.04	1152	1.73	
Hymenocephalus italicus	11.52	1100	1.65	
B I V A L V E S	9.16	26	1.32	
Merluccius polli	9.11	12	1.31	394
Halosaurus ovenii	5.76	263	0.83	
Chaceon maritae	4.80	12	0.69	
Waste General	4.22	6	0.61	0
Bassanago albescens	3.93	52	0.56	
THYSANOTEUTHIDAE	3.14	26	0.45	
Stomias boa boa	2.36	52	0.34	
Chlorophthalmus atlanticus	1.83	26	0.26	
SOLEIDAE	1.57	52	0.23	
Etmopterus polli	1.31	26	0.19	
Solenocera africana	1.31	183	0.19	
Gadella imberbis	1.05	52	0.15	
UNIDENTIFIED FISH	0.79	26	0.11	
MYCTOPHIDAE	0.52	105	0.08	
Waste General	0.44	0	0.06	
Plastic	0.28	0	0.04	
Nemichthys scolopaceus	0.26	26	0.04	
Bathyuroconger vicinus	0.26	26	0.04	
Benthodesmus tenuis	0.26	26	0.04	
Metal waste	0.08	0	0.01	
Total	696.52		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 121
DATE :16/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 8°26.30
start stop duration Lon E 12°47.42
TIME :23:50:41 00:20:55 30.2 (min) Purpose : 3
LOG : 5549.96 5551.47 1.5 Region : 4054
FDEPTH: 525 524 Gear cond.: 0
BDEPTH: 525 524 Validity : 0
Towing dir: 0° Wire out : 1180 m Speed : 3.0 kn
Sorted : 30 Total catch: 475.00 Catch/hour: 942.77

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	475.40	110560	50.43	
Lamprogrammus exutus	172.34	4754	18.28	
Aristeus varidens	71.00	5879	7.53	
Stomias boa boa	61.31	1375	6.50	
Chaceon maritae	48.17	93	5.11	
Hoplostethus cadenati	20.32	750	2.16	
Stereomastis sp.	20.03	1596	2.12	
Yarrella blackfordi	16.57	564	1.76	
Dibranchus atlanticus	8.14	218	0.86	
Triplophos hemingi	7.50	1000	0.80	
Zameus (Scymnodon) squamulosus	6.25	32	0.66	
Chaunax pictus	5.93	64	0.63	
Plesiopenaeus edwardsianus	5.32	93	0.56	
SQUALIDAE	5.00	32	0.53	
Halosaurus ovenii	2.82	93	0.30	
Melanocetus johnsoni	2.50	189	0.27	
Benthodesmus tenuis	2.50	64	0.27	
OMMASTREPHIDAE	2.18	32	0.23	
OPHIDIIDAE	1.57	189	0.17	
Bathyuroconger vicinus	1.57	64	0.17	
Xenodermichthys copei	1.25	125	0.13	
Ectreposebastes imus	0.93	32	0.10	
Nemichthys scolopaceus	0.93	314	0.10	
Gonostoma elongatum	0.93	32	0.10	
MYCTOPHIDAE	0.93	314	0.10	
Nezumia sp.	0.64	64	0.07	
GONOSTOMATIDAE	0.64	32	0.07	
Acanthephyra sp.	0.10	32	0.01	
Metal waste	0.02	2	0.00	
Total	942.79		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 122
DATE :17/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 8°35.77
start stop duration Lon E 12°54.08
TIME :03:00:34 03:14:44 14.2 (min) Purpose : 1
LOG : 5563.27 5563.82 0.6 Region : 4054
FDEPTH: 416 415 Gear cond.: 5
BDEPTH: 416 415 Validity : 5
Towing dir: 0° Wire out : 1000 m Speed : 2.3 kn
Sorted : 0 Total catch: 0.00 Catch/hour: 0.00

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

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 123
DATE :17/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 8°36.26
start stop duration Lon E 12°54.00
TIME :04:08:44 04:38:49 30.1 (min) Purpose : 3
LOG : 5566.87 5568.34 1.5 Region : 4054
FDEPTH: 419 415 Gear cond.: 0
BDEPTH: 419 415 Validity : 0
Towing dir: 0° Wire out : 1010 m Speed : 2.9 kn
Sorted : 26 Total catch: 300.00 Catch/hour: 598.40

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

Nematocarcinus africanus	280.09	65134	46.81
Hymenocephalus italicus	48.23	6341	8.06
Chaunax pictus	43.16	1432	7.21
Yarrella blackfordi	42.51	1277	7.10
Laemonema laureysi	28.84	1476	4.82
Etmopterus polli	20.92	507	3.50
Merluccius polli	19.27	32	3.22
Halosaurus ovenii	18.27	1983	3.05
Dibranchus atlanticus	16.95	1299	2.83
Bathynectes piperitus	11.89	44	1.99
Triplophos hemingi	9.47	44	1.58
Malacocephalus occidentalis	9.04	66	1.51
Lophius vaillanti	5.53	2	0.92
MYCTOPHIDAE	4.63	3128	0.77
Stomias sp.	4.63	110	0.77
Hoplostethus cadenati	3.97	154	0.66
Bassanago albescens	3.97	44	0.66
Aristeus varidens	3.65	22	0.61
Malacocephalus laevis	3.31	44	0.55
HISTIOTEUTHIDAE	2.87	22	0.48
Coelorinchus caelorhincus	2.41	22	0.40
Glyphus marsupialis	2.19	66	0.37
Lophius vaillanti, juvenile	1.76	0	0.29
Solenocera africana	1.62	176	0.27
Chaceon maritae	1.58	4	0.26
Cynoglossus sp.	1.32	44	0.22
Benthodesmus tenuis	1.32	44	0.22
Stereomastis sp.	0.88	88	0.15
Munidopsis sp.	0.88	572	0.15
Nemichthys scolopaceus	0.88	22	0.15
Trichiurus lepturus	0.86	2	0.14
Nezumia aequalis	0.66	22	0.11
Plesiopenaeus edwardsianus	0.62	463	0.10
OPHIDIIDAE	0.22	44	0.04
Nettastoma sp.	0.04	22	0.01
Total	598.42		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 124
DATE :17/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 8°20.24
start stop duration Lon E 13°6.59
TIME :07:43:21 08:13:24 30.0 (min) Purpose : 3
LOG : 5588.95 5590.46 1.5 Region : 4054
FDEPTH: 82 87 Gear cond.: 0
BDEPTH: 82 87 Validity : 0
Towing dir: 0° Wire out : 210 m Speed : 3.0 kn
Sorted : 65 Total catch: 190.00 Catch/hour: 379.49

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	240.16	9871	63.28	396
Dentex angolensis	44.98	807	11.85	397
Zeus faber	26.19	78	6.90	
Brachydeuterus auritus	14.41	112	3.80	398
Pterothrissus belloci	7.63	68	2.01	
Saurida brasiliensis	7.12	1616	1.88	
Illex coindetii	6.56	208	1.73	
Citharus linguatula	6.45	146	1.70	
Fistularia petimba	4.59	14	1.21	
Alloteuthis africana	4.37	1188	1.15	
Torpedo torpedo	2.84	4	0.75	
Lepidotrigla cadmani	2.58	22	0.68	
Brotula barbata	2.30	6	0.61	
Uranoscopus cadenati	1.60	8	0.42	
G A S T R O P O D S	1.57	214	0.41	
Sepia orbignyana	1.57	50	0.41	
Raja miraletus	1.32	2	0.35	
Trichiurus lepturus	0.95	6	0.25	
E C H I N O D E R M A T A	0.56	12	0.15	
Dicologoglossa cuneata	0.50	6	0.13	
Pontinus accraensis	0.45	6	0.12	
Octopus vulgaris	0.22	6	0.06	
Sea urchins (strong spines)	0.17	6	0.04	
Boops boops	0.11	6	0.03	
Sea urchin, weak spines	0.11	12	0.03	
Rochinia sp.	0.11	22	0.03	
Starfish - nei	0.06	12	0.01	
Total	379.49		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 125
DATE :17/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 8°16.51
start stop duration Lon E 13°11.96
TIME :09:47:35 10:18:44 31.1 (min) Purpose : 3
LOG : 5599.18 5600.75 1.6 Region : 4054
FDEPTH: 46 45 Gear cond.: 0
BDEPTH: 46 45 Validity : 0
Towing dir: 0° Wire out : 140 m Speed : 3.0 kn
Sorted : 92 Total catch: 92.30 Catch/hour: 177.78

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	42.57	3365	23.94	399
Trachurus trecae	35.83	354	20.15	400
Pomadasys peroteti**	32.59	92	18.33	
Raja miraletus	19.22	69	10.81	
Dasyatis marmorata	14.52	8	8.17	
Zeus faber	5.16	15	2.90	
Pagellus bellottii	4.66	50	2.62	
G A S T R O P O D S	4.37	8	2.46	
Sepia officinalis	3.33	6	1.87	
Lagocephalus laevigatus	3.06	6	1.72	
Alloteuthis africana	2.37	2267	1.33	
Pseudotolithus senegalensis	1.39	2	0.78	401
Chaetodon hoefleri	1.16	10	0.65	
Citharus linguatula	1.04	54	0.59	
Dentex barnardi	0.91	8	0.51	
Pseudupeneus prayensis	0.87	12	0.49	
Stromateus fiatola	0.87	4	0.49	
Grammoplites gruveli	0.65	13	0.37	
Syacium micrurum**	0.64	4	0.36	
Dicologoglossa cuneata	0.54	6	0.30	
E C H I N O D E R M A T A	0.44	23	0.25	
Ophiuroidae	0.33	6	0.18	
**	0.31	0	0.17	
Brotula barbata	0.23	2	0.13	
B I V A L V E S	0.12	10	0.07	
J E L L Y F I S H	0.10	2	0.06	
Selene dorsalis	0.10	8	0.05	
Illex coindetii	0.10	2	0.05	
Saurida brasiliensis	0.08	19	0.04	
Wood, paper, cardboard	0.04	4	0.02	
Monolene microstoma	0.04	6	0.02	
Boops boops	0.04	2	0.02	
Sphoeroides pachygaster	0.03	4	0.02	
C R A B S	0.02	10	0.01	
Eggs of ray	0.02	4	0.01	
Nemichthys scolopaceus	0.02	2	0.01	
Starfish	0.02	8	0.01	
GOBIIDAE	0.01	4	0.01	
Sepia orbignyana	0.01	6	0.00	
Total	177.78		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 126
DATE :17/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 8°4.55
start stop duration Lon E 13°7.84
TIME :11:57:17 12:27:17 30.0 (min) Purpose : 3
LOG : 5611.76 5613.30 1.5 Region : 4054
FDEPTH: 42 42 Gear cond.: 0
BDEPTH: 42 42 Validity : 0
Towing dir: 0° Wire out : 135 m Speed : 3.1 kn
Sorted : 98 Total catch: 222.00 Catch/hour: 444.00

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pomadasys perotaei	101.50	0	22.86	406
Dasyatis margarita	85.10	16	19.17	
Pteroscion peli	49.08	1486	11.05	
Pseudotolithus typus	45.16	128	10.17	402
Brachydeuterus auritus	38.30	1300	8.63	403
Pomadasys incisus	19.60	0	4.41	407
Galeoides decadactylus	18.48	0	4.16	408
Dasyatis marmorata	16.06	34	3.62	
Raja miraletus	14.06	46	3.17	
Ilisha africana	9.66	128	2.18	
Synagrops microlepis	6.44	34	1.45	
Pagellus bellottii	6.30	52	1.42	404
Grammoplites gruveli	5.28	180	1.19	
Penaeus notialis	4.78	294	1.08	
Trichiurus lepturus	4.56	114	1.03	
Torpedo torpedo	2.76	42	0.62	
Eucinostomus melanopterus	2.68	46	0.60	
Zeus faber	2.48	4	0.56	
Garbage	2.34	0	0.53	
Sepia orbignyana	2.30	16	0.52	
Trachurus trecae	2.14	26	0.48	405
Citharus linguatula	2.00	72	0.45	
Selene dorsalis	1.36	18	0.31	
Sepiella ornata	0.56	50	0.13	
Sphyraena guachancho	0.42	12	0.09	
Sphoeroides pachygaster	0.26	4	0.06	
E C H I N O D E R M A T A	0.08	4	0.02	
C R A B S	0.08	8	0.02	
GOBIIDAE	0.04	4	0.01	
Starfish	0.04	8	0.01	
URANOSCOPIDAE	0.04	4	0.01	
Plastic	0.04	0	0.01	
Squilla mantis	0.02	4	0.00	
Alloteuthis africana	0.02	8	0.00	
Total	444.02		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 127
DATE :17/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 8°11.53
start stop duration Lon E 12°55.40
TIME :15:26:45 15:56:42 30.0 (min) Purpose : 3
LOG : 5630.42 5632.05 1.6 Region : 4054
FDEPTH: 117 117 Gear cond.: 0
BDEPTH: 117 117 Validity : 0
Towing dir: 0° Wire out : 300 m Speed : 3.3 kn
Sorted : 0 Total catch: 65.40 Catch/hour: 130.98

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dentex angolensis	76.30	431	58.25	410
Raja miraletus	11.40	22	8.70	
Lepidotrigla cadmani	7.35	52	5.61	
Umbrina canariensis	7.25	26	5.53	411
Ariomma bondi	6.49	86	4.95	
Zeus faber	4.39	2	3.35	
Pagellus bellottii	2.58	26	1.97	409
Citharus linguatula	1.88	68	1.44	
G A S T R O P O D S	1.60	192	1.22	
Dasyatis margarita	1.58	2	1.21	
Branchiostegus semifasciatus	1.40	2	1.07	
Dentex canariensis	1.14	6	0.87	
Sepia orbignyana	1.14	10	0.87	
Miscellaneous fishes	1.14	0	0.87	
Waste General	0.86	2	0.66	
Pontinus kuhlii	0.84	4	0.64	
Trachurus trecae	0.48	12	0.37	
Perulibatrachus rossignoli	0.38	2	0.29	
Chaetodon hoefleri	0.32	24	0.24	
Uranoscopus polli	0.32	2	0.24	
Lophiodes kempi	0.28	2	0.21	
B I V A L V E S	0.26	172	0.20	
Pomadasys jubelini	0.26	2	0.20	
Illex coindetii	0.26	12	0.20	
Sardinella aurita	0.24	6	0.18	
Monolene microstoma	0.16	20	0.12	
Torpedo torpedo	0.12	2	0.09	
SOLEIDAE	0.12	2	0.09	
Dicologoglossa cuneata	0.10	2	0.08	
Boops boops	0.10	2	0.08	
Scorpaena scrofa	0.06	2	0.05	
Arnoglossus imperialis	0.06	10	0.05	
Todaropsis eblanae	0.06	4	0.05	
Saurida brasiliensis	0.04	48	0.03	
GOBIIDAE	0.01	2	0.01	
Total	130.98		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 128
DATE :17/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 8°15.04
start stop duration Lon E 12°47.22
TIME :18:24:17 18:50:21 26.1 (min) Purpose : 3
LOG : 5647.29 5648.62 1.3 Region : 4054
FDEPTH: 312 311 Gear cond.: 0
BDEPTH: 312 311 Validity : 0
Towing dir: 0° Wire out : 790 m Speed : 3.1 kn
Sorted : 66 Total catch: 492.44 Catch/hour: 1133.35

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Chlorophthalmus atlanticus	835.70	15963	73.74	
Merluccius polli	99.77	200	8.80	412
Malacocephalus occidentalis	46.88	283	4.14	
Pontinus accraensis	45.57	483	4.02	
Laemonema laureysi	41.24	350	3.64	
Gephyroberyx japonicus	17.31	21	1.53	
Lophius vaillanti	10.31	7	0.91	
Bembrops heterurus	7.83	182	0.69	
MYCTOPHIDAE	7.32	3077	0.65	
Lophius vaillanti, juvenile	5.32	51	0.47	
Coelorinchus caelorhincus	4.49	83	0.40	
Pterothrissus belloci	3.15	32	0.28	
S H R I M P S	1.66	865	0.15	
G A S T R O P O D S	1.17	499	0.10	
Raja miraletus	1.01	2	0.09	
Parapenaeus longirostris	0.99	99	0.09	
Calappa pelii	0.99	32	0.09	
Peristedion cataphractum	0.83	51	0.07	
Gadella imberbis	0.67	32	0.06	
Nettastoma sp.	0.51	16	0.04	
Bassanago albescens	0.32	9	0.03	
Monolene microstoma	0.16	16	0.01	
Munidopsis sp.	0.16	32	0.01	
Total	1133.35		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 129

DATE :17/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 8°15.69
start stop duration Lon E 12°44.30
TIME :20:52:01 21:22:11 30.1 (min) Purpose : 3
LOG : 5657.50 5659.02 1.5 Region : 4054
FDEPTH: 421 422 Gear cond.: 0
BDEPTH: 421 422 Validity : 0
Towing dir: 0° Wire out : 980 m Speed : 3.0 kn
Sorted : 28 Total catch: 280.00 Catch/hour: 557.21

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	193.33	44195	34.70	
Chaunax pictus	86.32	1335	15.49	
Hymenocephalus italicus	53.97	3968	9.69	
Dibranchus atlanticus	37.80	24	6.78	
Chaceon maritae	28.96	76	5.20	
Lophius vaillanti	23.48	22	4.21	
Laemonema laureysi	19.93	300	3.58	
Triplophos hemingi	18.05	2295	3.24	
Glyphus marsupialis	15.23	300	2.73	
Aristeus varidens	9.59	959	1.72	
Centrophorus granulosus	7.88	2	1.41	
Benthodesmus tenuis	6.77	225	1.22	
Merluccius polli	6.45	10	1.16	413
Bassanago albescens	6.39	56	1.15	
Stereomastis talismani	6.39	507	1.15	
Yarella blackfordi	6.21	283	1.11	
Sea anemone sp	4.89	18	0.88	
Malacocephalus laevis	4.70	56	0.84	
Coelorinchus caelorhincus	4.14	56	0.74	
Bathynectes piperitus	3.57	56	0.64	
Synagrops microlepis	3.39	3	0.61	
Hoplostethus cadenati	1.50	38	0.27	
Metal waste	1.47	4	0.26	
Shrimps unidentified	1.13	113	0.20	
Bembrops heterurus	1.13	18	0.20	
Stomias sp.	1.13	18	0.20	
Peristedion cataphractum	0.94	18	0.17	
Nezumia aequalis	0.56	38	0.10	
Bathyuroconger vicinus	0.56	18	0.10	
Nettastoma sp.	0.56	56	0.10	
Nemichthys scolopaceus	0.38	38	0.07	
Shark eggs	0.19	18	0.03	
Halosaurus ovenii	0.19	18	0.03	
Total	557.21		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 130
DATE :17/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 8°17.24
start stop duration Lon E 12°42.34
TIME :23:39:23 00:09:26 30.0 (min) Purpose : 3
LOG : 5668.44 5670.07 1.6 Region : 4054
FDEPTH: 608 611 Gear cond.: 0
BDEPTH: 608 611 Validity : 0
Towing dir: 0° Wire out : 1390 m Speed : 3.2 kn
Sorted : 54 Total catch: 390.00 Catch/hour: 778.96

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Stomias boa boa	296.87	7226	38.11	
Nematocarcinus africanus	223.02	40548	28.63	
Lamprogrammus exutus	79.07	405	10.15	
Yarella blackfordi	33.16	1564	4.26	
Stereomastis sp.	18.54	1969	2.38	
Merluccius polli	16.51	14	2.12	
Bathyuroconger vicinus	15.64	276	2.01	
Chaunax pictus	14.19	14	1.82	
Talismania longifilis	10.28	521	1.32	
Hoplostethus cadenati	9.85	276	1.26	
Triplophos hemingi	9.27	1274	1.19	
Nezumia sp.	6.08	174	0.78	
Dibranchus atlanticus	5.79	463	0.74	
Raja sp.	3.91	334	0.50	
Aristeus varidens	3.77	290	0.48	
OMMASTREPHIDAE	2.90	14	0.37	
Acanthephyra sp.	2.90	246	0.37	
Gadella imberbis	2.90	14	0.37	
Xenodermichthys copei	2.61	218	0.33	
Gonostoma elongatum	2.61	44	0.33	
Bajacalifornia megalops	2.17	116	0.28	
Luciobrotula nolfi	1.88	14	0.24	
Photonectes sp.	1.74	130	0.22	
Benthodesmus tenuis	1.74	44	0.22	
Hymenocephalus italicus	1.74	160	0.22	
GONOSTOMATIDAE	1.30	130	0.17	
Glyphus marsupialis	1.16	204	0.15	
Cataetyx sp.	1.16	188	0.15	
Ectreposebastes imus	1.01	0	0.13	
Laemonema laureysi	0.87	14	0.11	
Ebinania costaecanarie	0.87	14	0.11	
Sergestes sp.	0.72	102	0.09	
Dicrolene intronigra	0.58	0	0.07	
Regalecus sp.	0.58	14	0.07	
Caristius sp.	0.43	30	0.06	
Scopelosaurus meadi	0.43	14	0.06	
Chauliodus sloani	0.29	30	0.04	
Melanocetus johnsoni	0.14	14	0.02	
MELANOCETIDAE	0.14	14	0.02	
MYCTOPHIDAE	0.14	88	0.02	
Total	778.96		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 131
DATE :18/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 8°17.34
start stop duration Lon E 12°41.29
TIME :02:18:48 02:43:17 24.5 (min) Purpose : 3
LOG : 5677.29 5678.50 1.2 Region : 4054
FDEPTH: 714 703 Gear cond.: 0
BDEPTH: 714 703 Validity : 0
Towing dir: 0° Wire out : 1660 m Speed : 3.0 kn
Sorted : 73 Total catch: 330.00 Catch/hour: 808.49

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Lamprogrammus exutus	171.23	561	21.18	
Yarella blackfordi	101.14	2501	12.51	
Chaceon maritae	70.07	132	8.67	
Stereomastis sp.	69.63	3834	8.61	
Stomias boa boa	49.69	1090	6.15	
Coelorinchus polli	49.59	926	6.13	
Anemones, white	42.53	66	5.26	
Bristle worms (straws)	31.51	1896	3.90	
Bassanago albescens	30.53	539	3.78	
UNIDENTIFIED FISH	28.86	142	3.57	
ANTHOZOA (Sea anemones)	26.21	98	3.24	
Anemones, coral	16.41	32	2.03	
Dicrolene intronigra	12.57	980	1.55	
Hoplostethus cadenati	12.57	363	1.55	
Raja sp.	12.23	66	1.51	
Lophius vaillanti	9.92	54	1.23	
Rajella barnardi	9.48	10	1.17	
Alepocephalus sp.	8.16	265	1.01	
S H R I M P S	7.28	1566	0.90	
Talismania longifilis	6.93	176	0.86	
Aristeus varidens	3.97	287	0.49	
OMMASTREPHIDAE	3.09	10	0.38	
Bajacalifornia megalops	2.96	230	0.37	
Triplophos hemingi	2.87	341	0.35	
THYSANOTEUTHIDAE	2.74	32	0.34	
Munidopsis chuni	2.74	1553	0.34	
Dibranchus atlanticus	2.65	230	0.33	
Halosaurus ovenii	2.65	54	0.33	
OPHIDIIDAE	2.30	66	0.28	
Xenodermichthys copei	1.86	142	0.23	
Stomias sp.	1.64	66	0.20	
Bufoceratias wedli	1.64	132	0.20	
Acanthephyra sp.	1.10	176	0.14	
PORIFERA (Sponges)	1.10	10	0.14	
Small crabs	0.98	407	0.12	
Melanonus zugmayeri	0.76	22	0.09	
Scopelosaurus meadi	0.76	22	0.09	
Etmopterus spinax	0.66	10	0.08	
Starfish	0.54	44	0.07	
Parapagurus sp.	0.54	88	0.07	
Bathypterois guentheri	0.44	66	0.05	
Benthodesmus tenuis	0.44	10	0.05	
Nephropsis atlantica	0.32	22	0.04	
Myctophidae sp. large	0.32	44	0.04	
Pagurus cuanensis	0.22	44	0.03	
GALATHEIDAE	0.22	66	0.03	
Caristius sp.	0.22	10	0.03	
Plastic	0.22	22	0.03	
OPHIDIIDAE	0.22	32	0.03	0
SOLEIDAE	0.22	22	0.03	
Gymnoscopelus sp.	0.22	10	0.03	
Gonostoma elongatum	0.22	32	0.03	
E C H I N O D E R M A T A	0.22	54	0.03	
Stomias boa boa	0.22	44	0.03	0
Metal waste	0.10	10	0.01	
Monomitopus sp.	0.10	10	0.01	
MYCTOPHIDAE	0.10	54	0.01	
Opisthoteuthis agassizi	0.10	10	0.01	
Sicyonia sp.	0.10	10	0.01	
Total	808.30		99.98	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 132
DATE :18/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 8°8.02
start stop duration Lon E 12°59.83
TIME :06:20:41 06:50:36 29.9 (min) Purpose : 3
LOG : 5701.40 5702.92 1.5 Region : 4054
FDEPTH: 94 94 Gear cond.: 0
BDEPTH: 94 94 Validity : 0
Towing dir: 0° Wire out : 245 m Speed : 3.1 kn
Sorted : 59 Total catch: 220.00 Catch/hour: 441.03

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dasyatis marmorata	127.38	38	28.88	
Trachurus trecae	111.40	4080	25.26	414
Dentex angolensis	52.16	311	11.83	415
Dentex barnardi	51.02	166	11.57	
Rhinobatos albomaculatus	41.70	14	9.45	
Lepidotrigla cadmani	9.48	74	2.15	
Uranoscopus cadenati	7.92	38	1.80	
Citharus linguatula	7.38	188	1.67	
Alloteuthis africana	6.64	1912	1.50	
Chelidonichthys gabonensis	4.45	22	1.01	
Zeus faber	4.23	18	0.96	
Brotula barbata	3.67	8	0.83	
Umbrina canariensis	3.55	26	0.80	
Epinephelus aeneus	2.04	2	0.46	
Rossia sp.	1.22	30	0.28	
Pagellus bellottii	1.22	30	0.28	
Octopus vulgaris	0.98	2	0.22	
Saurida brasiliensis	0.96	223	0.22	
Chaetodon hoefleri	0.96	4	0.22	
Pterothrissus belloci	0.78	4	0.18	
Boops boops	0.52	14	0.12	
Sardinella aurita	0.52	18	0.12	
Illex coindetii	0.44	8	0.10	
Starfish	0.40	30	0.09	
Total	441.03		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 133
DATE :18/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 7°50.99
start stop duration Lon E 13°1.63
TIME :09:09:55 09:40:03 30.1 (min) Purpose : 3
LOG : 5719.15 5720.60 1.4 Region : 4054
FDEPTH: 39 40 Gear cond.: 0
BDEPTH: 39 40 Validity : 0
Towing dir: 0° Wire out : 130 m Speed : 2.9 kn
Sorted : 31 Total catch: 170.00 Catch/hour: 338.53

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pteroscion peli	55.76	1036	16.47	
Brachydeuterus auritus	52.47	1426	15.50	417
Pseudotolithus typus	49.91	289	14.74	
Ilisha africana	22.04	444	6.51	
Gymnura micrura	21.55	18	6.36	
Pomadasys jubelini	20.43	34	6.04	416
Raja miraletus	18.08	40	5.34	
Grammoplites gruveli	9.74	374	2.88	
Cynoglossus canariensis	9.72	48	2.87	
Dasyatis marmorata	8.68	8	2.56	
Pomadasys incisus	7.79	54	2.30	
Miscellaneous fishes	7.63	0	2.25	
Trichiurus lepturus	7.01	54	2.07	
Selene dorsalis	6.31	78	1.86	
Trachurus trecae	5.76	171	1.70	
Pomadasys perotaei	5.28	12	1.56	418
Dasyatis margarita	5.28	12	1.56	
Penaeus notialis	4.82	125	1.42	
Penaeus notialis, juvenile	4.04	1456	1.19	
Galeoides decadactylus	3.74	62	1.11	
Sepia hieredda**	2.71	4	0.80	
Dicologoglossa cuneata	1.79	16	0.53	
Raja miraletus, juvenile	1.71	40	0.51	
Epinephelus aeneus	1.59	6	0.47	
Pentanemus quinquarius	1.31	10	0.39	
Calappa rubroguttata	0.86	16	0.25	
JELLYFISH	0.78	8	0.23	
Octopus vulgaris	0.66	2	0.19	
Sepiella ornata	0.62	40	0.18	
Cymbium sp.	0.47	16	0.14	
Total	338.54		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 134
DATE :18/06/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 7°53.20
start stop duration Lon E 12°59.27
TIME :11:56:13 12:26:13 30.0 (min) Purpose : 3
LOG : 5729.93 5731.49 1.6 Region : 4054
FDEPTH: 58 56 Gear cond.: 0
BDEPTH: 58 56 Validity : 0
Towing dir: 0° Wire out : 180 m Speed : 3.1 kn
Sorted : 156 Total catch: 800.00 Catch/hour: 1600.53

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	954.58	30050	59.64	422

Pomadasys perotaei	224.95	460	14.06	419
Lagocephalus laevigatus	84.87	172	5.30	
Pagellus bellottii	49.38	0	3.08	
Pomadasys incisus	35.49	248	2.22	
Pseudotolithus typus	28.45	30	1.78	423
Dentex barnardi	26.93	206	1.68	
Fistularia petimba	26.41	34	1.65	
Stromateus fiatola	24.35	52	1.52	
Trachurus trecae	23.67	772	1.48	421
Sphyraena guachancho	21.17	68	1.32	420
Pseudupeneus prayensis	17.67	222	1.10	
Dasyatis marmorata	15.77	18	0.98	
Trichiurus lepturus	14.40	34	0.90	
Raja miraletus	10.80	42	0.68	
Umbrina canariensis	8.14	42	0.51	424
Rhinobatos albomaculatus	7.32	2	0.46	
Chelidonichthys gabonensis	6.08	42	0.38	
Zeus faber	4.88	18	0.30	
Citharus linguatula	4.38	198	0.27	
Pomadasys rogeri	3.60	0	0.23	
Plastic	3.60	8	0.23	
Chaetodon hoefleri	1.38	8	0.09	
Atractoscion aequidens	0.80	2	0.05	
Saurida brasiliensis	0.78	120	0.05	
Grammoplites gruveli	0.42	26	0.03	
Miscellaneous fishes	0.26	0	0.02	
Total	1600.53		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 135
DATE :18/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°59.53
start stop duration Lon E 12°43.66
TIME :16:34:54 17:01:01 26.1 (min) Purpose : 3
LOG : 5751.65 5752.99 1.3 Region : 4054
FDEPTH: 163 167 Gear cond.: 0
BDEPTH: 163 167 Validity : 0
Towing dir: 0° Wire out : 405 m Speed : 3.1 kn
Sorted : 33 Total catch: 160.00 Catch/hour: 367.39

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Synagrops microlepis	138.30	130	37.64	
Zenopsis conchifer	38.21	248	10.40	
Pterothrissus belloci	32.24	239	8.77	
Dentex angolensis	30.26	96	8.24	425
Illex coindetii	16.03	528	4.36	
Zeus faber	15.87	34	4.32	
Sphoeroides cf. pachygaster	14.90	25	4.06	
Rajella leopardus	10.95	5	2.98	
Brotula barbata	10.49	14	2.86	
Uranoscopus cadenati	9.71	60	2.64	
Umbrina canariensis	7.55	11	2.06	
Bembrops heterurus	7.26	135	1.98	
Monolene microstoma	4.68	443	1.28	
Parapenaeus longirostris	4.18	1279	1.14	
Chlorophthalmus atlanticus	3.93	1203	1.07	
Trichiurus lepturus	3.24	5	0.88	
Citharus linguatula	2.99	51	0.81	
Raja miraletus	2.25	7	0.61	
Branchiostegus semifasciatus	2.18	2	0.59	
Lophius vaillanti	1.49	2	0.41	
Miracorvina angolensis	1.45	9	0.39	
Saurida brasiliensis	1.45	154	0.39	
Pteroscion peli	1.29	9	0.35	
Lepidotrigla cadmani	1.29	9	0.35	
Octopus vulgaris	1.15	2	0.31	
Squilla mantis	0.76	44	0.21	
Trachurus trecae	0.69	25	0.19	
MYCTOPHIDAE	0.69	179	0.19	
Gadella imberbis	0.60	16	0.16	
OPHIDIIDAE	0.51	16	0.14	
Dicologoglossa cuneata	0.51	9	0.14	
Malacocephalus occidentalis	0.34	16	0.09	
Total	367.42		100.01	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 136
DATE :18/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 8°0.66
start stop duration Lon E 12°37.74
TIME :19:16:56 19:47:16 30.3 (min) Purpose : 3
LOG : 5764.78 5766.34 1.6 Region : 4054
FDEPTH: 535 539 Gear cond.: 0
BDEPTH: 535 539 Validity : 0
Towing dir: 0° Wire out : 1200 m Speed : 3.1 kn
Sorted : 25 Total catch: 200.00 Catch/hour: 395.65

