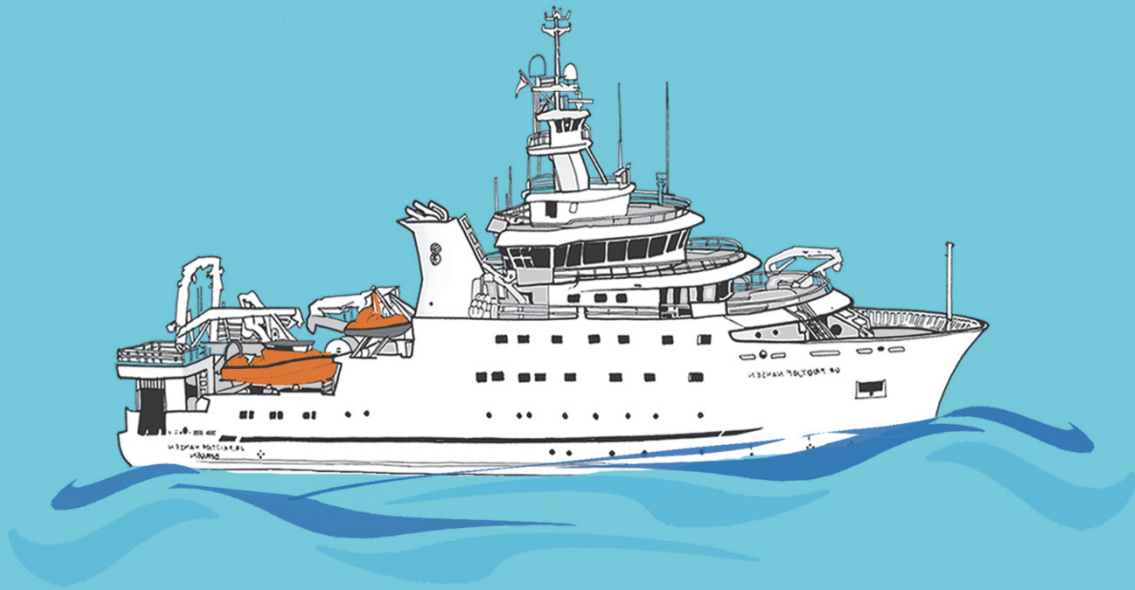


**NORAD-FAO PROGRAMME
GCP/GLO/690/NOR**

**CRUISE REPORTS *DR FRIDTJOF NANSEN*
EAF-Nansen/CR/2019/2**



TRANSBOUNDARY DEMERSAL SURVEY IN THE SOUTHEAST ATLANTIC

South Africa

28 February – 31 March 2019



**DAFF, South Africa
DEA, South Africa**

**Institute of Marine Research
Bergen, Norway**

THE EAF-NANSEN PROGRAMME (2017–2021)

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

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

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

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

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

LE PROGRAMME EAF-NANSEN (2017-2021)

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

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

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

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

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

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CRUISE REPORTS *DR FRIDTJOF NANSEN*

TRANSBOUNDARY DEMERSAL SURVEY IN THE SOUTHEAST ATLANTIC

South Africa

28 February – 31 March 2019

by

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**Institute of Marine Research
Bergen, 2020**

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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 2.1 covered the continental shelf and slope in the southwest and northwest coast of South Africa between the 30 and 800 m isobaths, from Cape Agulhas to 29°S (close to the border with Namibia). The design of the survey was based on the hake swept-area surveys developed during the 1990s and 2000s for the surveys with the R/V *Dr Fridtjof Nansen*.

Hydrographic variables (depth, temperature, salinity and oxygen) were measured with a CTD at almost every bottom trawl station and along every degree of latitude an ecosystem transect was carried out with plankton, egg and larvae, micro-plastics and water for chemical analyses sampled at predefined bathymetric depths.

This report summarises the key data on the hake stocks, and briefly several of the important bycatch species, for Leg 2.1. Much of the other data collected are presented with little analysis or comment, i.e. the oceanographic, plankton, top predator, jellyfish, benthic invertebrate and hake biological data; these data are for specialised groups to further analyse and utilise in their long-term time-series and research projects.

During a post-survey workshop held in November 2019 a further section was developed, Chapter 6, briefly investigates the transboundary distribution of the key demersal stocks between South Africa, Namibia and Angola.

This survey was conducted in late February and March; all previous surveys since 2000 have been conducted in January- February. Hence the comparability of the results from this survey with previous surveys has to be carried out with caution to adjust for daylight duration differences.

Cape hake largely consisted of a two main length-groups, one from 15 cm to 25 cm and the second from about 25 cm to 45 cm, with the fishable biomass slightly exceeding the non-fishable. On the other hand, the biomass of deepwater hake length distribution was rather unimodal with the non-fishable biomass fraction exceeding the fishable by a factor of 1.6. For both species, very few fish greater than 75 cm were observed.

The last demersal survey by the R/V *Dr Fridtjof Nansen* in the area was conducted in 2013. Compared to the estimates for deep-water hake, *M. paradoxus*, the current estimate is 35% lower (215 739 tonnes compared to 331 623 tonnes in 2013). Compared to 2013, the fishable biomass of deep-water hake in 2019 was lower by a similar percentage (34%) compared to the 123 286 tonnes estimated in 2013. This biomass is comparable to the biomass estimated in the area in 2003 and 2007. The non-fishable biomass was in turn found to be lower by 36% compared to 2013 estimates (208 338 tonnes of non-fishable biomass in 2013) (Table 1).

Table 1. Non-fishable and fishable biomass of deep-water hake in South Africa during 2003-2019 surveys

Year	Non-Fishable	Fishable	Total
2003	232 227	79 455	311 682
2005	200 077	88 850	288 927
2006	273 640	66 823	340 463
2007	234 518	79 894	314 412
2008	194 948	117 127	312 075
2009	231 501	121 594	353 095
2010	296 928	170 823	467 751
2011	237 331	138 242	375 573
2012	193 375	154 875	348 250
2013	208 338	123 286	331 624
2019	133 759	81 979	215 738

On the contrary, *M. capensis* biomass was found to have quadrupled compared to 2013, being just over 181 000 tonnes compared to approximately 45 000 tonnes in 2013. Concerning the biomass of the other important demersal resources in the area monkfish was estimated at 14 000 tonnes, kingklip at 6 000 tonnes and jakopever at approximately 43 000 tonnes.

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.

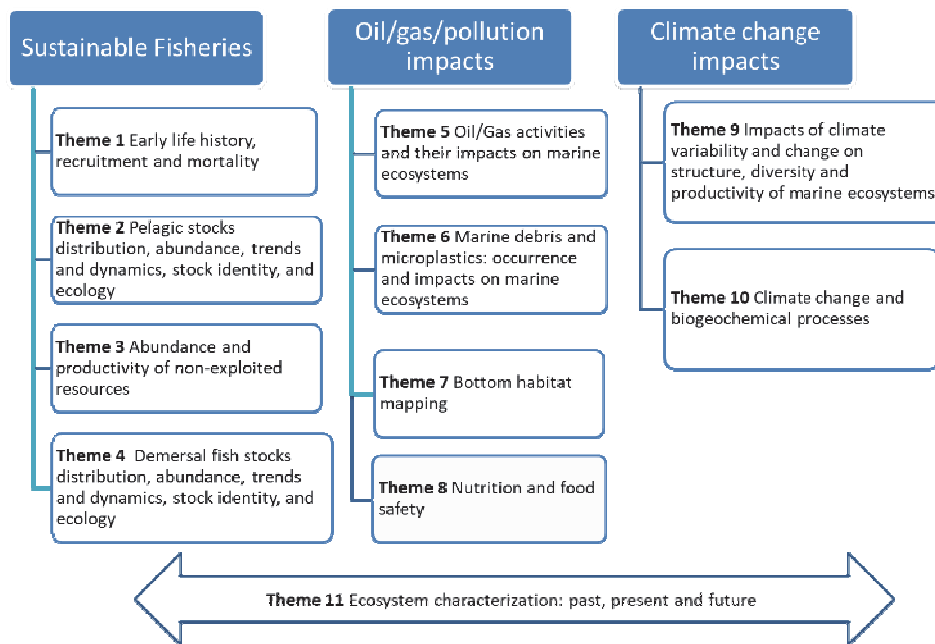


Figure 1. Research themes of the EAF-Nansen science plan

1.1 Survey objectives

The objectives of this survey were linked to Theme 4 of the Science Plan. Theme 4 has a special focus to provide knowledge on shared resources and contribute to understanding stock structure of priority demersal fish along the West African coast, their biology and the environment within which they occur. More specific objectives of this survey included:

Hydrography

- To map the hydrographic and environmental conditions in the survey area (temperature, salinity, dissolved oxygen, chlorophyll a, nutrients and pH). Obtain information on the dissolved oxygen concentrations, ocean acidification state and aragonite saturation state relevant for calcifying organisms.

Zooplankton, ichthyoplankton and jellyfish

- To describe the abundance and biomass patterns of mesozooplankton community, as well as its species composition.

- To provide information on the abundance patterns of ichthyoplankton community (fish eggs and larvae), at the lowest possible taxonomic level.
- To collect samples of jellyfish for a) morphological identification and taxonomic studies, b) genetic studies for the purposes of confirming identity, determining population structure and establishing regional and global connectivity, c) histological examination of reproductive maturity to determine reproductive synchronicity and semelparity within populations and individuals, and d) stable isotope analysis to determine trophic position and role.

Demersal resources

- To study the distribution and stock structure of hakes (*Merluccius capensis* and *M. paradoxus*), monkfish (*Lophius vomerinus*), kingklip (*Genypterus capensis* - catch composition in trawl, length frequency data, biological data, genetics, parasites and biotags).
- Carry out fecundity studies of hakes through POF (postovulatory follicles) assessment, including comparing data from SA with those from Namibia for both hake species.
- Study the distribution of juvenile hake species (otoliths, genetics, vertebral counts)

Pelagic resources

- Opportunistically collect samples of Cape horse mackerel (*Trachurus capensis*) and mackerel (*Scomber colias*) for genetic analysis.

Benthic studies

- Collect benthic invertebrate data for species identification and species composition.

Microplastics

- Map occurrence of microplastics and describe associated neustonic communities.

Top Predators

- Register occurrence of marine mammals and seabirds in the survey area.

1.2 The survey area

The area surveyed in 2019 by the R/V *Dr Fridtjof Nansen* includes the continental shelf and upper slope of West Africa from South Africa to Morocco. Furthermore, a dedicated survey to the Discovery sea mounts was carried out in collaboration with SEAFO in early 2019. Furthermore, mesopelagic transects are repeated off Walvis Bay and Morocco following the sampling strategy used in 2017. Figure 2 shows the overall survey programme foreseen for 2019 in Southwest Africa (Leg 2).



Figure 2. The survey plan for the R/V *Dr Fridtjof Nansen* during leg 2

The survey in South Africa covers the continental shelf and upper slope along the west coast of South Africa from 20 m to 800 m depth, from the south (Cape Agulhas) to the border with Namibia, following the survey design as in 2010 (see below).

1.3 Participation

A total of 23 scientists and technicians from South Africa, Namibia and Norway participated in the survey. The full list of the participants and their affiliations are given in Table 2.

Table 2. List of participants, their role and affiliation during the survey off South Africa

Name	Role	Affiliation
Jens-Otto Krakstad	Cruise Leader	IMR
Frøydis Tousgaard Rist Bogetveit	Fish Team Leader	IMR
David Cervantes	Chemical Oceanography	IMR
Olaf J Sørås	Instrument Engineer	IMR
Hege Rognaldsen	Instrument Engineer	IMR
Yonela Geja	Local Cruise Leader - Fish	DAFF
Sarah Ann Bruck	Fish - Team Leader	IMR
Kholeka Batyi-Nkwenkwe	Plankton	DEA
Monalisa Zandile Mabandla	Plankton	DEA
Jorunn Sanden	Plankton - Team Leader	IMR
Lungelwa Cordelia Nomxego	Fish	DAFF
Onele Mahlali	Fish	DAFF

Name	Role	Affiliation
Natalia Sibiya	Observer - Sea Birds	DEA
Nomzolisi Mxunyelwa	Fish	DAFF
Dumisani Ntiyantiya	Fish	DAFF
Israel Ndapandula Shigwedha	Fish	MFMR
Shamila Alexa Johr	Fish	MFMR
Roxanne Margaret Zunckel	Fish / Jellyfish	UWC
Pieter Gideon Hermanus Kotze	Observer - Marine Mammals	DEA
Baxolele Wiseman Mdokwana	CTD	DEA
Lonwabo Bebe	Fish	DEA
Sthabiso Siphamandla Mbongwa	CTD	DEA
Nikolaos Nikolioudakis	Scientist	IMR

List of institution abbreviations:

- IMR – Institute of Marine Research, Bergen, Norway
- DAFF – Department of Agriculture, Forestry and Fisheries, Cape Town, South Africa
- DEA – Department of Environmental Affairs, South Africa
- UWC – University of Western Cape
- MFMR – Ministry of Fisheries and Marine Resources, Namibia

1.4 Narrative

The vessel left Cape Town in the afternoon of 28 February 2019. Two days were set aside at the beginning of the survey to upgrade and test software of the trawl winch system. On the morning of March 1st, a stowaway was found onboard and the vessel had to return to port. On the following morning, the work on the trawl winches was finished and the vessel called Cape Town before proceeding to the southern border of the survey area to commence the work. The area immediately north of Saldanha Bay was reached on March 10th and the vessel continued northwards. Bad weather restricted trawling and other sampling operations for two consecutive nights before the weather conditions improved. Some bad weather was experienced again during the last few days of the survey (24 to 26 March) but without limiting the trawling operations to any large extent. The survey coverage off South Africa west coast was completed in the evening of 26 March and the vessel thereafter steamed north for calibration of the EK80 echosounders at anchorage in Walvis Bay. The calibration procedures started in the morning of 28 March and were completed the following day. The vessel called Walvis Bay on 29 March, at 17:00 local time.