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	243.60	45670	61.57	
Aristeus varidens	27.20	1703	6.88	
Centrophorus granulosus	18.67	6	4.72	
Lamprogrammus exutus	17.74	158	4.49	
MYCTOPHIDAE	14.03	8631	3.55	
Stomias sp.	13.18	271	3.33	
Zeus faber	8.45	14	2.13	
Yarella blackfordi	6.59	257	1.67	
Chaunax pictus	6.45	57	1.63	
Triplophos hemingi	5.44	702	1.38	
Merluccius polli	5.06	6	1.28	
Stereomastis sp.	4.73	730	1.20	
Etmopterus polli	4.39	12	1.11	
Malacocephalus laevis	3.15	44	0.80	
Illex coindetii	2.87	57	0.72	
Melanonus zugmayeri	2.43	44	0.61	
Chaceon maritae	2.26	14	0.57	
Acanthephyra sp.	1.72	328	0.43	
Ectreposebastes imus	1.01	14	0.26	
Lophius vaillanti	0.93	2	0.23	
Shrimps unidentified	0.71	14	0.18	
Lampadena sp.	0.71	28	0.18	
Xenodermichthys copei	0.71	14	0.18	
SERGESTIDAE	0.57	85	0.14	
HISTIOTEUTHIDAE	0.51	2	0.13	
Synagrops microlepis	0.44	44	0.11	
Eggs of ray	0.44	14	0.11	
Halosaurus ovenii	0.42	14	0.11	
JELLYFISH	0.28	14	0.07	
Neobythites sp.	0.28	71	0.07	
Hymenocephalus italicus	0.14	57	0.04	
OPHIDIIDAE	0.14	14	0.04	
Chaceon maritae	0.14	14	0.04	0
Dibranchus atlanticus	0.14	0	0.04	
Melanocetus johnsoni	0.14	0	0.04	
Total	395.65		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 137
DATE :19/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 8°3.62
start stop duration Lon E 12°36.96
TIME :00:21:51 00:51:52 30.0 (min) Purpose : 3
LOG : 5779.74 5781.23 1.5 Region : 4054
FDEPTH: 629 636 Gear cond.: 0
BDEPTH: 629 636 Validity : 0
Towing dir: 0° Wire out : 1410 m Speed : 3.0 kn
Sorted : 48 Total catch: 260.00 Catch/hour: 519.65

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	210.00	32	40.41	
Lamprogrammus exutus	82.41	232	15.86	
Opistotheutis rossi	41.83	42	8.05	
Stomias boa boa	27.96	42	5.38	
Stereomastis sp.	22.60	632	4.35	
Yarrella blackfordi	21.55	716	4.15	
Bathyuroconger vicinus	20.81	432	4.00	
Hoplostethus cadenati	13.97	168	2.69	
Nezumia micronychodon	13.55	390	2.61	
Chaceon maritae	7.32	18	1.41	
Chaunax pictus	6.10	168	1.17	
Centroscymnus sp.	5.47	52	1.05	
Bathyraja smithii	5.24	2	1.01	
THYSANOTEUTHIDAE	4.31	32	0.83	
Triplophos hemingi	3.16	116	0.61	
Dibranchus atlanticus	3.06	2900	0.59	
Xenodermichthys copei	2.94	220	0.57	
Gonostoma elongatum	2.84	42	0.55	
Talismania longifilis	2.84	368	0.55	
Lophiodes kempi	2.63	10	0.51	
Aristeus varidens	2.42	2	0.47	
Benthodesmus tenuis	1.89	10	0.36	
RAJIDAE	1.79	10	0.34	
Dicrolene intronigra	1.79	22	0.34	
Halosaurus ovenii	1.78	210	0.34	
Bajacalifornia megalops	1.58	42	0.30	
Acanthephyra sp.	1.58	106	0.30	
MYCTOPHIDAE	0.95	32	0.18	
Melanocetus johnsoni	0.74	32	0.14	
Shrimps unidentified	0.63	10	0.12	
Scopelosaurus meadi	0.53	10	0.10	
Myctophidae sp. small/mix	0.53	178	0.10	
Ebinania sp	0.53	22	0.10	
Deepwater fish mixture	0.42	0	0.08	
Eggs of ray	0.42	74	0.08	
OPHIDIIDAE	0.42	136	0.08	
Bathynectes piperitus	0.32	10	0.06	
Melanonus zugmayeri	0.21	558	0.04	
Gymnoscopelus sp.	0.21	10	0.04	
UNIDENTIFIED FISH	0.21	0	0.04	
Plastic	0.18	0	0.03	
Total	519.65		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 138
DATE :19/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°48.58
start stop duration Lon E 12°31.65
TIME :03:56:33 04:26:18 29.8 (min) Purpose : 3
LOG : 5796.19 5797.59 1.4 Region : 4054
FDEPTH: 760 739 Gear cond.: 0
BDEPTH: 760 739 Validity : 0
Towing dir: 0° Wire out : 1650 m Speed : 2.8 kn
Sorted : 31 Total catch: 300.00 Catch/hour: 605.04

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Coelorinchus caelorhincus	97.43	2233	16.10	
Etmopterus polli	62.30	194	10.30	
Anemones, white	58.23	117	9.62	
Stereomastis sp.	54.15	7492	8.95	
Bathyuroconger vicinus	41.93	311	6.93	
Hoplostethus cadenati	37.27	407	6.16	
Lamprogrammus exutus	26.78	97	4.43	
Chaceon maritae	26.02	38	4.30	
Opisthoteuthis sp.	23.88	38	3.95	
Metal waste	23.48	20	3.88	
Yarrella blackfordi	23.09	621	3.82	
Bathyraja smithii	16.88	38	2.79	
Photichthys sp.	15.53	311	2.57	
Sea anemone sp	12.63	58	2.09	
Halosaurus ovenii	10.49	135	1.73	
Ijimaia loppei	10.29	20	1.70	
Monomitopus metriostoma	8.35	369	1.38	
Narcetes stomias	8.15	58	1.35	
Triplophos hemingi	7.18	970	1.19	
Dibranchus atlanticus	6.59	349	1.09	
Bristle worms (straws)	4.66	369	0.77	
Octopoteuthis sicula	3.87	20	0.64	
Stomias sp.	3.69	117	0.61	
Synaphobranchus affinis	3.11	77	0.51	
CARISTIIDAE	2.90	20	0.48	
Talismania longifilis	2.72	77	0.45	
Plastic	1.75	20	0.29	
Starfish red A	1.75	194	0.29	
JELLYFISH	1.55	20	0.26	
Munidopsis sp.	1.35	893	0.22	
PHOSICHTHYIDAE	1.17	20	0.19	
Melanonus zugmayeri	0.77	20	0.13	
Stomias boa boa	0.77	38	0.13	
MACROURIDAE	0.77	20	0.13	
MYCTOPHIDAE	0.58	38	0.10	
Benthodesmus tenuis	0.58	20	0.10	
PASIPHAEIDAE	0.38	38	0.06	
Cynoglossus sp.	0.38	38	0.06	
Ectreposebastes imus	0.26	20	0.04	
CALLAIANASSIDAE	0.20	20	0.03	
Starfish	0.20	58	0.03	
Shark eggs	0.20	38	0.03	
PARAPAGURIDAE	0.20	20	0.03	
Neobythites analis	0.20	20	0.03	
Bathypterois phenax	0.20	20	0.03	
Unidentified	0.20	20	0.03	
Total	605.08		100.01	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 139
DATE :19/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°46.79
start stop duration Lon E 12°31.74
TIME :06:18:58 06:46:12 27.2 (min) Purpose : 3
LOG : 5802.80 5804.19 1.4 Region : 4054
FDEPTH: 626 636 Gear cond.: 0
BDEPTH: 626 636 Validity : 0
Towing dir: 0° Wire out : 1340 m Speed : 3.1 kn
Sorted : 23 Total catch: 150.00 Catch/hour: 330.40

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
NEMATISTIIDAE	97.27	19471	29.44	
Lamprogrammus exutus	43.48	231	13.16	
Yarrella blackfordi	20.86	515	6.31	
CENTROLOPHIDAE	20.04	40	6.07	
Aristeus varidens	18.15	258	5.49	
OPISTHOTEUTHIDAE	16.52	26	5.00	
Stereomastis sp.	10.70	1396	3.24	
Etmopterus princeps	9.63	13	2.91	
Centrophorus granulosus	9.16	2	2.77	
Photichthys sp.	9.07	203	2.75	
Coelorinchus caelorhincus	8.52	163	2.58	
Chaunax cf. pictus	7.31	40	2.21	
Bathyuroconger vicinus	6.50	176	1.97	
Chaceon maritae	5.18	15	1.57	
Malacocephalus laevis	4.06	55	1.23	
Waste General	3.66	13	1.11	
Lithodes ferox	3.39	2	1.03	
Halosaurus ovenii	3.11	68	0.94	

J E L L Y F I S H	2.97	40	0.90
Xenodermichthys copei	2.57	231	0.78
Triplophos hemingi	2.44	392	0.74
Ariomma sp.	2.31	55	0.70
PHOSICHTHYIDAE	2.31	95	0.70
Metal waste	2.03	7	0.61
Laemonema laureysi	2.03	26	0.61
Acanthephyra sp.	2.03	284	0.61
OPHIDIIDAE	2.03	244	0.61
Gonostoma elongatum	1.63	81	0.49
Synaphobranchus affinis	1.50	1	0.45
Munidopsis sp.	1.50	813	0.45
Talismania longifilis	1.35	68	0.41
Lophius vaillanti	0.95	13	0.29
Bathyraja smithii	0.93	11	0.28
PASIPHAEIDAE	0.81	40	0.25
Narcetes stomias	0.68	26	0.21
Starfish	0.68	26	0.21
MYCTOPHIDAE	0.68	189	0.21
Bristle worms (straws)	0.55	55	0.17
Neobythites analis	0.55	95	0.17
Dibranchus atlanticus	0.55	55	0.17
Plastic cans-jars etc	0.42	9	0.13
Benthodesmus tenuis	0.26	13	0.08
Total	330.39		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 140
DATE :19/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°43.22
start stop duration Lon E 12°33.55
TIME :08:19:59 08:50:33 30.6 (min) Purpose : 3
LOG : 5811.36 5813.03 1.7 Region : 4054
FDEPTH: 258 254 Gear cond.: 0
BDEPTH: 258 254 Validity : 0
Towing dir: 0° Wire out : 630 m Speed : 3.3 kn
Sorted : 177 Total catch: 1380.00 Catch/hour: 2708.54

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Synagrops microlepis	1254.27	79521	46.31	
Merluccius polli	615.23	4716	22.71	426
Zenopsis conchifer	402.11	732	14.85	
Chlorophthalmus atlanticus	286.70	9969	10.59	
Parapenaeus longirostris	57.10	7770	2.11	
Sphoeroides pachygaster	36.94	92	1.36	
Brotula barbata	16.34	45	0.60	
Illex coindetii	15.72	428	0.58	
Malacocephalus occidentalis	6.41	169	0.24	
Cynoponticus ferox	4.27	16	0.16	
Coelorinchus caelorhincus	3.97	92	0.15	
Pterothrissus belloci	3.82	31	0.14	
Chascanopsetta lugubris	1.83	31	0.07	
Lophius vaillanti	1.22	16	0.05	
Nemichthys scolopaceus	1.07	31	0.04	
Zenion hololepis	0.76	137	0.03	
Jellyfish	0.46	16	0.02	
Hymenocephalus italicus	0.15	16	0.01	
Peristedion cataphractum	0.15	16	0.01	
Total	2708.54		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 141
DATE :19/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°41.21
start stop duration Lon E 12°37.49
TIME :10:24:29 10:54:42 30.2 (min) Purpose : 3
LOG : 5819.42 5821.08 1.7 Region : 4054
FDEPTH: 115 115 Gear cond.: 0
BDEPTH: 115 115 Validity : 0
Towing dir: 0° Wire out : 300 m Speed : 3.3 kn
Sorted : 95 Total catch: 94.51 Catch/hour: 187.64

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dentex angolensis	107.79	619	57.44	427
Lepidotrigla cadmani	24.86	203	13.25	
Pagellus bellottii	11.28	153	6.01	430
Trachurus trecae	6.47	191	3.45	429
Citharus linguatula	4.63	143	2.47	
Ariomma bondi	4.59	119	2.44	
Raja miraletus	4.43	8	2.36	
Miscellaneous fishes	4.21	0	2.24	
Rhinobatos albomaculatus	3.30	2	1.76	
Zeus faber	2.74	8	1.46	
Dentex barnardi	2.46	8	1.31	
Octopus vulgaris	2.40	4	1.28	
Umbrina canariensis	1.77	16	0.94	428
Illex coindetii	1.43	91	0.76	
Zenopsis conchifer	1.21	4	0.65	
Uranoscopus polli	1.19	6	0.63	
Rajella leopardus	0.81	6	0.43	
Perulibatrachus rossignoli	0.66	4	0.35	
Chaetodon hoefleri	0.66	4	0.35	
Saurida tumbil	0.20	36	0.11	
Sepia sp	0.20	2	0.11	
Saurida brasiliensis	0.20	32	0.11	
Chascanopsetta lugubris	0.12	2	0.06	
Arnoglossus imperialis	0.04	6	0.02	
Dicologoglossa hexophthalma	0.03	8	0.01	
Total	187.65		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 142
DATE :19/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°39.03
start stop duration Lon E 12°45.72
TIME :12:34:53 13:04:28 29.6 (min) Purpose : 3
LOG : 5831.30 5832.81 1.5 Region : 4054
FDEPTH: 87 88 Gear cond.: 0
BDEPTH: 87 88 Validity : 0
Towing dir: 0° Wire out : 230 m Speed : 3.1 kn
Sorted : 107 Total catch: 595.00 Catch/hour: 1206.90

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	813.53	25099	67.41	434
Lepidotrigla cadmani	84.56	635	7.01	
Umbrina canariensis	79.19	85	6.56	435
Dentex congoensis	66.92	1323	5.54	433
Zeus faber	26.41	57	2.19	
Saurida brasiliensis	23.57	3657	1.95	
Dentex angolensis	20.22	162	1.68	431
Lagocephalus laevigatus	14.95	22	1.24	
Dentex barnardi	13.77	65	1.14	
Illex coindetii	12.05	1420	1.00	
Dentex gibbosus	9.15	10	0.76	
Raja miraletus	7.71	10	0.64	
Rhinobatos albomaculatus	6.09	4	0.50	
Sepia orbignyana	6.02	12	0.50	
Pagellus bellottii	5.80	75	0.48	432
Fistularia petimba	5.35	14	0.44	
Citharus linguatula	4.20	162	0.35	
Chaetodon hoefleri	1.72	10	0.14	
Deepwater fish mixture	1.72	0	0.14	
Sardinella aurita	1.40	55	0.12	436
Priacanthus arenatus	1.30	10	0.11	
Grammoplites gruveli	1.30	22	0.11	
Total	1206.94		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 143
DATE :19/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°36.45
start stop duration Lon E 12°56.80
TIME :15:07:35 15:37:37 30.0 (min) Purpose : 3
LOG : 5846.91 5848.57 1.7 Region : 4054
FDEPTH: 32 31 Gear cond.: 0
BDEPTH: 32 31 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.3 kn
Sorted : 240 Total catch: 850.00 Catch/hour: 1698.30

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	620.56	13347	36.54	437
Sphyraena guachancho	324.50	1157	19.11	
Ilisha africana	257.86	5506	15.18	
Galeoides decadactylus	144.82	2579	8.53	440
Pteroscion peli	104.40	1504	6.15	
Pagellus bellottii	56.16	376	3.31	438
Selene dorsalis	51.71	851	3.04	
Pseudotolithus typus	41.32	132	2.43	439
Pomadasys incisus	23.56	154	1.39	
Gymnura micrura	13.43	8	0.79	
Raja miraletus	8.71	20	0.51	
Mustelus mustelus	7.29	2	0.43	
Selar crumenophthalmus	6.61	62	0.39	
Ephippion guttifer	4.74	6	0.28	
Pseudupeneus prayensis	4.54	28	0.27	
Cynoglossus browni	4.26	6	0.25	
Dentex canariensis	4.26	20	0.25	
Trichiurus lepturus	3.70	14	0.22	
Sardinella maderensis	2.94	28	0.17	
Rhinobatos albomaculatus	2.14	2	0.13	
Penaeus notialis	1.88	34	0.11	
Carlarius parkii	1.82	6	0.11	
Pagrus caeruleostictus	1.68	6	0.10	
Cynoglossus canariensis	1.46	6	0.09	
Grammoplites gruveli	1.18	14	0.07	
Dasyatis margarita	1.04	6	0.06	
Trachurus trecae	0.76	20	0.04	
Eucinostomus melanopterus	0.48	6	0.03	
Sardinella aurita	0.20	6	0.01	
Citharus linguatula	0.20	6	0.01	
Coral - small	0.14	6	0.01	
Total	1698.30		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 144
DATE :19/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°33.71
start stop duration Lon E 12°56.39
TIME :16:23:41 16:48:11 24.5 (min) Purpose : 3
LOG : 5852.96 5854.27 1.3 Region : 4054
FDEPTH: 28 27 Gear cond.: 0
BDEPTH: 28 27 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.2 kn
Sorted : 0 Total catch: 280.00 Catch/hour: 685.43

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pteroscion peli	155.45	5004	22.68	
Brachydeuterus auritus	117.21	25	17.10	
Ilisha africana ***	94.15	6967	13.74	
Galeoides decadactylus	62.01	644	9.05	442
Pomadasys incisus	54.86	375	8.00	
Ephippion guttifer	37.85	29	5.52	
Penaeus notialis	23.40	624	3.41	
Sphyraena guachancho	21.79	125	3.18	
Arius parkii **	21.64	27	3.16	
Chloroscombrus chrysurus	21.62	215	3.15	
Selene dorsalis	12.85	215	1.88	
Pagellus bellottii	11.97	88	1.75	441
Torpedo nobiliana	8.03	17	1.17	
Pseudotolithus typus	7.15	54	1.04	
Stromateus fiatola	6.27	15	0.91	
Raja miraletus	4.82	12	0.70	
Pomadasys jubelini	4.65	37	0.68	
Cynoglossus canariensis	4.58	24	0.67	
Rhinobatos albomaculatus	4.28	17	0.63	
Sepia orbignyana	3.75	5	0.55	
Pentanemus quinquarius	2.69	17	0.39	
Eucinostomus melanopterus	2.50	17	0.36	
Trichiurus lepturus	1.62	17	0.24	
Calappa rubroguttata	0.32	2	0.05	
Total	685.43		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 145
DATE :19/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°42.76
start stop duration Lon E 12°32.16
TIME :20:32:41 21:02:59 30.3 (min) Purpose : 3
LOG : 5882.82 5884.36 1.5 Region : 4054
FDEPTH: 361 358 Gear cond.: 0
BDEPTH: 361 358 Validity : 0
Towing dir: 0° Wire out : 900 m Speed : 3.1 kn
Sorted : 29 Total catch: 330.00 Catch/hour: 653.47

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	213.60	78770	32.69	
Laemonema laureysi	88.16	1642	13.49	
Merluccius polli	60.18	121	9.21	443
Hymenocephalus italicus	60.18	6018	9.21	
Chaunax pictus	39.31	3709	6.02	
Bathyuroconger vicinus	36.08	426	5.52	
Centrophorus granulosus	22.38	6	3.42	
Hoplunnis punctata	21.07	162	3.22	
Dibranchus atlanticus	17.62	2594	2.70	
Carlarius parkii	17.54	2	2.68	
Chlorophthalmus atlanticus	14.79	426	2.26	
Malacocephalus laevis	14.59	202	2.23	
Lophiodes kempi	11.84	2	1.81	
Aristeus varidens	11.54	1196	1.77	
Malacocephalus occidentalis	6.08	61	0.93	
Lophius vaillanti	5.17	8	0.79	
Raja miraletus	4.85	10	0.74	
Bathynectes piperitus	3.64	81	0.56	
Coelorinchus caelorhincus	2.44	81	0.37	
Gadella imberbis	0.81	20	0.12	
Sergia sp.	0.40	40	0.06	
G A S T R O P O D S	0.40	61	0.06	
Munidopsis sp.	0.40	143	0.06	
Xenodermichthys copei	0.40	40	0.06	
Total	653.47		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 146
DATE :20/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°17.81
start stop duration Lon E 12°42.26
TIME :07:50:55 08:18:01 27.1 (min) Purpose : 3
LOG : 5942.10 5943.44 1.3 Region : 4054
FDEPTH: 41 41 Gear cond.: 0
BDEPTH: 41 41 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.0 kn
Sorted : 60 Total catch: 59.58 Catch/hour: 131.96

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pagrus caeruleostictus	33.53	89	25.41	
Dentex barnardi	30.52	115	23.13	
Dactylopterus volitans	17.19	31	13.02	
Dasyatis marmorata	14.93	20	11.31	
Raja miraletus	8.28	18	6.28	
Sarda sarda	4.03	4	3.05	
Zanobatus shoenleinii **	3.52	4	2.67	
Dasyatis margarita	2.75	2	2.08	
Sepia officinalis	2.39	2	1.81	
Aluterus heudelotii	1.77	2	1.34	
Chilomycterus spinosus mauretanicus	1.73	7	1.31	
Pagellus bellottii	1.64	13	1.24	
Xyrichtys novacula	1.53	11	1.16	
Rhinobatos albomaculatus	1.44	2	1.09	
Sphyraena sphyraena	0.97	4	0.74	
Chelidonichthys gabonensis	0.95	7	0.72	
Chaetodon hoefleri	0.84	4	0.64	
Pseudupeneus prayensis	0.82	4	0.62	
Uranoscopus polli	0.47	4	0.35	
Heart urchin	0.47	20	0.35	
Fistularia petimba	0.42	2	0.32	
Caranx rhonchus	0.38	2	0.29	
Trachinus armatus	0.29	2	0.22	
Bothus podas	0.22	2	0.17	
B I V A L V E S	0.20	66	0.15	
Trachinocephalus myops	0.18	4	0.13	
Trachinus armatus	0.16	2	0.12	0
Chaetodon robustus	0.13	2	0.10	
Sphoeroides marmoratus	0.11	2	0.08	
Calappa rubroguttata	0.07	2	0.05	
Grammoplites gruveli	0.04	4	0.03	
Total	131.96		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 147
DATE :20/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°22.58
start stop duration Lon E 12°39.90
TIME :09:50:00 10:20:05 30.1 (min) Purpose : 3
LOG : 5952.78 5954.41 1.6 Region : 4054
FDEPTH: 63 61 Gear cond.: 0
BDEPTH: 63 61 Validity : 0
Towing dir: 0° Wire out : 160 m Speed : 3.3 kn
Sorted : 132 Total catch: 132.43 Catch/hour: 264.07

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Rhinobatos cemiculus	79.76	2	30.20	
Pagellus bellottii	45.74	477	17.32	444
Lagocephalus laevigatus	39.92	70	15.12	
Rhinobatos annulatus	24.61	0	9.32	
Raja miraletus	21.69	48	8.22	
**	9.71	0	3.68	
Sepia orbignyana	6.52	10	2.47	
Fistularia petimba	5.58	20	2.11	
Caranx crysos	5.04	4	1.91	
Dactylopterus volitans	4.19	6	1.59	
Chelidonichthys gabonensis	3.85	34	1.46	
Pagrus caeruleostictus	2.94	8	1.11	
Ophiuroidae	2.19	0	0.83	
Aluterus schoepfii	1.93	2	0.73	
Balistes capriscus	1.81	2	0.69	
Sepia sp	1.64	2	0.62	
Sarda sarda	1.62	2	0.61	
Torpedo torpedo	1.62	2	0.61	
Chaetodon hoefleri	1.54	8	0.58	
Zeus faber	0.74	2	0.28	
Trachurus trecae	0.44	2	0.17	
Seriola carpenteri	0.34	2	0.13	
G A S T R O P O D S	0.22	28	0.08	
Arnoglossus imperialis	0.12	30	0.05	
Monolene microstoma	0.10	20	0.04	
Dibranchus atlanticus	0.08	14	0.03	
Saurida brasiliensis	0.06	10	0.02	
Citharus linguatula	0.04	2	0.02	
Grammoplites gruveli	0.02	2	0.01	
Eggs of ray	0.02	2	0.01	
Total	264.08		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 148
DATE :20/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°23.29
start stop duration Lon E 12°34.41
TIME :11:35:12 12:05:24 30.2 (min) Purpose : 3
LOG : 5961.33 5962.81 1.5 Region : 4054
FDEPTH: 85 87 Gear cond.: 0
BDEPTH: 85 87 Validity : 0
Towing dir: 0° Wire out : 240 m Speed : 3.0 kn
Sorted : 156 Total catch: 156.21 Catch/hour: 310.56

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dentex congoensis	156.98	0	50.55	
Lepidotrigla cadmani	47.71	406	15.36	
Pagellus bellottii	14.19	0	4.57	446
Zeus faber	12.25	30	3.94	
Trachurus trecae	11.23	201	3.62	447
Lagocephalus laevigatus	10.52	14	3.39	
Sepia orbignyana	9.70	24	3.12	
Alloteuthis africana	7.61	3986	2.45	
Dentex canariensis	5.65	6	1.82	
Dentex barnardi	5.65	0	1.82	
Rhinobatos albomaculatus	5.37	2	1.73	
Seriola carpenteri	2.84	6	0.92	
Priacanthus arenatus	2.80	22	0.90	
Raja miraletus	2.62	4	0.85	
Epinephelus aeneus	2.39	4	0.77	449
Pseudupeneus prayensis	1.95	22	0.63	
Dentex angolensis	1.85	32	0.60	445
Citharus linguatula	1.77	179	0.57	
Fistularia petimba	1.59	4	0.51	
Starfish, mixed	1.27	203	0.41	
Sponges	0.93	78	0.30	
Chaetodon hoefleri	0.74	4	0.24	
Deepwater fish mixture	0.68	0	0.22	
Saurida brasiliensis	0.50	89	0.16	
Sardinella aurita	0.44	12	0.14	448
G A S T R O P O D S	0.40	145	0.13	
Arnoglossus imperialis	0.34	58	0.11	
P O L Y C H A E T A	0.22	6	0.07	
Grammoplites gruveli	0.20	6	0.06	
Mycteroperca rubra	0.12	2	0.04	
OPHICHTHIDAE	0.04	2	0.01	
Ariomma bondi	0.02	2	0.01	
Total	310.56		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 149
DATE :20/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°25.56
start stop duration Lon E 12°27.59
TIME :13:40:02 14:10:54 30.9 (min) Purpose : 3
LOG : 5971.52 5973.11 1.6 Region : 4054
FDEPTH: 116 117 Gear cond.: 0
BDEPTH: 116 117 Validity : 0
Towing dir: 0° Wire out : 290 m Speed : 3.1 kn
Sorted : 56 Total catch: 155.00 Catch/hour: 301.26

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dentex congoensis	112.28	641	37.27	450
Dentex angolensis	97.61	472	32.40	451
Chelidonichthys gabonensis	19.61	189	6.51	
Ariomma sp.	15.63	262	5.19	
Raja miraletus	11.00	16	3.65	
Spicara alta	9.54	52	3.17	
Scomber japonicus	6.92	16	2.30	
Trachurus trecae	5.03	21	1.67	
Rhinobatos albomaculatus	3.97	2	1.32	
Cynoponticus ferox	3.85	2	1.28	
Perulibatrachus rossignoli	2.41	6	0.80	
Uranoscopus albesca	2.35	6	0.78	
Octopus vulgaris	2.16	6	0.72	
Echeneis naucrates	2.16	6	0.72	
Zeus faber	2.10	10	0.70	
Citharus linguatula	1.26	47	0.42	
Waste General	0.89	6	0.30	
Serranus cabrilla	0.62	6	0.21	
Sepia orbignyana	0.62	10	0.21	
**	0.62	0	0.21	
G A S T R O P O D S	0.43	37	0.14	
GORGONOCEPHALIDAE	0.21	0	0.07	
Total	301.28		100.01	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 150
DATE :20/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°27.45
start stop duration Lon E 12°19.23
TIME :16:02:45 16:25:50 23.1 (min) Purpose : 3
LOG : 5982.77 5983.95 1.2 Region : 4054
FDEPTH: 427 425 Gear cond.: 0
BDEPTH: 427 425 Validity : 0
Towing dir: 0° Wire out : 1020 m Speed : 3.1 kn
Sorted : 19 Total catch: 170.00 Catch/hour: 441.75

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Merluccius polli	110.00	234	24.90	452
Laemonema laureysi	64.26	767	14.55	
**	38.22	0	8.65	
Yarella blackfordi	30.25	829	6.85	
Chaunax pictus	25.28	107	5.72	
Lophius vaillanti	16.19	13	3.66	
Dibranchus atlanticus	11.15	1265	2.52	
Stomias sp.	11.15	166	2.52	
Centrophorus granulosus	10.91	3	2.47	
Stereomastis sp.	10.84	1265	2.45	
Aristeus varidens	9.64	873	2.18	
Stomias boa boa	8.89	60	2.01	
Gadella imberbis	8.29	707	1.88	
Anemones, white	8.13	31	1.84	
Coloconger cadenati	8.03	23	1.82	
Xenodermichthys copei	7.98	572	1.81	
Illex coindetii	7.22	135	1.64	
Chlorophthalmus atlanticus	6.78	107	1.54	
Bristle worms (straws)	5.87	1084	1.33	
Chaceon maritae	5.43	16	1.23	
Gonostoma elongatum	5.12	60	1.16	
Etmopterus polli	4.68	481	1.06	
Raja miraletus	4.16	8	0.94	
Nettastoma parviceps	2.70	166	0.61	
Synagrops microlepis	2.55	91	0.58	
Triplophos hemingi	2.55	377	0.58	
B I V A L V E S	2.42	361	0.55	
Waste General	2.26	0	0.51	
Halosaurus ovenii	1.82	135	0.41	
Malacocephalus laevis	1.51	16	0.34	
Munidopsis sp.	1.20	330	0.27	
Bathynectes sp.	1.20	31	0.27	
Ariomma bondi	1.20	16	0.27	
Benthodesmus tenuis	1.07	31	0.24	
Dicrolene sp.	0.91	44	0.21	
OPHIDIIDAE	0.75	60	0.17	
Hymenocephalus italicus	0.44	120	0.10	
Nemichthys scolopaceus	0.16	16	0.04	
Peristedion cataphractum	0.16	16	0.04	
Nettastoma sp.	0.16	16	0.04	
Neobythites analis	0.16	44	0.04	
MYCTOPHIDAE	0.16	151	0.04	
Total	441.80		100.01	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 151
DATE :20/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°32.89
start stop duration Lon E 12°14.41
TIME :19:08:52 19:39:39 30.8 (min) Purpose : 3
LOG : 5997.40 5998.92 1.5 Region : 4054
FDEPTH: 712 702 Gear cond.: 0
BDEPTH: 712 702 Validity : 0
Towing dir: 0° Wire out : 1550 m Speed : 3.0 kn
Sorted : 31 Total catch: 151.00 Catch/hour: 294.35

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Shrimps, larvae	60.27	0	20.48	
Raja sp.	41.87	0	14.23	
Stereomastis sp.	30.86	0	10.48	
Nezumia aequalis	19.77	0	6.72	
Waste General	19.32	0	6.56	
Yarella blackfordi	14.00	0	4.75	
Centroscymnus sp.	12.53	0	4.26	
Ateleopus sp.	11.29	0	3.83	
Bristle worms (straws)	10.57	0	3.59	
Centrophorus granulosus	7.56	2	2.57	
Narcetes cf stomias	7.21	0	2.45	
Halosaurus ovenii	5.59	0	1.90	
Hoplostethus cadenati	5.15	0	1.75	
Bathyuroconger vicinus	4.97	0	1.69	
Talismania longifilis	4.60	0	1.56	
Triplophos hemingi	4.15	0	1.41	
JELLYFISH	3.78	0	1.28	
Dibranchus atlanticus	3.33	0	1.13	
Photonectes sp.	2.81	0	0.95	
Photonectes braueri	2.71	0	0.92	
Chaceon maritae	2.59	8	0.88	
Monomitopus metriostoma	2.53	0	0.86	
Starfish	1.81	0	0.62	
Photichthys sp.	1.72	0	0.58	
UNIDENTIFIED FISH	1.72	0	0.58	
Octopoteuthis sicula	1.44	0	0.49	
Lithodes ferox	1.29	4	0.44	
Bathyurocongrus sp.	1.09	0	0.37	
Shrimps unidentified	0.99	0	0.34	
Xenodermichthys copei	0.90	0	0.30	
Shark eggs	0.82	0	0.28	
Trachipterus sp.	0.62	0	0.21	
Munidopsis sp.	0.55	0	0.19	
PARAPAGURIDAE	0.45	0	0.15	
Bathypterois phenax	0.45	0	0.15	
Scopelosaurus sp.	0.45	0	0.15	
Starfish - many arms	0.37	0	0.13	
Astronesthes sp	0.37	0	0.13	

Melanocetus johnsoni	0.37	0	0.13
Chauliodus sloani	0.27	0	0.09
Acanthephyra sp.	0.27	0	0.09
GALATHEIDAE	0.18	0	0.06
Synaphobranchus affinis	0.18	0	0.06
Nemichthys scolopaceus	0.18	0	0.06
Venefica sp.	0.18	0	0.06
Neobythites analis	0.18	0	0.06
'Undidentified crab'	0.10	0	0.03
Total	294.39		100.01

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 152
DATE :20/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°19.56
start stop duration Lon E 12°0.51
TIME :23:54:26 00:16:19 21.9 (min) Purpose : 1
LOG : 6021.51 6022.53 1.0 Region : 4054
FDEPTH: 529 527 Gear cond.: 0
BDEPTH: 529 527 Validity : 5
Towing dir: 0° Wire out : 1230 m Speed : 2.8 kn
Sorted : 0 Total catch: 0.00 Catch/hour: 0.00

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

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 153
DATE :21/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°20.12
start stop duration Lon E 12°3.99
TIME :02:27:38 02:36:23 8.8 (min) Purpose : 1
LOG : 6030.54 6030.93 0.4 Region : 4054
FDEPTH: 419 419 Gear cond.: 0
BDEPTH: 419 419 Validity : 5
Towing dir: 0° Wire out : 950 m Speed : 2.6 kn
Sorted : 27 Total catch: 135.00 Catch/hour: 924.66

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Hymenocephalus italicus	426.58	39479	46.13	
Chaunax pictus	88.70	1719	9.59	
Laemonema laureysi	56.23	664	6.08	
Merluccius polli	45.21	82	4.89	453
Dibranchus atlanticus	32.74	5274	3.54	
Shrimps, small, non comm.	31.44	8521	3.40	
Stereomastis sp.	29.25	2767	3.16	
Miscellaneous fishes	28.29	0	3.06	
Aristeus varidens	21.64	2000	2.34	
Bassanago albescens	20.96	253	2.27	
MELANOSTOMIATIDAE	20.34	288	2.20	
Bristle worms (straws)	17.19	2767	1.86	
Etmopterus polli	16.51	384	1.79	
Anemones, white	13.97	219	1.51	
Chaceon maritae	12.33	34	1.33	
Halosaurus ovenii	11.44	384	1.24	
MYCTOPHIDAE	8.90	3685	0.96	
Todaropsis eblanae	5.75	34	0.62	
COLOCONGRIDAE	4.45	34	0.48	
Regalecus russelii	3.15	34	0.34	
Yarrella blackfordi	3.15	96	0.34	
Nezumia micronychodon	2.88	158	0.31	
G A S T R O P O D S	2.53	856	0.27	
NETTASTOMATIDAE	2.53	130	0.27	
Triplophos hemingi	2.19	507	0.24	
CARIDEA	1.92	62	0.21	
Epigonus telescopus	1.92	34	0.21	
Plastic cans-jars etc	1.71	0	0.19	
Bathynectes piperitus	1.58	96	0.17	
Metal waste	1.51	0	0.16	
Acanthephyra sp.	1.30	507	0.14	
Chlorophthalmus atlanticus	1.30	34	0.14	
GONOSTOMATIDAE	0.96	96	0.10	
Benthodesmus tenuis	0.96	34	0.10	
Starfish	0.62	34	0.07	
OPHICHTHIDAE	0.62	34	0.07	
SOLEIDAE	0.34	34	0.04	
PARALEPIDIDAE	0.34	34	0.04	
GALATHEIDAE	0.34	130	0.04	
Gadella imberbis	0.34	34	0.04	
Eggs of ray	0.34	34	0.04	
Nemichthys scolopaceus	0.34	96	0.04	
Total	924.79		100.01	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 154
DATE :21/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°14.41
start stop duration Lon E 12°8.35
TIME :04:43:08 05:17:04 33.9 (min) Purpose : 3
LOG : 6040.57 6042.30 1.7 Region : 4054
FDEPTH: 230 222 Gear cond.: 0
BDEPTH: 230 222 Validity : 0
Towing dir: 0° Wire out : 540 m Speed : 3.1 kn
Sorted : 59 Total catch: 150.00 Catch/hour: 265.25

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Synagrops microlepis	60.00	3517	22.62	
Trichiurus lepturus	37.49	136	14.13	
Dentex angolensis	34.98	103	13.19	454
Brotula barbata	23.59	0	8.89	
Merluccius polli	19.10	97	7.20	455
Parapenaeus longirostris	18.82	426	7.09	
Chlorophthalmus atlanticus	17.70	1643	6.67	
Zenopsis conchifer	14.68	42	5.53	
Bembrops heterurus	12.73	150	4.80	
Pteroscion peli	8.08	111	3.05	
Calappa rubroguttata	3.61	67	1.36	
Miracorvina angolensis	3.18	18	1.20	
Illex coindetii	2.21	42	0.83	
Monolene microstoma	1.72	108	0.65	
Octopus vulgaris	1.33	4	0.50	
Apogon sp.	1.08	189	0.41	
Coelorinchus caelorhincus	0.94	18	0.35	
Coloconger cadenati	0.90	4	0.34	
OPHIDIIDAE	0.74	50	0.28	
Todaropsis eblanae	0.71	4	0.27	
G A S T R O P O D S	0.35	28	0.13	
Dicologoglossa cuneata	0.35	7	0.13	
Malacocephalus occidentalis	0.28	7	0.11	
Bristle worms (straws)	0.28	50	0.11	
Peristedion cataphractum	0.21	4	0.08	
Pontinus accraensis	0.14	7	0.05	
Nettastoma parviceps	0.07	4	0.03	
Nemichthys scolopaceus	0.04	4	0.01	
Total	265.31		100.02	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 155
DATE :21/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°11.76
start stop duration Lon E 12°18.20
TIME :07:35:26 08:05:28 30.0 (min) Purpose : 3
LOG : 6056.66 6058.25 1.6 Region : 4054
FDEPTH: 119 119 Gear cond.: 0
BDEPTH: 119 119 Validity : 0
Towing dir: 0° Wire out : 300 m Speed : 3.2 kn
Sorted : 0 Total catch: 125.12 Catch/hour: 249.99

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	157.16	4260	62.87	456
Dentex angolensis	50.07	362	20.03	
Lepidotrigla cadmani	10.55	66	4.22	
Citharus linguatula	4.64	106	1.85	
Raja miraletus	4.24	6	1.69	
Ariomma bondi	3.72	50	1.49	
Zeus faber	3.34	10	1.33	
Illex coindetii	3.28	202	1.31	
Sepia orbignyana	2.26	28	0.90	
Zenopsis conchifer	1.86	6	0.74	
Sardinella aurita	1.74	46	0.70	458
Brotula barbata	1.70	2	0.68	
Torpedo torpedo	1.62	2	0.65	
Fistularia petimba	1.48	4	0.59	
Pagellus bellottii	0.76	10	0.30	457
Dentex barnardi	0.44	2	0.18	
Spicara alta	0.38	28	0.15	
Bembrops heterurus	0.24	2	0.10	
Calappa rubroguttata	0.14	2	0.06	
Todaropsis eblanae	0.12	2	0.05	
Arnoglossus imperialis	0.10	16	0.04	
Saurida brasiliensis	0.08	16	0.03	
G A S T R O P O D S	0.06	34	0.02	
Peristedion cataphractum	0.02	2	0.01	
OPHIDIIDAE	0.02	2	0.01	
Total	249.99		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 156
DATE :21/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 6°57.55
start stop duration Lon E 12°11.21
TIME :10:25:40 10:55:45 30.1 (min) Purpose : 3
LOG : 6072.88 6074.55 1.7 Region : 4054
FDEPTH: 87 85 Gear cond.: 0
BDEPTH: 87 85 Validity : 0
Towing dir: 0° Wire out : 225 m Speed : 3.3 kn
Sorted : 61 Total catch: 445.00 Catch/hour: 887.34

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pagellus bellottii	647.20	2877	72.94	460
Epinephelus aeneus	76.41	20	8.61	459
Dentex angolensis	66.34	415	7.48	463
Umbrina canariensis	15.87	30	1.79	462
Dentex barnardi	14.22	0	1.60	
Raja miraletus	11.72	22	1.32	
Lepidotrigla cadmani	10.83	76	1.22	
Zeus faber	9.69	26	1.09	
Lagocephalus laevigatus	8.81	12	0.99	
Pseudupeneus prayensis	5.40	26	0.61	
Trachurus trecae	5.38	28	0.61	461
Sepia orbignyana	4.25	4	0.48	
**	2.77	0	0.31	
Chaetodon hoefleri	2.39	12	0.27	
Trichiurus lepturus	2.13	0	0.24	
Branchiostegus semifasciatus	1.77	4	0.20	
Brotula barbata	1.66	2	0.19	
Fistularia petimba	0.48	2	0.05	
Total	887.34		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 157
DATE :21/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°2.88
start stop duration Lon E 12°4.61
TIME :12:40:35 13:14:28 33.9 (min) Purpose : 3
LOG : 6085.87 6087.54 1.7 Region : 4054
FDEPTH: 119 117 Gear cond.: 0
BDEPTH: 119 117 Validity : 0
Towing dir: 0° Wire out : 290 m Speed : 2.9 kn
Sorted : 159 Total catch: 410.00 Catch/hour: 726.09

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	439.99	13142	60.60	
Dentex angolensis	121.40	754	16.72	
Lepidotrigla cadmani	45.85	384	6.31	
Umbrina canariensis	42.52	58	5.86	
Fistularia petimba	13.64	9	1.88	
Dentex congoensis	13.14	195	1.81	
Citharus linguatula	8.45	244	1.16	
Seriola carpenteri	7.69	2	1.06	
Raja miraletus	7.54	9	1.04	
Zeus faber	4.78	27	0.66	
Dentex barnardi	4.75	9	0.65	
Pagrus caeruleostictus	3.79	5	0.52	
Brotula barbata	3.70	9	0.51	
Sphoeroides pachygaster	2.13	5	0.29	
Illex coindetii	1.45	122	0.20	
Lophiodes kempi	1.31	5	0.18	
Spicara alta	0.96	9	0.13	
Uranoscopus polli	0.90	5	0.12	
Pterothrissus belloci	0.64	5	0.09	
Monolene microstoma	0.58	32	0.08	
Arnoglossus imperialis	0.27	32	0.04	
Sepia orbignyana	0.27	5	0.04	
Dicologoglossa hexophthalma	0.18	5	0.02	
G A S T R O P O D S	0.09	14	0.01	
Saurida brasiliensis	0.05	18	0.01	
SOLEIDAE	0.05	9	0.01	
Dibranchus atlanticus	0.05	5	0.01	
Total	726.16		100.01	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 158
DATE :21/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°5.64
start stop duration Lon E 11°57.24
TIME :15:05:20 15:36:33 31.2 (min) Purpose : 3
LOG : 6098.21 6099.84 1.6 Region : 4054
FDEPTH: 269 260 Gear cond.: 0
BDEPTH: 269 260 Validity : 0
Towing dir: 0° Wire out : 700 m Speed : 3.1 kn
Sorted : 0 Total catch: 1600.00 Catch/hour: 3073.97

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Synagrops microlepis	2288.65	10711	74.45	
Chlorophthalmus atlanticus	287.74	7193	9.36	
Parapenaeus longirostris	188.45	19145	6.13	
Dentex angolensis	112.16	231	3.65	464
Brotula barbata	62.06	46	2.02	
Merluccius polli	52.39	459	1.70	465
Bembrops heterurus	16.54	184	0.54	
Pterothrissus belloci	11.49	92	0.37	
Zenopsis conchifer	8.28	23	0.27	
Alloteuthis africana	7.82	667	0.25	
MYCTOPHIDAE	6.90	6298	0.22	
Trichiurus lepturus	6.44	23	0.21	
Coelorinchus caelorhincus	5.05	92	0.16	
Illex coindetii	4.13	69	0.13	
Parasudis sp.	3.21	138	0.10	
Pontinus accraensis	1.84	23	0.06	
Malacocephalus occidentalis	1.84	23	0.06	

Erythrocles monodi	1.61	2	0.05
Gadella imberbis	1.38	69	0.04
Monolene microstoma	1.38	92	0.04
Ariomma bondi	0.92	23	0.03
Peristedion cataphractum	0.92	23	0.03
Chascanopsetta lugubris	0.92	23	0.03
Epigonus telescopus	0.92	23	0.03
Bassanago albescens	0.46	23	0.01
Cyttopsis rosea	0.46	46	0.01
Total	3073.99		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 159
DATE :21/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°6.30
start stop duration Lon E 11°56.80
TIME :17:14:41 17:44:58 30.3 (min) Purpose : 3
LOG : 6107.24 6108.80 1.6 Region : 4054
FDEPTH: 309 317 Gear cond.: 0
BDEPTH: 309 317 Validity : 0
Towing dir: 0° Wire out : 740 m Speed : 3.1 kn
Sorted : 34 Total catch: 225.00 Catch/hour: 445.84

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Chlorophthalmus atlanticus	169.76	3260	38.08	
Merluccius polli	80.65	351	18.09	466
Pontinus accraensis	38.40	0	8.61	
Benthodesmus tenuis	20.29	410	4.55	
URCHINS	15.81	36	3.55	
Pterothrissus belloci	13.16	73	2.95	
Malacocephalus occidentalis	12.92	85	2.90	
Lophius vaillanti	12.48	2	2.80	
Laemonema laureysi	11.35	168	2.55	
Synagrops microlepis	9.29	410	2.08	
Hymenocephalus italicus	8.82	1268	1.98	
Gephyroberyx darwini	7.13	4	1.60	
Parapenaeus longirostris	6.52	1605	1.46	
Zenopsis conchifer	5.31	12	1.19	
MYCTOPHIDAE	4.72	4082	1.06	
Raja straeleni	4.56	4	1.02	
Gadella imberbis	3.86	97	0.87	
Coelorinchus caelorhincus	2.89	48	0.65	
Erythrocles monodi	2.42	2	0.54	
Bathynectes piperitus	1.80	24	0.40	
Illex coindetii	1.68	109	0.38	
Malacocephalus laevis	1.68	24	0.38	
Lithodes ferox	1.66	2	0.37	
Chascanopsetta lugubris	1.45	36	0.32	
Ectreposebastes imus	1.33	24	0.30	
Calappa rubroguttata	1.33	24	0.30	
Lophius vaillanti, juvenile	1.15	4	0.26	
NETTASTOMATIDAE	1.09	12	0.24	
Echelus myrus	0.85	0	0.19	
Bembrops heterurus	0.48	12	0.11	
Todaropsis eblanae	0.48	12	0.11	
Nezumia aequalis	0.12	12	0.03	
Peristedion cataphractum	0.12	12	0.03	
Plastic	0.12	2	0.03	
Raja straeleni, juvenile	0.12	12	0.03	
Total	445.80		99.99	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 160
DATE :21/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°12.32
start stop duration Lon E 11°53.06
TIME :20:54:31 21:24:36 30.1 (min) Purpose : 3
LOG : 6123.87 6125.45 1.6 Region : 4054
FDEPTH: 623 626 Gear cond.: 0
BDEPTH: 623 626 Validity : 0
Towing dir: 0° Wire out : 1500 m Speed : 3.2 kn
Sorted : 29 Total catch: 160.00 Catch/hour: 319.15

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	56.87	10693	17.82	
Yarrella blackfordi	50.92	1247	15.96	
Stereomastis sp.	36.12	4159	11.32	
Hoplostethus cadenati	33.51	710	10.50	
Nezumia micronychodon	18.21	409	5.71	
Lamprogrammus exutus	13.92	40	4.36	
Plesiopenaeus edwardsianus	10.91	652	3.42	
Lophius vaillanti	10.33	4	3.24	
Centroscymnus sp.	9.73	30	3.05	
Octopoteuthis sicula	8.78	74	2.75	
Triplophos hemingi	7.70	1051	2.41	
Chaceon maritae	6.10	10	1.91	
Bathyuroconger vicinus	6.04	30	1.89	
Bathyraja smithii	5.94	2	1.86	
MELANOSTOMIATIDAE	4.49	88	1.41	
OPISTHOTEUTHIDAE	3.95	8	1.24	
Dicrolene sp.	3.71	467	1.16	
Ebinania costaecanarie	3.29	4	1.03	
Stomias boa boa	3.01	58	0.94	
THYSANOTEUTHIDAE	2.91	10	0.91	
Halosaurus ovenii	2.83	40	0.89	
Malacocephalus laevis	2.83	20	0.89	
Miscellaneous fishes	2.63	0	0.83	
Rajella leopardus	2.51	2	0.79	
Melanonus zugmayeri	2.43	30	0.76	
Benthodesmus tenuis	2.13	68	0.67	
Talismania longifilis	2.13	48	0.67	
Dibranchus atlanticus	1.46	48	0.46	
Synaphobranchus kaupii	1.08	20	0.34	
Shrimps unidentified	0.78	48	0.24	
Laemonema sp.	0.58	10	0.18	
Xenodermichthys copei	0.40	30	0.13	
P O L Y C H A E T A	0.30	40	0.09	
OPHIDIIDAE	0.20	78	0.06	
Hymenocephalus italicus	0.20	20	0.06	
Nemichthys scolopaceus	0.10	10	0.03	
Plastic	0.10	20	0.03	
Total	319.17		100.01	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 161
DATE :22/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 6°55.43
start stop duration Lon E 11°43.86
TIME :00:43:43 01:15:04 31.4 (min) Purpose : 3
LOG : 6143.87 6145.43 1.6 Region : 4054
FDEPTH: 517 511 Gear cond.: 0
BDEPTH: 517 511 Validity : 0
Towing dir: 0° Wire out : 1200 m Speed : 3.0 kn
Sorted : 27 Total catch: 165.00 Catch/hour: 315.79

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	130.18	31847	41.22	
Yarrella blackfordi	37.88	844	11.99	
Lamprogrammus exutus	34.28	157	10.85	
Aristeus varidens	16.63	1158	5.27	
Stomias boa boa	13.38	247	4.24	
Stereomastis talismani	11.35	1192	3.59	
Triplophos hemingi	9.22	1259	2.92	
Hoplostethus cadenati	9.11	325	2.88	
Benthodesmus tenuis	6.64	157	2.10	
**	6.18	0	1.96	
Centroscymnus sp.	4.73	34	1.50	
Malacocephalus laevis	4.27	56	1.35	
Monomitopus metriostoma	3.37	67	1.07	
Chaceon maritae	3.23	6	1.02	
Lophius vaillanti	2.76	4	0.87	
MYCTOPHIDAE	2.35	2057	0.75	
Bathyuroconger vicinus	2.24	44	0.71	
JELLYFISH	2.03	281	0.64	
CENTROLOPHIDAE	1.70	4	0.54	
Bristle worms (straws)	1.57	191	0.50	
Merluccius polli	1.51	2	0.48	
NETTASTOMATIDAE	1.34	11	0.42	
Raja sp.	1.26	2	0.40	
Xenodermichthys copei	1.24	34	0.39	
Dicrolene intronigra	1.13	145	0.36	
OPHIDIIDAE	1.13	11	0.36	
Gonostoma elongatum	1.01	23	0.32	
Scopelosaurus meadi	0.67	11	0.21	
Synaphobranchus kaupii	0.67	23	0.21	
Acanthephyra sp.	0.67	67	0.21	
Shrimps unidentified	0.44	113	0.14	
LOLIGINIDAE	0.44	78	0.14	
Waste General	0.33	0	0.10	
Parasudis fraserbrunneri	0.23	11	0.07	
Dibranchus atlanticus	0.23	11	0.07	
Torpedo torpedo	0.11	11	0.04	
Symphurus sp.	0.11	11	0.04	
GALATHEIDAE	0.11	0	0.04	
Plastic	0.02	0	0.01	
Total	315.77		99.99	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 162
DATE :22/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 6°54.37
start stop duration Lon E 11°45.27
TIME :03:23:56 03:53:45 29.8 (min) Purpose : 3
LOG : 6152.00 6153.53 1.5 Region : 4054
FDEPTH: 446 443 Gear cond.: 0
BDEPTH: 446 443 Validity : 0
Towing dir: 0° Wire out : 1000 m Speed : 3.1 kn
Sorted : 49 Total catch: 215.00 Catch/hour: 432.45

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Yarrella blackfordi	81.92	2154	18.94	
Stomias sp.	49.90	1062	11.54	
Chauliodus pictus	34.23	278	7.92	
Stereomastis sp.	34.07	2567	7.88	
Aristeus varidens	31.84	2400	7.36	
Lamprogrammus exutus	30.73	229	7.11	
Merluccius polli	27.07	42	6.26	
Nematocarcinus africanus	19.01	3090	4.40	
Laemonema laureysi	13.32	191	3.08	
Lophius vaillanti	8.89	6	2.06	
Dibranchus atlanticus	8.55	792	1.98	
Triplophos hemingi	7.76	1030	1.80	
Dicrolene nigricaudis	6.42	445	1.48	
Etmopterus polli	6.42	64	1.48	
Malacocephalus occidentalis	6.09	24	1.41	
Benthodesmus tenuis	6.01	159	1.39	
Bathygadus sp.	5.85	175	1.35	
Trachipterus sp.	5.43	2	1.26	
CARISTIIDAE	4.91	8	1.13	
Coloconger cadenati	4.28	12	0.99	
Malacocephalus laevis	3.80	32	0.88	
Hoplostethus cadenati	3.56	119	0.82	
Halosaurus ovenii	3.48	78	0.80	
CENTROLOPHIDAE	3.40	6	0.79	
Bristle worms (straws)	2.86	340	0.66	
Xenodermichthys copei	2.61	183	0.60	
Histioteuthis sp.	2.29	24	0.53	
Chaceon maritae	1.91	6	0.44	
JELLYFISH	1.75	380	0.40	
Synagrops microlepis	1.75	16	0.40	
Nezumia aequalis	1.51	103	0.35	
Gadella imberbis	1.43	32	0.33	
Nettastoma parviceps	1.19	24	0.27	
Deania calcea	1.11	24	0.26	
Anemones, white	0.95	16	0.22	
Bathynectes piperitus	0.95	16	0.22	
Chlorophthalmus atlanticus	0.70	16	0.16	
Gonostoma elongatum	0.70	32	0.16	
Bathyuroconger vicinus	0.64	40	0.15	
TETRAODONTIDAE	0.64	8	0.15	
Stomias boa boa	0.56	40	0.13	
MORIDAE	0.40	48	0.09	
Ariomma bondi	0.40	8	0.09	
Taonius pavo	0.32	8	0.07	
MYCTOPHIDAE	0.32	364	0.07	
Bassanago albescens	0.32	8	0.07	
Synaphobranchus kaupii	0.08	8	0.02	
MACROURIDAE	0.08	8	0.02	
Total	432.45		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 163
DATE :22/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 6°51.96
start stop duration Lon E 11°50.30
TIME :05:49:34 06:21:03 31.5 (min) Purpose : 3
LOG : 6162.25 6163.96 1.7 Region : 4054
FDEPTH: 268 273 Gear cond.: 0
BDEPTH: 268 273 Validity : 0
Towing dir: 0° Wire out : 680 m Speed : 3.3 kn
Sorted : 0 Total catch: 780.00 Catch/hour: 1486.66

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Synagrops microlepis	924.32	36103	62.17	
Parapenaeus longirostris	198.60	26882	13.36	
Merluccius polli	122.10	602	8.21	467
Chlorophthalmus atlanticus	33.28	760	2.24	
CIDARIDAE	25.67	105	1.73	
Pontinus accraensis	19.92	156	1.34	
Coelorinchus caelorhincus	18.07	366	1.22	
Bembrops heterurus	16.51	183	1.11	
Zenopsis conchifer	15.67	21	1.05	
MYCTOPHIDAE	14.94	8699	1.01	
Dentex angolensis	12.83	29	0.86	
Trichiurus lepturus	12.50	15	0.84	
Malacocephalus occidentalis	9.95	78	0.67	
Torpedo nobiliana	8.58	2	0.58	
Chascanopsetta lugubris	7.60	132	0.51	
Rajella leopardus	7.55	23	0.51	
Pterothrissus belloci	6.80	51	0.46	
Brotula barbata	6.37	11	0.43	
Heptranchias perlo	5.68	2	0.38	
Rajella dissimilis	4.99	11	0.34	
Illex coindetii	4.46	734	0.30	
Calappa rubroguttata	3.93	78	0.26	
Dibranchus atlanticus	1.83	236	0.12	
Bathygadus sp.	1.83	27	0.12	
OPHIDIIDAE	1.05	51	0.07	
G A S T R O P O D S	0.78	105	0.05	
Lophius vaillanti	0.59	2	0.04	
Bathyuroconger vicinus	0.27	27	0.02	
Total	1486.66		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 164
DATE :22/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 6°51.30
start stop duration Lon E 11°54.93
TIME :08:21:04 08:51:19 30.3 (min) Purpose : 3
LOG : 6174.46 6176.02 1.6 Region : 4054
FDEPTH: 117 116 Gear cond.: 0
BDEPTH: 117 116 Validity : 0
Towing dir: 0° Wire out : 280 m Speed : 3.1 kn
Sorted : 0 Total catch: 290.00 Catch/hour: 575.02

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dentex angolensis	216.40	843	37.63	469
Dentex congoensis	174.45	966	30.34	470
Umbrina canariensis	140.36	343	24.41	
Spicara alta	15.15	141	2.63	
Lepidotrigla cadmani	10.33	89	1.80	
Waste General	6.01	0	1.04	
Raja miraletus	3.93	6	0.68	
Trachurus trecae	3.33	22	0.58	468
Fistularia petimba	1.45	6	0.25	
Sphoeroides cf. pachygaster	0.97	2	0.17	
Zeus faber	0.83	4	0.14	
Rajella lespardus	0.65	8	0.11	
Rajella dissimilis	0.40	2	0.07	
Bembrops heterurus	0.40	4	0.07	
Illex coindetii	0.36	10	0.06	
Total	575.02		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 165
DATE :22/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 6°47.97
start stop duration Lon E 12°0.45
TIME :10:30:40 11:00:56 30.3 (min) Purpose : 3
LOG : 6185.27 6186.90 1.6 Region : 4054
FDEPTH: 89 89 Gear cond.: 0
BDEPTH: 89 89 Validity : 0
Towing dir: 0° Wire out : 230 m Speed : 3.2 kn
Sorted : 0 Total catch: 188.10 Catch/hour: 372.72

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dentex canariensis	162.48	0	43.59	
Dentex barnardi	104.66	0	28.08	
Dentex gibbosus	23.14	16	6.21	
Dentex congoensis	14.19	252	3.81	471
Pagrus caeruleostictus	11.97	8	3.21	
Pagrus africanus	9.69	26	2.60	
Chromis cadenati	9.27	65	2.49	
Chelidonichthys gabonensis	6.32	48	1.70	
Pagellus bellottii	5.15	40	1.38	473
Dentex angolensis	4.48	16	1.20	472
Raja miraletus	4.16	8	1.12	
Miscellaneous fishes	3.29	0	0.88	
Chaetodon hoefleri	2.71	18	0.73	
Lagocephalus laevigatus	1.74	2	0.47	
Brotula barbata	1.61	2	0.43	
Pagrus pagrus	1.49	2	0.40	
Epinephelus aeneus	1.21	2	0.32	
Illex coindetii	0.95	125	0.26	
Zeus faber	0.85	2	0.23	
Pseudupeneus prayensis	0.79	4	0.21	
Fistularia petimba	0.67	2	0.18	
Trachurus trecae	0.55	4	0.15	
Anthias anthias	0.42	36	0.11	
Sepia orbignyana	0.32	6	0.09	
Scorpaena stephanica	0.26	2	0.07	
Citharus linguatula	0.18	20	0.05	
Saurida brasiliensis	0.08	18	0.02	
Dibranchus atlanticus	0.04	2	0.01	
Arnoglossus imperialis	0.04	10	0.01	
Total	372.72		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 166
DATE :22/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 6°43.95
start stop duration Lon E 12°9.55
TIME :12:51:48 13:21:36 29.8 (min) Purpose : 3
LOG : 6199.02 6200.57 1.6 Region : 4054
FDEPTH: 69 68 Gear cond.: 0
BDEPTH: 69 68 Validity : 0
Towing dir: 0° Wire out : 180 m Speed : 3.1 kn
Sorted : 0 Total catch: 150.00 Catch/hour: 302.11

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pagellus bellottii	235.59	1972	77.98	474
Lagocephalus laevigatus	8.64	6	2.86	
Alectis alexandrinus	6.71	6	2.22	
Mustelus mustelus	6.38	4	2.11	
Epinephelus aeneus	5.60	2	1.85	
Dactylopterus volitans	5.18	10	1.71	
Illex coindetii	5.16	2268	1.71	
Pagrus caeruleostictus	3.67	10	1.21	
Dentex canariensis	3.67	10	1.21	475
Fistularia petimba	3.46	0	1.15	
Dentex barnardi	2.94	10	0.97	
Chelidonichthys gabonensis	2.60	20	0.86	
Lepidotrigla cadmani	2.58	34	0.85	
Monolene microstoma	1.59	38	0.53	
Trachinus armatus	1.51	6	0.50	
Miscellaneous fishes	1.49	0	0.49	
Chaetodon hoefleri	0.91	4	0.30	
Trichiurus lepturus	0.85	12	0.28	
Lutjanus goreensis	0.85	2	0.28	
Sepia orbignyana	0.64	2	0.21	
Raja miraletus	0.64	2	0.21	
P O L Y C H A E T A	0.58	0	0.19	
Seriola carpenteri	0.40	2	0.13	
Trachinus radiatus	0.30	4	0.10	
Arnoglossus imperialis	0.10	22	0.03	
Eggs of ray	0.04	2	0.01	
Saurida brasiliensis	0.04	18	0.01	
Total	302.11		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 167
DATE :22/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 6°37.95
start stop duration Lon E 12°14.92
TIME :14:59:34 15:28:04 28.5 (min) Purpose : 3
LOG : 6210.83 6212.32 1.5 Region : 4054
FDEPTH: 45 46 Gear cond.: 0
BDEPTH: 45 46 Validity : 0
Towing dir: 0° Wire out : 135 m Speed : 3.2 kn
Sorted : 0 Total catch: 138.10 Catch/hour: 290.74

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pomadasys incisus	155.96	1137	53.64	476
Pagellus bellottii	34.36	0	11.82	
Raja miraletus	14.91	32	5.13	
Loligo vulgaris	10.63	2924	3.66	
Ephippion guttifer	8.63	2	2.97	
Pagrus caeruleostictus	7.96	19	2.74	
Dasyatis marmorata	7.68	6	2.64	
Miscellaneous fishes	6.61	0	2.27	
Chelidonichthys gabonensis	6.25	27	2.15	
Dentex canariensis	5.33	6	1.83	
Fistularia petimba	4.46	8	1.54	
Priacanthus arenatus	2.99	4	1.03	
Pseudupeneus prayensis	2.84	40	0.98	
Sepia officinalis	2.67	2	0.92	
Panulirus regius	2.21	4	0.76	
Balistes capriscus	1.96	2	0.67	
Dentex barnardi	1.83	6	0.63	
Chaetodon hoefleri	1.79	6	0.62	
Sepia orbignyana	1.66	2	0.57	
Grammoplites gruveli	1.52	11	0.52	
Dicologoglossa cuneata	1.37	4	0.47	
Sphyraena guachancho	1.28	2	0.44	
Cynoglossus canariensis	1.16	2	0.40	
Torpedo torpedo	1.03	6	0.35	
Trachinus radiatus	0.76	2	0.26	
Syacium micrurum	0.74	15	0.25	
Caranx rhonchus	0.69	2	0.24	
Uranoscopus polli	0.63	2	0.22	
Arnoglossus imperialis	0.59	4	0.20	
Saurida brasiliensis	0.11	51	0.04	
Starfish	0.06	4	0.02	
Bathyuroconger vicinus	0.04	2	0.01	
Small crabs	0.02	2	0.01	
Total	290.74		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 168
DATE :24/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 6°15.57
start stop duration Lon E 11°50.72
TIME :05:42:49 06:12:03 29.2 (min) Purpose : 3
LOG : 6426.45 6428.13 1.7 Region : 4054
FDEPTH: 92 91 Gear cond.: 0
BDEPTH: 92 91 Validity : 0
Towing dir: 0° Wire out : 170 m Speed : 3.5 kn
Sorted : 0 Total catch: 52.53 Catch/hour: 107.86