1.5 Survey effort

The design of the standard survey and the sampling followed the agreed design described in the sailing order for Leg 2.1. The design of the survey was based on the *Dr Fridtjof Nansen* demersal survey in 2010, and demersal trawling was carried out on predetermined positions within predetermined depth strata. These stations were designed along a systematic survey track consisting of pseudo-parallel transect lines perpendicular to the coastline, from 20 m to 800 m depth, approximately 20 nautical miles apart. Every degree latitude an environmental

transect was carried out with detailed hydrographic sampling with CTD and zooplankton sampling stations at predefined bathymetric depths (Annex I).

Hydrographic variables were measured with a CTD at every bottom trawl station in addition to the “environmental” transects.

Table 3 summarises the survey effort in each sub-area, while Table 4 shows the area covered and effort per strata as used in the swept area analyses. The cruise tracks with bottom-trawls, pelagic trawls, plankton and hydrographic stations can be found in Figures 3-5.

Table 3. Survey effort per region in number of sampling stations. Number of CTD, WP2 – zooplankton nets, Multi – Multinet midi for eggs and larvae, Manta – nets for plastic particles in the surface, BT-bottom trawl

Regions	South West	North West
Date	28/2-10/3	10/3-26/3
Distance (NM)	1 340	2 070
Number of environmental transects	9	12
BT	53	100
CTD	51	125
WP2	10	9
Multinet	8	10
Manta	9	8

Table 4. Survey effort, with number of valid trawl hauls for swept-area analysis (by region and depth strata)

Region	Effort	Depth strata (m)							
		0-100m	100m-200m	200m-300m	300m-400m	400m-500m	500m-600m	600m-700m	700m-800m
South West	Number of valid trawl hauls	1	16	7	5	8	10		
	Sampling intensity (Area / Number of valid trawl hauls)	1 959	256.9	283.7	207.8	97.9	51.2		
	Area (NM ²)	1 959	4 110	1 986	1 039	783	512		
North West	Number of valid trawl hauls	6	28	21	13	13	9	6	2
	Sampling intensity (Area / Number of valid trawl hauls)	312.0	379.5	333.6	243.6	153.3	103.8	86.2	210.5
	Area (NM ²)	1 872	10 627	7 006	3 167	1 993	934	517	421