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	27.93	577	25.89	480
Euthynnus alletteratus	12.28	2	11.38	
Dentex angolensis	11.05	82	10.24	477
Trichiurus lepturus	11.01	14	10.20	
Dentex congoensis	8.97	133	8.32	478
Raja miraletus	8.46	14	7.84	
Zeus faber	6.49	16	6.02	
Miracorvina angolensis	6.45	4	5.98	
Saurida brasiliensis	4.41	205	4.09	
Pagellus bellottii	3.41	53	3.16	479
Umbrina canariensis	2.30	2	2.13	
Brotula barbata	1.70	2	1.58	
G A S T R O P O D S	0.80	337	0.74	
Pseudupeneus prayensis	0.74	6	0.69	
Boops boops	0.41	10	0.38	
Citharus linguatula	0.39	33	0.36	
Illex coindetii	0.31	29	0.29	
Uranoscopus cadenati	0.31	4	0.29	
Lepidotrigla cadmani	0.21	2	0.19	
Lepidotrigla carolae	0.10	2	0.10	
Arnoglossus imperialis	0.06	8	0.06	
GOBIIDAE	0.04	2	0.04	
Squilla mantis	0.02	2	0.02	
Sepia orbignyana	0.02	2	0.02	
Total	107.86		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 169
DATE :24/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 6°13.32
start stop duration Lon E 12°4.48
TIME :11:42:12 12:12:21 30.2 (min) Purpose : 3
LOG : 6455.65 6457.09 1.4 Region : 4054
FDEPTH: 34 34 Gear cond.: 0
BDEPTH: 34 34 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 2.9 kn
Sorted : 80 Total catch: 79.65 Catch/hour: 158.45

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Sphyrna sp.	26.26	2	16.57	
Pseudotolithus senegalensis	18.82	28	11.88	
Chelidonichthys capensis	15.40	60	9.72	
Brachydeuterus auritus	13.13	0	8.29	0
Pagellus bellottii	9.67	0	6.10	
Brachydeuterus auritus	9.35	56	5.90	
Trichiurus lepturus	6.72	113	4.24	
Raja miraletus	5.51	14	3.48	
Galeoides decadactylus	5.45	88	3.44	
Dasyatis margarita	4.30	14	2.71	
Ilisha africana	4.22	82	2.66	
CITHARIDAE	3.56	34	2.25	
Raja clavata	3.18	4	2.01	
Pteroscion peli	3.06	36	1.93	
Pomadasys perotaei	3.02	2	1.91	
Trachinus armatus	2.96	60	1.87	
Pomadasys incisus	2.94	24	1.86	
Uranoscopus polli	2.92	50	1.85	
Alloteuthis africana	2.43	3537	1.53	
Torpedo torpedo	2.41	2	1.52	
Umbrina canariensis	1.83	2	1.16	
Jelly	1.47	4	0.93	
Pseudupeneus prayensis	1.37	16	0.87	
Acanthurus monroviae	1.31	2	0.83	
Deepwater fish mixture	1.27	0	0.80	
Cynoglossus canariensis	1.19	4	0.75	
Penaeus notialis	0.94	36	0.59	
Zeus faber	0.72	2	0.45	
OPHICHTHIDAE	0.64	2	0.40	
Pisodonophis semicinctus	0.58	2	0.36	
Callinectes amnicola	0.28	229	0.18	
Calappa pelii	0.16	2	0.10	
Unidentified juv fish	0.16	36	0.10	
Sphyraena sp.	0.16	36	0.10	
Squilla mantis	0.14	4	0.09	
Sepiella ornata	0.14	6	0.09	
Dentex congoensis	0.12	2	0.08	
Illex coindetii	0.10	2	0.06	
Trachinocephalus myops	0.10	4	0.06	
Arnoglossus imperialis	0.08	4	0.05	
Saurida brasiliensis	0.08	30	0.05	
Grammoplites gruveli	0.08	26	0.05	
Parapenaeopsis atlantica	0.08	44	0.05	
Dicologoglossa hexophthalma	0.04	4	0.03	
Selene dorsalis	0.04	16	0.03	
UNIDENTIFIED FISH	0.02	18	0.01	
Lophius sp.	0.02	4	0.01	
Plastic	0.02	2	0.01	
Total	158.45		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 170
DATE :24/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 6°13.02
start stop duration Lon E 11°56.26
TIME :13:18:47 13:48:08 29.4 (min) Purpose : 3

LOG : 6465.28 6466.79 1.5 Region : 4054
FDEPTH: 72 74 Gear cond.: 0
BDEPTH: 72 74 Validity : 0
Towing dir: 0° Wire out : 185 m Speed : 3.1 kn
Sorted : 0 Total catch: 73.34 Catch/hour: 149.88

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Selene dorsalis	21.13	37	14.10	483
Brotula barbata	20.76	31	13.85	
Dentex angolensis	13.08	74	8.73	482
Dentex congoensis	11.16	131	7.44	485
Raja miraletus	9.89	12	6.60	
Trachurus trecae	9.56	22	6.38	481
Alloteuthis africana	8.79	3376	5.86	
Umbrina canariensis	7.97	20	5.32	484
Dentex barnardi	7.32	20	4.88	
Trichiurus lepturus	6.29	6	4.20	
Lagocephalus laevigatus	4.33	2	2.89	
Branchiostegus semifasciatus	3.90	8	2.60	
Pseudupeneus prayensis	3.19	41	2.13	
Scorpaena stephanica	3.07	6	2.05	
Pagrus africanus	2.92	4	1.95	
Pagellus bellottii	2.74	29	1.83	486
Plectorhinchus macrolepis	1.76	2	1.17	
Chaetodon hoefleri	1.72	10	1.15	
Pagrus caeruleostictus	1.51	2	1.01	
Chelidonichthys gabonensis	1.49	6	1.00	
Sepia officinalis	1.14	2	0.76	
Priacanthus arenatus	1.14	6	0.76	
Zeus faber	1.10	4	0.74	
Miscellaneous fishes	0.82	0	0.55	
Ophiuroidea	0.72	0	0.48	
Saurida brasiliensis	0.72	296	0.48	
Arnoglossus imperialis	0.43	25	0.29	
Pomadasys incisus	0.37	2	0.25	
Citharus linguatula	0.33	14	0.22	
B I V A L V E S	0.12	27	0.08	
Starfish	0.08	43	0.05	
Illex coindetii	0.08	2	0.05	
Dicologoglossa hexophthalma	0.08	2	0.05	
Boops boops	0.08	4	0.05	
GOBIIDAE	0.02	4	0.01	
SOLEIDAE	0.02	2	0.01	
Chelidonichthys capensis	0.02	2	0.01	
Sepia orbignyana	0.02	8	0.01	
Total	149.88		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 171
DATE :24/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 6°17.19
start stop duration Lon E 11°46.47
TIME :15:33:02 16:04:28 31.4 (min) Purpose : 3
LOG : 6478.21 6479.98 1.8 Region : 4054
FDEPTH: 109 109 Gear cond.: 0
BDEPTH: 109 109 Validity : 0
Towing dir: 0° Wire out : 290 m Speed : 3.4 kn
Sorted : 0 Total catch: 140.65 Catch/hour: 268.42

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Umbrina canariensis	174.27	351	64.93	487
Trachurus trecae	19.50	656	7.27	488
Trichiurus lepturus	19.01	25	7.08	
Dentex angolensis	16.03	103	5.97	489
Raja miraletus	6.34	13	2.36	
Dentex congoensis	5.73	86	2.13	490
Zeus faber	5.69	15	2.12	
Illex coindetii	4.20	281	1.56	
Dentex barnardi	3.76	13	1.40	
Octopus vulgaris	3.65	2	1.36	
Lepidotrigla cadmani	1.64	17	0.61	
Ariomma bondi	1.56	38	0.58	
Brotula barbata	1.11	2	0.41	
Citharus linguatula	1.01	29	0.38	
Miscellaneous fishes	0.94	0	0.35	
Scomber colias	0.84	2	0.31	491
G A S T R O P O D S	0.71	214	0.26	
Miracorvina angolensis	0.57	2	0.21	
Dentex canariensis	0.55	2	0.21	
Pagellus bellottii	0.36	2	0.14	
Saurida brasiliensis	0.27	111	0.10	
Starfish	0.19	36	0.07	
Dicologoglossa hexophthalma	0.19	4	0.07	
Sepia orbignyana	0.10	2	0.04	
Uranoscopus polli	0.08	2	0.03	
Plastic	0.06	2	0.02	
Scorpaena sp.	0.04	2	0.01	
Arnoglossus imperialis	0.02	6	0.01	
Eggs of ray	0.02	2	0.01	
Total	268.42		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 172
DATE :24/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 6°20.95
start stop duration Lon E 11°28.32
TIME :18:41:03 19:11:37 30.6 (min) Purpose : 3
LOG : 6499.89 6501.52 1.6 Region : 4054
FDEPTH: 350 353 Gear cond.: 0
BDEPTH: 350 353 Validity : 0
Towing dir: 0° Wire out : 875 m Speed : 3.2 kn
Sorted : 29 Total catch: 280.00 Catch/hour: 549.74

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Chlorophthalmus atlanticus	172.40	2658	31.36	
Benthodesmus tenuis	117.45	2729	21.36	
Parasudis fraserbrunneri	64.65	1043	11.76	
Laemonema laureysi	59.45	701	10.81	
Rajella leopardus	26.03	90	4.74	
Merluccius polli	16.61	49	3.02	
Rajella dissimilis	14.55	18	2.65	
Nettastoma parviceps	9.17	53	1.67	
Malacocephalus laevis	8.27	73	1.50	
Malacocephalus occidentalis	6.64	53	1.21	
MYCTOPHIDAE	5.75	4706	1.05	
Bembrops greyi	5.58	143	1.01	
Etmopterus cf polli	5.26	26	0.96	
Parapenaeus longirostris	4.85	558	0.88	
Hymenocephalus italicus	4.32	646	0.79	
PANDALIDAE	3.95	306	0.72	
Illex coindetii	3.42	108	0.62	
Epigonus telescopus	2.87	90	0.52	
Chaunax pictus	2.69	359	0.49	
Dibranchus atlanticus	2.51	467	0.46	
Synagrops microlepis	2.00	161	0.36	
Mystriophis rostellatus	1.96	4	0.36	
Trichiurus lepturus	1.71	2	0.31	
Nezumia aequalis	1.61	53	0.29	
Coelorinchus caelorhincus	1.61	53	0.29	
Raja miraletus	1.28	2	0.23	
Halosaurus ovenii	0.90	35	0.16	
Munidopsis sp.	0.53	53	0.10	
Bristle worms (straws)	0.53	143	0.10	
Beryx splendens	0.49	2	0.09	
GONEPLACIDAE	0.35	53	0.06	
Solenocera africana	0.35	73	0.06	
Total	549.74		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 173
DATE :24/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 6°26.01
start stop duration Lon E 11°16.82
TIME :22:44:51 23:14:43 29.9 (min) Purpose : 3
LOG : 6516.73 6518.24 1.5 Region : 4054
FDEPTH: 752 761 Gear cond.: 0
BDEPTH: 752 761 Validity : 0
Towing dir: 0° Wire out : 1650 m Speed : 3.0 kn
Sorted : 34 Total catch: 660.00 Catch/hour: 1326.19

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Sea cucumber A	404.34	587	30.49	
Hoplostethus cadenati	264.86	3157	19.97	
Lamprogrammus exutus	130.08	430	9.81	
Shrimps unidentified	52.50	9639	3.96	
Nezumia micronychodon	48.58	1097	3.66	
Halosaurus ovenii	47.02	822	3.55	
Miscellaneous fishes	45.06	0	3.40	
Yarrella blackfordi	39.96	784	3.01	
Stereomastis sp.	36.83	2389	2.78	
Bathyuroconger vicinus	33.30	195	2.51	
Centroscymnus sp.	27.82	38	2.10	
THYSANOTEUTHIDAE	25.08	117	1.89	
Anemones, white	21.94	38	1.65	
Anemones, yellow	19.59	117	1.48	
Bajacalifornia megalops	14.50	78	1.09	
UNIDENTIFIED FISH	14.11	1684	1.06	
P O L Y C H A E T A	10.58	1019	0.80	
Etmopterus sp.	9.80	38	0.74	
Lophius vaillanti	9.65	2	0.73	
MELANOSTOMIATIDAE	9.40	195	0.71	
Glyphus marsupialis	9.01	392	0.68	
Nesiarchus sp.	9.01	38	0.68	
Xenodermichthys copei	6.66	273	0.50	
Eggs of ray	6.66	38	0.50	
Starfish - giant	5.09	117	0.38	
Munidopsis chuni	3.53	2389	0.27	
Bathypterois guentheri	3.13	508	0.24	
MELANOSTOMIATIDAE	3.13	38	0.24	0
Triplophos hemingi	2.74	235	0.21	
Monomitopus metriostoma	2.35	549	0.18	
JELLYFISH	1.96	38	0.15	
Dibranchus atlanticus	1.57	117	0.12	
Lithodes ferox	1.51	2	0.11	
Plastic	1.49	12	0.11	
Nephropsis atlantica	1.18	38	0.09	
MYCTOPHIDAE	1.18	313	0.09	
Waste General	0.50	4	0.04	
Melanocetus johnsoni	0.39	38	0.03	
Plastic cans-jars etc	0.12	4	0.01	
Total	1326.19		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 174
DATE :25/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 6°25.45
start stop duration Lon E 12°5.82
TIME :05:30:25 06:00:52 30.4 (min) Purpose : 3
LOG : 6569.59 6571.20 1.6 Region : 4054
FDEPTH: 52 53 Gear cond.: 0
BDEPTH: 52 53 Validity : 0
Towing dir: 0° Wire out : 150 m Speed : 3.2 kn
Sorted : 88 Total catch: 190.00 Catch/hour: 374.38

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	219.25	2859	58.56	495
Chelidonichthys gabonensis	27.98	142	7.47	
Pagellus bellottii	24.59	223	6.57	496
Pomadasys incisus	16.63	65	4.44	
Trachinus radiatus	14.70	41	3.93	
Trachinus armatus	12.89	211	3.44	
Rhinobatos albomaculatus	8.20	4	2.19	
Dasyatis marmorata	7.65	4	2.04	
Pseudotolithus senegalensis	7.17	8	1.92	494
Boops boops	3.84	201	1.03	
Zeus faber	3.51	8	0.94	
Pseudupeneus prayensis	3.43	53	0.92	
Pomadasys jubelini	3.13	2	0.84	492
Uranoscopus polli	2.96	32	0.79	
Sepia hieredda**	2.25	2	0.60	
Paraconger notialis	1.81	2	0.48	
Saurida brasiliensis	1.62	288	0.43	
Balistes capriscus	1.54	2	0.41	
Umbrina canariensis	1.38	4	0.37	497
Munida sp.	1.20	869	0.32	
Lagocephalus laevigatus	1.18	2	0.32	
Trachinocephalus myops	1.12	35	0.30	
Raja miraletus	0.95	2	0.25	
Trachurus trecae	0.79	4	0.21	493
Eggs of ray	0.77	32	0.21	
Torpedo torpedo	0.65	4	0.17	
Bothus podas	0.57	32	0.15	
Dicologoglossa hexophthalma	0.57	8	0.15	
Alloteuthis africana	0.57	234	0.15	
Stereomastis sp.	0.35	16	0.09	
Squilla mantis	0.32	12	0.08	
Decapterus punctatus	0.20	8	0.05	
Starfish	0.20	12	0.05	
PORTUNIDAE	0.16	69	0.04	
Scyllarides herklotsii	0.12	89	0.03	
G A S T R O P O D S	0.04	4	0.01	
NEPHROPIDAE	0.04	4	0.01	
Scorpaena sp.	0.04	4	0.01	
Calappa sp.	0.04	4	0.01	
Grammoplites gruveli	0.04	8	0.01	
Total	374.42		100.01	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 175
DATE :25/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 6°27.59
start stop duration Lon E 11°58.55
TIME :07:50:45 08:21:09 30.4 (min) Purpose : 3
LOG : 6582.77 6584.34 1.6 Region : 4054
FDEPTH: 96 94 Gear cond.: 0
BDEPTH: 96 94 Validity : 0
Towing dir: 0° Wire out : 250 m Speed : 3.1 kn
Sorted : 73 Total catch: 72.53 Catch/hour: 143.10

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dentex angolensis	54.02	51	37.75	499
Trichiurus lepturus	35.08	63	24.51	
Raja miraletus	9.61	20	6.71	
Trachurus trecae	8.76	85	6.12	503
Umbrina canariensis	7.16	14	5.00	502
Pterothrissus belloci	3.97	28	2.77	
Selene dorsalis	3.93	8	2.74	
Zeus faber	3.37	10	2.36	
Brachydeuterus auritus	2.68	30	1.88	501
Pagellus bellottii	2.39	28	1.67	498
Lepidotrigla cadmani	2.15	20	1.50	
Uranoscopus cadenati	2.13	10	1.49	

Lagocephalus laevigatus	1.60	2	1.12	
Citharus linguatula	1.46	34	1.02	
Illex coindetii	1.05	47	0.73	
Ariomma bondi	1.01	8	0.70	
G A S T R O P O D S	0.85	156	0.59	
Dentex congoensis	0.43	6	0.30	500
Boops boops	0.39	8	0.28	
Starfish red	0.36	16	0.25	
Scombrops sp.	0.32	2	0.22	
B I V A L V E S	0.16	36	0.11	
Saurida brasiliensis	0.12	28	0.08	
Sepia orbignyana	0.10	4	0.07	
Arnoglossus imperialis	0.02	2	0.01	
Total	143.10		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 176
DATE :25/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 6°29.48
start stop duration Lon E 11°55.15
TIME :10:05:48 10:36:17 30.5 (min) Purpose : 3
LOG : 6594.87 6596.47 1.6 Region : 4054
FDEPTH: 110 110 Gear cond.: 0
BDEPTH: 110 110 Validity : 0
Towing dir: 0° Wire out : 290 m Speed : 3.1 kn
Sorted : 64 Total catch: 63.71 Catch/hour: 125.37

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dentex angolensis	36.90	169	29.43	504
Trachurus trecae	22.20	758	17.71	506
Raja miraletus	15.43	22	12.31	
Trichiurus lepturus	14.80	16	11.80	
Umbrina canariensis	9.27	22	7.39	505
Ariomma bondi	3.11	61	2.48	
Illex coindetii	2.72	179	2.17	
Citharus linguatula	2.26	65	1.81	
Boops boops	2.22	49	1.77	
Pterothrissus belloci	2.09	14	1.66	
Lepidotrigla cadmani	1.95	41	1.55	
Zeus faber	1.77	6	1.41	
Uranoscopus cadenati	1.44	10	1.15	
Brotula barbata	1.38	2	1.10	
Scorpaena stephanica	1.28	2	1.02	
Torpedo torpedo	1.16	2	0.93	
G A S T R O P O D S	1.08	917	0.86	
Octopus vulgaris	1.00	2	0.80	
Miscellaneous fishes	0.87	0	0.69	
Dentex congoensis	0.59	12	0.47	
B I V A L V E S	0.39	138	0.31	
Saurida brasiliensis	0.35	173	0.28	
Brachydeuterus auritus	0.31	2	0.25	
Pontinus kuhlii	0.26	2	0.20	
Starfish	0.24	14	0.19	
Sepia orbignyana	0.20	4	0.16	
GOBIIDAE	0.06	6	0.05	
Arnoglossus imperialis	0.04	2	0.03	
C R A B S	0.02	4	0.02	
Total	125.37		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 177
DATE :25/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 6°30.63
start stop duration Lon E 11°48.71
TIME :12:03:54 12:33:15 29.4 (min) Purpose : 3
LOG : 6604.72 6606.15 1.4 Region : 4054
FDEPTH: 123 124 Gear cond.: 0
BDEPTH: 123 124 Validity : 0
Towing dir: 0° Wire out : 300 m Speed : 2.9 kn
Sorted : 60 Total catch: 59.97 Catch/hour: 122.60

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dentex angolensis	39.05	141	31.85	507
Dentex congoensis	21.38	321	17.44	508
Trichiurus lepturus	16.89	41	13.77	
Lepidotrigla cadmani	11.20	168	9.14	
Trachurus trecae	6.91	94	5.64	509
Zeus faber	3.90	8	3.18	
Illex coindetii	3.68	155	3.00	
Ariomma bondi	3.45	55	2.82	
Pterothrissus belloci	3.43	31	2.80	
Brotula barbata	3.11	4	2.53	
Raja miraletus	2.17	6	1.77	
Citharus linguatula	1.37	61	1.12	
Sepia orbignyana	1.06	12	0.87	
Spicara alta	0.82	6	0.67	
Branchiostegus semifasciatus	0.82	2	0.67	
G A S T R O P O D S	0.63	100	0.52	
Peristedion cataphractum	0.57	10	0.47	
Uranoscopus polli	0.45	2	0.37	
Miscellaneous fishes	0.39	0	0.32	
Sphoeroides pachygaster	0.37	2	0.30	
Octopus sp.	0.31	2	0.25	
Dicologoglossa hexophthalma	0.29	6	0.23	
Saurida brasiliensis	0.14	51	0.12	
Arnoglossus imperialis	0.12	27	0.10	
**	0.04	2	0.03	
Eggs of ray	0.04	4	0.03	
Total	122.60		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 178
DATE :25/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 6°33.75
start stop duration Lon E 11°41.59
TIME :14:05:06 14:35:00 29.9 (min) Purpose : 3
LOG : 6614.89 6616.42 1.5 Region : 4054
FDEPTH: 227 235 Gear cond.: 0
BDEPTH: 227 235 Validity : 0
Towing dir: 0° Wire out : 550 m Speed : 3.1 kn
Sorted : 221 Total catch: 700.00 Catch/hour: 1404.21

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Synagrops microlepis	1026.08	73896	73.07	
Zenopsis conchifer	111.59	173	7.95	
MYCTOPHIDAE	64.05	32030	4.56	
Dentex angolensis	43.21	108	3.08	510
Trichiurus lepturus	30.63	64	2.18	
Brotula barbata	20.72	20	1.48	
Merluccius polli	20.46	126	1.46	511
Bembrops heterurus	18.17	261	1.29	
Chlorophthalmus atlanticus	14.30	566	1.02	
Deepwater fish mixture	10.29	0	0.73	
Miracorvina angolensis	9.03	50	0.64	
Raja clavata	6.42	6	0.46	
Parapenaeus longirostris	6.36	1202	0.45	
Illex coindetii	5.02	217	0.36	
Uranoscopus polli	3.17	20	0.23	
Pontinus kuhlii	2.49	20	0.18	
Coelorinchus caelorhincus	2.35	44	0.17	
Lophius vaillanti	2.35	6	0.17	
Pterothrissus belloci	2.29	20	0.16	
Raja miraletus	1.58	6	0.11	
G A S T R O P O D S	1.14	20	0.08	
Monolene microstoma	0.64	44	0.05	
Gephyroberyx darwini	0.50	6	0.04	
Squilla mantis	0.44	6	0.03	
Parasudis fraserbrunneri	0.38	12	0.03	
LOLIGINIDAE	0.20	82	0.01	
Sea urchin, weak spines	0.12	20	0.01	
GOBIIDAE	0.12	6	0.01	
Cyclothone sp.	0.06	20	0.00	
Total	1404.17		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 179
DATE :25/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 6°34.84
start stop duration Lon E 11°38.17
TIME :16:02:45 16:33:50 31.1 (min) Purpose : 3
LOG : 6621.85 6623.34 1.5 Region : 4054
FDEPTH: 336 320 Gear cond.: 0
BDEPTH: 336 320 Validity : 0
Towing dir: 0° Wire out : 800 m Speed : 2.9 kn
Sorted : 64 Total catch: 680.00 Catch/hour: 1313.16

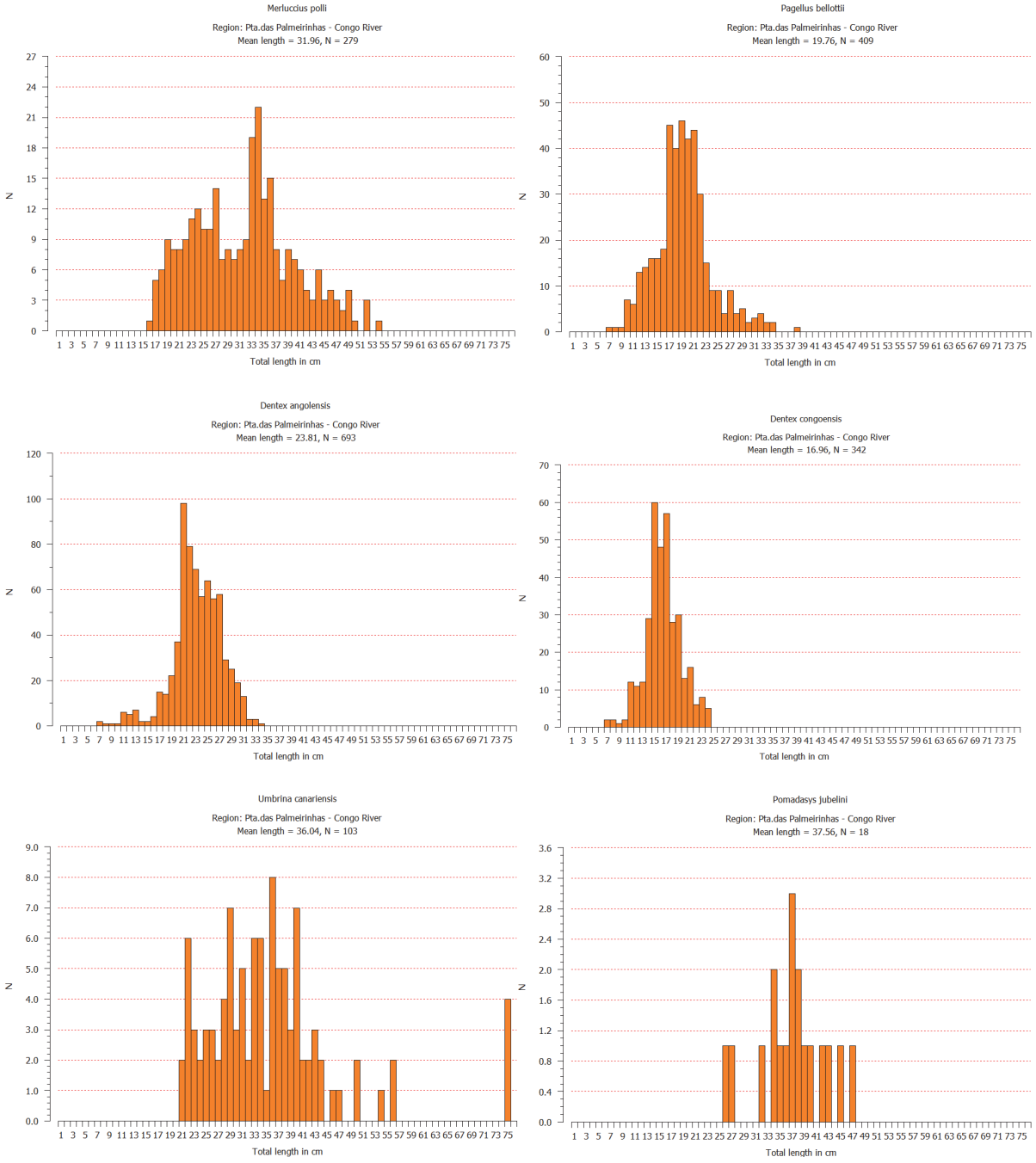
SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Synagrops microlepis	730.93	36116	55.66	
Chlorophthalmus atlanticus	185.08	3870	14.09	
Merluccius polli	98.49	491	7.50	512
Parapenaeus longirostris	45.46	5017	3.46	
Trichiurus lepturus	41.77	102	3.18	
Zenopsis conchifer	34.80	41	2.65	
Malacocephalus occidentalis	28.04	245	2.14	
Benthodesmus tenuis	21.71	695	1.65	
Laemonema laureysi	21.30	328	1.62	
Gadella imberbis	20.68	716	1.57	
Parasudis fraserbrunneri	15.56	512	1.19	
Coelorinchus caelorhincus	13.11	245	1.00	
Munidopsis sp.	8.19	859	0.62	
Cubiceps sp.	6.95	245	0.53	
Hymenocephalus italicus	6.76	1064	0.51	
Illex coindetii	4.91	102	0.37	
Rajella dissimilis	4.75	2	0.36	
Setarches guentheri	4.09	81	0.31	
Pontinus accraensis	3.48	21	0.26	
Lophius vaillanti	2.95	4	0.22	
Chascanopsetta lugubris	2.86	62	0.22	
Bathynectes piperitus	1.83	21	0.14	
Rajella leopardus	1.76	8	0.13	
Lithodes ferox	1.56	2	0.12	
Lophius vaillanti, juvenile	1.43	21	0.11	
Gephyroberyx darwini	1.33	2	0.10	
MYCTOPHIDAE	1.02	388	0.08	
Mystriophis rostellatus	0.50	2	0.04	
Goneplax angulata	0.41	102	0.03	
Dibranchus atlanticus	0.41	41	0.03	
Chaunax pictus	0.41	21	0.03	
Dicologoglossa cuneata	0.41	21	0.03	
Monolene mertensi, juvenile	0.21	21	0.02	
Total	1313.14		100.00	

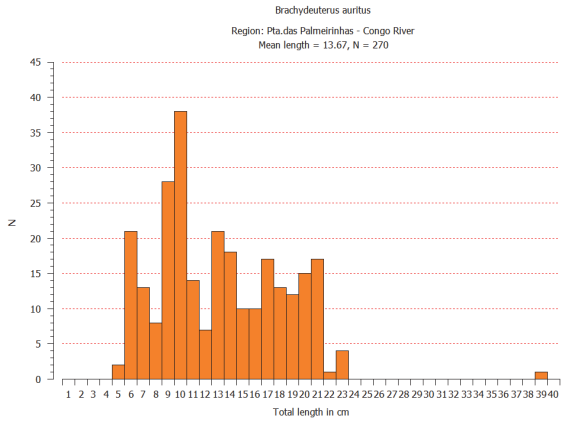
R/V Dr. Fridtjof Nansen SURVEY:2019406 STATION: 180
DATE :25/06/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 6°37.71
start stop duration Lon E 11°29.04
TIME :19:47:32 20:14:22 26.8 (min) Purpose : 3
LOG : 6642.19 6643.52 1.3 Region : 4054
FDEPTH: 651 655 Gear cond.: 0
BDEPTH: 651 655 Validity : 0
Towing dir: 0° Wire out : 1450 m Speed : 3.0 kn
Sorted : 27 Total catch: 210.00 Catch/hour: 469.45

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Hoplostethus cadenati	135.65	711	28.90	
Yarella blackfordi	58.50	58	12.46	
Nezumia sp.	33.04	791	7.04	
Lamprogrammus exutus	28.93	78	6.16	
Octopoteuthis sicula	23.56	94	5.02	
Merluccius polli	21.66	31	4.61	
Lithodes ferox	21.64	25	4.61	
Centroscymnus coelolepis	17.08	47	3.64	
Stereomastis sp.	15.34	997	3.27	
Bristle worms (straws)	14.55	1549	3.10	
Bathyraja smithii	11.69	94	2.49	
Trachyrincus scabrus	10.75	31	2.29	
Bathyuroconger vicinus	10.75	31	2.29	
Monomitopus metriostoma	9.63	474	2.05	
Halosaurus ovenii	8.70	94	1.85	
Sea cucumbers	8.34	42	1.78	
Photichthys sp.	5.37	94	1.14	
Dibranchus atlanticus	4.74	143	1.01	
Ebinania costaecanarie	4.14	2	0.88	
Nettastoma parviceps	3.80	16	0.81	
JELLYFISH	3.64	78	0.78	
Aristeus varidens	3.15	315	0.67	
Synaphobranchus affinis	3.00	31	0.64	
Triplophos hemingi	1.90	300	0.40	
Xenodermichthys copei	1.74	78	0.37	
Benthodesmus tenuis	1.74	47	0.37	
PARAPAGURIDAE	1.59	253	0.34	
Plastic	1.50	0	0.32	
B I V A L V E S	1.05	2	0.22	
Bathygadus sp.	0.94	16	0.20	
Neobythites analis	0.63	63	0.13	
Waste General	0.36	2	0.08	
Dicrolene intronigra	0.16	16	0.03	
Acanthephyra sp.	0.16	31	0.03	
Metal waste	0.02	2	0.00	
Wood, paper, cardboard	0.02	2	0.00	