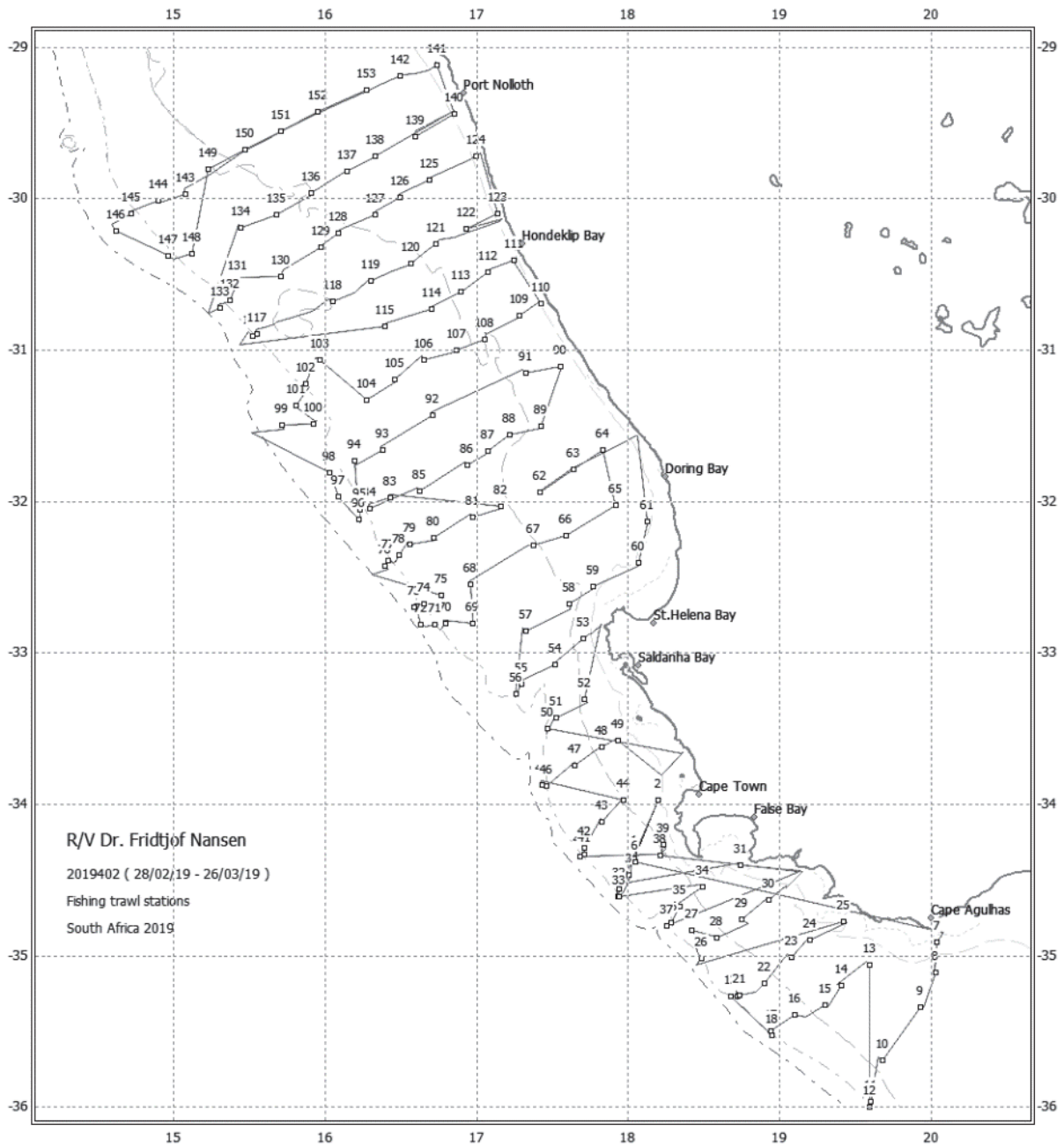


Figure 3. Cruise track and trawl stations

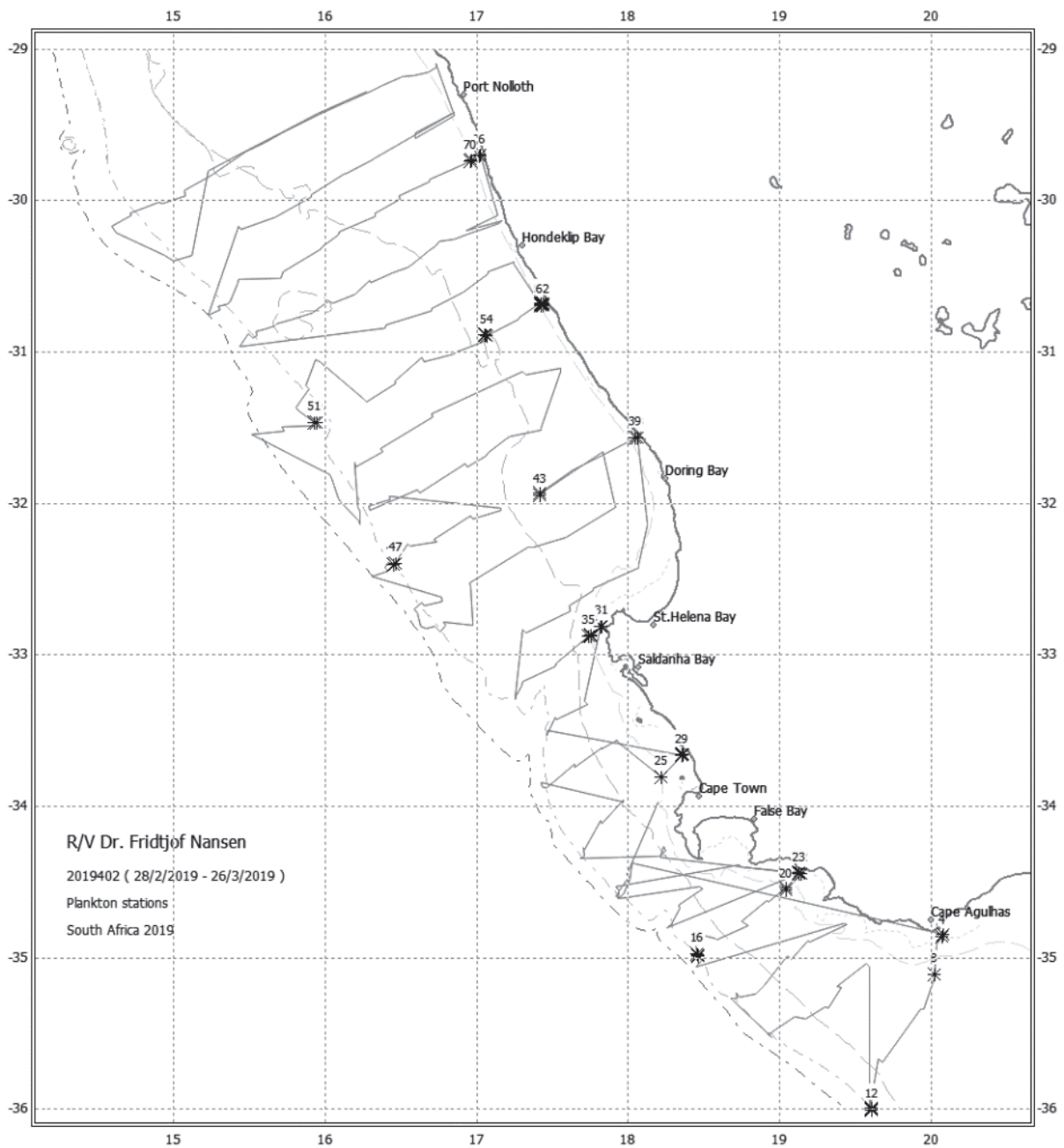


Figure 4. Cruise track and plankton stations

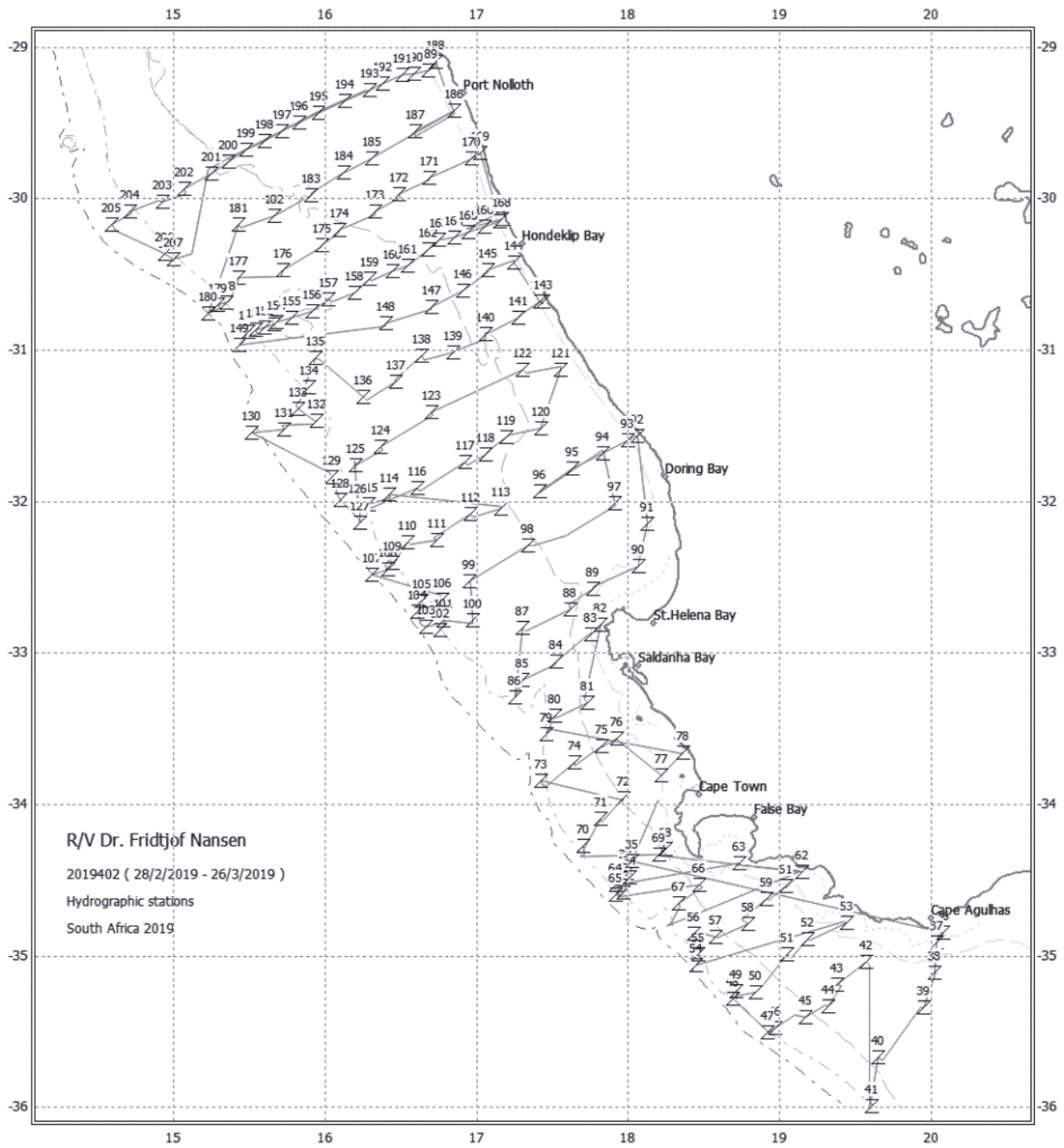


Figure 5. Cruise track and trawl stations

CHAPTER 2. METHODS

2.1 Underway sampling

2.1.1 Meteorological data recording

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

2.1.2 Thermosalinograph

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

2.1.3 Current speed and direction measurements (ADCP)

Two hull-mounted Acoustic Doppler Current Profiler (VMADCP) from RD Instruments ran during the survey. The frequency of the VMADCP are 75 and 150 kHz. During the entire survey the 75 kHz ADCP has been set to narrowband mode with 16 meter vertical bin to a maximum of 1200 meters depth while the 150 kHz ADCP has been set to broadband mode with 4 meter vertical bin to a maximum of 400 meters depth. The heading data to convert the current recorded in the ship-referenced coordinates to the absolute zonal and meridional components were obtained from the vessel's differential GPS system, Seapath.

The lowered ADCPs (LADCP) were used together with the CTD at the super stations up until CTD station 90. After this, they were used on every CTD station.

2.2 Fixed hydrographic station sampling

Biological and oceanographic sampling was undertaken every 60 NM, i.e. along every 3rd transect (Transects 1, 4, 7 and so on), referred to as “environmental transects”. Samples were collected at water depths between 25 and 30 m, the 100 m isobath and at 500 m. These stations were referred to as “super stations”. During each super station deployment, the 12-bottle rosette collected water at predefined depths during the up cast to obtain vertical profiles of pH, total alkalinity, nutrients, and chlorophyll a. The CTD stopped at each predefined depth for at least 20 seconds to allow the bottles to rinse with the surrounding water as it reached equilibrium to best represent the water composition at that depth. In addition, further CTD stations were sampled at all bottom trawl stations.

Types of samples collected on these transects are shown in the schematic diagram in Figure 6 and water sampling depths are provided in Annex I.

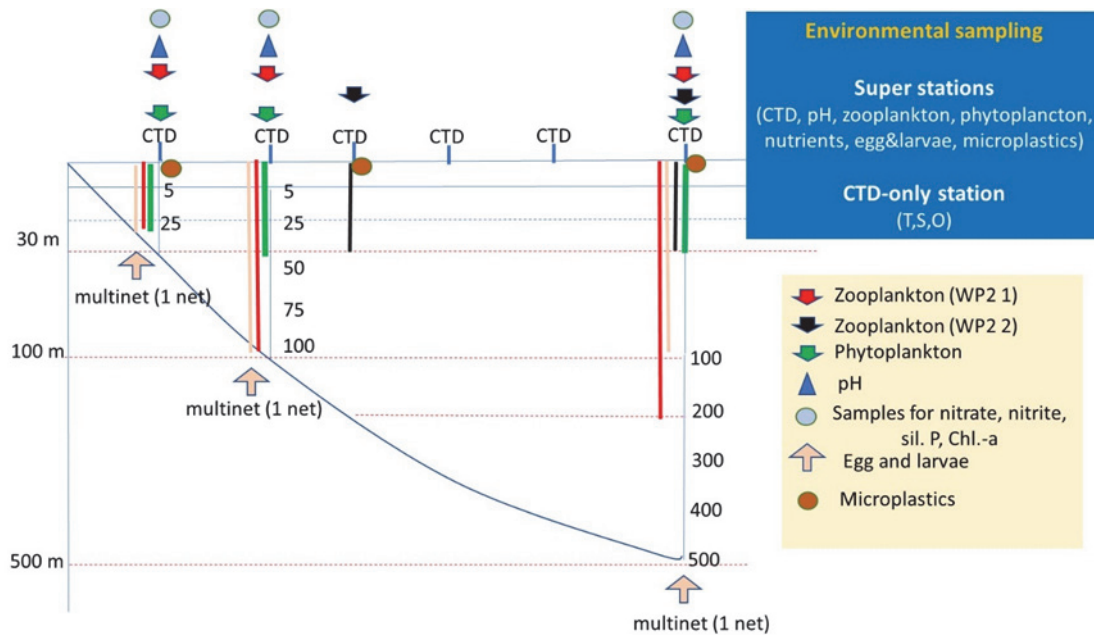


Figure 6. Schematic diagram showing the depth and the equipment used at the super stations transects, from the inshore (left side) towards the deep 500 m stations (right side). Note, phytoplankton samples were not taken during the survey

2.2.1 CTD sensors – temperature, salinity, dissolved oxygen and fluorescence

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

Water was collected from low-gradient depths of 300 m and below to perform onboard validations of the conductivity sensor derived salinity values and the dissolved oxygen sensor values. A Guildline Portasal Salinometer 8410A was used to validate the sensor salinity values, whereas the dissolved oxygen sensor measurements were validated using a Metrohm 916 Ti-Touch potentiometric titrator performing Winkler (Grasshoff *et al.* 1983) and Karl Fischer titrations.

2.2.2 Ocean acidification parameters (pH and 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 be brought to 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 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 to determine the correction factor appropriate for sample measurements. All total alkalinity titrations were performed in triplicates on board.

2.2.3 Nutrient samples

Seawater samples for nutrient analyses (nitrite, nitrate, silicate and phosphate) were collected 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. Additional nutrient samples were collected along the transects at Childs Bank and below the Orange River outlet.

2.2.4 Phytoplankton sampling

Water for chlorophyll_a samples were collected in 1000 ml polyethylene bottles and subsequently divided into two 260 ml bottles for duplicate analyses. These water samples were collected from 200 m to the surface and filtered using a 0.7µm filtration system (Munktell glass-fibre filters Grade: MGF, vacuum 200 mm Hg). The filters were stored in a freezer until they were transferred to centrifuge tubes with 10 ml of 90% acetone for 15 hours of extraction at 4°C. Samples were then centrifuged and transferred to cuvettes for measurement on a Turner Designs 10AU Fluorometer, according to Welshmeyer (1994) and Jeffrey and Humphrey (1975). First measured without acid for chlorophyll a determination and then a second time with two drops of 5% HCl for phaeopigment determination. The 10AU is calibrated approximately every three months with standards created from a chlorophyll a solid (from spinach).

Qualitative phytoplankton samples with phytoplankton net were not collected during the survey.

2.2.5 Plankton sampling

Zooplankton samples were collected with vertical tows of a WP2 net (180 µm). Sample collection and processing followed the sailing orders of the survey. Specifically, the net was towed within 5 m from the bottom to the surface, or from 200 m depth to the surface at deep stations. Each sample was halved into parts with a Motoda splitter. One half was size fractionated through 2 000 µm, 1 000 µm and 180 µm mesh sizes, and dried in the oven (60°C) in pre-weighed aluminum trays. The second half was preserved in 4% borax buffered formaldehyde solution.

Ichthyoplankton was collected with oblique tows of a Multinet midi net (405 µm). Samples were collected according to the sailing orders in most of the stations using oblique tows within 5 m from the bottom or a maximum depth of 200 m to the surface at deep stations.

However, due to low numbers of fish larvae recorded in the samples multinet deployment changed to double-oblique tows to increase the volume of water filtered. This change was applied on the 17/3/2019 and for the rest of the survey (i.e., St 132-169). In all cases, once the Multinet was on board the sample was divided in two parts by use of a Motoda plankton splitter. Each part was treated as follows:

- a) One half of the sample was sieved on a 180 μm and transferred in a 100 mL bottle (or bigger) and preserved immediately in 96% ethanol.
- b) The other half was examined under the microscope and ichthyoplankton was sorted (for most of the samples). The sorted larvae were photographed and preserved in 4% borax buffered formaldehyde solution (especially for ichthyoplankton) in small labelled scintillation vials indicating clearly the part of the sample used (i.e. 50%), the preservative, station etc. When sorting had finished, the bulk sample was preserved in 4% borax buffered formaldehyde (especially made for ichthyoplankton) in labelled bottles (as “sorted”).

Samples from Manta trawl were collected and processed according to the sailing orders. All samples were sorted on board for microplastics and ichthyoplankton. Sorted microplastics were photographed, washed in fresh water, dried in aluminum trays, individually packed in aluminum foil and stored frozen. Sorted fish larvae and eggs were sorted, photographed, preserved in 96% ethanol for genetics in small scintillation vials. The bulk of neuston samples after sorting was preserved in 96% ethanol.

2.3 Sediment sampling

Sediment from bottom trawls: stainless steel cylinders were mounted on the footrope of the trawl to collect bottom sediment samples at every trawl station. The samples were collected from the cylinder when the trawl was on deck and stored in Rizan plastic bags and preserved for further analyses of sedimentological and chemical compositions.

2.4 Bottom mapping echo sounder

The EM 710 and EM 302 multibeam echo sounders belong to a very high-resolution seabed mapping system. The EM 302 is hull mounted whereas the EM 710 is mounted on the drop keel. The operational depths of the EM 710 are 3 to 2 000 m and of the EM 302 are 10 to 7 000 m. Across track coverage (swath width) is up to 5.5 times water depth and may be limited by the operator either in angle or in swath width without reducing the number of beams. The operating frequencies are between 70 to 100 kHz. There are 128 beams with dynamic focusing employed in the near field. The transmitting fan is divided into three sectors to maximize range capability and to suppress interference from multiples of strong bottom echoes. The sectors are transmitted sequentially within each ping and use distinct frequencies or waveforms. The along track beam width is 1 degree. Ping rate is set according to depth. The receiving beam width is 2 degrees. Sound profiles were set manually in the system

according to the area of operation. The EM 710 was not operational for most of the survey. Data from the EM 302 were 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.

2.5 Top predator observations

Observations for marine mammals and seabirds were carried out from the observation platform of the vessel, situated 21.5 m above sea level, during daylight hours between 07:00 to 18:00 (with breaks). 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 to confirm sightings. The search effort changed from primary to secondary during such stations. Both marine mammal and seabird observers assisted with observations, covering a forward angle of 180° from port to starboard to an approximate distance of 2.5 km from the vessel. Scanning for animals was performed by using either the naked eye or handheld Pentax (7X35; 9.3) and Lynx reticular binoculars to locate and identify different species as well as determining group sizes. In cases where a slightly spread out group of cetaceans were observed, the observation time, ship’s position and the distance between the ship and first animal were recorded as if for the entire group. Sighting positions were obtained from a Garmin eTrex 30 GPS. Species identification were carried out through the careful observation and photography (Canon EOS 80D camera with 100-400 mm telephoto lens) of specific features such as shape and height of the blow, body shape and size, colour patterns and animal behaviour. Two cetacean field and identification guides were consulted for more challenging identifications (Mark Carwardine with Illustrations by Martin Camm, *Whales Dolphins and Porpoises*, Dorling Kindersley Limited, 1995) and (Thomas A. Jefferson; Marc A. Webber; Robert L. Pitman; Illustrations by Uko Gort, *Marine Mammals of the World - A Comprehensive Guide to Their Identification*, Second Edition, 2015).

All relevant sightings data were recorded on the standard International Whaling Commission’s Cetacean Data Record Sighting form. Additional data such as ship’s time (GMT+2), position of the ship, orientation(bearing) and distance of the animal(s) relative to the ship were also noted. Since adverse weather conditions negatively effects sight- and visibility, parameters such as cloud cover, wind speed and direction, swell size, rainfall, water and air temperature and sea state were recorded hourly. Primary observations were only ceased during super stations, trawl stations, severe mist, rain or wind speeds in excess of 20 knots in strength.

Seabird observations were conducted in similar fashion during day light hours but at 10-minute increments, meaning that a GPS-position was recorded every 10 minutes and all seabirds observed during that period recorded. Observations were done by both seabird and marine mammal observers, covering the forward angle of 180° from the port to starboard side

and within a 300 m distance from the vessel. Observations were not carried out during oceanographic and fisheries sampling stations or during unfavourable weather conditions. Birds were recorded as in-flight or sitting on the water at the time of the sighting. Sightings were only recorded while the vessel was in transit between research stations. Birds following the vessel between stations were not recorded. Searching for seabirds was performed either by naked eye or handheld Pentax (7X35; 9.3) and Lynx reticular binoculars. A Garmin eTrex 30 GPS was used to obtain accurate ships positions. Seabirds were identified using their body shape and size, colour patterns and the way of flight. A Nikon D7000 camera with 80-200 m telephoto lens were used to further assist with confirmation of species identification. A seabird field guide, Guide to Seabirds of Southern Africa by Peter Ryan, 2017 was also used to assist with species identification of unknown seabird species.

2.6 Biological trawl sampling

Biological sampling of the fish was carried out using a bottom trawl. A more detailed description of instruments and fishing gear is given Annex II.

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.*, 1988) in addition to several online databases especially the Eschmeyer database (Fricke *et al.*, 2019), WoRMS database (WoRMS Ed. Board, 2018) and FishBase (Froese and Pauly, 2018). Invertebrates were identified using the Field Guide to Offshore Marine Invertebrates of South Africa (Atkinson and Sink, 2018). The complete records of fishing stations and catches are shown in Annex III.

For the selected target species length (total length to the nearest cm) and weight (to the nearest 0.5 g) were recorded. When the size distribution of the target species in the catch was seemingly narrow (similarly sized individuals), a total of 50 individuals were length measured. Length and weight measurements were used to estimate the length-weight relationship and together with length frequency distributions applied in biomass calculations. Further biological analyses of sex, gonad maturity stage (according to table in Annex IV), and stomach fullness (according to table in Annex IV) will be recorded after the survey based on the samples offloaded at NatMIRC. These samples were taken to investigate the parasite community and allow sampling in relation to genetics, maturity, stomach and otoliths (Table 5). A list of biological scales used for maturity and stomach fullness is given in Annex IV. An overview of the sampling procedures followed in the fish lab is provided in Annex V.

Table 5. Samples for main target species and specific sampling (to be done on land)

Species	Specific sampling
<i>Merluccius paradoxus</i>	Whole fish (for genetics and parasites+ standard sampling of maturity, stomach, otoliths) Gonads (fish >45 cm) 30 specimens per degree 20 specimens /trawl haul in the same day/region
<i>Merluccius capensis</i>	Whole fish (for genetics and parasites+ standard sampling of maturity, stomach, otoliths) Gonads (fish >45 cm) 30 specimens per degree 20 specimens /trawl haul in the same day/region
<i>Dentex macrophthalmus</i> *	Whole frozen fish for morphometric analysis Consider genetic sampling
<i>Lophius vomerinus</i>	Whole fish (for genetics and parasites+ standard sampling of maturity, stomach, otoliths) Finclips samples for genetic analysis
<i>Genypterus capensis</i>	Whole fish (for genetics and parasites+ standard sampling of maturity, stomach, otoliths) Finclips samples for genetic analysis
<i>Trachurus capensis</i> and <i>Scomber colias</i>	Whole fish (for genetics and parasites+ standard sampling of maturity, stomach, otoliths) Finclips samples for genetic analysis

*NOT FOUND DURING THE SURVEY

2.7 Jellyfish Collection and Preservation

Jellyfish caught as part of the trawl haul were identified to the lowest taxonomic level possible, counted and measured or weighed, depending on the species. Specimens in good condition were photographed before being preserved for future analysis.

For the jellyfish, *Chrysaora fulgida* specimens were measured and weighed. Two small sections of the oral arm tissue were removed and preserved in both 96% ethanol and FDL Storage Buffer. This will be used to compare effectiveness of the storage methods of DNA material as well as for genetic analysis. The gonads were removed and stored in 8% seawater formalin. The remainder of the specimen was also stored in 8% sea water formalin.

Chiropsopus gorilla specimens that were collected were measured and weighed and preserved whole in 8% seawater formalin. Two small sections of the oral arms were removed for DNA analysis and a comparison between the FDL Storage Buffer and 96% ethanol for the storage of genetic material.

Atolla wyvillei, *Pelagia noctiluca* were measured and preserved whole in 96% ethanol. The samples were frozen, and the ethanol was replaced after the initial 24 hours. Two small sections of the oral arms were removed for the same genetic analyses described above.

The samples collected will be used to determine both the species and the population structure, as well as establishing regional and global connectivity. These samples will aid with a greater morphological identification and taxonomic study as part of Theme 3 of the EAF-Nansen Science Plan.

2.8 Acoustic sampling

2.8.1 Sonar data

No sonars were used during the survey.

2.8.2 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. The last calibration was conducted in Bergen on 23 January 2017. Annex II provides details on the acoustic settings used during the survey. A new calibration was carried out after the survey on 28 and 29 March. The new calibration settings will be used from the next survey onwards.

2.8.3 Allocation of acoustic energy to species group

Acoustic data were logged and post-processed on board using the latest acoustic data post-processing software, the Large-Scale Survey System (LSSS) Version 2.5.0.

Scatters were displayed at 38 kHz. The mean 5 nautical miles (NM) area backscattering coefficient $s_A(m^2/NM^2)$ was allocated to a predefined set of species groups on the basis of established echogram features and stored as mean values per 1 nautical mile (NM). Allocation of acoustic densities to species groups was based on cruise leader's expert knowledge. No biomass estimation was carried out as part of the survey as the acoustic data only was used as supporting information.

The target groups used during the survey during acoustic scrutinizing was: PILCH – Pilchard, PEL1 - Round herring and Anchovy, PEL2 - Mackerel species, HORSE – Horse Mackerel, HAKE – hake, ODFI – Other demersal fish, MESFI -Mesopelagic fish and PLANK – Plankton. The HAKE category was not used, and all hake targets were allocated as ODFI (Other Demersal Fish) as these were impossible to distinguish from other demersal fish echoes during the scrutinizing process. The complete records of fishing stations and catches are shown in Annex III.

2.9 Swept area biomass calculations

In the bottom trawl survey, stock biomasses were estimated by the swept-area method with catch per haul as the index of abundance (see Strømme, 1992). In most hauls the trawling time (with the gear at the bottom) was around 30 min. The area swept by the trawl net within 30 minutes trawl time was typically 0.015 NM² and it corresponds to an average horizontal trawl opening of 18.5 m efficient net width, towing at 3.0 knots. Diagrams of the bottom trawl used are shown in Annex II.

Two different approaches were used for biomass calculation, i.e. by using average catch rates without taking into consideration length structure, while for selected priority species, biomass was estimated using length frequencies raised by length group.

Approach 1

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

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

A is the total area surveyed, a is the swept area of the net per haul, \bar{X} is the average catch per haul (the index of abundance) and q (catchability coefficient) is the proportion of fish in the path of the net that are actually caught (set to 1). The density is estimated as biomass per unit area. In a stratified survey of k non-overlapping strata, if the mean catch per haul in stratum i and its variance are denoted by \bar{X}_i and s_i^2 respectively, then an unbiased estimate of the population mean \bar{X} is the stratified mean \bar{X}_{st} , which is given by:

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

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

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

where n_i is number of hauls in the i_{th} stratum and n is the total number of hauls in the survey. Table 3 shows the areas used in the swept-area method to estimate biomass for the different regions. A stratified semi-random design was used with depth and area as stratification factors.

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. 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, as in previous surveys.

The areas used for biomass estimation are shown in Table 6.

Table 6. Area per depth stratum and by 1o latitude in NM2. Total area size per Region is also provided

Latitude	Region	0-100m	100-200m	200-300m	300-400m	400-500m	500-600m	600-700m	700-800m
28°40'-29°	NW	186	303	0	0	0	0	0	0
29°-30°	NW	359	4348	451	195	202	23	7	2
30°-31°	NW	200	2481	3443	460	465	262	177	135
31°-32°	NW	288	2187	1794	1209	894	493	211	173
32°-33°	NW	839	1308	1318	1303	432	156	122	111
33°-34°	SW	654	833	546	375	381	247	243	117
34°-35°	SW	1280	1376	662	496	259	134	80	69
35°-36°	SW	25	1901	778	168	143	131	89	86
Total	NW	1872	10627	7006	3167	1993	934	517	421
	SW	1959	4110	1986	1039	783	512	412	272

2.10 Calculation of swept-area fish density estimates and conversion to biomass

For target species, where length-based estimates are more useful, i.e., *Merluccius capensis* and *Merluccius paradoxus*, a slightly different procedure was followed. The total biomass in the two methods is the same.

Swept-area fish density estimation by species and length are used to calculate density and biomass of target species from the bottom trawl catches (Jacobsen, 1997).

The calculations are carried out as follows.

$$p_{s,l} = \frac{f_{s,l}}{a_{s,l}}$$

Where:

$p_{s,l}$ = number of fish of length l per nm^2 observed on trawl station s

$f_{s,l}$ = estimated frequency of length l

$a_{s,l}$ = swept area:

$$a_{s,l} = \frac{d_s * EW_l}{1852}$$

Where:

d_s = towed distance

EW_l = length dependent effective fishing width.

1852 = number of meters in a NM to convert m to NM

The length dependent effective fishing width is estimated at 18.5 m. The effective fishing width (=18.5) corresponds with the width of the Gisund super bottom trawl used during swept area surveys.

Stratified abundance indices for each length group and strata can then be calculated from:

$$L_{p,l} = \frac{A_p}{S_p} * \sum P_{s,l}$$

Where:

$L_{p,l}$ is the index (Total number of fish estimated) for stratum p , length group l

A_p is the area (nm^2) of stratum p

S_p is the number of stations in stratum p

The length frequencies used for estimating numbers at length, and illustrated in this report, were calculated from the length frequencies of individual trawls raised to the density of fish at that station (i.e. raised by the sample size compared to the total catch and the length of the trawl). The abundance per length group is then converted to density by applying a calculated weight at length ratio using regression analyses on the measured (l) and weighted (w) fish in the trawl catches.

$$w = a * l^b$$

It should be noted that in earlier surveys with the RV *Dr Fridtjof Nansen* the same approach was used for the priority species, except that strata used were obtained through post-stratification based on densities.

2.11 Genetics

Finclips of 30 individuals of each fish species in each region were preserved individually with 95% Ethanol in Eppendorf vials for genetic analysis. In addition, samples were taken from species to confirm the identity at species level. All genetic samples will be analysed at IMR and the results will be presented separately from this report. Whole fish samples of priority species destined for full biological analysis were frozen and transported to NatMIRC for analysis.

CHAPTER 3. RESULTS

3.1 Oceanography

3.1.1 Background

The west coast of South Africa is primarily influenced by the wind-driven cold Benguela upwelling system, the only upwelling system in the world that is enclosed by warm-water systems in the north and south, i.e. by the Angola and Agulhas Currents, respectively (Shillington *et al.*, 2006). Figure 7 shows a representation of wind speed and direction during the survey.