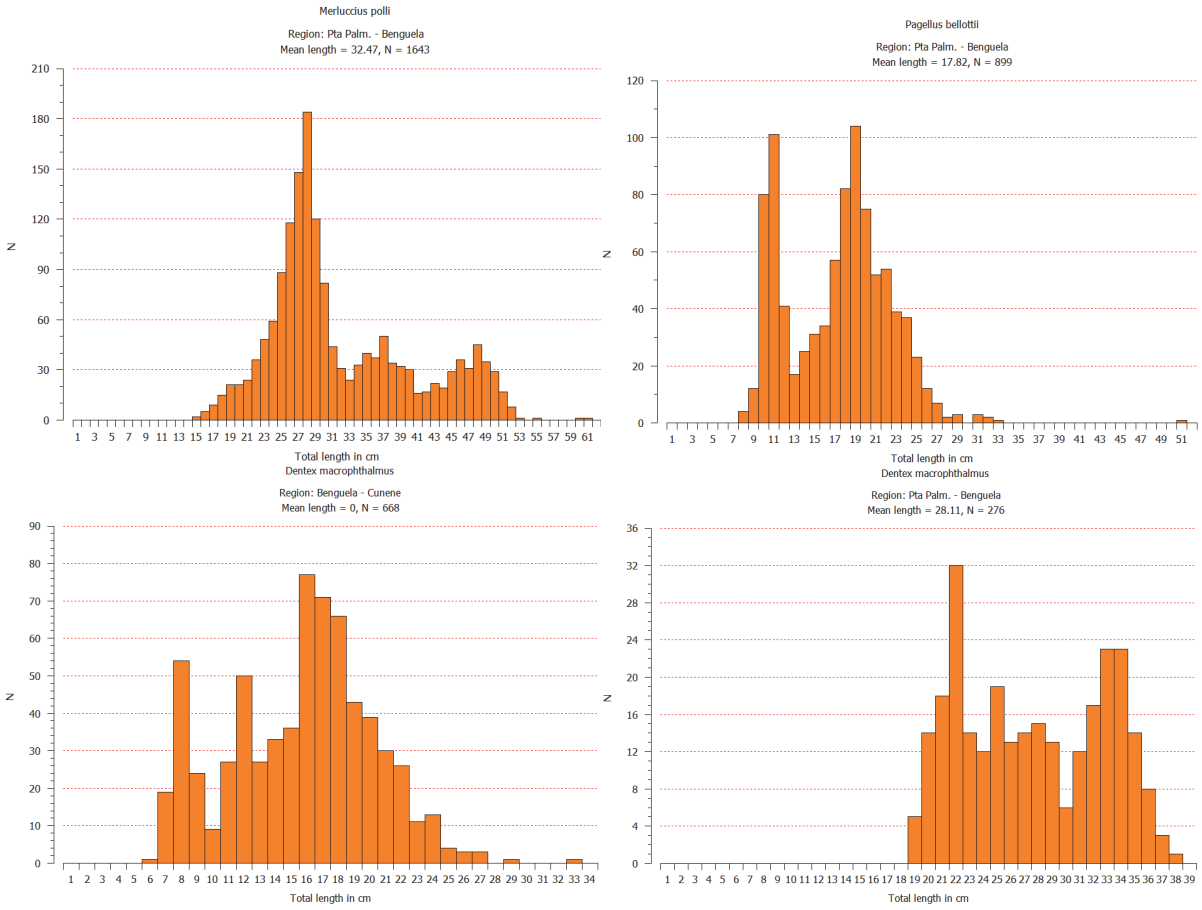
ANNEX IX. LENGTH DISTRIBUTION OF MAIN SPECIES

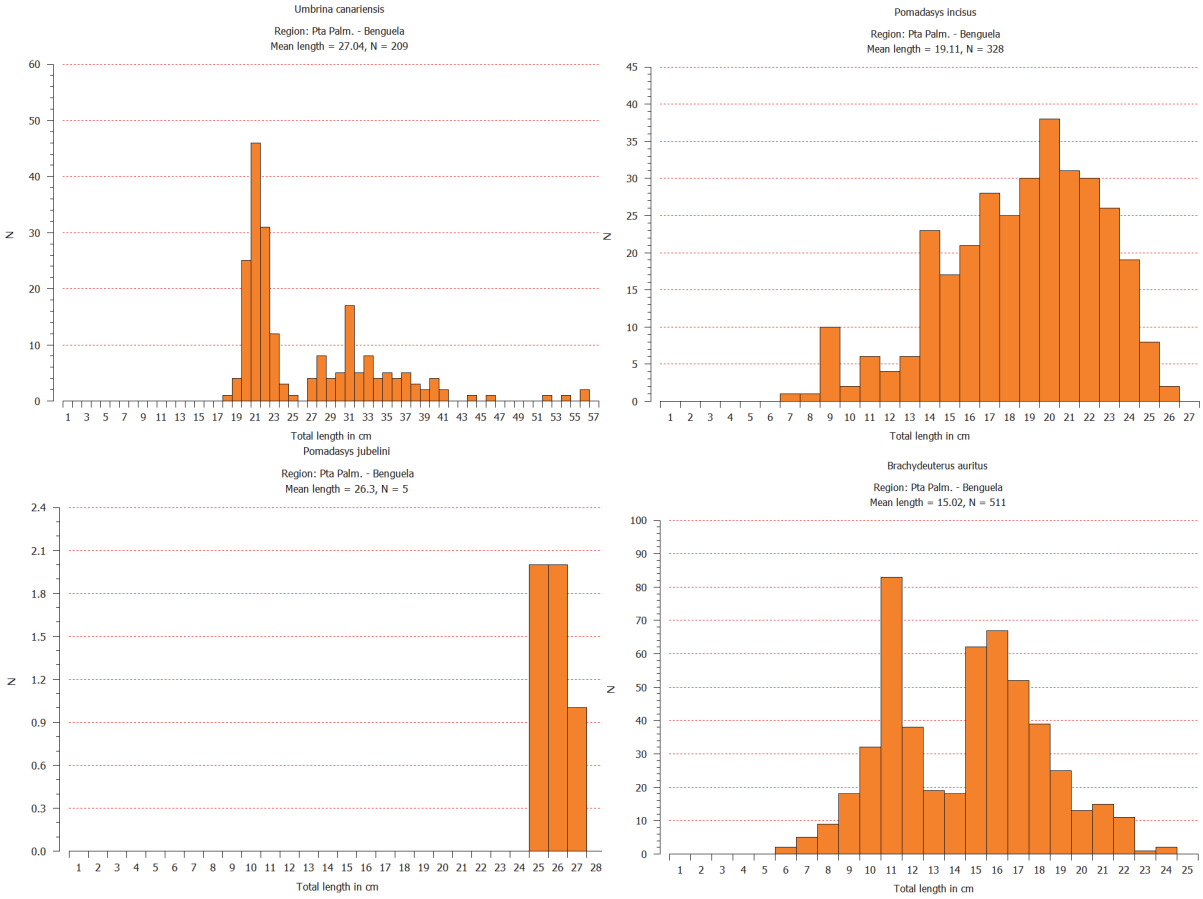
Northern Angola: Pooled length frequency distribution of the main.



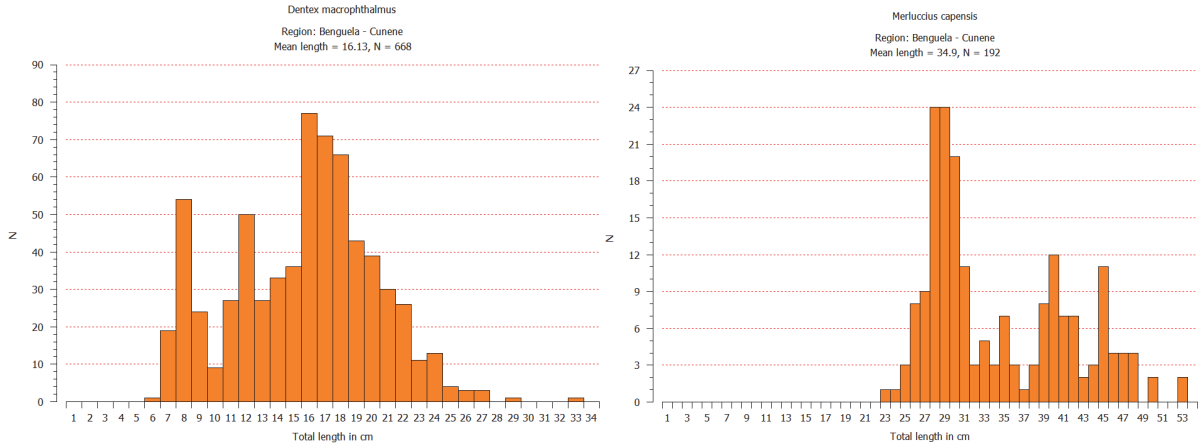


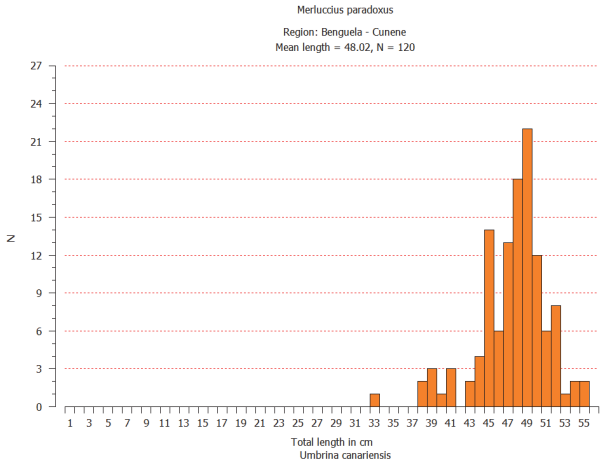
Central Angola: Pooled length frequency distribution of the main species.

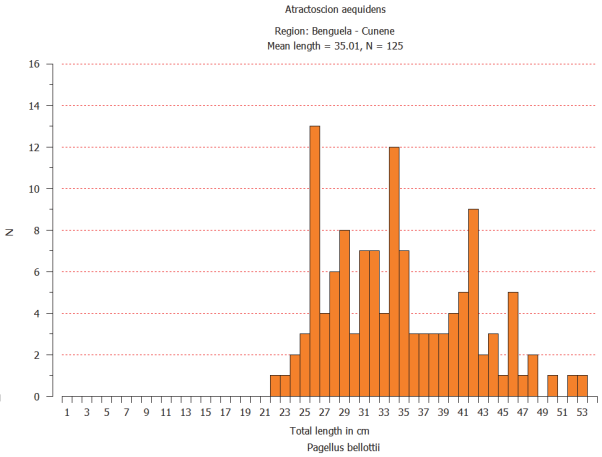


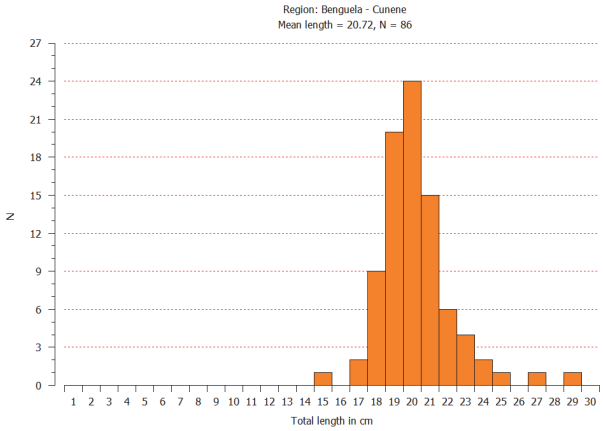


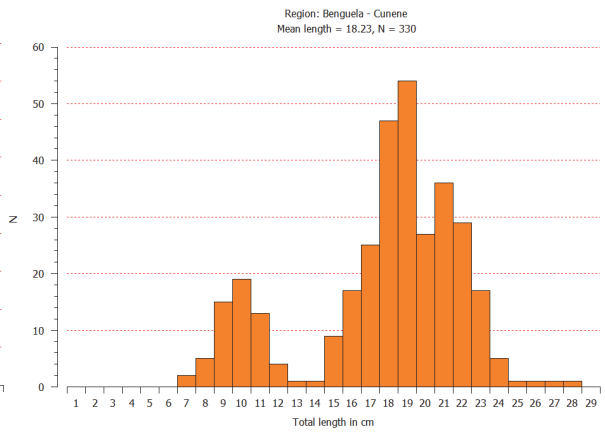
Southern Angola: Pooled length frequency distribution of the main species.




Merluccius paradoxus
Region: Benguela - Cunene
Mean length = 48.02, N = 120
N
Total length in cm


Atractoscion aequidens
Region: Benguela - Cunene
Mean length = 35.01, N = 125
N
Total length in cm


Umbrina canariensis
Region: Benguela - Cunene
Mean length = 20.72, N = 86
N
Total length in cm


Pagellus bellottii
Region: Benguela - Cunene
Mean length = 18.23, N = 330
N
Total length in cm

ANNEX X. SWEPT AREA ESTIMATES

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

	Lower limits, Kg/nm						% incidence	Mean dens. t/nm²	Mean densities by bottom depth strata t/nm²			
SPECIES NAME	>0	10	30	100	300	1 000			0-30m	30-50m	50-100m	100-200m
Brachydeuterus auritus	4	3	3	1	1		35,29	2,048	3,655	3,489	2,928	0,001
Trachurus trecae	21	2	3	2			82,35	1,932		0,19	3,136	1,951
Dentex angolensis	7	9	5				61,76	1,165			0,657	2,588
Pagellus bellottii	18	4	1	1			70,59	1,067	0,373	0,446	2,452	0,038
Dentex congoensis	9	1	3				38,24	0,563		0,001	0,657	0,884
Umbrina canariensis	13	2	2				50	0,473		0,008	0,309	0,998
Spicara alta	5			1			17,65	0,46				1,303
Pteroscion peli	3	2	2				20,59	0,345	4,847	0,857		0,003
Sphyraena guachancho	5		1				17,65	0,328	0,679	1,223	0,052	
Pomadasys perotaei	2		2				11,76	0,317		0,448	0,554	
Pomadasys incisus	6	2	1				26,47	0,295	1,711	0,832	0,129	
Lepidotrigla cadmani	16	3					55,88	0,292			0,403	0,39
Ilisha africana	4		1				14,71	0,266		1,133		
Dentex barnardi	12	2	1				44,12	0,254		0,14	0,552	0,03
Raja miraletus	32						94,12	0,244	0,15	0,379	0,216	0,194
Galeoides decadactylus	3	1	1				14,71	0,212	1,934	0,658		
Dasyatis marmorata	7		1				23,53	0,205		0,256	0,379	
Pseudotolithus typus	3	3					17,65	0,172	0,223	0,588	0,07	
Lagocephalus laevigatus	9	2					32,35	0,168		0,013	0,432	
Dentex canariensis	6		1				20,59	0,167		0,037	0,411	0,004
Trichiurus lepturus	18	1					55,88	0,164	0,05	0,168	0,172	0,161
Zeus faber	27						79,41	0,161		0,035	0,247	0,166
Synagrops microlepis	1		1				5,88	0,138		0,026		0,375
Dasyatis margarita	5	1					17,65	0,096		0,403		0,004
Selene dorsalis	8	1					26,47	0,091	0,401	0,234	0,062	
Brotula barbata	16						47,06	0,087		0,016	0,078	0,15
Ilisha africana ***		1					2,94	0,086	2,936			
Epinephelus aeneus	6	1					20,59	0,08		0,008	0,205	
Rhinobatos albomaculatus	9	1					29,41	0,08	0,134	0,014	0,172	0,019
Illex coindetii	21						61,76	0,077		0,001	0,066	0,146
Chelidonichthys gabonensis	10						29,41	0,075		0,029	0,128	0,053
Rhinobatos cemiculus		1					2,94	0,072			0,189	

	Lower limits, Kg/nm						% incidence	Mean dens. t/nm²	Mean densities by bottom depth strata t/nm²			
SPECIES NAME	>0	10	30	100	300	1 000			0-30m	30-50m	50-100m	100-200m
Pterothrissus belloci	8	1					26,47	0,072			0,031	0,17
Bembrops heterurus	4	1					14,71	0,072				0,203
Zenopsis conchifer	4	1					14,71	0,07				0,198
Fistularia petimba	13						38,24	0,066		0,019	0,119	0,046
Uranoscopus cadenati	7	1					23,53	0,065			0,03	0,153
Sphoeroides pachygaster	5	1					17,65	0,065		0,001		0,184
Pagrus caeruleostictus	7	1					23,53	0,064		0,179	0,048	0,011
Citharus linguatula	24						70,59	0,059		0,019	0,067	0,081
Ephippion guttifer	3	1					11,76	0,054	1,18	0,081		
Penaeus notialis	6						17,65	0,052	0,73	0,132		
Erythrocles monodi		1					2,94	0,05				0,142
Stromateus fiatola	4						11,76	0,043	0,195	0,062	0,06	
Saurida brasiliensis	25						73,53	0,042		0,001	0,099	0,01
Pseudupeneus prayensis	12						35,29	0,041		0,041	0,081	
Sepia orbignyana	21						61,76	0,04	0,117	0,016	0,072	0,015
Arius parkii **	2						5,88	0,038	0,675	0,078		
Gymnura micrura	2						5,88	0,034		0,144		
Grammoplites gruveli	13						38,24	0,033		0,131	0,005	
Alloteuthis africana	8						23,53	0,032		0,021	0,071	
Miscellaneous fishes	12						35,29	0,032		0,059	0,014	0,035
Pomadasys peroteti**		1					2,94	0,032		0,135		
Dentex gibbosus	2						5,88	0,03			0,078	
Monolene microstoma	8						23,53	0,029			0,004	0,079
Pomadasys jubelini	4						11,76	0,028	0,145	0,088	0,008	0,001
Octopus vulgaris	10						29,41	0,028		0,003	0,003	0,073
Pseudotolithus senegalensis	3						8,82	0,027		0,088	0,017	
Sphyrna sp.	1						2,94	0,027		0,115		
Pontinus kuhlii	4						11,76	0,026				0,074
Dactylopterus volitans	3						8,82	0,026		0,072	0,023	
**	5						14,71	0,025		0,055	0,029	0,002
Anthias anthias	2						5,88	0,023			0,001	0,065
Ariomma bondi	9						26,47	0,022			0,003	0,061
Rhinobatos annulatus	1						2,94	0,022			0,058	
Chloroscombrus chrysurus	2						5,88	0,021	0,674	0,004		
Cynoglossus canariensis	5						14,71	0,018	0,143	0,057		
Chaetodon hoefleri	14						41,18	0,018		0,015	0,034	0,002

	Lower limits, Kg/nm						% incidence	Mean dens. t/nm²	Mean densities by bottom depth strata t/nm²			
SPECIES NAME	>0	10	30	100	300	1 000			0-30m	30-50m	50-100m	100-200m
Trachinus armatus	4						11,76	0,017		0,015	0,035	
Torpedo torpedo	10						29,41	0,016		0,026	0,013	0,015
Chelidonichthys capensis	2						5,88	0,016		0,068		
Sphoeroides cf. pachygaster	2						5,88	0,015				0,043
G A S T R O P O D S	16						47,06	0,015		0,018	0,01	0,021
Ariomma sp.	2						5,88	0,015				0,043
Trachinus radiatus	3						8,82	0,015		0,003	0,036	
Miracorvina angolensis	5						14,71	0,014			0,014	0,025
Sepia officinalis	5						14,71	0,014		0,057	0,003	
Garbage	2						5,88	0,014		0,009		0,034
Lophiodes kempi	3						8,82	0,013				0,037
Mustelus mustelus	2						5,88	0,012		0,027	0,016	
Rajella leopardus	3						8,82	0,012				0,033
Pagrus africanus	2						5,88	0,012			0,03	
Seriola carpenteri	4						11,76	0,011			0,009	0,022
Euthynnus alletteratus	1						2,94	0,01			0,027	
Parapenaeus longirostris	2						5,88	0,007				0,019
Parapenaeopsis atlantica	1						2,94					
Other fish								0,261	0,422	0,428	0,21	0,193
Sum all species								14,098	21,374	13,898	16,015	11,549
Sum SNAPPERS, JOBFISHES								0,001			0,002	
Sum GROUPERS, SEABASSES								0,104		0,008	0,206	0,067
Sum POD								0,032		0,135		
Sum CROAKERS, DRUMS, WEAKF., KOBS								1,032	5,07	1,541	0,413	1,027
Sum PANDORAS, PORGIES, SEABREAMS,								3,324	0,373	0,802	4,889	3,555
Sum SHARKS, CHIMAERAS								0,04		0,143	0,016	
Sum BATOID FISHES, RAYS								0,807	0,534	1,261	1,029	0,287
Sum CEPHALOPODS								0,211	0,117	0,156	0,228	0,236
Numbers of stations included in analysis, total and by depth strata								34	1	8	13	12

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

	Lower limits, Kg/nm						% incidence	Mean dens. t/nm²	Mean densities by bottom depth strata t/nm²		
SPECIES NAME	>0	10	30	100	300	1 000			200-300m	300-400m	400-500m
Synagrops microlepis	6	2		2	4		70	12,287	31,026	4,043	0,042
Chlorophthalmus atlanticus	8	2	6	2			90	4,402	4,681	7,85	0,055
Merluccius polli	8	5	6	1			100	3,046	5,145	2,742	0,952
Nematocarcinus africanus	1		4	2			35	2,671		1,463	7,198
Zenopsis conchifer	7	1	2	1			55	1,352	3,632	0,221	0,011
MYCTOPHIDAE	12	2		1			75	1,182	3,213	0,128	0,041
Synagrops japonicus				1			5	0,928	2,652		
Parapenaeus longirostris	8	2	2				60	0,899	2,136	0,433	
Laemonema laureysi	8	5					65	0,689	0,089	1,136	0,868
Chaunax pictus	4	6					50	0,522		0,395	1,28
Trichiurus lepturus	6	3	1				50	0,502	1,101	0,329	0,005
Brotula barbata	5	1	1				35	0,466	1,33		
Hymenocephalus italicus	7	4					55	0,46	0,001	0,758	0,647
Yarrella blackfordi		3	1				20	0,429			1,429
Dentex angolensis	1	3	1				25	0,39	1,114		
Lamprogrammus exutus	1		1				10	0,385			1,282
Pontinus accraensis	6	3					45	0,327	0,463	0,472	
Lophius vaillanti	11	2					65	0,311	0,019	0,451	0,489
Bembrops heterurus	8	2					50	0,307	0,818	0,052	0,006
Aristeus varidens	6	3					45	0,292	0,22	0,086	0,615
Benthodesmus tenuis	9		1				50	0,287		0,745	0,088
Etmopterus polli	5	1					30	0,258		0,559	0,208
Malacocephalus occidentalis	12	1					65	0,231	0,094	0,492	0,085
Dibranchus atlanticus	10	1					55	0,2	0,008	0,107	0,532
Coelorinchus caelorhincus	14	1					75	0,19	0,382	0,129	0,037
Pterothrissus belloci	8	1					45	0,164	0,391	0,079	
Parasudis fraserbrunneri	2	1					15	0,129	0,002	0,366	
Stomias sp.	5	1					30	0,124		0,001	0,413
Triplophos hemingi	7						35	0,117		0,028	0,356
Stereomastis sp.	4	1					25	0,116			0,386
Illex coindetii	12						60	0,104	0,192	0,07	0,039
Malacocephalus laevis	9						45	0,099		0,141	0,167
**	1	1					10	0,089			0,298
Chaceon maritae	6						30	0,087			0,29

	Lower limits, Kg/nm						% incidence	Mean dens. t/nm²	Mean densities by bottom depth strata t/nm²		
SPECIES NAME	>0	10	30	100	300	1 000			200-300m	300-400m	400-500m
Centrophorus granulosus	4						20	0,08		0,105	0,143
Dentex macrophthalmus		1					5	0,079	0,225		
Bassanago albescens	9						45	0,072	0,002	0,131	0,085
Hoplostethus cadenati	6						30	0,07		0,013	0,219
Rajella leopardus	5						25	0,07	0,069	0,13	
Gadella imberbis	9						45	0,066	0,006	0,133	0,059
Halosaurus ovenii	8						40	0,064		0,015	0,197
Bathyuroconger vicinus	4	1					25	0,062	0,001	0,169	0,008
Lophiodes kempi	3						15	0,06	0,11	0,062	
Yarella blackfordi	2						10	0,06			0,199
Sphoeroides pachygaster		1					5	0,056	0,161		
Bathynectes piperitus	7						35	0,04		0,035	0,094
CIDARIDAE	1						5	0,039	0,113		
Rajella dissimilis	3						15	0,039	0,022	0,089	
Hoplunnis punctata	1						5	0,035		0,099	
Glyphus marsupialis	3						15	0,031			0,104
Gephyroberyx darwini	5						25	0,03	0,007	0,079	
Carlarius parkii	1						5	0,029		0,082	
Gephyroberyx japonicus	1						5	0,028		0,081	
Ariomma bondi	4						20	0,027	0,004		0,086
Munidopsis sp.	4						20	0,027		0,072	0,005
URCHINS	1						5	0,026		0,073	
Chascanopsetta lugubris	6						30	0,025	0,046	0,027	
Coloconger cadenati	3						15	0,022	0,004		0,067
Raja miraletus	5						25	0,021	0,007	0,033	0,023
Nettastoma parviceps	4						20	0,021		0,041	0,021
B I V A L V E S	2						10	0,02			0,066
Miracorvina angolensis	2						10	0,02	0,057		
Xenodermichthys copei	4						20	0,02		0,002	0,064
Stomias boa boa	3						15	0,02			0,065
Lepidotrigla cadmani	1						5	0,017	0,048		
Deepwater fish mixture	1						5	0,017	0,048		
Umbrina ronchus	1						5	0,017	0,048		
Bristle worms (straws)	4						20	0,016	0,001	0,002	0,047
Anemones, white	2						10	0,015			0,049
Calappa rubroguttata	3						15	0,014	0,034	0,006	

	Lower limits, Kg/nm						% incidence	Mean dens. t/nm²	Mean densities by bottom depth strata t/nm²		
SPECIES NAME	>0	10	30	100	300	1 000			200-300m	300-400m	400-500m
CENTROLOPHIDAE	3						15	0,014		0,02	0,022
Pteroscion peli	1						5	0,013	0,038		
Torpedo nobiliana	1						5	0,013	0,038		
Alloteuthis africana	1						5	0,012	0,036		
Bathygadus sp.	2						10	0,012	0,008		0,032
Cubiceps sp.	1						5	0,012		0,035	
Waste General	2						10	0,012			0,039
Dicrolene intronigra	1						5	0,012		0,033	
Epigonus telescopus	3						15	0,011	0,019	0,013	
Bembrops greyi	2						10	0,011		0,031	
Solenocera africana	4						20	0,011		0,016	0,017
Stereomastis talismani	1						5	0,011			0,035
Raja clavata	1						5	0,01	0,03		
Dicrolene nigricaudis	1						5	0,01			0,035
G A S T R O P O D S	7						35	0,01	0,016	0,007	0,007
Trachipterus sp.	2						10	0,01		0,004	0,029
Acanthephyra sp.	2						10	0,01		0,027	0,001
PANDALIDAE	1						5	0,006		0,018	
Shrimps unidentified	2						10	0,006		0,012	0,006
S H R I M P S	1						5	0,003		0,008	
Plesiopenaeus edwardsianus	2						10	0,001			0,005
Sergia sp.	1						5	0,001		0,002	
Other fish								0,219	0,191	0,171	0,307
Sum all species								35,824	60,098	25,15	19,956
Sum SNAPPERS, JOBFISHES											
Sum GROUPERS, SEABASSES											
Sum POD											
Sum CROAKERS, DRUMS, WEAKF., KOBS								0,05	0,142		
Sum PANDORAS, PORGIES, SEABREAMS,								0,469	1,339		
Sum SHARKS, CHIMAERAS								0,362	0,025	0,687	0,374
Sum BATOID FISHES, RAYS								0,163	0,173	0,274	0,023
Sum CEPHALOPODS								0,139	0,243	0,079	0,089
Numbers of stations included in analysis, total and by depth strata								20	7	7	6

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

	Lower limits, Kg/nm						% incidence	Mean dens. t/nm²	Mean densities by bottom depth strata t/nm²		
SPECIES NAME	>0	10	30	100	300	1 000			500-600m	600-700m	700-800m
Nematocarcinus africanus		1	5	3			52,94	4,461	10,781	3,141	0,89
Lamprogrammus exutus	7	5	4				94,12	2,023	2,704	1,606	1,834
Hoplostethus cadenati	9	3	3				88,24	1,556	0,27	1,279	2,672
Sea cucumber A			1	1			11,76	1,275			3,096
Stereomastis sp.	9	6	1				94,12	0,977	0,326	0,668	1,662
Stomias boa boa	10	2	1				76,47	0,963	0,757	2,031	0,349
Chaceon maritae	8	4					70,59	0,589	0,963	0,122	0,655
Yarella blackfordi	2	3	1				35,29	0,551	0,043	0,394	1,026
Yarrella blackfordi	7	4					64,71	0,53	0,466	0,808	0,376
Bathyuroconger vicinus	12	3					88,24	0,406	0,066	0,389	0,661
Aristeus varidens	12	1					76,47	0,398	0,932	0,179	0,173
Nezumia micronychodon	3	2					29,41	0,268		0,207	0,503
Anemones, white	3	2					29,41	0,265			0,643
Coelorinchus caelorhincus	1		1				11,76	0,219		0,056	0,493
Nezumia sp.	4	2					35,29	0,21	0,023	0,26	0,308
Waste General	6	1					41,18	0,21	0,002	0,026	0,489
Halosaurus ovenii	14	1					88,24	0,207	0,061	0,109	0,382
NEMATISTIIDAE			1				5,88	0,187		0,635	
Opisthoteuthis agassizi	1		1				11,76	0,184			0,446
Miscellaneous fishes	4	1					29,41	0,155	0,022	0,017	0,348
Lophius vaillanti	8	1					52,94	0,154	0,311	0,072	0,102
Triplophos hemingi	17						100	0,143	0,163	0,156	0,119
Etmopterus polli	1	1					11,76	0,138	0,028		0,315
Bristle worms (straws)	7	1					47,06	0,134	0,017	0,101	0,241
Talismania longifilis	9	1					58,82	0,129		0,105	0,24
Shrimps unidentified	6	1					41,18	0,129	0,008	0,009	0,301
Raja sp.	4	1					29,41	0,123	0,008	0,024	0,275
Shrimps, larvae		1					5,88	0,12			0,291
Centroscymnus sp.	5						29,41	0,117	0,032	0,098	0,191
Dibranchus atlanticus	17						100	0,108	0,069	0,101	0,141
Bajacalifornia megalops	8						47,06	0,102	0,003	0,024	0,229
Coelorinchus polli		1					5,88	0,098			0,239
UNIDENTIFIED FISH	6						35,29	0,098	0,002	0,001	0,235
Merluccius polli	5						29,41	0,097	0,043	0,247	0,029

	Lower limits, Kg/nm						% incidence	Mean dens. t/nm²	Mean densities by bottom depth strata t/nm²		
SPECIES NAME	>0	10	30	100	300	1 000			500-600m	600-700m	700-800m
Octopoteuthis sicula	5						29,41	0,093		0,214	0,072
Opistotheutis rossi	1	1					11,76	0,086		0,281	0,009
Chaunax pictus	5						29,41	0,086	0,163	0,128	
Monomitopus metriostoma	9						52,94	0,083	0,029	0,065	0,135
Bathyraja smithii	5						29,41	0,082		0,158	0,085
THYSANOTEUTHIDAE	5						29,41	0,069	0,005	0,047	0,131
Centrophorus granulosus	3						17,65	0,068	0,121	0,06	0,036
Lithodes ferox	6						35,29	0,065		0,168	0,039
Photichthys sp.	4						23,53	0,064		0,095	0,087
JELLYFISH	8						47,06	0,062	0,015	0,025	0,123
Bassanago albescens		1					5,88	0,061			0,147
Metal waste	7						41,18	0,059		0,013	0,133
Centroscymnus coelolepis	2						11,76	0,057		0,115	0,055
OMMASTREPHIDAE	6						35,29	0,052	0,028	0,018	0,094
ANTHOZOA (Sea anemones)	1						5,88	0,052			0,126
MYCTOPHIDAE	13						76,47	0,052	0,123	0,012	0,029
Opisthoteuthis sp.	1						5,88	0,05			0,121
Xenodermichthys copei	16						94,12	0,049	0,025	0,067	0,054
Trachyrincus scabrus	2						11,76	0,044		0,072	0,055
SQUALIDAE	2						11,76	0,042	0,033		0,079
CENTROLOPHIDAE	2						11,76	0,042	0,011	0,131	
Nezumia aequalis	1						5,88	0,039			0,095
OPISTHOTEUTHIDAE	2						11,76	0,039		0,133	
Anemones, yellow	1						5,88	0,038			0,092
Stomias sp.	4						23,53	0,037	0,085		0,029
P O L Y C H A E T A	3						17,65	0,036		0,002	0,087
Benthodesmus tenuis	10						58,82	0,036	0,065	0,05	0,005
Dicrolene intronigra	7						41,18	0,035	0,013	0,017	0,064
Malacocephalus laevis	5						29,41	0,033	0,067	0,045	
MELANOSTOMIATIDAE	2						11,76	0,033		0,028	0,059
Anemones, coral	1						5,88	0,033			0,079
Ebinania costaecanarie	5						29,41	0,032	0,009	0,054	0,032
Plesiopenaeus edwardsianus	2						11,76	0,031	0,035	0,069	
Sea cucumbers	2						11,76	0,03		0,056	0,033
Wood, paper, cardboard	3						17,65	0,03			0,073
Acanthephyra sp.	12						70,59	0,03	0,037	0,043	0,016

	Lower limits, Kg/nm						% incidence	Mean dens. t/nm²	Mean densities by bottom depth strata t/nm²		
SPECIES NAME	>0	10	30	100	300	1 000			500-600m	600-700m	700-800m
Etmopterus sp.	2						11,76	0,03			0,072
Synaphobranchus affinis	5						29,41	0,029		0,03	0,049
Sea anemone sp	1						5,88	0,026			0,064
Glyphus marsupialis	4						23,53	0,024		0,007	0,053
Aphanopus carbo	1						5,88	0,024			0,057
Rajella barnardi	2						11,76	0,023			0,057
Alepocephalus sp.	2						11,76	0,023			0,057
Munidopsis chuni	5						29,41	0,023	0,009		0,05
Ateleopus sp.	1						5,88	0,022			0,054
Stereomastis talismani	1						5,88	0,022	0,076		
Ijimaia loppei	1						5,88	0,021			0,052
Gonostoma elongatum	7						41,18	0,019	0,013	0,046	0,004
Etmopterus princeps	1						5,88	0,018		0,063	
Narcetes stomias	2						11,76	0,018		0,004	0,041
Nesiarchus sp.	1						5,88	0,017			0,042
Eggs of ray	4						23,53	0,017	0,003	0,003	0,036
OPHIDIIDAE	8						47,06	0,017	0,019	0,017	0,014
Laemonema laureysi	3						17,65	0,016	0,036	0,019	
Zeus faber	1						5,88	0,016	0,055		
Lophiodes kempi	2						11,76	0,015		0,018	0,024
S H R I M P S	1						5,88	0,014			0,035
Melanonus zugmayeri	6						35,29	0,014	0,021	0,017	0,008
Narcetes cf stomias	1						5,88	0,014			0,035
Chaunax cf. pictus	1						5,88	0,014		0,048	
Plastic	9						52,94	0,014	0,001	0,012	0,024
Zameus (Scymnodon) squamulosus	1						5,88	0,012	0,042		
**	1						5,88	0,012	0,041		
Centroscymnus owstonii	2						11,76	0,011	0,02		0,013
Melanocetus johnsoni	9						52,94	0,01	0,018	0,006	0,007
Heterocarpus grimaldii	1						5,88	0,003			0,008
PASIPHAEIDAE	2						11,76	0,002		0,005	0,002
Sergestes sp.	1						5,88	0,001		0,004	
SERGESTIDAE	1						5,88	0,001	0,004		
Sicyonia sp.	1						5,88				
Other fish								0,306	0,172	0,289	0,413
Sum all species								20,004	19,495	15,617	23,501

	Lower limits, Kg/nm						% incidence	Mean dens. t/nm²	Mean densities by bottom depth strata t/nm²		
SPECIES NAME	>0	10	30	100	300	1 000			500-600m	600-700m	700-800m
Sum SNAPPERS, JOBFISHES											
Sum GROUPERS, SEABASSES											
Sum POD											
Sum CROAKERS, DRUMS, WEAKF., KOBS											
Sum PANDORAS, PORGIES, SEABREAMS,											
Sum SHARKS, CHIMAERAS								0,516	0,296	0,336	0,802
Sum BATOID FISHES, RAYS								0,253	0,012	0,212	0,453
Sum CEPHALOPODS								0,585	0,058	0,693	0,884
Numbers of stations included in analysis, total and by depth strata								17	5	5	7

Central: Palmerinhas – Benguela, shelf (20-200 m)

	Lower limits, Kg/nm						% incidence	Mean dens. t/nm²	Mean densities by bottom depth strata t/nm²			
SPECIES NAME	>0	10	30	100	300	1 000			0-30m	30-50m	50-100m	100-200m
Brachydeuterus auritus	10	2	4	1		1	48,65	5,797	4,94	27,197	0,657	0,008
Synagrops microlepis	2	1			2		13,51	4,092			3,505	7,871
Trachurus trecae	8	6	6	1			56,76	1,817	0,008	1,154	3,744	0,516
Pagellus bellottii	13	5	6	2			70,27	1,763	1,25	3,865	2,167	0,315
Pomadasys incisus	8	2	2	1			35,14	0,715	0,273	2,776	0,443	
Pterothrissus belloci	5	3	4				32,43	0,679			1,029	0,824
Trichiurus lepturus	16	2	4				59,46	0,625	1,141	0,407	0,858	0,372
Dentex angolensis	11	11	1				62,16	0,613			0,486	1,222
Citharus linguatula	26	1	3				81,08	0,566	0,015	0,174	0,993	0,445
Ilisha africana	2	1	1	1			13,51	0,56	2,134	2,043		
Raja miraletus	25	4	1				81,08	0,491	0,134	0,483	0,765	0,283
Zeus faber	20	3	2				67,57	0,484	0,076	0,028	0,613	0,686
Pteroscion peli	2		4				16,22	0,442	2,524	1,252		
Lepidotrigla carolae	6	3	2				29,73	0,404			0,211	0,923
Umbrina canariensis	15	1	2				48,65	0,4		0,749	0,427	0,275
Brotula barbata	14	5					51,35	0,385			0,256	0,819
Galeoides decadactylus	4	1	2				18,92	0,34	0,32	1,658		
Lagocephalus laevigatus	19	3					59,46	0,287	0,222	0,192	0,548	0,071
Zenopsis conchifer	9		2				29,73	0,271		0,007	0,007	0,761
Pseudupeneus prayensis	14	3					45,95	0,237	0,192	0,536	0,317	
Dentex barnardi	15	3					48,65	0,201	0,005	0,109	0,33	0,155
Dentex macrophthalmus	5		1				16,22	0,189			0,354	0,156
Scorpaena normani	9	3					32,43	0,189			0,119	0,408
Chloroscombrus chrysurus	3		1				10,81	0,187	0,055	0,953	0,006	
TETRAODONTIDAE	4		1				13,51	0,172	0,005		0,013	0,474
Sepia orbignyana	16	2					48,65	0,151	0,123	0,17	0,254	0,035
Chelidonichthys gabonensis	4	1	1				16,22	0,143			0,158	0,238
Octopus vulgaris	20	1					56,76	0,142	0,022	0,029	0,197	0,171
Bembrops heterurus	3	2					13,51	0,135		0,232	0,175	0,07
Rhinobatos albomaculatus	7	2					24,32	0,127	0,161	0,35	0,126	
Alloteuthis africana	13	1					37,84	0,112	0,011	0,005	0,291	
Trigla lyra	6	2					21,62	0,105		0,158	0,039	0,172
Sepia officinalis	13	2					40,54	0,104	0,043	0,17	0,124	0,06
Selene dorsalis	9	1					27,03	0,094	0,118	0,287	0,078	

	Lower limits, Kg/nm						% incidence	Mean dens. t/nm²	Mean densities by bottom depth strata t/nm²			
SPECIES NAME	>0	10	30	100	300	1 000			0-30m	30-50m	50-100m	100-200m
Merluccius polli	1	2					8,11	0,091				0,26
Torpedo torpedo few spots	8	1					24,32	0,089		0,002	0,189	0,05
Torpedo torpedo	10	1					29,73	0,089	0,011	0,024	0,006	0,231
Jellyfish			1				2,7	0,087	1,078			
Bembrops greyi	10	1					29,73	0,087		0,012	0,006	0,233
Bristle worms		1					2,7	0,081			0,214	
Deepwater fish mixture	16						43,24	0,079	0,012	0,004	0,088	0,124
Argyrosomus hololepidotus	5	1					16,22	0,07		0,248	0,061	
Atractoscion aequidens	6	1					18,92	0,07			0,171	0,015
Sardinella maderensis	10						27,03	0,068	0,204	0,171	0,043	0,008
Uranoscopus polli	8	1					24,32	0,067			0,021	0,167
Miscellaneous fishes	12						32,43	0,064	0,085	0,013	0,063	0,088
Pseudotolithus typus	2	1					8,11	0,06	0,713		0,006	
Pseudotolithus senegalensis	4	1					13,51	0,059		0,299	0,006	
G A S T R O P O D S	17						45,95	0,057		0,025	0,099	0,043
Sphyraena sphyraena	8	1					24,32	0,054	0,023	0,075	0,101	
Saurida brasiliensis	16						43,24	0,053		0,001	0,077	0,066
Dentex congoensis	3	1					10,81	0,052			0,08	0,06
J E L L Y F I S H		1					2,7	0,05		0,265		
Ephippion guttifer	5						13,51	0,048	0,016	0,248		
Dasyatis marmorata	4						10,81	0,043	0,02	0,097	0,062	
Sphoeroides pachygaster	1	1					5,41	0,042				0,119
Grammoplites gruveli	8						21,62	0,042	0,019	0,018	0,098	
Gymnura micrura		1					2,7	0,037	0,46			
Fistularia petimba	14						37,84	0,031	0,044	0,019	0,062	
Balistes capriscus	2						5,41	0,03	0,089	0,121		
Monolene microstoma	6						16,22	0,028			0,055	0,02
Rajella leopardus	3						8,11	0,027				0,078
Peristedion cataphractum	6						16,22	0,027			0,001	0,076
Chelidonichthys capensis	3						8,11	0,026				0,073
Lepidopus caudatus	1						2,7	0,024			0,065	
GOBIIDAE	9						24,32	0,024		0,001	0,055	0,009
Venefica proboscidea	2						5,41	0,024				0,067
Parapenaeus longirostris	3						8,11	0,023			0,016	0,048
Ilisha africana ***	1						2,7	0,023	0,279			
Lithognathus mormyrus	3						8,11	0,022	0,107		0,036	

	Lower limits, Kg/nm						% incidence	Mean dens. t/nm²	Mean densities by bottom depth strata t/nm²			
SPECIES NAME	>0	10	30	100	300	1 000			0-30m	30-50m	50-100m	100-200m
Gephyroberyx darwini	3						8,11	0,022				0,062
Bembrops anatirostris	1						2,7	0,022			0,057	
Sphyraena guachancho	4						10,81	0,02	0,157	0,031	0,004	
Plastic	6						16,22	0,018		0,005	0,045	
Pomatomus saltatrix	3						8,11	0,018			0,048	
Rhinobatos irvinei	1						2,7	0,018			0,047	
Waste General	3						8,11	0,018			0,046	
Carlarius parkii	3						8,11	0,017	0,067	0,063		
Illex coindetii	13						35,14	0,017			0,017	0,028
Syacium micrurum	5						13,51	0,016		0,071	0,001	0,007
Squatina oculata	2						5,41	0,016			0,011	0,034
Uranoscopus cadenati	2						5,41	0,015				0,043
Spicara alta	1						2,7	0,015				0,043
Conger conger	4						10,81	0,015		0,012	0,016	0,019
Cynoglossus senegalensis	2						5,41	0,015	0,099	0,036		
MYCTOPHIDAE	3						8,11	0,015				0,041
Syacium micrurum**	2						5,41	0,014				0,04
Pontinus kuhlii	2						5,41	0,013			0,032	0,003
Chaetodon hoefleri	8						21,62	0,013	0,003		0,026	0,007
Chelidonichthys sp2	1						2,7	0,012			0,033	
Lagocephalus lagocephalus	1						2,7	0,012			0,033	
Serranus cabrilla	4						10,81	0,012			0,031	
Torpedo marmorata	2						5,41	0,011	0,108			0,007
Sardinella aurita	7						18,92	0,011		0,01	0,024	
ECHINOMETRIDAE	1						2,7	0,01			0,027	
Caranx rhonchus	2						5,41	0,01	0,029	0,042		
Penaeus notialis	5						13,51	0,006	0,05	0,011		
Parapandalus narval	1						2,7					0,001
Penaeus kerathurus	2						5,41		0,003			
Solenocera africana	1						2,7					0,001
Plesionika martia	1						2,7					
Other fish								0,3	0,766	0,176	0,242	0,321
Sum all species								25,564	18,213	47,082	21,711	19,825
Sum SNAPPERS, JOBFISHES												
Sum GROUPERS, SEABASSES								0,024	0,009	0,002	0,049	0,012
Sum POD												

	Lower limits, Kg/nm						% incidence	Mean dens. t/nm²	Mean densities by bottom depth strata t/nm²			
SPECIES NAME	>0	10	30	100	300	1 000			0-30m	30-50m	50-100m	100-200m
Sum CROAKERS, DRUMS, WEAKF., KOBS								1,101	3,237	2,549	0,672	0,29
Sum PANDORAS, PORGIES, SEABREAMS,								2,84	1,362	3,974	3,452	1,912
Sum SHARKS, CHIMAERAS								0,016			0,011	0,034
Sum BATOID FISHES, RAYS								0,942	0,911	0,993	1,194	0,649
Sum CEPHALOPODS								0,538	0,204	0,376	0,889	0,325
Numbers of stations included in analysis, total and by depth strata								37	3	7	14	13

Central: Palmerinhas – Benguela, slope (200-500 m)

	Lower limits, Kg/nm						% incidence	Mean dens. t/nm²	Mean densities by bottom depth strata t/nm²		
SPECIES NAME	>0	10	30	100	300	1 000			200-300m	300-400m	400-500m
Merluccius polli	4	1	13	8	1		90	9,411	13,183	12,761	2,247
Synagrops microlepis	7	3	2	4	2		60	5,846	14,054	2,031	0,251
Chlorophthalmus atlanticus	14	2	1	5	1		76,67	4,077	6,604	5,429	0,079
Nematocarcinus africanus	1	1	13	3			60	3,894		4,76	7,398
Zenopsis conchifer	7	3	5	2			56,67	2,291	5,519	0,891	
Laemonema laureysi	10	12	4				86,67	1,602	1,271	2,401	1,246
Pterothrissus belloci	4	4	7				50	1,302	2,06	1,818	0,005
Stomias boa boa	7	3	2	1			43,33	1,025	0,001	0,308	2,797
Hymenocephalus italicus	11	4	2				56,67	0,771	0,004	2,001	0,507
Lophius vaillanti	14	1	3				60	0,68	0,047	0,817	1,255
Bembrops greyi	1	5	2				26,67	0,546	1,489		
Yarrella blackfordi	8	3	1				40	0,508		0,623	0,962
Aristeus varidens	7	9					53,33	0,488	0,016	0,3	1,175
Parapenaeus longirostris	12	2	2				53,33	0,413	0,792	0,408	
Scorpaena normani	5	3	1				30	0,399	0,843	0,3	
Hoplostethus cadenati	12	4					53,33	0,39	0,062	0,387	0,753
MYCTOPHIDAE	19	1	1				70	0,383	0,183	0,684	0,333
Brotula barbata	6	2	1				30	0,366	0,998		
Lamprogrammus exutus	6	1	1				26,67	0,358		0,011	1,063
Trichiurus lepturus	9	2	1				40	0,34	0,776	0,173	0,009
Chlorophthalmus agassizi			2				6,67	0,317	0,592	0,334	
Malacocephalus laevis	8	3					36,67	0,272	0,2	0,487	0,158
Dentex macrophthalmus	2	2	1				16,67	0,263	0,719		
Gephyroberyx darwini	6		1				23,33	0,249	0,622	0,071	
Chaunax pictus	9	2					36,67	0,24		0,398	0,361
Etmopterus sp.	6	1	1				26,67	0,233		0,539	0,215
Malacocephalus occidentalis	10	2					40	0,219	0,177	0,466	0,044
Dibranchus atlanticus	9	1					33,33	0,167	0,004	0,091	0,416
Plesiopenaeus edwardsianus	6		1				23,33	0,159		0,457	0,065
Deepwater fish mixture	10	1					36,67	0,125	0,062	0,122	0,198
Dentex angolensis		2					6,67	0,123	0,337		
Neoharriotta pinnata	6	1					23,33	0,109	0,028	0,011	0,288
Bembrops heterurus	4	1					16,67	0,102	0,278	0,001	
Halosaurus ovenii	11	1					40	0,095		0,03	0,259

	Lower limits, Kg/nm						% incidence	Mean dens. t/nm²	Mean densities by bottom depth strata t/nm²		
SPECIES NAME	>0	10	30	100	300	1 000			200-300m	300-400m	400-500m
Plesionika martia	1	1					6,67	0,093			0,278
Coelorinchus polli	10	1					36,67	0,092	0,157	0,07	0,041
Miscellaneous fishes	9						30	0,08	0,081	0,126	0,037
Rajella leopardus	1	1					6,67	0,078	0,212		
Illex coindetii	9						30	0,066	0,105	0,019	0,065
Bassanago albescens	9						30	0,064		0,166	0,044
Chaceon maritae	7						23,33	0,059		0,026	0,153
UNIDENTIFIED FISH	1	1					6,67	0,059	0,152		0,009
Pagellus bellottii	1	1					6,67	0,055	0,149		
Dicrolene intronigra	5						16,67	0,052	0,023		0,13
Schedophilus velaini		1					3,33	0,047	0,128		
Glyphus marsupialis	7						23,33	0,046	0,003		0,134
CONGRIDAE	4						13,33	0,046	0,001	0,103	0,043
Ophisurus serpens	2						6,67	0,042	0,114		
Bathynectes piperitus	13						43,33	0,039	0,004	0,046	0,071
Branchiostegus semifasciatus		1					3,33	0,038	0,103		
Eumunida squamifera	6						20	0,037		0,12	0,003
Torpedo torpedo	4						13,33	0,034	0,093		
Coelorinchus caelorhincus	5						16,67	0,033	0,07	0,025	
Uranoscopus polli	1						3,33	0,029	0,078		
Sphoeroides cf. pachygaster	1						3,33	0,028	0,076		
Galeus polli	5						16,67	0,027	0,032	0,037	0,013
TETRAODONTIDAE	1						3,33	0,026	0,07		
Pontinus sp.	2						6,67	0,025	0,004	0,078	
Etmopterus spinax	1						3,33	0,024		0,08	
Lagocephalus sp.	1						3,33	0,023	0,064		
Benthodesmus tenuis	8						26,67	0,023		0,027	0,045
Lophiodes kempi	2						6,67	0,022	0,061		
Calappa pelii	7						23,33	0,022	0,048	0,013	
Triplophos hemingi	8						26,67	0,022		0,002	0,063
Epigonus telescopus	7						23,33	0,02	0,016	0,047	
Syacium micrurum	6						20	0,018	0,05		
Coelorinchus sp.	5						16,67	0,018	0,012	0,015	0,027
Ommastrephes bartrami	4						13,33	0,017		0,024	0,03
Pontinus accraensis	1						3,33	0,016	0,043		
Xenodermichthys copei	7						23,33	0,014		0,007	0,036

	Lower limits, Kg/nm						% incidence	Mean dens. t/nm²	Mean densities by bottom depth strata t/nm²		
SPECIES NAME	>0	10	30	100	300	1 000			200-300m	300-400m	400-500m
Nemichthys scolopaceus	10						33,33	0,014		0,013	0,029
Bathyuroconger vicinus	8						26,67	0,012	0,003	0,014	0,021
Chaunax cf. pictus	3						10	0,012		0,026	0,014
Dibranchus sp.	1						3,33	0,012	0,034		
Callinectes sp.	2						6,67	0,012		0,034	0,005
Miracorvina angolensis	1						3,33	0,012	0,032		
Centrophorus granulosus	2						6,67	0,012		0,016	0,02
CHIROSTYLIDAE	1						3,33	0,011		0,038	
Myctophidae sp. X	1						3,33	0,011		0,037	
OPHICHTHIDAE	3						10	0,01	0,015	0,015	
Solenocera africana	11						36,67	0,009		0,011	0,017
S H R I M P S	1						3,33	0,007	0,019		
Plesionika longirostris	1						3,33	0,006		0,022	
Sergestes sp.	2						6,67	0,002			0,007
Acanthephyra sp.	3						10	0,001		0,001	0,002
Other fish								0,27	0,327	0,255	0,221
Sum all species								39,612	53,297	40,627	23,643
Sum SNAPPERS, JOBFISHES											
Sum GROUPERS, SEABASSES											
Sum POD											
Sum CROAKERS, DRUMS, WEAKF., KOBS								0,015	0,041		
Sum PANDORAS, PORGIES, SEABREAMS,								0,442	1,204		
Sum SHARKS, CHIMAERAS								0,435	0,069	0,747	0,557
Sum BATOID FISHES, RAYS								0,125	0,321	0,001	0,021
Sum CEPHALOPODS								0,11	0,141	0,067	0,114
Numbers of stations included in analysis, total and by depth strata								30	11	9	10

Central: Palmerinhas – Benguela, slope (500-800 m)

	Lower limits, Kg/nm						% incidence	Mean dens. t/nm²	Mean densities by bottom depth strata t/nm²		
SPECIES NAME	>0	10	30	100	300	1 000			500-600m	600-700m	700-800m
Nematocarcinus africanus		1	9				58,82	3,105	5,064	2,759	0,71
Lamprogrammus exutus	8	5	3	1			100	2,467	3,333	2,221	1,501
Stomias boa boa	8	5	3				94,12	1,668	2,859	1,398	0,273
Aristeus varidens	8	9					100	1,091	1,807	0,908	0,269
Hoplostethus cadenati	14	2	1				100	0,703	0,863	0,826	0,358
Yarrella blackfordi	15	2					100	0,599	0,481	0,691	0,673
PANDALIDAE	1		1				11,76	0,291		0,991	
Nezumia sp.	5	2					41,18	0,278	0,004	0,083	0,855
Nezumia micronychodon	2	2					23,53	0,233		0,148	0,645
Lophius vaillanti	11						64,71	0,221	0,37	0,141	0,093
Bathyuroconger vicinus	13						76,47	0,204	0,033	0,154	0,491
Chaceon maritae	16						94,12	0,196	0,153	0,285	0,167
Plastic cans-jars etc			1				5,88	0,195			0,662
Stereomastis sp.	9						52,94	0,17	0,048	0,147	0,362
Bajacalifornia megalops	10						58,82	0,169	0,001	0,296	0,276
Laemonema laureysi	8	1					52,94	0,162	0,378	0,019	0,005
Cubiceps sp.	1	1					11,76	0,147	0,357		
Triplophos hemingi	17						100	0,123	0,095	0,197	0,086
Anemone - purple		1					5,88	0,121			0,41
Dibranchus atlanticus	10	1					64,71	0,12	0,02	0,02	0,362
POLYCHAELIDAE	5	1					35,29	0,116	0,078	0,054	0,229
Anemones, white	1	1					11,76	0,09			0,306
Miscellaneous fishes	4						23,53	0,079	0,044		0,208
Deepwater fish mixture	6						35,29	0,078	0,083	0,091	0,057
Merluccius polli	8						47,06	0,075	0,123	0,054	0,03
Ebinania costaecanarie	11						64,71	0,075	0,025	0,173	0,047
Zameus (Scymnodon) squamulosus	3						17,65	0,069		0,107	0,126
Trichiurus lepturus		1					5,88	0,065	0,157		
Halosaurus ovenii	14						82,35	0,062	0,033	0,074	0,091
Anemones, pink		1					5,88	0,062			0,21
Xenodermichthys copei	14						82,35	0,056	0,039	0,062	0,074
J E L L Y F I S H	3						17,65	0,056	0,002		0,187
Talismania sp.	2						11,76	0,046		0,018	0,137
Dicrolene intronigra	10						58,82	0,045	0,085	0,013	0,023

	Lower limits, Kg/nm						% incidence	Mean dens. t/nm²	Mean densities by bottom depth strata t/nm²		
SPECIES NAME	>0	10	30	100	300	1 000			500-600m	600-700m	700-800m
Etmopterus spinax	1						5,88	0,042			0,141
Todaropsis eblanae	3						17,65	0,041	0,097		0,003
Etmopterus sp.	7						41,18	0,04	0,037	0,012	0,073
Opisthoteuthis agassizi	1						5,88	0,037			0,127
Alepocephalus sp.	3						17,65	0,037	0,052	0,004	0,049
Gonostoma denudatum	8						47,06	0,037	0,012	0,074	0,032
Bathyurocongrus sp.	1						5,88	0,032	0,077		
Glyphus marsupialis	13						76,47	0,031	0,044	0,022	0,022
Thysanoteuthis rhombus	1						5,88	0,031			0,105
**	1						5,88	0,03		0,103	
Bristle worms (straws)	1						5,88	0,03			0,103
Nezumia sp1	1						5,88	0,029		0,099	
OPISTHOTEUTHIDAE	1						5,88	0,026		0,088	
MYCTOPHIDAE	7						41,18	0,025	0,022	0,007	0,048
Ariomma bondi	4						23,53	0,024	0,055		0,003
Garbage	1						5,88	0,023			0,078
Munida sp.	1						5,88	0,022			0,075
Benthodesmus tenuis	7						41,18	0,022	0,045	0,011	0,002
Luciobrotula nolfi	2						11,76	0,022		0,018	0,057
ANTHOZOA (Sea anemones)	1						5,88	0,021			0,071
JELLYFISH	2						11,76	0,019	0,005		0,059
Bathyraja smithii	1						5,88	0,019			0,065
Munidopsis chuni	6						35,29	0,018	0,011	0,002	0,046
Talismania antillarum	1						5,88	0,018		0,062	
ALEPOCEPHALIDAE	1						5,88	0,018		0,061	
Bathyuroconger sp.	1						5,88	0,017		0,059	
Talismania longifilis	3						17,65	0,017		0,048	0,01
Plesiopenaeus edwardsianus	8						47,06	0,017	0,02	0,005	0,023
Astronesthes niger	1						5,88	0,016		0,056	
Nemichthys scolopaceus	14						82,35	0,016	0,026	0,016	0,004
PAGUROIDEA	3						17,65	0,016		0,048	0,006
Centrophorus granulosus	1						5,88	0,016	0,038		
Stereomastis sculpta	1						5,88	0,015		0,051	
Rajella barnardi	2						11,76	0,015		0,05	
Chaunax cf. pictus	3						17,65	0,014	0,033		
Chlorophthalmus atlanticus	4						23,53	0,012	0,023	0,01	

	Lower limits, Kg/nm						% incidence	Mean dens. t/nm²	Mean densities by bottom depth strata t/nm²		
SPECIES NAME	>0	10	30	100	300	1 000			500-600m	600-700m	700-800m
Raja sp.	2						11,76	0,012			0,04
PARAPAGURIDAE	1						5,88	0,011			0,039
Malacocephalus laevis	1						5,88	0,011	0,026		
Neoharriotta pinnata	2						11,76	0,011	0,026		
Illex coindetii	3						17,65	0,01	0,011	0,02	
Starfish small	1						5,88	0,01			0,034
Heterocarpus grimaldii	3						17,65	0,006	0,014		
Heterocarpus ensifer	1						5,88	0,002		0,008	
Plesionika sp.	2						11,76	0,002	0,001		0,006
Plesionika edwardsii	1						5,88	0,002			0,007
Shrimps, small, non comm.	1						5,88	0,002			0,007
Acanthephyra sp.	2						11,76	0,002	0,002		0,004
Small shrimps	1						5,88	0,001		0,005	
PASIPHAEIDAE	1						5,88	0,001	0,003		
S H R I M P S	1						5,88	0,001			0,004
ARISTEIDAE	1						5,88	0,001			0,004
Plesionika martia	2						11,76	0,001		0,003	
Pasiphaea multidentata	1						5,88	0,001			0,003
Parapandalus narval	1						5,88	0,001	0,002		
Plesiopenaeus nitidus	1						5,88		0,001		
Other fish								0,301	0,206	0,351	0,384
Sum all species								14,492	17,423	13,222	11,659
Sum SNAPPERS, JOBFISHES											
Sum GROUPERS, SEABASSES								0,007		0,022	
Sum POD											
Sum CROAKERS, DRUMS, WEAKF., KOBS											
Sum PANDORAS, PORGIES, SEABREAMS,											
Sum SHARKS, CHIMAERAS								0,197	0,107	0,132	0,386
Sum BATOID FISHES, RAYS								0,066	0,003	0,08	0,139
Sum CEPHALOPODS								0,169	0,116	0,145	0,268
Numbers of stations included in analysis, total and by depth strata								17	7	5	5

South: Tombua - Cunene, shelf (20-200 m)

	Lower limits, Kg/nm						% incidence	Mean dens. t/nm²	Mean densities by bottom depth strata t/nm²			
SPECIES NAME	>0	10	30	100	300	1 000			0-30m	30-50m	50-100m	100-200m
Trachurus trecae	3	1	1	3	3	3	77,78	80,79	27,838	277,768	8,753	41,423
Trachurus capensis		1	2			1	22,22	52,829	1,386		0,352	188,93
Dentex macrophthalmus	3	1	4	2	1		61,11	8,539			4,964	24,785
Chrysaora fulgida	1		1	2			22,22	2,751	1,019	5,822	3,861	
Chrysaora sp.	2	1	1		1		27,78	2,578	3,561	8,61	0,213	
Pagellus bellottii	6	1		3			55,56	2,163	0,037	3,191	3,952	0,47
Dead shells					1		5,56	1,856			5,569	
Engraulis encrasicolus					1		5,56	1,758		7,909		
Lithognathus mormyrus	1			1			11,11	1,491	0,011	6,701		
ARCHTOCEPHALUS SP				1			5,56	1,162		5,23		
Chelidonichthys capensis	7		3				55,56	1,124	1,229	0,078	2,602	0,126
Sepia officinalis	3		1	1			27,78	1,122	0,115	3,323	1,092	
Atractoscion aequidens	7		1	1			50	1,119		0,87	0,255	3,027
Loligo reynaudi	1	1		1			16,67	1,066	0,776	4,2	0,01	
Merluccius capensis	1		1	1			16,67	0,9			0,162	3,047
Squalus megalops	2	3	1				33,33	0,857			0,685	2,265
Chrysaora hysoscella			2				11,11	0,774	2,285	1,769		
Zenopsis conchifer	1			1			11,11	0,764				2,751
Zeus faber	5	3	1				50	0,572	0,004		0,284	1,716
Etrumeus whiteheadi	2		1				16,67	0,556	3,118		0,008	0,123
Pterothrissus belloci	1		2				16,67	0,466				1,678
Dicologoglossa cuneata	8	3					61,11	0,462	0,307	0,104	0,839	0,39
Raja miraletus	4	2	1				38,89	0,394	0,423		0,872	0,118
Rhinoptera marginata			1				5,56	0,386			1,157	
Loligo vulgaris	5		1				33,33	0,381	0,157	1,316	0,16	0,033
Helicolenus dactylopterus		1	1				11,11	0,374				1,346
Umbrina canariensis	3	1	1				27,78	0,351		0,334	0,802	0,034
Deepwater fish mixture	2		1				16,67	0,299	0,124		0,836	
Argyrosomus inodorus			1				5,56	0,225	1,353			
Turtle			1				5,56	0,224	1,342			
SEPIIDAE			1				5,56	0,218			0,654	
Synagrops microlepis	1		1				11,11	0,216				0,778
Dasyatis marmorata			1				5,56	0,203		0,914		
Pomadasys incisus			1				5,56	0,201		0,905		