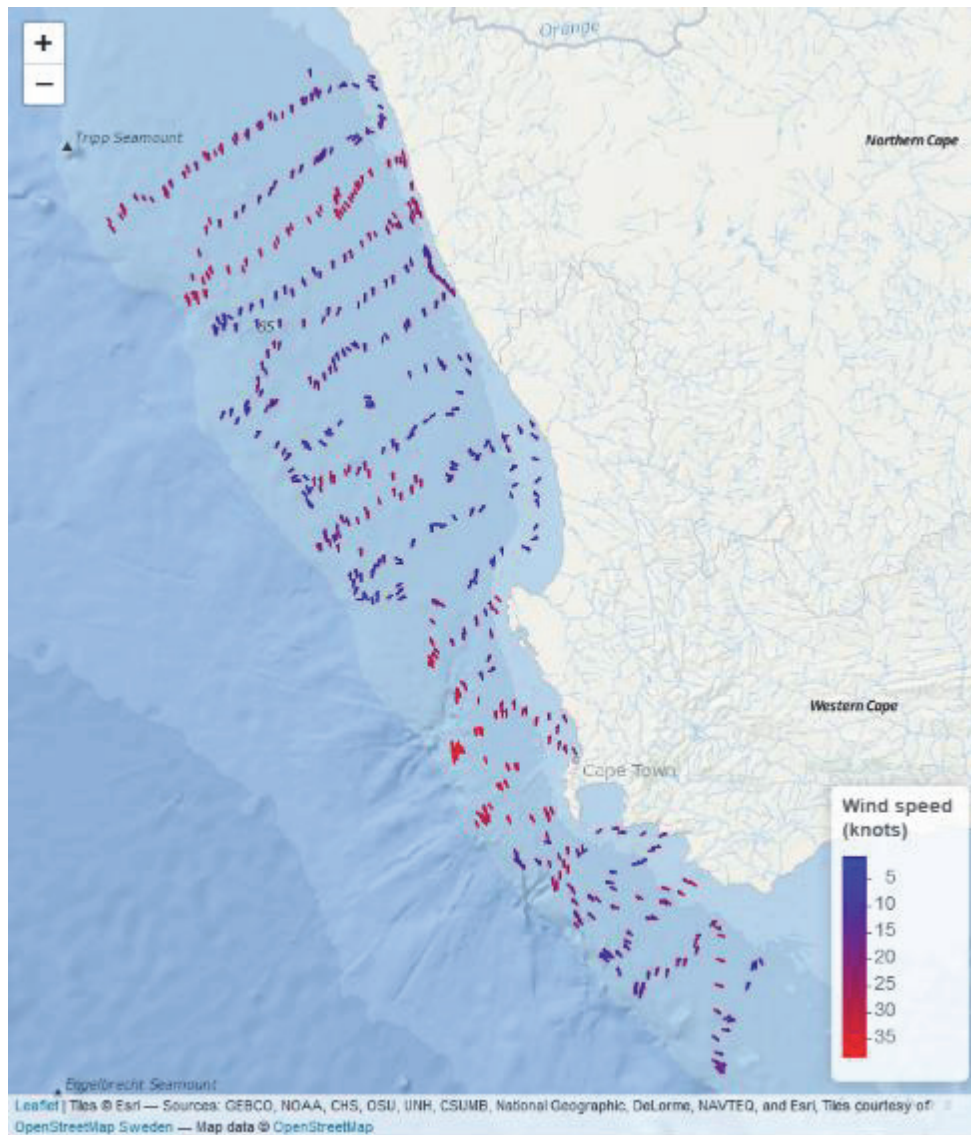


Figure 7. Wind directions and wind speed averaged by 3 h time intervals in the survey area indicated by direction and colour of arrows

3.1.2 Horizontal distribution of oceanographic parameters

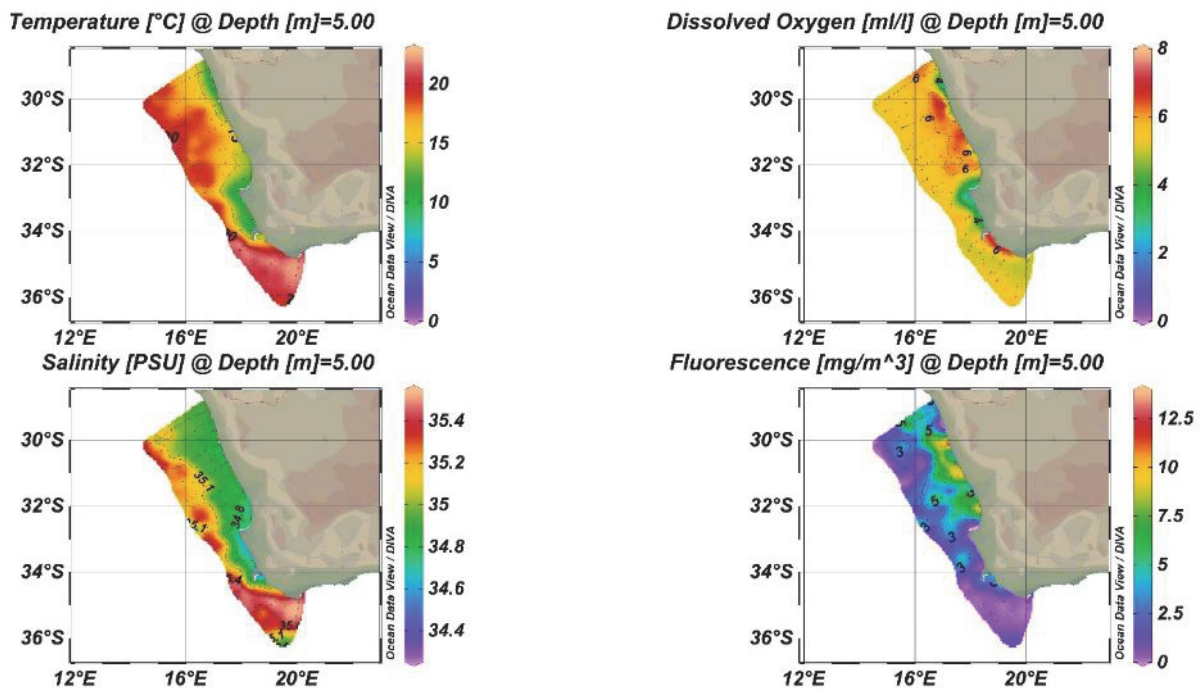


Figure 8. CTD measured temperature, salinity, dissolved oxygen and fluorescence values at 5 m depth throughout the survey

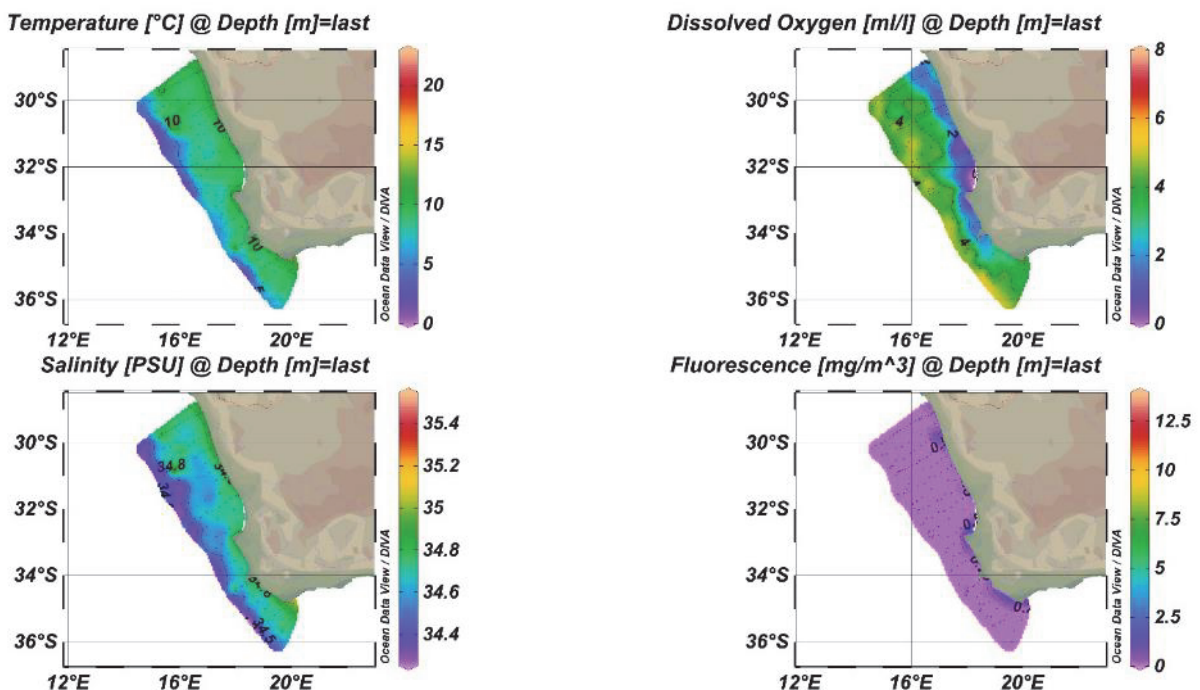


Figure 9. CTD measured temperature, salinity, dissolved oxygen and fluorescence values at station bottom depths throughout the survey

3.1.3 Vertical distribution of oceanographic parameters

Seven hydrographic ecosystem transects were occupied along the coast of South Africa where water was collected for chemical analyses in addition to the normal CTD sensor measurements. Two additional transects consisting of Childs Bank and below the Orange River outlet were also samples to describe the nutrient and chlorophyll *a* concentration (Figures 8-12).

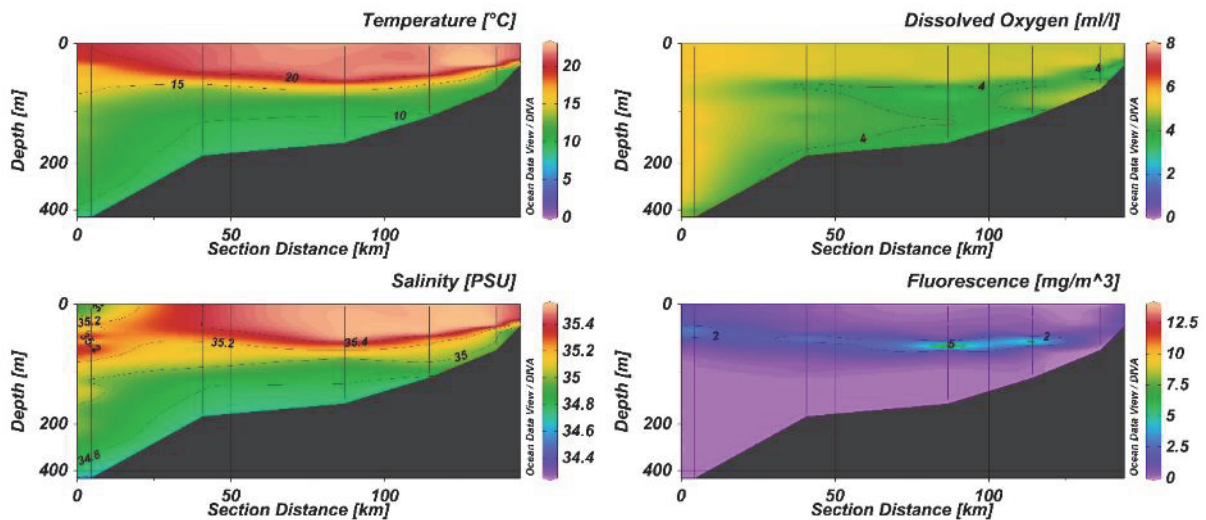


Figure 10. Temperature, salinity, dissolved oxygen and fluorescence cross shelf sections from the southern-most transect beginning at 19.61°E, 35.99°S

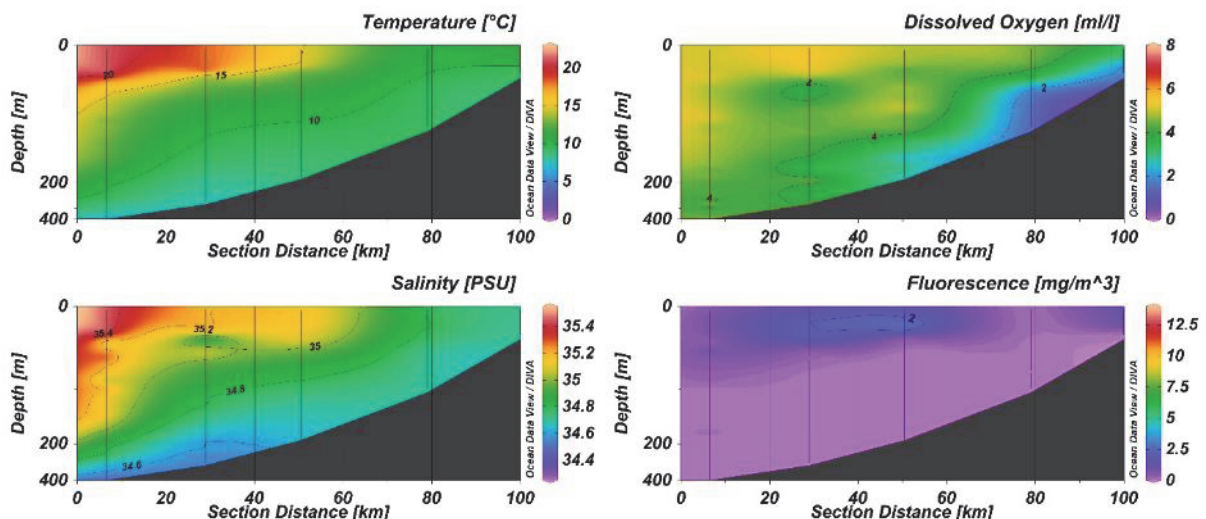


Figure 11. Temperature, salinity, dissolved oxygen and fluorescence cross shelf sections just above Cape Town starting at 17.70°E, 34.27°S