	Lower limits, Kg/nm						% incidence	Mean dens. t/nm²	Mean densities by bottom depth strata t/nm²			
SPECIES NAME	>0	10	30	100	300	1 000			0-30m	30-50m	50-100m	100-200m
Citharus linguatula	2	1					16,67	0,182			0,546	
Sepia orbignyana		2					11,11	0,18			0,539	
Trigla lyra	4	1					27,78	0,178			0,151	0,46
Gymnura altavela			1				5,56	0,174		0,781		
Stromateus fiatola	1	1					11,11	0,173	0,99	0,034		
Galeichthys feliceps		1					5,56	0,161	0,965			
Spondyliosoma cantharus	5	1					33,33	0,156	0,004	0,009	0,357	0,123
Chelonia mydas		1					5,56	0,149	0,895			
SOFT SPONGES		1					5,56	0,132	0,79			
Squatina aculeata		1					5,56	0,13			0,39	
Callorhinchus capensis		1					5,56	0,125	0,751			
Illex coindetii	4	1					27,78	0,125		0,3	0,158	0,019
Pontinus leda		1					5,56	0,11				0,395
Octopus vulgaris	4	1					27,78	0,1			0,099	0,243
Todarodes sagittatus	1	1					11,11	0,095			0,234	0,06
PORTUNIDAE	1	1					11,11	0,089	0,536			
Selene dorsalis		1					5,56	0,085	0,511			
Malacocephalus occidentalis		1					5,56	0,085				0,306
OPHICHTHIDAE	1	1					11,11	0,071			0,214	
G A S T R O P O D S	10						55,56	0,07	0,025		0,189	0,011
Calappa pelii		1					5,56	0,067		0,3		
Carlarius parkii	2						11,11	0,066		0,055	0,163	
Pomatomus saltatrix	1	1					11,11	0,066	0,388	0,004		
B I V A L V E S	2						11,11	0,064			0,134	0,071
Starfish	5						27,78	0,059	0,001	0,25	0,009	
Brotula barbata	4						22,22	0,051			0,124	0,036
Thyrsites atun	2						11,11	0,051	0,297	0,007		
Lepidopus caudatus	2						11,11	0,046	0,264			0,007
Myliobatis aquila	2						11,11	0,043	0,127	0,098		
Mustelus mustelus	2						11,11	0,042		0,013	0,118	
TRIAKIDAE	1						5,56	0,042	0,25			
Merluccius polli	3						16,67	0,033			0,051	0,059
Chaceon maritae	1						5,56	0,028				0,1
Trachyscorpia sp.	1						5,56	0,027				0,097
Sea pens	3						16,67	0,027	0,001		0,08	
Astropecten sp.	1						5,56	0,026	0,157			

	Lower limits, Kg/nm						% incidence	Mean dens. t/nm²	Mean densities by bottom depth strata t/nm²			
SPECIES NAME	>0	10	30	100	300	1 000			0-30m	30-50m	50-100m	100-200m
Chlorophthalmus atlanticus	1						5,56	0,024				0,087
Scomber japonicus	2						11,11	0,024	0,025			0,07
Syacium micrurum	2						11,11	0,023		0,055		0,037
Trichiurus lepturus	3						16,67	0,021			0,064	
Lagocephalus laevigatus	2						11,11	0,021		0,021	0,049	
Miscellaneous fishes	3						16,67	0,021	0,04			0,051
Maja squinado	4						22,22	0,02		0,087	0,003	
Scorpaena elongata	1						5,56	0,018				0,064
Dentex congoensis	1						5,56	0,017			0,052	
Dentex barnardi	4						22,22	0,017			0,043	0,011
Ophiuroidea indetCV1	1						5,56	0,016		0,074		
LOLIGINIDAE	1						5,56	0,016			0,047	
Pteromylaeus bovinus	1						5,56	0,014		0,063		
Scorpaena angolensis	1						5,56	0,012			0,036	
Brachioteuthis sp.	1						5,56	0,011			0,034	
Fistularia petimba	3						16,67	0,011	0,059		0,004	
Scomber colias	1						5,56	0,011		0,05		
Pomadasys perotaei	1						5,56	0,011	0,066			
Saurida brasiliensis	3						16,67	0,01		0,009	0,025	
Pseudupeneus prayensis	1						5,56	0,01		0,046		
Parapandalus narval	1						5,56	0,001				0,002
Other fish								0,121	0,079	0,088	0,131	0,162
Sum all species								172,932	52,305	331,388	42,125	275,511
Sum SNAPPERS, JOBFISHES												
Sum GROUPERS, SEABASSES												
Sum POD												
Sum CROAKERS, DRUMS, WEAKF., KOBS								1,695	1,353	1,204	1,057	3,061
Sum PANDORAS, PORGIES, SEABREAMS,								12,384	0,052	9,9	9,368	25,389
Sum SHARKS, CHIMAERAS								1,204	1,001	0,013	1,215	2,265
Sum BATOID FISHES, RAYS								1,217	0,551	1,87	2,029	0,118
Sum CEPHALOPODS								3,328	1,048	9,139	3,039	0,395
Numbers of stations included in analysis, total and by depth strata								18	3	4	6	5

South: Tombua - Cunene, slope (200-800 m)

	Lower limits, Kg/nm						% incidence	Mean dens. t/nm²	Mean densities by bottom depth strata t/nm²			
SPECIES NAME	>0	10	30	100	300	1 000			200-300m	300-400m	400-500m	500-800m
Helicolenus dactylopterus		2		1		1	100	55,972		110,172		1,773
Trachyrincus scabrus			1	1			50	6,911				13,822
Chaceon maritae		1	2	1			100	6,639		5,757		7,522
Lophius vaillanti	2	1		1			100	6,502		12,118		0,887
Bajacalifornia megalops			1	1			50	6,247				12,493
Centroscymnus crepidater			1	1			50	6,096				12,193
Merluccius capensis				1			25	3,336		6,672		
Nezumia micronychodon		1		1			50	3,248		5,899		0,598
Merluccius paradoxus		2	2				100	3,01		2,98		3,041
Coelorinchus polli	1		1				50	2,269		4,537		
Galeus polli		1	1				50	1,853		3,705		
Todarodes sagittatus	1		2				75	1,785		0,15		3,42
Priacanthus arenatus			1				25	1,588		3,175		
Ebinania costaecanarie	1	3					100	1,478		1,069		1,886
Merluccius polli			1				25	1,446		2,892		
Centrophorus squamosus		1	1				50	1,425				2,85
Chlorophthalmus atlanticus			1				25	1,177		2,353		
Laemonema laureysi	2		1				75	1,063		2,121		0,006
Malacocephalus laevis			1				25	0,898		1,797		
Deepwater fish mixture	1	2					75	0,822		0,366		1,278
Aristeus varidens	4						100	0,524		0,48		0,568
Yarrella blackfordi	1	1					50	0,479				0,958
Apristurus saldanha		1					25	0,456				0,912
Nematocarcinus africanus	2	1					75	0,434		0,05		0,818
Deania calcea	2						50	0,361				0,722
Bathynectes piperitus	2						50	0,29		0,579		
Hoplostethus cadenati	2						50	0,273				0,546
Anemones, white	2						50	0,27				0,541
Squalus megalops		1					25	0,262		0,524		
Rajella barnardi		1					25	0,261				0,522
Centroscymnus coelolepis	1						25	0,195				0,39
Trachurus capensis	1						25	0,158		0,316		
Anemones, pink	1						25	0,158				0,316
Illex coindetii	1						25	0,149		0,298		

	Lower limits, Kg/nm						% incidence	Mean dens. t/nm²	Mean densities by bottom depth strata t/nm²			
SPECIES NAME	>0	10	30	100	300	1 000			200-300m	300-400m	400-500m	500-800m
Trigla lyra	1						25	0,113		0,227		
Lamprogrammus exutus	2						50	0,112				0,224
Cruriraja parcomaculata	1						25	0,107				0,214
Nezumia sp.	1						25	0,107				0,214
Chlorophthalmus agassizi	1						25	0,083		0,166		
Vitreledonella richardi	1						25	0,082				0,163
Etmopterus pusillus	1						25	0,082				0,163
Deania profundorum	1						25	0,071				0,141
Halosaurus ovenii	2						50	0,068				0,137
Ijimaia loppei	1						25	0,059				0,117
Synaphobranchus kaupii	2						50	0,057				0,115
Pterothrissus belloci	1						25	0,054		0,108		
Rossia enigmatica	1						25	0,049				0,098
CENTROLOPHIDAE	1						25	0,036				0,071
Triplophos hemingi	2						50	0,036				0,071
Parapenaeus longirostris	1						25	0,035		0,071		
Thysanoteuthis rhombus	1						25	0,033				0,065
Lophius vomerinus	1						25	0,028		0,055		
Bathyuroconger vicinus	1						25	0,025				0,049
Starfish	1						25	0,022				0,044
Glyphus marsupialis	1						25	0,022				0,044
Histioteuthis reversa	1						25	0,016				0,033
Bathylagus antarcticus	1						25	0,016				0,033
SOFT SPONGES	1						25	0,014		0,028		
Plastic	1						25	0,014				0,028
PARAPAGURIDAE	1						25	0,011				0,022
Heterocarpus grimaldii	1						25	0,006				0,011
Other fish								0,052	0	0,052	0	0,052
Sum all species								119,446	0	168,719	0	70,172
Sum SNAPPERS, JOBFISHES												
Sum GROUPERS, SEABASSES												
Sum POD												
Sum CROAKERS, DRUMS, WEAKF., KOBS												
Sum PANDORAS, PORGIES, SEABREAMS,												
Sum SHARKS, CHIMAERAS								10,801		4,229		17,373
Sum BATOID FISHES, RAYS								0,377				0,753

	Lower limits, Kg/nm						% incidence	Mean dens. t/nm²	Mean densities by bottom depth strata t/nm²			
SPECIES NAME	>0	10	30	100	300	1 000			200-300m	300-400m	400-500m	500-800m
Sum CEPHALOPODS								2,113		0,447		3,779
Numbers of stations included in analysis, total and by depth strata								4	0	2	0	2

ANNEX XI. SPECIES CODES

NANSIS species codes used in defining the 'grouped species' tables

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

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

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

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

ANNEX XII. CATCH RATES

Families included under each group:

Demersal: Sciaenidae, Sparidae, Pomadasyidae, Ariidae, Serranidae, Lutjanidae, Merlucciidae, Ophidiidae, Lethrinidae.

Pelagic: Scombridae, Sphyrnidae, Trichiuridae, Clupeidae, Engraulidae, Carangidae.

Cephalopods: Squids and octopuses.

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

Inner shelf (20-70 m).

Number of stations: 13

Station	Gear depth	Cephalopoda	Demersal	Pelagic	Sharks	Shrimps	Other	Total
114	31,0	6,0	175,7	41,1	0,1	16,9	64,8	304,5
125	45,5	5,8	49,8	36,8	0,0	0,0	85,4	177,8
126	42,0	2,9	259,9	8,5	0,0	4,8	167,9	444,0
133	39,5	4,0	193,2	19,1	0,0	8,9	113,4	338,5
134	57,0	0,0	1332,3	83,6	0,0	0,0	184,6	1600,5
143	31,5	0,0	853,7	390,4	7,3	1,9	445,0	1698,3
144	27,5	3,7	372,9	158,3	0,0	23,4	127,1	685,4
146	41,0	2,4	65,7	5,4	0,0	0,0	58,5	132,0
147	62,0	8,2	48,7	7,4	0,0	0,0	199,8	264,1
166	68,5	5,8	252,3	8,0	6,4	0,0	29,7	302,1
167	45,5	15,0	205,4	2,0	0,0	0,0	68,4	290,7
169	34,0	2,7	61,9	6,9	26,3	1,0	59,6	158,5
174	52,5	2,8	276,0	1,0	0,0	0,0	94,6	374,4
Mean	44,4	4,6	319,1	59,1	3,1	4,4	130,7	520,8
Std dev	12,6	3,9	370,9	109,1	7,4	7,6	108,1	520,7

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

Outer shelf (71-200 m)

Number of stations: 21

Station	Gear depth	Cephalopoda	Demersal	Pelagic	Sharks	Shrimps	Other	Total
116	147,0	19,0	129,5	46,3	0,0	0,0	742,3	937,1
117	164,0	17,7	102,6	3,6	0,0	2,8	132,9	259,6
124	84,5	12,7	61,8	241,1	0,0	0,0	63,9	379,5
127	117,0	1,5	87,6	0,7	0,0	0,0	41,2	131,0
132	94,0	9,3	114,2	111,9	0,0	0,0	205,6	441,0
135	165,0	17,2	51,5	3,9	0,0	4,2	290,6	367,4
141	115,0	4,0	123,3	6,5	0,0	0,0	53,9	187,7
142	87,5	18,1	195,1	814,9	0,0	0,0	178,9	1206,9
148	86,0	17,3	186,8	14,5	0,0	0,0	91,9	310,6
149	116,5	2,8	210,5	12,0	0,0	0,0	76,0	301,3
155	119,0	5,7	53,0	158,9	0,0	0,0	32,4	250,0
156	86,0	4,2	821,7	7,5	0,0	0,0	53,9	887,3
157	118,0	1,7	189,3	447,7	0,0	0,0	87,5	726,2
164	116,5	0,4	531,2	3,3	0,0	0,0	40,1	575,0
165	89,0	1,3	340,5	0,6	0,0	0,0	30,4	372,7
168	91,5	0,3	34,3	51,2	0,0	0,0	22,0	107,9
170	73,0	10,0	69,7	37,0	0,0	0,0	33,2	149,9
171	109,0	7,9	202,4	39,4	0,0	0,0	18,7	268,4
175	95,0	1,1	67,1	47,8	0,0	0,0	27,1	143,1
176	110,0	3,9	50,7	37,0	0,0	0,0	33,8	125,4
177	123,5	5,0	63,5	23,8	0,0	0,0	30,2	122,6
Mean	109,9	7,7	175,5	100,5	0,0	0,3	108,9	392,9
Std dev	25,2	6,7	188,4	195,1	0,0	1,1	161,3	306,4

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

Slope (201-800 m).

Number of stations: 37

Station	Gear depth	Cephalopoda	Demersal	Pelagic	Sharks	Shrimps	Other	Total
108	263,5	7,8	309,7	114,5	0,0	46,4	2589,2	3067,6
109	369,0	5,8	151,8	26,2	110,0	123,9	279,7	697,4
110	489,0	0,2	201,6	0,7	13,8	487,1	133,3	836,6
111	522,5	2,0	152,4	0,7	5,9	399,8	125,5	686,3
112	709,0	91,9	35,9	0,0	2,6	204,8	363,9	699,0
113	528,5	0,8	33,1	0,0	0,3	378,3	147,8	560,3
118	228,5	4,0	256,8	32,5	0,0	8,3	829,3	1131,0
119	306,5	0,0	66,3	0,0	0,0	14,0	378,0	458,3
120	450,5	3,1	9,1	0,3	1,3	351,3	331,4	696,5
121	524,5	2,2	173,9	2,5	11,3	551,8	201,1	942,8
123	417,0	2,9	19,5	2,2	20,9	288,2	264,8	598,4
128	311,5	0,0	99,8	0,0	0,0	2,6	1030,9	1133,3
129	421,5	0,0	6,4	6,8	8,1	219,3	316,6	557,2
130	609,5	2,9	98,0	1,7	0,0	231,6	444,7	779,0
131	708,5	5,9	186,4	0,4	0,7	12,4	602,4	808,3
136	537,0	3,4	23,2	0,0	23,1	273,8	72,2	395,7
137	632,5	46,1	84,6	1,9	5,5	214,6	166,9	519,7
138	749,5	27,8	35,3	0,6	62,5	0,4	478,5	605,1
139	631,0	16,5	46,1	0,3	18,8	21,0	227,8	330,4
140	256,0	15,7	631,6	0,0	0,0	57,1	2004,2	2708,5
145	359,5	0,0	77,7	0,0	22,4	225,5	327,8	653,5
150	426,0	7,2	111,8	1,1	15,6	9,6	296,5	441,8
151	707,0	1,4	2,7	0,0	20,9	61,5	207,8	294,4
154	226,0	4,2	89,7	37,5	0,0	18,8	115,1	265,3
158	264,5	12,0	226,6	6,4	0,0	188,5	2640,5	3074,0
159	313,0	2,2	80,6	20,3	0,0	6,5	336,2	445,8

Number of stations: 37								
Station	Gear depth	Cephalopoda	Demersal	Pelagic	Sharks	Shrimps	Other	Total
160	624,5	15,6	17,8	2,1	9,7	68,6	205,3	319,2
161	514,0	0,4	41,4	6,6	4,7	147,9	114,6	315,8
162	444,5	2,6	64,2	6,0	7,5	50,8	301,2	432,5
163	270,5	4,5	142,3	12,5	5,7	198,6	1123,1	1486,7
172	351,5	3,4	16,6	119,2	5,3	9,1	396,1	549,7
173	756,5	25,1	132,4	0,0	37,6	61,5	1069,6	1326,2
178	231,0	5,2	93,4	30,6	0,0	6,4	1268,5	1404,2
179	328,0	4,9	98,5	63,5	0,0	45,5	1100,8	1313,1
180	653,0	23,6	61,0	1,7	17,1	3,3	362,7	469,4
181	717,5	15,5	27,2	0,0	25,6	13,0	602,2	683,6
182	721,0	11,0	13,4	11,5	14,5	5,4	378,1	434,0
Mean	475,0	10,2	105,9	13,8	12,7	135,3	590,1	868,1
Std dev	173,6	16,9	116,3	28,5	20,9	151,4	638,9	706,3

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

Inner shelf (20-70 m).

Number of stations: 13

Station	Gear depth	Croakers	Groupers	Grunts	Hake	Seabream	Snappers	Other	Total
114	31	12,2	0,3	0	0	1,6	0	290,5	304,5
125	45,5	1,4	0	0	0	5,6	0	170,8	177,8
126	42	94,2	0	121,1	0	6,3	0	222,4	444
133	39,5	105,7	1,6	33,5	0	0	0	197,8	338,5
134	57	37,4	0	264	0	76,3	0	1222,8	1600,5
143	31,5	145,7	0	23,6	0	62,1	0	1466,9	1698,3
144	27,5	162,6	0	59,5	0	12	0	451,4	685,4
146	41	0	0	0	0	65,7	0	66,3	132
147	62	0	0	0	0	48,7	0	215,4	264,1
166	68,5	0	5,6	0	0	245,9	0,8	49,8	302,1
167	45,5	0	0	156	0	49,5	0	85,3	290,7
169	34	23,7	0	6	0	9,8	0	119	158,5
174	52,5	8,6	0	19,8	0	28,4	0	317,7	374,4
Mean	44,4	45,5	0,6	52,6	0	47,1	0,1	375,1	520,8
Std dev	12,6	59,9	1,6	80,8	0	65,6	0,2	447,2	520,7

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

Outer shelf (71-200 m).

Number of stations: 21									
Station	Gear depth	Croakers	Groupers	Grunts	Hake	Seabream	Snappers	Other	Total
116	147	5,4	23,6	0	0	95,7	0	812,4	937,1
117	164	3,1	0	0	0	72	0	184,5	259,6
124	84,5	0	0	0	0	45,1	0	334,4	379,5
127	117	7,2	0	0,3	0	80,1	0	43,3	131
132	94	3,5	2	0	0	104,9	0	330,5	441
135	165	10,3	0	0	0	30,3	0	326,9	367,4
141	115	1,8	0	0	0	121,5	0	64,4	187,7
142	87,5	79,2	0	0	0	115,9	0	1011,9	1206,9
148	86	0	2,5	0	0	184,3	0	123,7	310,6
149	116,5	0	0,6	0	0	209,9	0	90,8	301,3
155	119	0	0	0	0	51,3	0	198,7	250
156	86	15,9	76,4	0	0	727,8	0	67,3	887,3
157	118	42,5	0	0	0	143,1	0	540,6	726,2
164	116,5	140,4	0	0	0	390,9	0	43,8	575
165	89	0	1,6	0	0	337,3	0	33,8	372,7
168	91,5	8,7	0	0	0	23,8	0	75,3	107,9
170	73	8	0	2,1	0	38,8	0	101	149,9
171	109	174,8	0	0	0	26,4	0	67,1	268,4
175	95	7,2	0	0	0	57,2	0	78,7	143,1
176	110	9,3	0	0	0	39,7	0	76,4	125,4
177	123,5	0	0	0	0	60,4	0	62,2	122,6
Mean	109,9	24,6	5,1	0,1	0	140,8	0	222,3	392,9
Std dev	25,2	48,1	17,1	0,5	0	166,6	0	265,8	306,4

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

Inner shelf (20-70 m).

Number of stations: 13								
Station	Gear depth	Barracuda	Carangidae	Clupeoids	Hairtails	Scombrids	Other	Total
114	31	0,2	4,3	0,3	20,5	0	279,2	304,5
125	45,5	0	35,9	0	0	0	141,9	177,8
126	42	0,4	3,5	0	4,6	0	435,5	444
133	39,5	0	12,1	0	7	0	319,5	338,5
134	57	21,2	23,7	0	14,4	0	1541,3	1600,5
143	31,5	324,5	59,1	3,1	3,7	0	1307,9	1698,3
144	27,5	21,8	34,5	94,1	1,6	0	533,4	685,4
146	41	1	0,4	0	0	4	126,6	132
147	62	0	5,8	0	0	1,6	256,6	264,1
166	68,5	0	7,1	0	0,8	0	294,2	302,1
167	45,5	1,3	0,7	0	0	0	288,8	290,7
169	34	0,2	0	0	6,7	0	151,5	158,5
174	52,5	0	1	0	0	0	373,4	374,4
Mean	44,4	28,5	14,5	7,5	4,6	0,4	465,4	520,8
Std dev	12,6	89,3	18,4	26	6,4	1,2	443,4	520,7

Outer shelf (71-200 m).

Number of stations: 21								
Station	Gear depth	Barracuda	Carangidae	Clupeoids	Hairtails	Scombrids	Other	Total
116	147	0	43,4	0	2,8	0	890,8	937,1
117	164	0	0	0	3,6	0	256	259,6
124	84,5	0	240,2	0	1	0	138,4	379,5
127	117	0	0,5	0,2	0	0	130,3	131
132	94	0	111,4	0,5	0	0	329,1	441
135	165	0	0,7	0	3,2	0	363,5	367,4
141	115	0	6,5	0	0	0	181,2	187,7
142	87,5	0	813,5	1,4	0	0	392	1206,9
148	86	0	14,1	0,4	0	0	296	310,6
149	116,5	0	5	0	0	6,9	289,3	301,3
155	119	0	157,2	1,7	0	0	91,1	250
156	86	0	5,4	0	2,1	0	879,8	887,3
157	118	0	447,7	0	0	0	278,5	726,2
164	116,5	0	3,3	0	0	0	571,7	575
165	89	0	0,6	0	0	0	372,2	372,7
168	91,5	0	27,9	0	11	12,3	56,7	107,9
170	73	0	30,7	0	6,3	0	112,9	149,9
171	109	0	19,5	0	19	0,8	229,1	268,4
175	95	0	12,7	0	35,1	0	95,3	143,1
176	110	0	22,2	0	14,8	0	88,4	125,4
177	123,5	0	6,9	0	16,9	0	98,8	122,6
Mean	109,9	0	93,8	0,2	5,5	1	292,4	392,9
Std dev	25,2	0	197,1	0,5	9,1	3	236,4	306,4

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

Slope (201-800 m).

Number of stations: 37								
Station	Gear depth	A. varidens	Hake	N.africana	P.longirost	Seabream	Other	Total
108	263,5	46,4	242,9	0	0	47,4	2730,9	3067,6
109	369	6,4	145,1	90,9	16,3	0	438,8	697,4
110	489	23,1	1,5	462,2	0	0	349,8	836,6
111	522,5	0,3	0	399,3	0	0	286,8	686,3
112	709	24,8	0	176,6	0	0	497,6	699
113	528,5	22,9	0	352,9	0	0	184,5	560,3
118	228,5	0	73,5	0	8,3	37,9	1011,3	1131
119	306,5	0	66,3	0	14	0	378	458,3
120	450,5	32,2	9,1	317,8	0	0	337,4	696,5
121	524,5	71	0	475,4	0	0	396,4	942,8
123	417	3,7	19,3	280,1	0	0	295,4	598,4
128	311,5	0	99,8	0	1	0	1032,6	1133,3
129	421,5	9,6	6,4	193,3	0	0	347,8	557,2
130	609,5	3,8	16,5	223	0	0	535,7	779
131	708,5	4	0	0	0	0	804,3	808,3
136	537	27,2	5,1	243,6	0	0	119,8	395,7
137	632,5	2,4	0	210	0	0	307,2	519,7
138	749,5	0	0	0	0	0	605,1	605,1
139	631	18,1	0	0	0	0	312,2	330,4
140	256	0	615,2	0	57,1	0	2036,2	2708,5
145	359,5	11,5	60,2	213,6	0	0	368,1	653,5
150	426	9,6	110	0	0	0	322,2	441,8
151	707	0	0	0	0	0	294,4	294,4
154	226	0	19,1	0	18,8	35	192,4	265,3
158	264,5	0	52,4	0	188,5	112,2	2721	3074
159	313	0	80,6	0	6,5	0	358,6	445,8
160	624,5	0	0	56,9	0	0	262,3	319,2
161	514	16,6	1,5	130,2	0	0	167,4	315,8
162	444,5	31,8	27,1	19	0	0	354,5	432,5
163	270,5	0	122,1	0	198,6	12,8	1153,1	1486,7
172	351,5	0	16,6	0	4,8	0	528,3	549,7
173	756,5	0	0	0	0	0	1326,2	1326,2
178	231	0	20,5	0	6,4	43,2	1334,1	1404,2
179	328	0	98,5	0	45,5	0	1169,2	1313,1
180	653	3,2	21,7	0	0	0	444,6	469,4
181	717,5	1,3	6,2	0	0	0	676,2	683,6
182	721	4,5	0	0	0	0	429,5	434
Mean	475	10,1	52,4	103,9	15,3	7,8	678,7	868,1
Std dev	173,6	15,7	109,2	149	44,9	21,9	644	706,3

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

Inner shelf (20-70 m).

Number of stations: 16								
Station	Gear depth	Cephalopoda	Demersal	Pelagic	Sharks	Shrimps	Other	Total
25	55,5	56,5	819,4	46,8	0,0	0,0	323,1	1245,8
28	56,0	24,8	215,7	45,6	0,0	0,0	116,8	402,9
42	64,5	19,9	389,7	167,9	0,0	0,0	174,7	752,2
43	33,5	41,7	214,6	81,2	0,0	0,0	64,2	401,7
44	61,0	53,4	255,1	3,8	0,0	0,0	142,5	454,8
55	66,5	108,6	96,2	834,9	0,0	0,0	357,8	1397,5
56	22,0	9,0	166,5	7,0	0,0	0,0	82,8	265,3
70	37,5	36,2	1073,8	40,6	0,0	1,5	169,7	1321,8
76	37,0	1,2	81,0	81,9	0,0	0,0	95,0	259,1
77	24,0	12,4	669,1	146,8	0,0	4,3	339,2	1171,8
89	44,5	0,0	6363,2	454,2	0,0	0,0	838,8	7656,2
90	58,5	0,3	96,7	399,0	0,0	0,6	162,8	659,4
91	35,5	1,9	132,4	13,2	0,0	0,6	120,8	268,9
99	31,5	10,2	283,8	91,5	0,0	0,0	199,5	585,0
100	31,0	0,3	767,3	14,4	0,0	0,3	192,3	974,4
104	22,5	0,5	179,3	51,6	0,0	0,9	172,4	404,8
Mean	42,6	23,6	737,7	155,0	0,0	0,5	222,0	1138,9
Std dev	15,5	29,9	1530,5	224,9	0,0	1,1	186,8	1783,0

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

Outer shelf (71-200 m).

Number. of stations: 16								
Station	Gear depth	Cephalopoda	Demersal	Pelagic	Sharks	Shrimps	Other	Total
23	105,5	11,9	1228,2	11,9	0,0	0,0	253,2	1505,3
24	89,5	25,6	476,3	161,8	0,0	0,0	72,4	736,1
29	102,5	2,1	87,7	3,1	0,0	0,0	54,2	147,2
41	162,5	0,0	87,9	19,0	0,0	0,0	3745,2	3852,1
45	103,5	44,9	122,8	0,0	13,2	0,0	317,1	498,0
54	149,0	15,8	146,7	1,2	0,0	0,0	374,1	537,8
57	98,0	29,5	87,1	0,0	0,0	0,0	2093,5	2210,1
58	134,0	2,8	177,3	0,0	0,0	0,2	193,1	373,4
69	81,0	10,2	25,7	19,3	0,0	0,0	231,1	286,3
74	140,5	3,4	71,3	112,8	0,0	0,0	140,8	328,3
75	73,0	2,0	39,8	178,9	0,0	0,0	108,6	329,2
78	73,0	5,3	22,8	75,8	0,0	0,0	155,8	259,6
79	185,0	5,9	227,9	0,0	0,0	0,0	180,9	414,7
87	106,5	5,2	102,0	161,4	0,0	0,0	168,5	437,1
88	77,5	19,2	30,6	138,2	5,0	0,0	162,5	355,4
92	119,0	12,5	153,2	1,7	0,0	0,3	211,3	379,1
97	109,5	6,2	80,6	20,5	0,0	0,0	187,0	294,4
98	82,5	10,7	138,3	104,6	0,0	0,0	94,3	347,9
101	97,5	25,2	98,6	6,6	0,0	6,1	339,5	476,0
102	178,5	2,1	60,7	2,5	0,0	19,5	128,3	213,1
103	116,0	18,7	103,0	25,4	0,0	0,0	369,2	516,4
Mean	113,5	12,3	169,9	49,7	0,9	1,2	456,2	690,4
Std dev	33,3	11,5	261,2	64,3	3,0	4,4	864,3	865,0

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

Slope (201-800 m).

Number of stations: 47								
Station	Gear depth	Cephalopoda	Demersal	Pelagic	Sharks	Shrimps	Other	Total
26	677,5	0,3	14,8	0,0	1,2	39,5	93,7	149,4
27	735,0	0,1	12,5	0,2	2,1	24,5	118,6	158,0
30	233,0	1,1	578,1	0,0	0,0	45,2	2101,0	2725,4
31	329,5	0,0	831,0	1,4	30,2	163,5	1106,1	2132,2
32	434,0	2,0	103,7	2,1	0,0	120,3	226,6	454,7
33	509,5	0,0	23,5	41,6	6,8	245,3	309,9	627,1
34	606,5	0,4	23,2	0,0	0,9	167,2	216,6	408,4
35	720,5	0,0	35,6	0,0	22,8	14,4	177,6	250,4
36	652,5	0,0	32,7	0,9	13,9	62,9	238,9	349,2
37	535,0	18,4	498,6	0,0	7,9	114,4	167,8	807,1
38	439,0	3,1	295,5	1,9	36,4	128,7	371,2	836,9
39	331,0	7,3	200,1	5,0	0,0	40,0	975,3	1227,7
40	251,5	8,6	325,0	183,4	0,0	34,5	1721,4	2272,9
46	282,5	0,0	305,8	0,0	11,2	34,4	236,1	587,5
47	382,5	0,0	92,3	4,3	14,2	392,0	499,4	1002,2
48	430,0	4,3	18,6	1,9	0,0	150,5	513,6	688,9
49	550,0	0,0	10,9	0,5	0,0	198,5	116,5	326,4
50	521,0	3,4	12,5	0,0	0,2	207,3	109,9	333,3
51	414,0	10,0	38,1	6,1	33,7	303,3	416,0	807,2
52	331,0	1,3	763,2	0,0	109,2	201,1	452,4	1527,1
53	271,5	1,2	472,1	13,5	0,0	24,0	1099,5	1610,3
59	217,5	4,6	194,7	0,5	0,4	1,4	216,0	417,6
60	328,0	0,0	225,0	0,0	9,4	109,9	257,1	601,4
61	438,5	0,8	40,0	1,5	1,1	314,1	198,8	556,3
62	558,0	0,0	70,9	0,4	2,5	280,8	264,5	619,2
63	649,0	19,6	100,3	0,6	1,9	224,2	174,5	521,2
64	743,0	21,6	127,3	0,0	10,8	111,7	185,6	457,0
65	512,5	1,2	88,9	0,6	3,9	187,1	287,4	569,2
66	431,0	4,8	384,5	6,0	52,0	422,0	274,0	1143,4
67	364,0	9,4	112,2	39,7	14,1	256,3	302,9	734,6
68	251,5	2,9	1127,3	33,4	0,0	9,8	1890,7	3064,0
71	451,0	0,0	27,1	0,0	0,0	341,0	214,4	582,5
72	351,0	0,0	419,2	3,0	12,2	130,1	710,3	1274,9
73	254,0	0,9	47,4	0,9	0,0	2,9	346,4	398,4
80	249,0	5,3	824,8	3,9	0,0	114,4	1674,5	2622,9
81	328,5	0,0	625,2	0,0	0,0	28,6	1064,9	1718,7
82	435,0	0,0	7,5	1,7	0,0	246,0	269,4	524,6
83	729,0	15,7	24,2	0,0	18,9	6,7	340,9	406,5
84	523,0	1,6	37,9	0,0	1,1	250,0	102,7	393,3
85	413,0	9,3	133,1	0,5	44,0	282,2	502,5	971,6
86	227,5	12,9	379,8	0,0	2,8	1,7	1616,4	2013,6
93	286,0	0,0	321,3	0,0	9,0	5,3	590,8	926,4
94	380,0	0,0	133,3	0,0	3,0	279,0	257,1	672,4
95	459,0	0,0	0,4	0,0	1,6	407,6	85,7	495,2
96	210,0	11,1	566,6	16,4	0,0	4,7	551,9	1150,8
105	649,5	0,0	169,9	0,0	0,9	193,3	132,3	496,3
106	738,0	2,8	53,6	0,0	4,9	4,0	432,8	498,3
Mean	442,8	4,0	232,6	7,9	10,3	147,4	515,2	917,3
Std dev	161,4	5,8	269,3	27,9	19,3	123,8	520,2	711,1

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

Inner shelf (20-70 m).