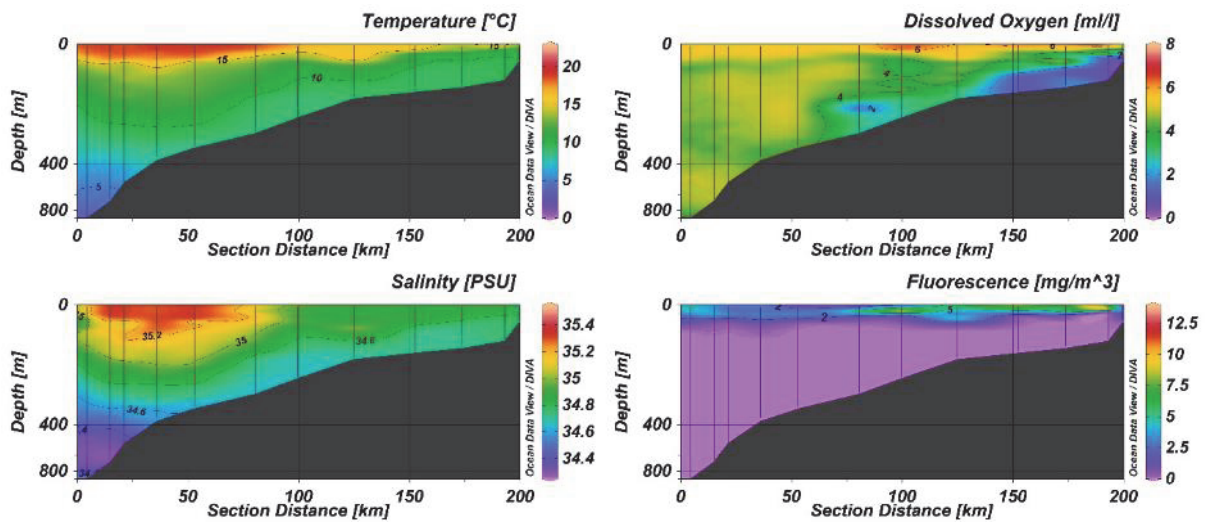


Figure 12. Temperature, salinity, dissolved oxygen and fluorescence cross shelf sections north of St. Helena Bay starting at 16.31°E, 32.48°S

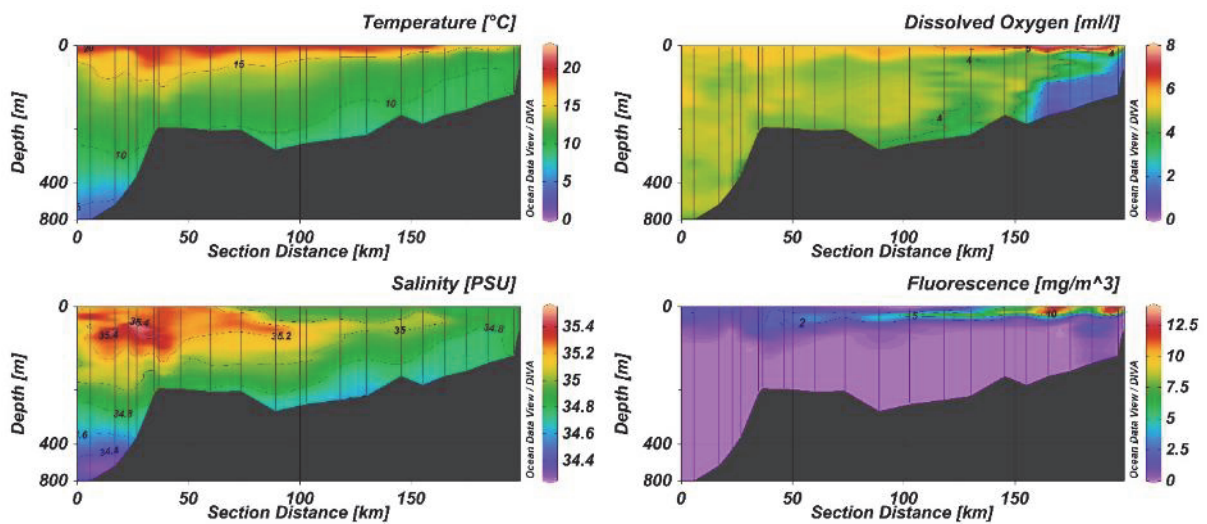


Figure 13. Temperature, salinity, dissolved oxygen and fluorescence cross shelf sections during the Childs Bank transect starting at 15.44°E, 30.96°S

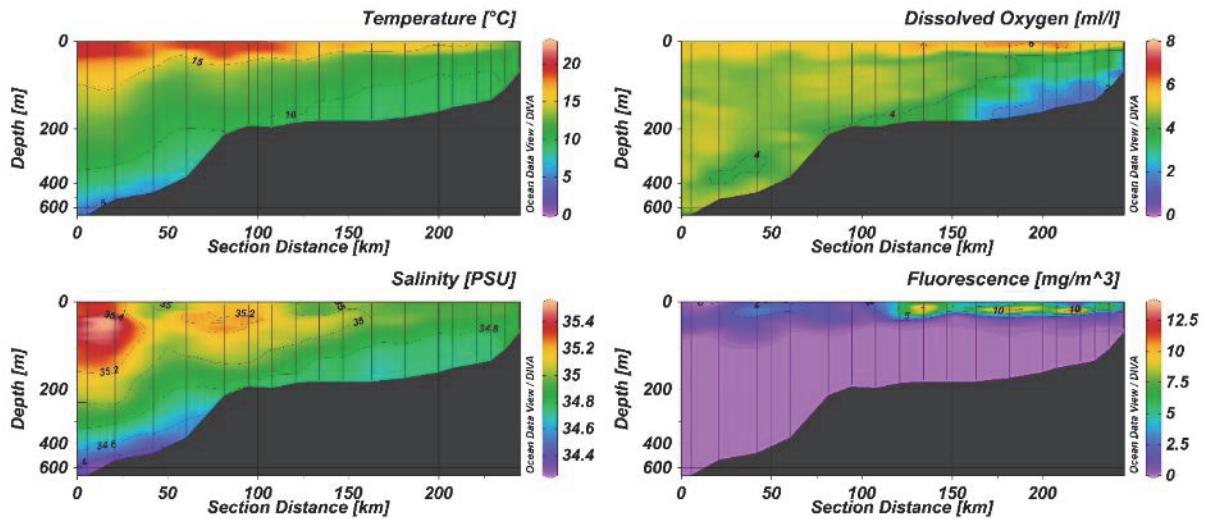


Figure 14. Temperature, salinity, dissolved oxygen and fluorescence cross shelf sections just below the Orange River outlet starting at 14.59°E, 30.17°S

3.1.4 ADCP results

ADCP data were collected and pre-processed on board. Data will be taken to the Institute of Marine Research for postprocessing for horizontal distributions descriptions of ocean current velocity.

3.1.5 pH and total alkalinity

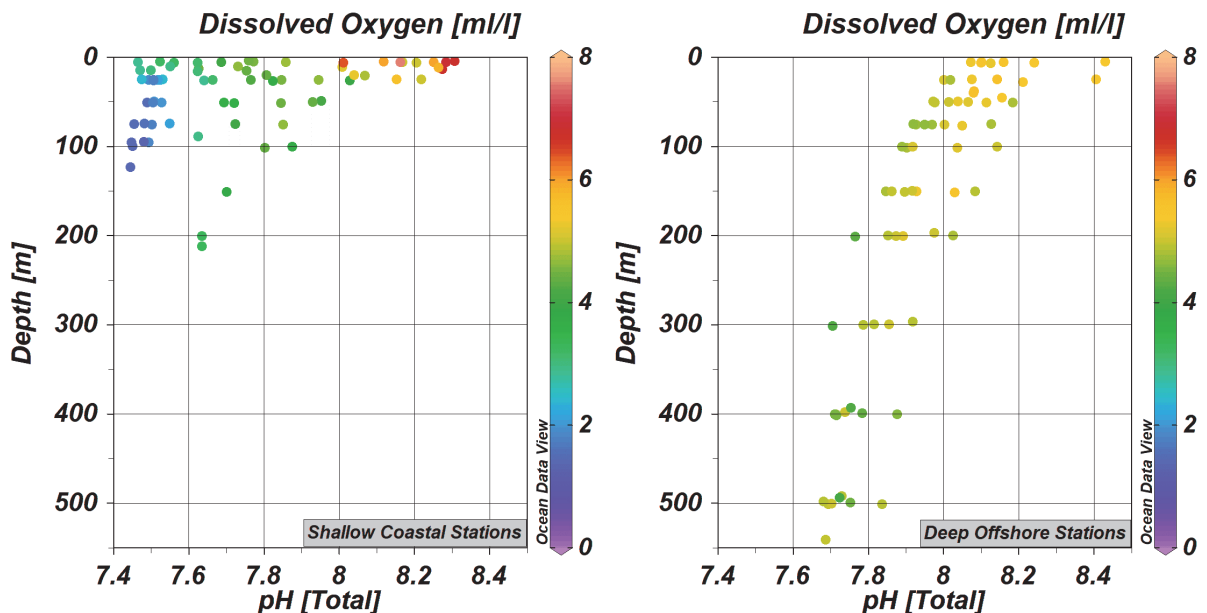


Figure 15. Coastal and offshore pH distribution in relation to dissolved oxygen concentrations

Deep offshore stations recorded an average pH of 7.951 throughout the survey. The shallow coastal stations recorded an average pH of 7.898, meaning the coastal stations, on average, are 1.13% more acidic than the offshore stations. However, what is significant is the low values that are observed along the coast that are not observed offshore. pH values along the coast

reach as low as 7.444, whereas the lowest value recorded offshore is 7.680 and the low offshore values are recorded at greater depths, which agrees with the consequences of sinking organic carbon degradation. Lower temperatures at the coast (Figure 8) indicate upwelling that also brought along carbon resulting in lower coastal pH values. The lower coastal pH values could also have contributions from run off from land and river outlets. Low pH values observed with low dissolved oxygen levels are stressors for marine organisms.

3.1.6 Nutrients

Nutrient samples for nitrite, nitrate, phosphate and silicate determination were taken to the Institute of Marine Research for analysis. Once analyses are complete, phosphate and silicate concentrations combined with the on board measurements of pH and total alkalinity will 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.

3.1.7 Chlorophyll a and Phaeopigment

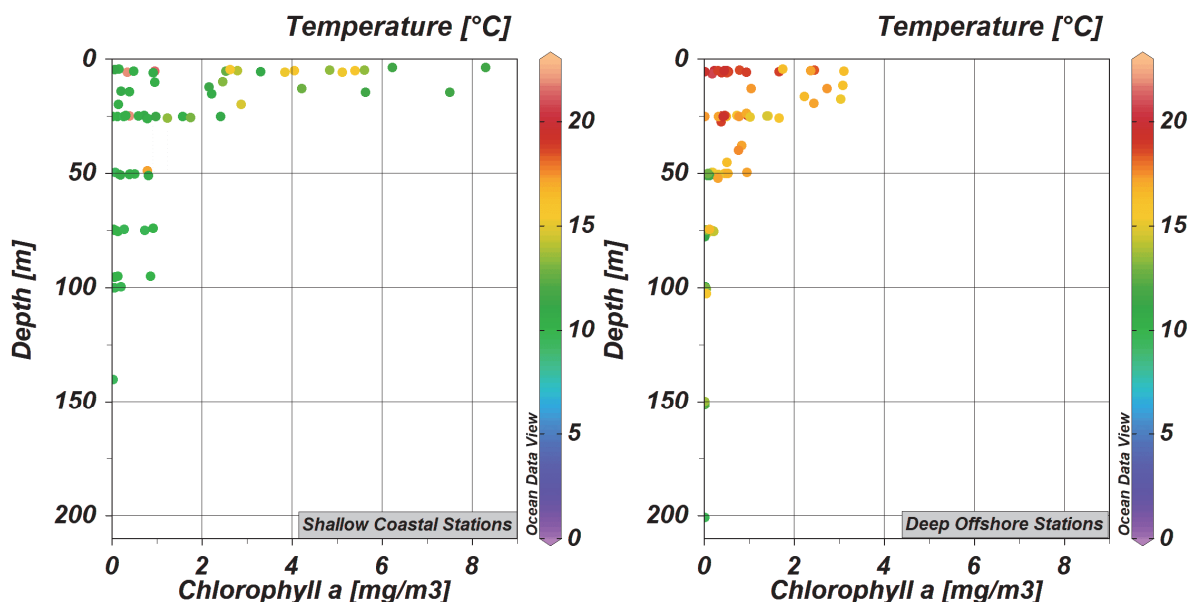


Figure 16. Coastal and offshore chlorophyll *a* distribution in relation to temperature

Lower temperatures were observed along shallow coastal waters during the survey with average values near 12°C. In addition, chlorophyll *a* levels near the coast were considerably higher than the deep offshore stations. Coastal chlorophyll *a* levels averaged near 4 mg m⁻³, whereas the offshore water average was closer to 2 mg m⁻³, nearly half the concentration. The colder and more productive waters against the coast as compared to offshore show signs of upwelling as the colder deeper water is pushed against the coast and brought to the surface as the ocean floor rises. This upwelling causes surface temperatures ranging from 10°C to 16°C against the coast, whereas surface temperatures offshore range from 16°C to above 20°C.

Information on the calibration factors of the sensors used for oceanographic measurements on the current survey, as well as parameters for water chemistry quality assurance are provided in Annex VI.

3.2 Plankton and microplastics

The plankton sampling grid of the survey consisted of 20 superstations located over the isobaths of 30 m, 100 m and 500 m (Station 36 to Station 178). Due to adverse weather conditions the deployment of all sampling devices was not possible at every station. The total number of stations sampled with each sampling device but also the stations where sampling was not conducted due to weather conditions are summarized in Table 7.