Number of stations: 16									
Station	Gear depth	Croakers	Groupers	Grunts	Hake	Seabream	Snappers	Other	Total
25	55,5	42,8	0	142,1	0	577,2	0	483,7	1245,8
28	56	2,4	1,6	42,8	0	167,9	0	188,2	402,9
42	64,5	0	4,4	4,6	0	151,6	0	591,6	752,2
43	33,5	0	0	5,5	0	81,9	0	314,4	401,7
44	61	7,9	8,2	9,6	0	225,8	0	203,4	454,8
55	66,5	0	0	0	0	96,2	0	1301,3	1397,5
56	22	0	0,8	1,7	0	163,5	0	99,3	265,3
70	37,5	404,1	0	118,4	0	430,2	0	369,2	1321,8
76	37	3,5	0	0	0	0,9	0	254,7	259,1
77	24	169,4	0	4,4	0	0	0	998	1171,8
89	44,5	31,7	0	30	0	178,8	0	7415,6	7656,2
90	58,5	3,3	1,8	0	0	86,9	0	567,5	659,4
91	35,5	114,1	0	4	0	0	0	150,8	268,9
99	31,5	17,4	0	48,4	0	39,2	0	480	585
100	31	0	0,5	448,2	0	318,6	0	207,2	974,4
104	22,5	144,2	0,2	27,1	0	0	0	233,3	404,8
Mean	42,6	58,8	1,1	55,4	0	157,4	0	866,1	1138,9
Std dev	15,5	107,6	2,2	113,1	0,0	165,2	0,0	1776,1	1783,0

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

Outer shelf (71-200 m).

Number of stations: 21									
Station	Gear depth	Croakers	Groupers	Grunts	Hake	Seabream	Snappers	Other	Total
23	105,5	0	0	0	0	1228,2	0	277,1	1505,3
24	89,5	187,2	0,9	0	0	245,1	0	302,9	736,1
29	102,5	8,9	4,8	0	0	74	0	59,5	147,2
41	162,5	2,3	0	0	0	60	0	3789,8	3852,1
45	103,5	0,8	0	0	0	38,5	0	458,7	498
54	149	5,2	0	0	49,5	46,9	0	436,2	537,8
57	98	14,8	0	0	0	33,5	0	2161,8	2210,1
58	134	1	0	0	0	111,1	0	261,3	373,4
69	81	0,3	0	0	0	8,3	0	277,7	286,3
74	140,5	0	0	0	0	63,9	0	264,4	328,3
75	73	9,8	0,4	0	0	29,6	0	289,5	329,2
78	73	1,1	2	2	0	16,7	0	237,8	259,6
79	185	36,5	0	0	48,4	143,1	0	186,8	414,7
87	106,5	0	0	0	0	102	0	335,1	437,1
88	77,5	11,1	3,5	0	0	16	0	324,9	355,4
92	119	28,2	0	0	0	56,4	0	294,5	379,1
97	109,5	5,9	0	0	0	72,8	0	215,7	294,4
98	82,5	7,3	0	0	0	125	0	215,5	347,9
101	97,5	10	0	0	0	48,4	0	417,7	476
102	178,5	5	0	0	11,2	25,9	0	170,9	213,1
103	116	32,2	0	0	0	45,9	0	438,3	516,4
Mean	113,5	17,5	0,6	0,1	5,2	123,4	0	543,6	690,4
Std dev	33,3	40,3	1,3	0,4	14,8	258,9	0	854	865

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

Inner shelf (20-70 m).

Number of stations: 16								
Station	Gear depth	Barracuda	Carangidae	Clupeoids	Hairtails	Scombrids	Other	Total
25	55,5	0	6,2	11,2	29,4	0	1199	1245,8
28	56	3,2	33,3	4,1	4,9	0	357,3	402,9
42	64,5	45,2	117,2	4	0	1,4	584,3	752,2
43	33,5	0	79,2	2	0	0	320,5	401,7
44	61	2,1	1,6	0	0	0	451,1	454,8
55	66,5	0	834,9	0	0	0	562,6	1397,5
56	22	0,4	6,6	0	0	0	258,3	265,3
70	37,5	0	0	0	40,6	0	1281,2	1321,8
76	37	0,2	73,7	3	2,2	0	180,1	259,1
77	24	2	17	20,6	107,2	0	1025	1171,8
89	44,5	0	389	30	35,1	0	7202	7656,2
90	58,5	0	186,3	8,6	202,4	0	262,1	659,4
91	35,5	0	1,6	7,7	3,8	0	255,8	268,9
99	31,5	14,8	57,8	0,5	14,2	0,7	496,9	585
100	31	11,4	2,9	0	0	0	960,1	974,4
104	22,5	14,6	0,4	25,9	7,1	0	356,8	404,8
Mean	42,6	5,9	113	7,4	27,9	0,1	984,6	1138,9
Std dev	15,5	11,8	217,4	9,8	54,2	0,4	1695,3	1783

Outer shelf (71-200 m).

Number of stations: 21								
Station	Gear depth	Barracuda	Carangidae	Clupeoids	Hairtails	Scombrids	Other	Total
23	105,5	0	11,9	0	0	0	1493,3	1505,3
24	89,5	0	32,7	0	129,1	0	574,3	736,1
29	102,5	0	0	0	0	3,1	144,1	147,2
41	162,5	0	0	0	19	0	3833,1	3852,1
45	103,5	0	0	0	0	0	498	498
54	149	0	0	0	1,2	0	536,6	537,8
57	98	0	0	0	0	0	2210,1	2210,1
58	134	0	0	0	0	0	373,4	373,4
69	81	0	19,3	0	0	0	267	286,3
74	140,5	0	0	0	112,8	0	215,5	328,3
75	73	0	176,6	2,2	0,1	0	150,4	329,2
78	73	2	73	0,5	0,4	0	183,8	259,6
79	185	0	0	0	0	0	414,7	414,7
87	106,5	0	158,7	0	0	2,7	275,7	437,1
88	77,5	0	137,5	0,7	0	0	217,2	355,4
92	119	0	0	0	1,7	0	377,4	379,1
97	109,5	0	19,7	0	0,9	0	273,9	294,4
98	82,5	0	67,3	0	37,3	0	243,3	347,9
101	97,5	0	0	1,9	4,7	0	469,5	476
102	178,5	0	0	0,8	1,6	0	210,6	213,1
103	116	0	15	2,4	8	0	490,9	516,4
Mean	113,5	0,1	33,9	0,4	15,1	0,3	640,6	690,4
Std dev	33,3	0,4	56,2	0,8	36,4	0,9	879,4	865

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

Slope (201-800 m).

Number of stations: 47								
Station	Gear depth	A.varidens	Hake	N.africana	P.longirost	Seabream	Other	Total
26	677,5	36,8	4,4	0	0	0	108,2	149,4
27	735	21,1	0	0	0	0	136,9	158
30	233	0	523,8	0	45,2	35,1	2121,2	2725,4
31	329,5	8,2	831	151,1	3,4	0	1138,4	2132,2
32	434	13	93	106,2	0	0	242,6	454,7
33	509,5	75,9	1,6	166,6	0	0	383	627,1
34	606,5	12,7	3,6	0	0	0	392	408,4
35	720,5	12	0	0	0	0	238,5	250,4
36	652,5	60,8	0	0	0	0	288,4	349,2
37	535	43,6	14,8	70	0	0	678,7	807,1
38	439	10,7	282,5	111,6	0	0	432,1	836,9
39	331	0	200,1	34,2	0	0	993,5	1227,7
40	251,5	0	277,6	0	34,5	1,8	1959	2272,9
46	282,5	5,6	302,8	0	20,9	0	258,1	587,5
47	382,5	62,5	89,3	329,2	0	0	521,3	1002,2
48	430	30,7	0	116,9	0	0	541,3	688,9
49	550	66,4	2,3	129,6	0	0	128,1	326,4
50	521	34,5	0	167,8	0	0	131	333,3
51	414	29,2	25,3	258,7	0	0	494	807,2
52	331	0	763,2	0	87,3	0	676,7	1527,1
53	271,5	0	365,1	0	24	83,7	1137,7	1610,3
59	217,5	0	127	0	1,4	39,9	249,3	417,6
60	328	0,3	225	100,2	9,4	0	266,5	601,4
61	438,5	72,5	2,3	239,7	0	0	241,8	556,3
62	558	31,6	1,7	247,3	0	0	338,5	619,2
63	649	17,8	0	203,7	0	0	299,7	521,2
64	743	3,7	0	107,3	0	0	346,1	457
65	512,5	71,3	5,1	115	0	0	377,8	569,2
66	431	30,6	161,6	305,2	0	0	646	1143,4
67	364	0	112,2	255,1	0	0	367,2	734,6
68	251,5	0	1115,8	0	9,8	0	1938,4	3064
71	451	38	0	302,1	0	0	242,4	582,5
72	351	0	419,2	129,4	0,4	0	725,8	1274,9
73	254	0	25,2	0	2,9	10,6	359,7	398,4
80	249	0	707,1	0	114,4	117,7	1683,7	2622,9
81	328,5	0,5	625,2	25,8	2,1	0	1065,1	1718,7
82	435	29,3	4,1	216	0	0	275,2	524,6
83	729	2,9	4,5	0	0	0	399,1	406,5
84	523	58,3	0	186,4	0	0	148,5	393,3
85	413	31	119,7	215,1	0	0	605,7	971,6
86	227,5	0	319,3	0	1,7	43,3	1649,3	2013,6
93	286	0	162,7	0	5,3	0	758,4	926,4
94	380	9,7	133,3	269,3	0	0	260,1	672,4
95	459	69	0	337,5	0	0	88,8	495,2
96	210	0	452,9	0	4,7	79	614,1	1150,8
105	649,5	1,3	0	192	0	0	303	496,3
106	738	2,2	0	0	0	0	496	498,3
Mean	442,8	21,1	180,9	108,3	7,8	8,7	590,4	917,3
Std dev	161,4	24,8	265,1	111,9	22	24,8	520	711,1

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

Inner shelf (20-70 m).

Number of stations: 8								
Station	Gear depth	Cephalopoda	Demersal	Pelagic	Sharks	Shrimps	Other	Total
1	24,0	0,0	264,4	3737,3	111,0	0,0	876,1	4988,8
6	34,0	35,3	0,0	18232,9	0,0	0,0	1066,3	19334,5
12	45,0	488,4	0,0	12878,7	0,0	0,0	1516,6	14883,7
13	19,5	105,1	2,2	0	0	0	547,9	655,2
15	45,5	165,8	18,2	2480,1	1,7	0,0	53,1	2718,7
19	69,0	79,1	321,5	640,5	1,3	0,0	108,0	1150,4
20	22,5	18,8	4,2	59,4	0,0	0,0	130,1	212,4
22	30,5	418,4	1713,6	7,5	0,0	0,0	237,5	2377,0
Mean	36,2	163,9	290,5	4754,5	14,2	0,0	567,0	5790,1
Std dev	16,4	187,2	589,8	6948,6	39,1	0,0	537,3	7239,5

Outer shelf (71-200 m).

Number of stations: 10								
Station	Gear depth	Cephalopoda	Demersal	Pelagic	Sharks	Shrimps	Other	Total
2	119,5	0	2882	34421,7	0	0	77,3	37381
4	151,5	9,8	464,4	1	0	0	301,6	776,9
5	89	245,6	56,5	866,7	0	0	1609,1	2777,8
9	167	40	867,3	135,4	293,1	0,3	1103,6	2439,7
11	99	159,3	312,6	0	0	0	978,2	1450,1
14	97	1,8	882,8	10,3	61,1	0	261,9	1218
16	71,5	29,2	12,5	280,5	29,4	0	14,1	365,8
17	105,5	7,2	79,2	720,7	46,2	0	56,3	909,7
18	110,5	1,6	714,4	3435	0	0	51,1	4202,2
21	97	60,2	483,7	16,8	130,8	0	403,4	1094,9
Mean	110,8	55,5	675,5	3988,8	56,1	0	485,7	5261,6
Std dev	28,8	82,4	839,4	10744,1	93,3	0,1	551,7	11344

Slope (201-800 m).

Number of stations: 4								
Station	Gear depth	Cephalopoda	Demersal	Pelagic	Sharks	Shrimps	Other	Total
3	346,0	8,7	427,2	18,5	69,0	30,1	1681,0	2234,6
7	639,0	110,1	82,2	0,0	414,3	55,7	1372,6	2034,9
8	571,0	108,7	106,7	0,0	590,9	27,9	1194,2	2028,5
10	359,5	17,1	300,9	0,0	175,3	4,9	7006,5	7504,8
Mean	478,9	61,2	229,3	4,6	312,4	29,6	2813,6	3450,7
Std dev	148,4	55,8	164,3	9,2	235,2	20,8	2802,5	2704,4

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

Inner shelf (20-70 m).

Number of stations: 8									
Station	Gear depth	Croakers	Groupers	Grunts	Hake	Seabream	Snappers	Other	Total
1	24	150	0	7,3	0	0	0	4831,4	4988,8
6	34	0	0	0	0	0	0	19334,5	19334,5
12	45	0	0	0	0	0	0	14883,7	14883,7
13	19,5	0	0	0	0	2,2	0	653,1	655,2
15	45,5	10,3	0	0	0	1,1	0	2707,3	2718,7
19	69	24,3	0	0	9,4	268,3	0	848,3	1150,4
20	22,5	0	0	0	0	4,2	0	208,2	212,4
22	30,5	142	0	114,7	0	1456,9	0	663,5	2377
Mean	36,2	40,8	0	15,3	1,2	216,6	0	5516,3	5790,1
Std dev	16,4	65,5	0	40,3	3,3	509,8	0	7408,7	7239,5

Outer shelf (71-200 m).

Number of stations: 10									
Station	Gear depth	Croakers	Groupers	Grunts	Hake	Seabream	Snappers	Other	Total
2	119,5	0	0	0	0	2882	0	34499	37381
4	151,5	3,9	0	0	301,5	158,4	0	313,2	776,9
5	89	0	0	0	0	22,6	0	2755,2	2777,8
9	167	27,2	0	0	154,6	680,9	0	1577	2439,7
11	99	0	0	0	27,5	281,7	0	1140,9	1450,1
14	97	170,5	0	0	0	712,3	0	335,2	1218
16	71,5	0,7	0	0	0	11,8	0	353,3	365,8
17	105,5	25,2	0	0	0	54	0	830,5	909,7
18	110,5	358,6	0	0	0	355,8	0	3487,8	4202,2
21	97	5,7	0	0	0	477,9	0	611,2	1094,9
Mean	110,8	59,2	0	0	48,4	563,7	0	4590,3	5261,6
Std dev	28,8	117,4	0	0	101,2	853,9	0	10564,2	11344

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

Inner shelf (20-70 m).

Number of stations: 8								
Station	Gear depth	Barracuda	Carangidae	Clupeoids	Hairtails	Scombrids	Other	Total
1	24	0	3243,2	352,2	29,3	2,8	1361,3	4988,8
6	34	0	17296,2	930,8	0	5,9	1101,6	19334,5
12	45	0	12878,7	0	0	0	2005	14883,7
13	19,5	0	0	0	0	0	655,2	655,2
15	45,5	0	2475,8	0	0	0	242,9	2718,7
19	69	0	638,9	0	1,6	0	509,9	1150,4
20	22,5	0	59,4	0	0	0	153,1	212,4
22	30,5	0	7	0,6	0	0	2369,5	2377
Mean	36,2	0	4574,9	160,4	3,9	1,1	1049,8	5790,1
Std dev	16,4	0	6704,4	334,8	10,3	2,2	815,6	7239,5

Outer shelf (71-200 m).

Number of stations: 10								
Station	Gear depth	Barracuda	Carangidae	Clupeoids	Hairtails	Scombrids	Other	Total
2	119,5	0	34421,7	0	0	0	2959,3	37381
4	151,5	0	0	0	1	0	775,9	776,9
5	89	0	866,7	0	0	0	1911,1	2777,8
9	167	0	125	0	0	10,4	2304,3	2439,7
11	99	0	0	0	0	0	1450,1	1450,1
14	97	0	8,8	1,5	0	0	1207,7	1218
16	71,5	0	280,5	0	0	0	85,3	365,8
17	105,5	0	700,5	20,2	0	0	189	909,7
18	110,5	0	3435	0	0	0	767,2	4202,2
21	97	0	7	0	9,8	0	1078,1	1094,9
Mean	110,8	0	3984,5	2,2	1,1	1	1272,8	5261,6
Std dev	28,8	0	10745,7	6,4	3,1	3,3	911,4	11344

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

Slope (201-800 m).

Number of stations: 4								
Station	Gear depth	A.varidens	Hake	N.africana	P.longirost	Seabream	Other	Total
3	346	27,2	427,2	2,9	0	0	1777,3	2234,6
7	639	19,6	73,3	32,9	0	0	1909,1	2034,9
8	571	13,3	102,6	14,6	0	0	1898	2028,5
10	359,5	0,8	300,9	0	4,1	0	7199	7504,8
Mean	478,9	15,2	226	12,6	1	0	3195,8	3450,7
Std dev	148,4	11,2	167,9	14,9	2	0	2669,4	2704,4

ANNEX XIII. TIME SPENT ON PRIMARY OBSERVATIONS FOR CETACEANS AND SEABIRDS

Table XIII.1. Cetaceans

Species	Count	Dates	Time	Latitude	Logitude	Depth	SST (C°)	Wind direction
Bottlenose dolphin	10	27.mai.19	11:11	17°4'47"S	11°7'54"E	1478	18	S
Minke whale	1	28.mai.19	14:15	16°36'33"S	11°39'19"E	54	18	SW
Minke whale	1	28.mai.19	16:00	16°29'36"S	11°43'54"E	33	18	SW
Bottlenose dolphin	26	31.mai.19	11:45	13°28'53"S	12°30'12"E	470	23	SW
Bottlenose dolphin	20	01.jun.19	15:30	12°19'58"S	13°22'25"E	160	25	SW
Bryde's whale	1	02.jun.19	11:15	12°1'10"S	13°39'4"E	59	24	S
Pilot whale	10	02.jun.19	11:17	12°1'10"S	13°39'4"E	57	24	S
Bottlenose dolphin	15	03.jun.19	15:50	11°48'45"S	13°40'7"E	69	25	W
Bottlenose dolphin	5	06.jun.19	11:35	10°23'10"S	13°29'54"E	26	24	W
Bryde's whale	1	07.jun.19	08:50	10°21'25"S	12°58'3"E	408	25	S

Table XIII.2. Seabirds

Dates of observation	Hours spend on observation (Average)
27.05.2019	7.5
28.05.2019	7.5
29.05.2019	7.5
30.05.2019	7.5
31.05.2019	7.5
01.06.2019	7.5
02.06.2019	7.5
03.06.2019	7.5
04.06.2019	7.5
05.06.2019	7.5
06.06.2019	7.5
07.06.2019	7.5
08.06.2019	7.5
Total	97,5

ANNEX XIV. OVERVIEW OF DATA COLLECTED AND WHEN THEY ARE MADE AVAILABLE TO PARTNER COUNTRIES

2019406		after the survey, to local cruise leader Virgilio Estevão	at the post survey meeting, to local cruise leader	upon request	not collected/stored	analyzed by partner country	analyzed by Science Plan
Data types	**Data**						
Track log	Continous GPS data	x					
Diary	event information	x					
Acoustic data	EK 60 raw data		x				
Acoustic data	EK60 processed (report files like list com scatter)		x				
Acoustic data	EK80, raw data			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 (C, t, d, O, fl, light)	x					
Physics	CTD Underway				x		
Physics	ADCP 75kHz	x					
Physics	ADCP 150kHz	x					
Physics	LADCP				x		
Physics	Thermosalinograph (c, t, fl, turb)	x					
Physics	Weather st (T, w dir, w speed, solar ir, humid)	x					

2019406		after the survey, to local cruise leader Virgilio Estevão	at the post survey meeting, to local cruise leader	upon request	not collected/stored	analyzed by partner country	analyzed by Science Plan
Data types	**Data**						
Chemistry	Nutrients		x				
Chemistry	pH			x			x
Chemistry	Total alkalinity			x			x
Chemistry	Chlorophyll		x				
Biology	Trawl catch data (Nansis data base)	x	x				
Biology	Zooplankton biomass			x			
Pollution	Microplastics						x
Pollution	Microplastics (pictures)						
Geology	Sediment (trawl)						x
Geology	Grab					x	
Observation platforms	VAMS				x		
Observation platforms	WBAT				x		
Observation platforms	Deep vision				x		

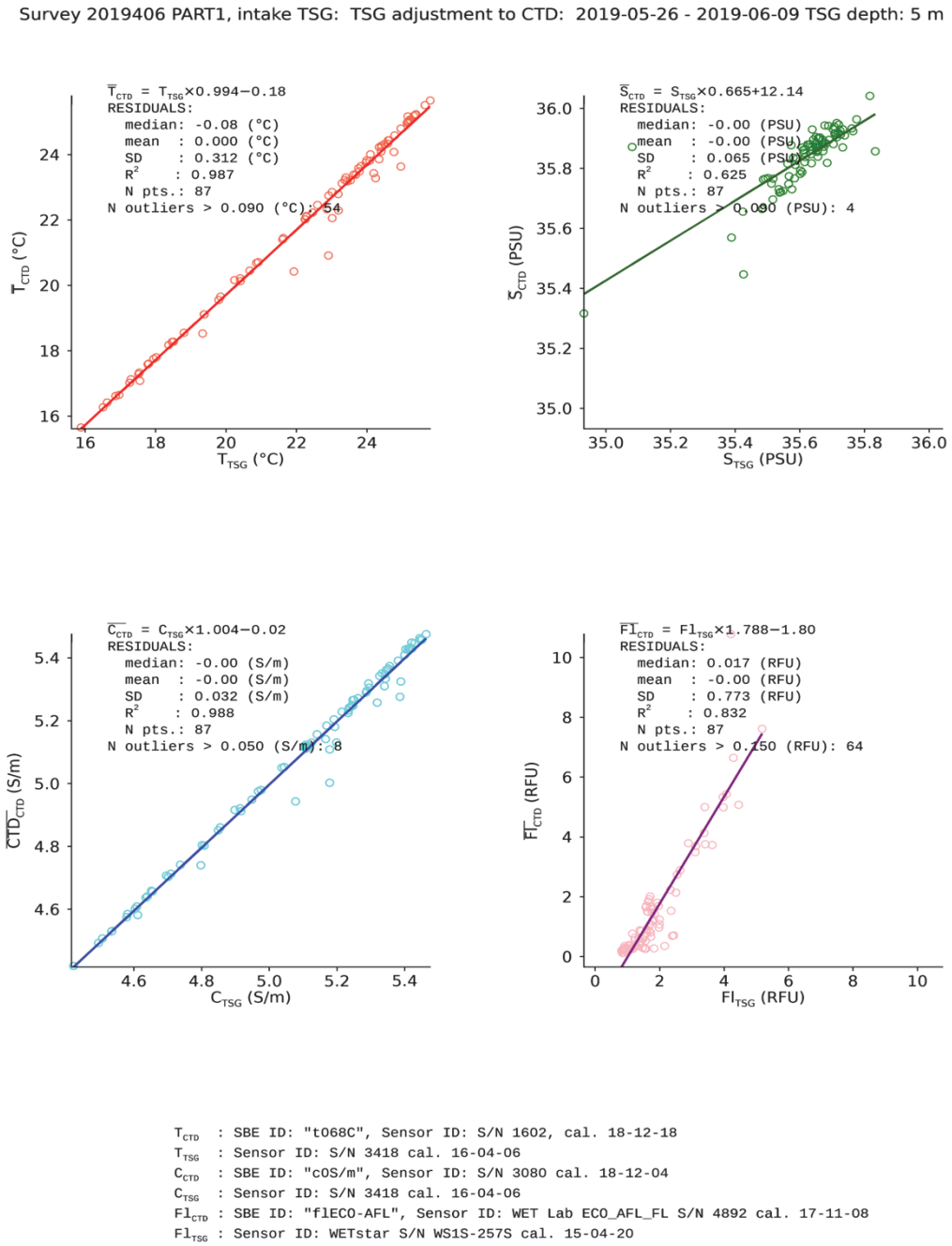
ANNEX XV. OVERVIEW OF COLLECTED SAMPLES

Species	***Station [N]***	***Tot no [N]***	***Length [N]***	***Weigth [N]***	***Sex [N]***	***Maturity [N]***	***Gonad weight [N]***	***Stomach fullness [N]***	***Genetics [N]***
Selene dorsalis	3	140	140	140					
Trachurus trecae	53	2976	2976	2976	374	374	12		
Trachurus capensis	4	144	144	144					
Sardinella aurita		63	63	63	30				21
Sardinella maderensis	7	69	69	69					
Chaceon maritae	19	259	259	259	259	60			
Cynoglossus canariensis	1	1	1						
Engraulis encrasicolus	1	100	100	100					
Brachydeuterus auritus	22	905	905	905	74				
Pomadasys jubelini	3	23	23	23					
Pomadasys incisus	11	371	371	371					
Pomadasys perotaei	5	134	134	134					
Lophiodes kempi	3	12	12	12					
Lophiodes caulinaris *	28	134	134	134	1				
Lophius vomerinus	1	1	1	1					
Merluccius polli	56	2131	2131	2131	376	372	86		
Merluccius capensis	4	192	192	192	44	44			
Merluccius paradoxus	4	120	120	120	23	23			
Galeoides decadactylus	6	246	246	246	83	83			
Argyrosomus hololepidotus	4	25	25	25					
Atractoscion aequidens	9	140	140	140					
Pseudotolithus senegalensis	5	38	38	38					40
Pseudotolithus typus	6	135	135	135	28	28	9		60
Umbrina canariensis	32	411	411	411	93	91			
Scomber colias	1	1	1	1	1				1

Species	***Station [N]***	***Tot no [N]***	***Length [N]***	***Weigth [N]***	***Sex [N]***	***Maturity [N]***	***Gonad weight [N]***	***Stomach fullness [N]***	***Genetics [N]***
Helicolenus dactylopterus	5	279	279	279					
Epinephelus aeneus	2	12	12	12	12	12			
Aristeus varidens	31	1924	1924	1924	1922	900			
Plesionika longirostris	1	11	11	11	11	9			
Parapenaeus longirostris	13	770	770	770	769	405			
Penaeus notialis	2	103	103	103	103	63			
Dentex angolensis	50	1743	1743	1743	495	490		5	420
Dentex canariensis	1	1	1	1	1	1			
Dentex macrophthalmus	20	944	944	944	136	77		25	30
Dentex congoensis	13	523	523	523					
Dentex barnardi	17	320	320	320	7				
Pagellus bellottii	48	1686	1686	1686	314	306			
Sphyraena guachancho	2	24	24	24					
Todarodes sagittatus	3	25	25	25					
Chelidonichthys capensis	2	8	8	8	4	4			
Sum		17144	17144	17143	5160	3342	107	30	572

* Possibly wrong species

Comparison of temperature, conductivity, salinity and fluorescence between TSG and CTD during leg 2.5 (Stations 469-585):

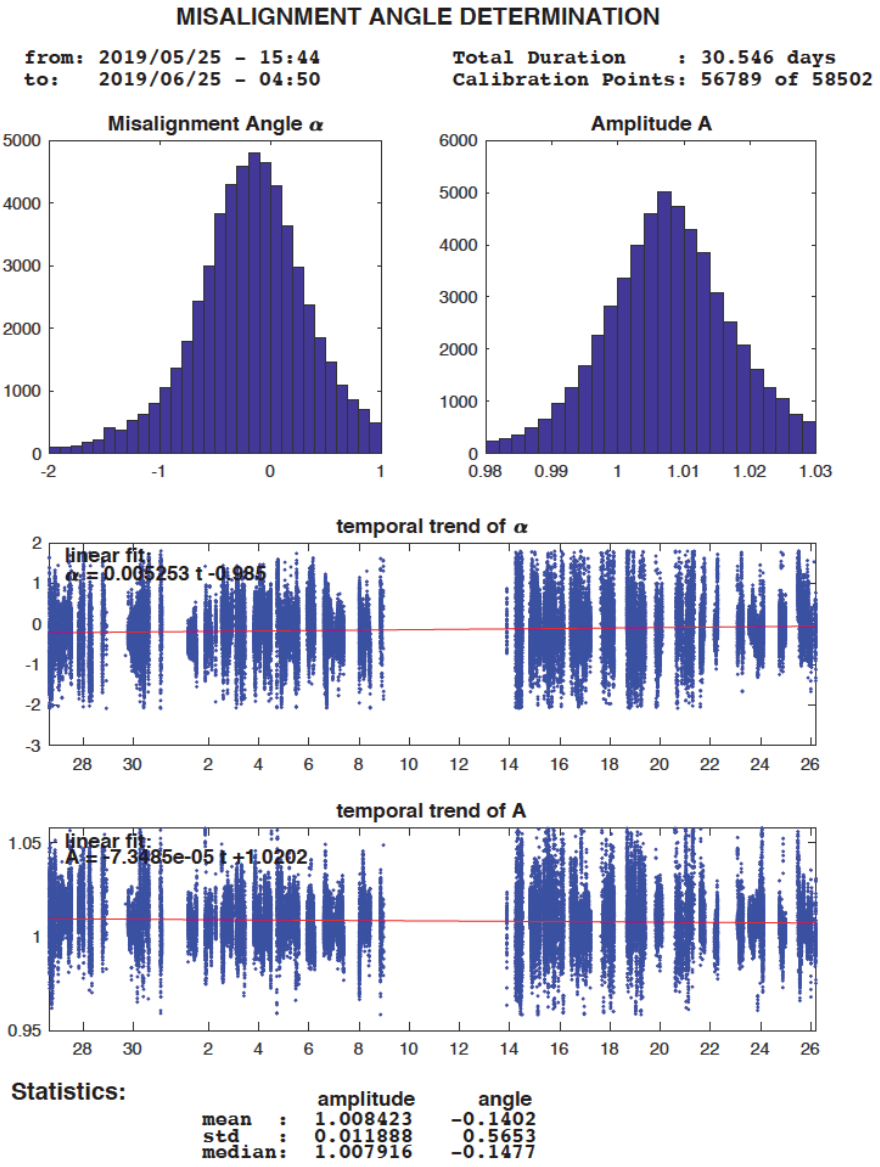


T_{CTD} : SBE ID: "t068C", Sensor ID: S/N 1602, cal. 18-12-18
T_{TSG} : Sensor ID: S/N 3418 cal. 16-04-06
C_{CTD} : SBE ID: "c0S/m", Sensor ID: S/N 3080 cal. 18-12-04
C_{TSG} : Sensor ID: S/N 3418 cal. 16-04-06
Fl_{CTD} : SBE ID: "flECO-AFL", Sensor ID: WET Lab ECO_AFL_FL S/N 4892 cal. 17-11-08
Fl_{TSG} : Sensor ID: WETstar S/N WS1S-257S cal. 15-04-20

Summary: Scattergrams of TSG vs CTD sensor values, represented by the horizontal and vertical axis, respectively; temperature (top-left), conductivity (bottom-left), salinity (top-right), fluorescence (bottom-right). TSG sampled at the time instances of the CTD probe passing the start of 5 m depth level (representing the mean value of the 4-5 m depth bin). The null hypothesis (no linear relationship between the two sensors) rejected for all presented parameters (p-value << 0.05). The descriptions indicate parameters of the residuals from the linear fit: the median, mean (a control value, always 0), SD – standard deviation, R2 – R-

squared (explained error), N – number of outliers over the predefined thresholds, 0.9°C, 0.05 S/m, 0.09 PSU and 0.15 RFU.

ADCP Transducer Orientation Correction



Summary: Result of the statistical correction of the transducer orientation for the 150 kHz ADCP for Survey 2019406. Postprocessing was accomplished using OSSI software (GEOMAR).