Table 7. Overview of plankton stations sampled

Sampling device	Number of sampled stations	Not sampled stations
WP2 (180 μm)	19	St86, St 178
Manta trawl (335 μm)	17	St77, St82, St86, St178
Multinet midi (405 μm)	18	St86, St170, St178

3.2.1 Zooplankton

A total of 43 aluminum trays for zooplankton dry weight estimation were produced during the survey and transferred to IMR for zooplankton biomass estimation. Based on these measurements the horizontal distribution pattern of mesozooplankton biomass has been in Figure 17 (left panel). Total zooplankton biomass ranged between 0.77-39.2 g m^{-2} , showing higher values at coastal stations and towards the northern part of the surveyed area.

Size fractionation of samples revealed that organisms smaller than 1 mm in size comprised most of the biomass, although for some stations the contribution of organisms larger than 2 mm was also important (Fig 17, right panel). The future taxonomic analysis of the preserved in formalin (4% borax buffered formaldehyde) fraction of the samples (19 WP2 samples was transferred to NatMIRC) will provide insight in the group composition of the samples.

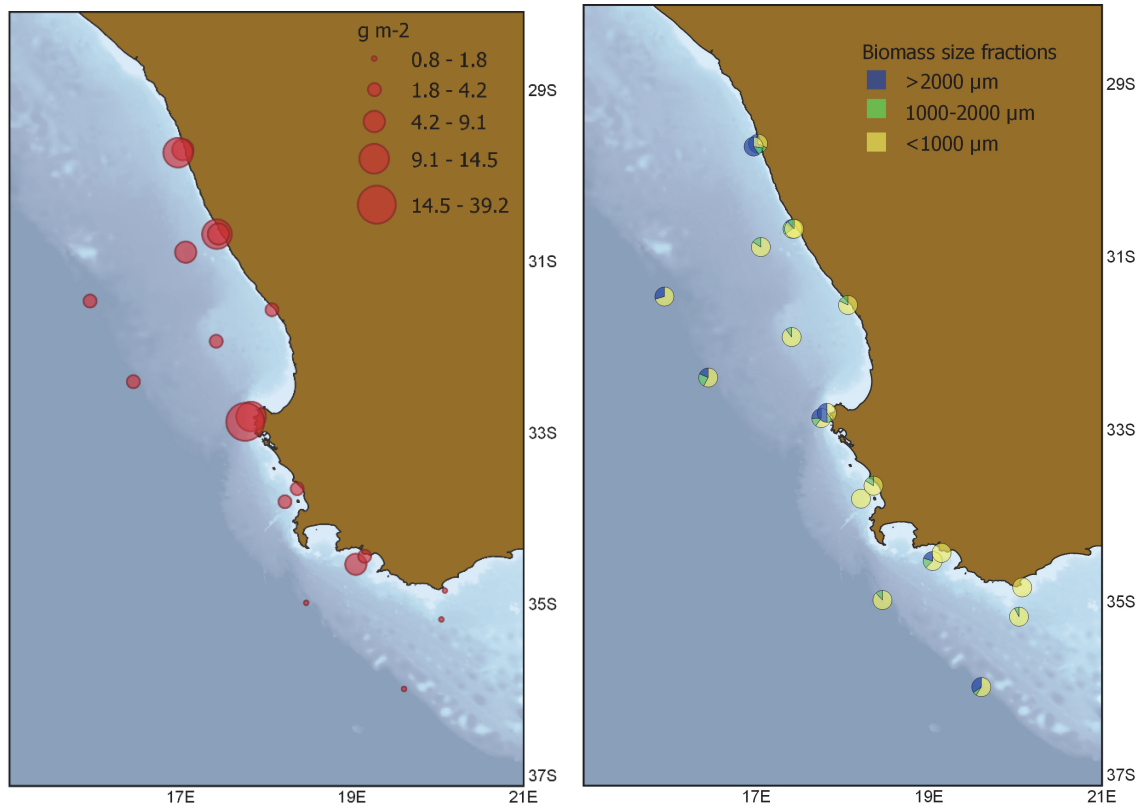


Figure 17. Horizontal distribution of total zooplankton biomass (g m^{-2}) in the superstation grid (left panel) and the contribution of different size fractions at each station (right panel)

3.2.2 Ichthyoplankton

Multinet

Fourteen out of the 18 collected multinet samples were processed under the stereomicroscope onboard. The number of fish larvae and eggs present in the samples was particularly small, indicating a mismatch between sampling period and the spawning season for most of the fish species in the area. The stations with a presence of fish larvae and eggs are shown in Figure 18. Fish larvae were found only in 8 samples accounting for a total of 31 individuals. Only 11 eggs in total were found in the samples.

Calculated larval abundances were extremely low even at the positive stations with maximum values $0.83 \text{ larvae}/100 \text{ m}^2$ (Station 92, based on 7 larvae sorted from half of the sample). Among the identified families were Engraulidae, Myctophidae, Paralepididae, Sternoptychidae, Blennidae and Callionymidae. Maximum egg abundance was $0.31 \text{ eggs}/10 \text{ m}^2$ at the coastal station 36.

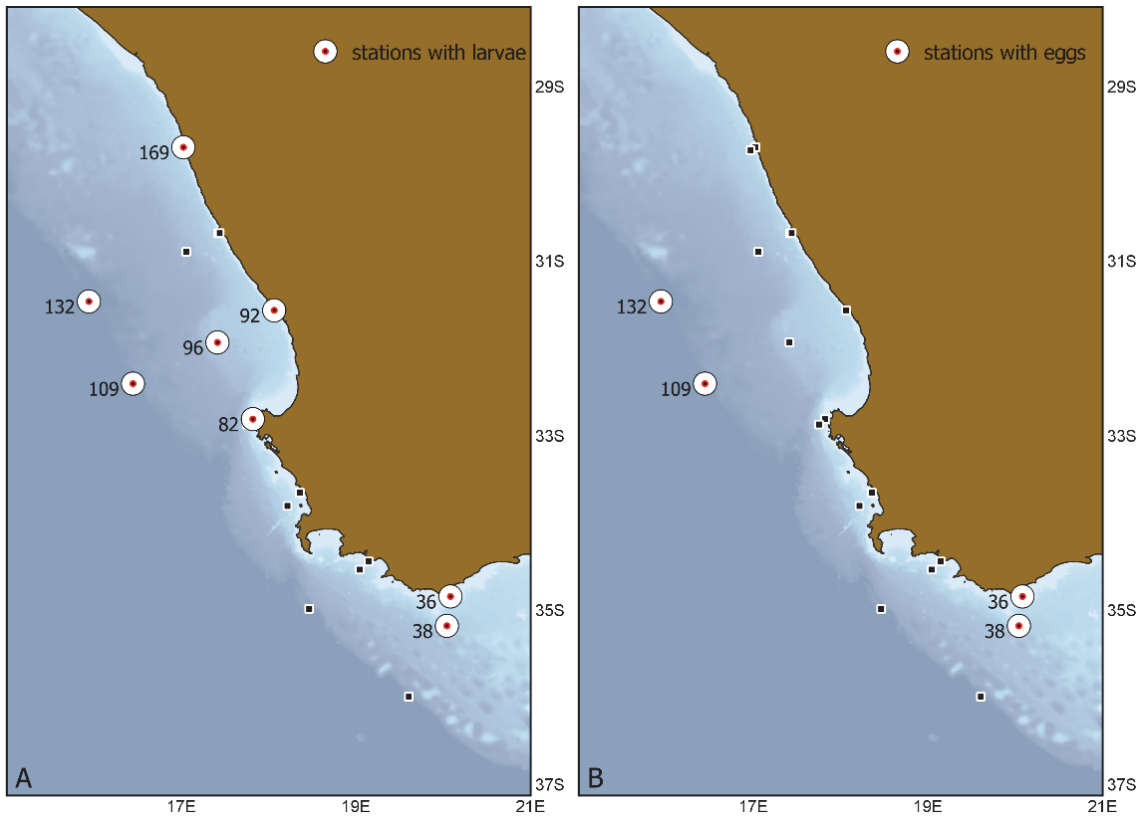


Figure 18. Stations characterized by the presence of larvae (A) and eggs (B) in the multinet collections

A small number of larval engraulids (Figure 19) were present in samples collected from the southernmost region of the sampling grid (i.e. Station 36 and 38), however no eggs of the family were found in this area. Interestingly, engraulid juveniles (Figure 20) were found at the coastal Station 92, indicating a possible suitability of the area as a nursery ground.

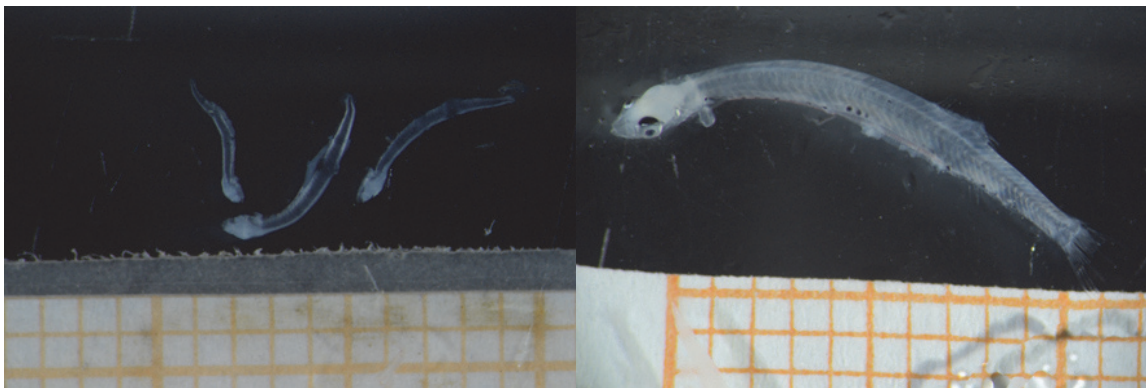


Figure 19. Preflexion (left) and postflexion (right) Engraulid larvae collected at station 36 and 38, respectively

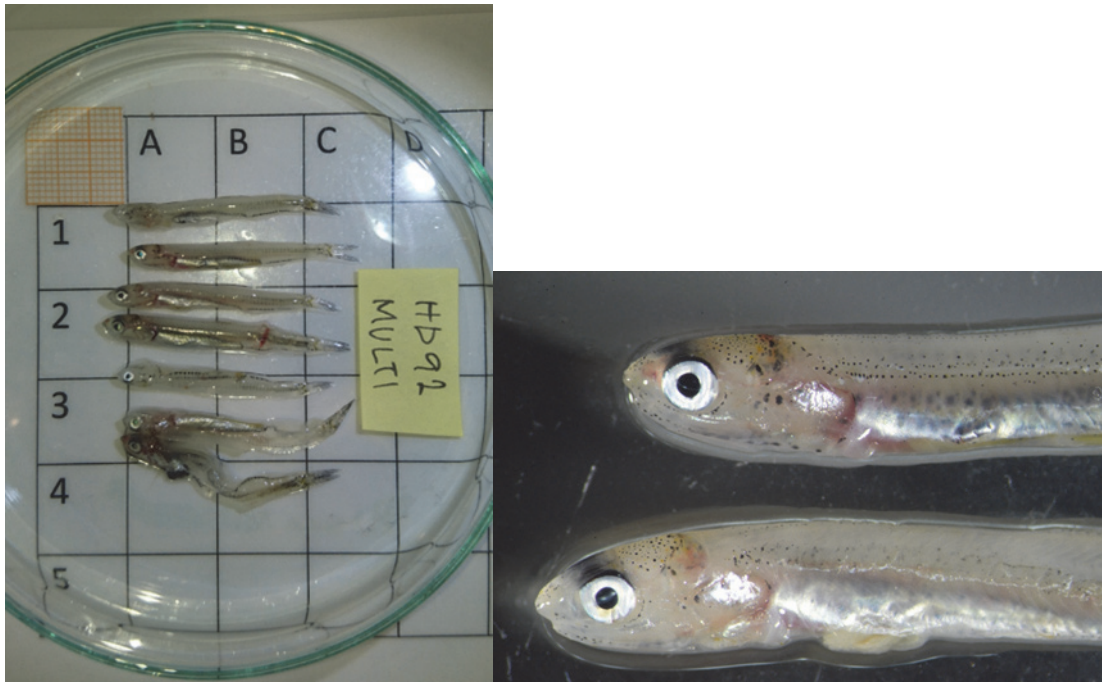


Figure 20. Engraulid juveniles sampled at the coastal station 92

Larvae of mesopelagic taxa (i.e. Myctophidae, Sternophychidae, Paralepididae) (Figure 21) were recorded at some deep and offshore stations (e.g. Station 109, 132).

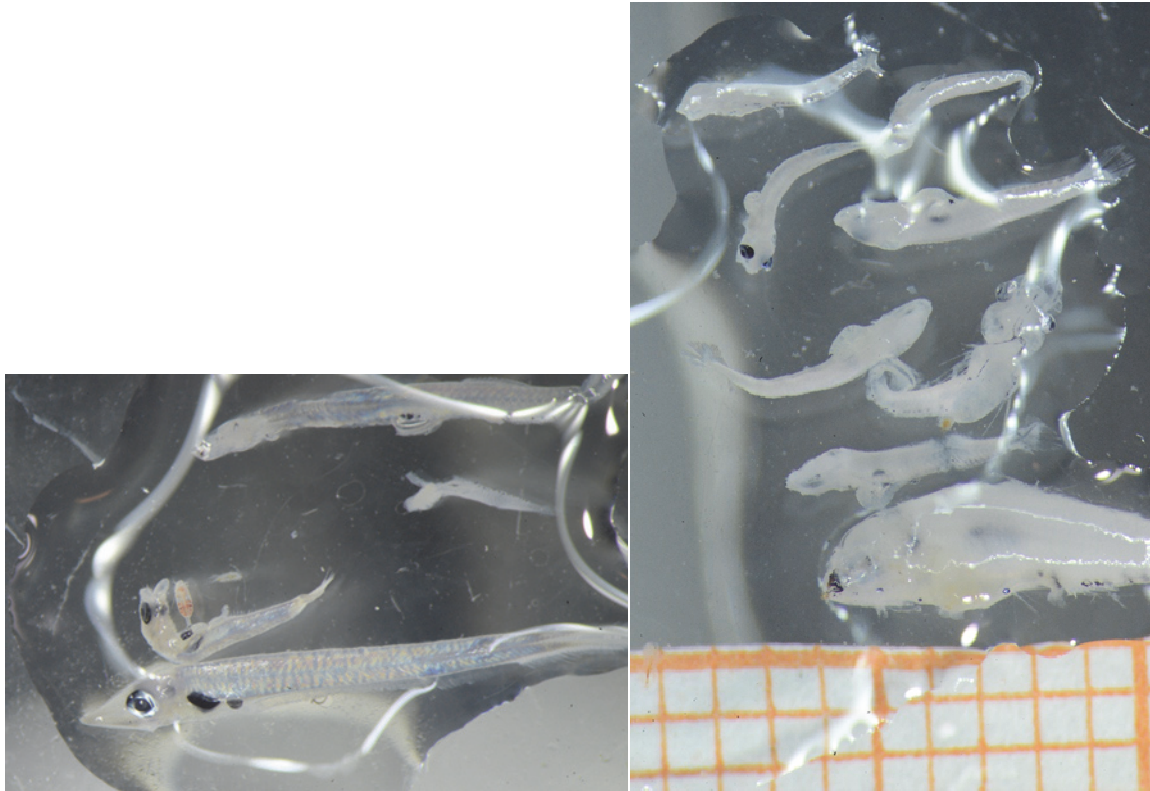


Figure 21. Mesopelagic larvae recorded at the offshore deep Station 109 (left photo) and 132 (right photo)

All sorted larvae and eggs (formalin preserved, 12 scintillation vials) as well as the bulk of sorted plankton (formalin preserved, 18 jars) were transferred to NatMIRC in Namibia for future ichthyoplankton identification at a deeper taxonomic lever and possible rechecking of the bulk samples. The other half of the multinet samples (preserved in ethanol) was also transferred to NatMIRC to be used in future works.

Manta

Larval/post larval and juvenile stages of fish were present in most of the manta collections (14 out of the 17 samples collected). However, eggs were found only at 3 samples collected in the northern part of the surveyed area (Figure 22). A total of 643 larval/post larval/juvenile stages and 55 eggs were sorted out from the manta collections.

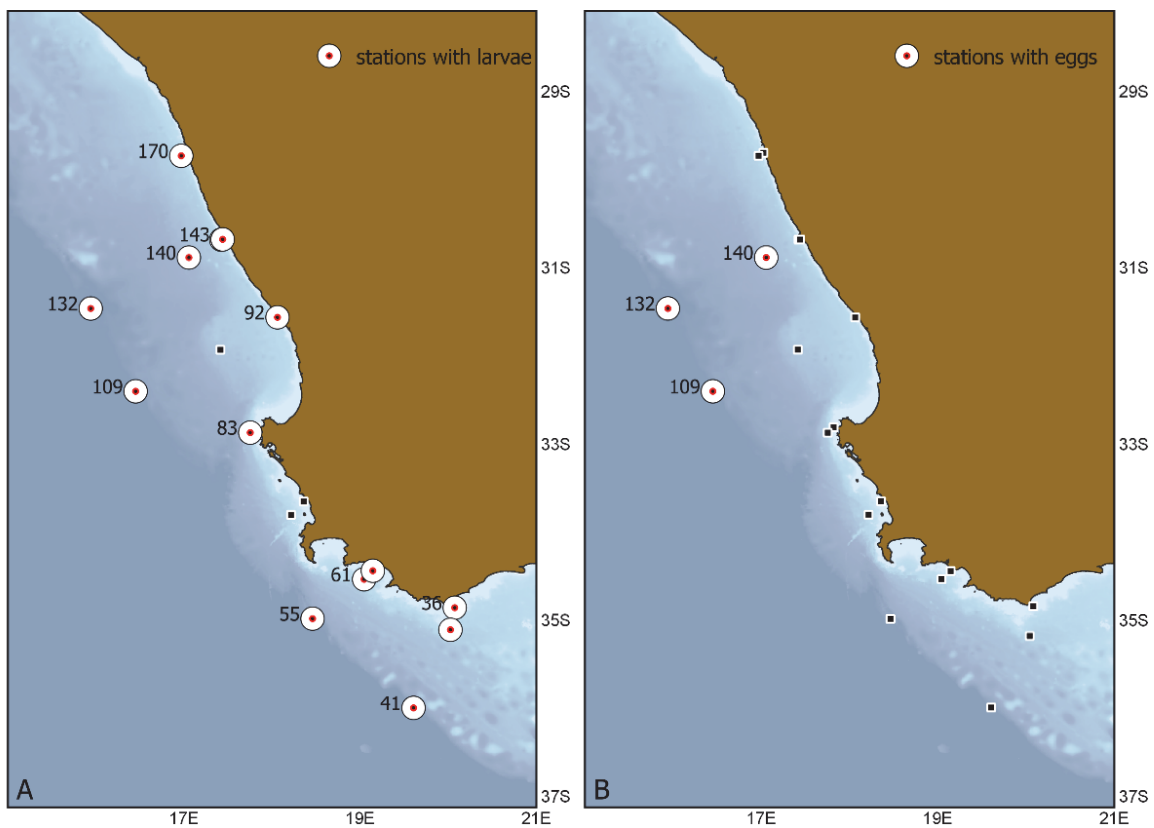


Figure 22. Stations characterized by the presence of larvae (A) and eggs (B) in the manta collections

The horizontal distribution of early life history stages of fish (including post larval and juveniles) collected by the manta net is presented in Figure 23, showing higher values offshore. Overall, the manta collections had very low species richness and were mostly dominated by later developmental stages (post larvae and juveniles). Engraulid juveniles (Figure 24) were present in the samples collected at offshore stations in the southern part but also at the coastal Station 92 and the Station 140 located in the north. The observation for the coastal station seems to agree with the findings of juveniles in the multinet collection at this site.

Juveniles of the family Scomberesocidae (possibly *Scomberesox saurus*) but also other families of the order Beloniformes that are known to dwell close to the surface, were present in most of the collections. All sorted specimens from the manta collections (preserved in 96% ethanol 15 scintillation vials, and 3 100 ml jars) were transferred to IMR for detailed taxonomic identification. The bulk plankton of Manta net after sorting (17 samples) were transferred to University of Western cape, South Africa for future analysis

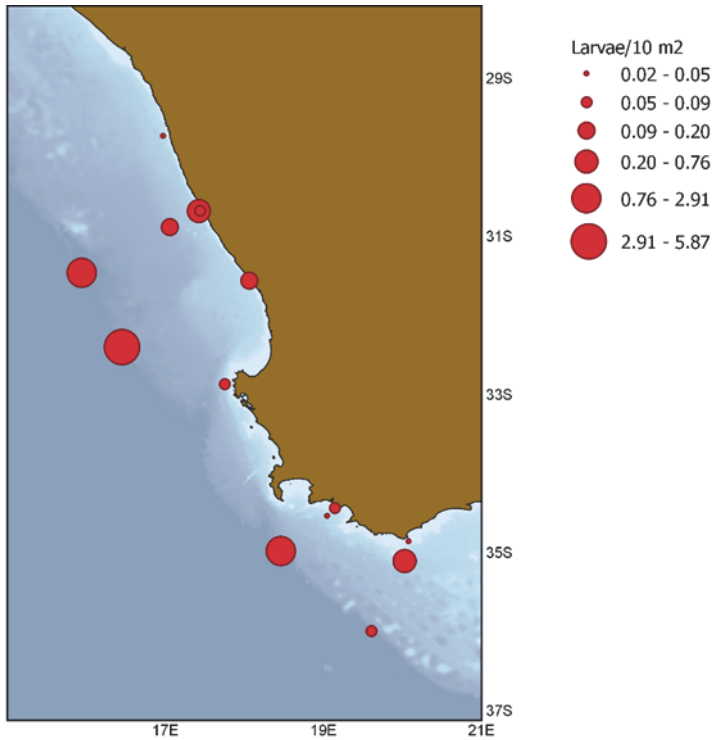


Figure 23. Horizontal distribution of larval fish/post larval stages/juveniles (larvae/10m²) based on the manta collections

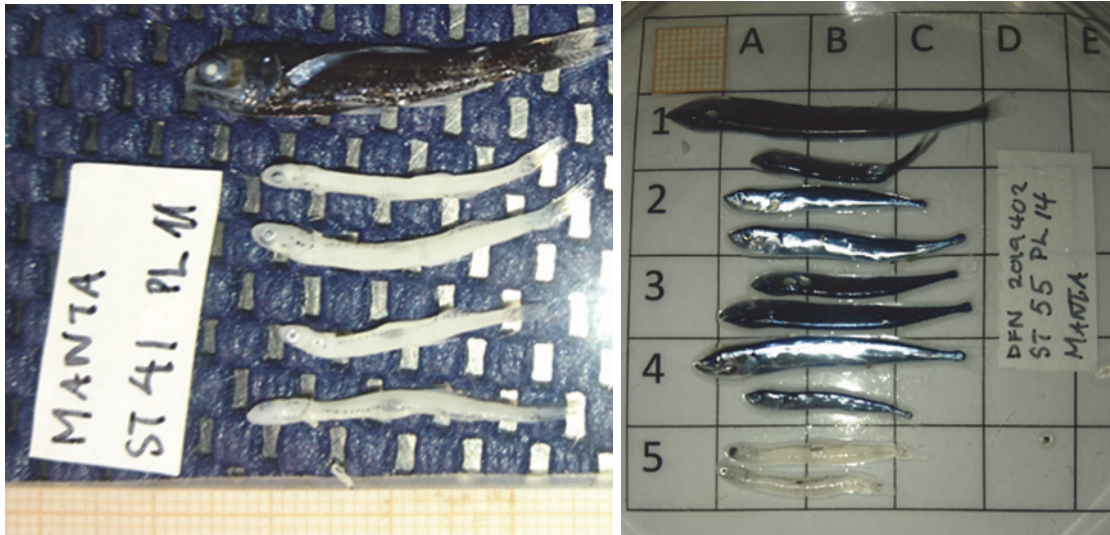


Figure 24. Engraulid juveniles sorted from the the manta collections

3.2.3 Microplastics and Debris

Microplastics were found in 7 out of the 17 manta samples collected (Figure 25). The total number of sorted microplastics from the samples was 39. Higher number of microplastics was found in the southern part of the surveyed area, with maximum values at Station 61 (Figure 26). Characteristic example of microplastics found in the area are shown in Figure 27.

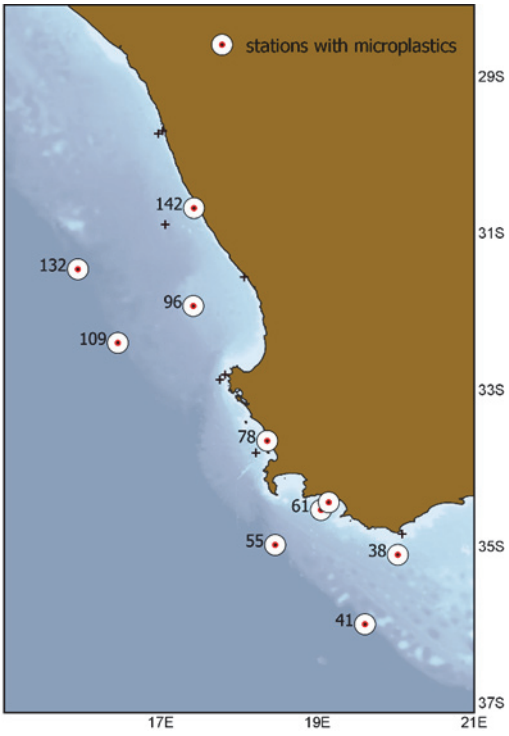


Figure 25. Stations characterized by the presence of microplastics

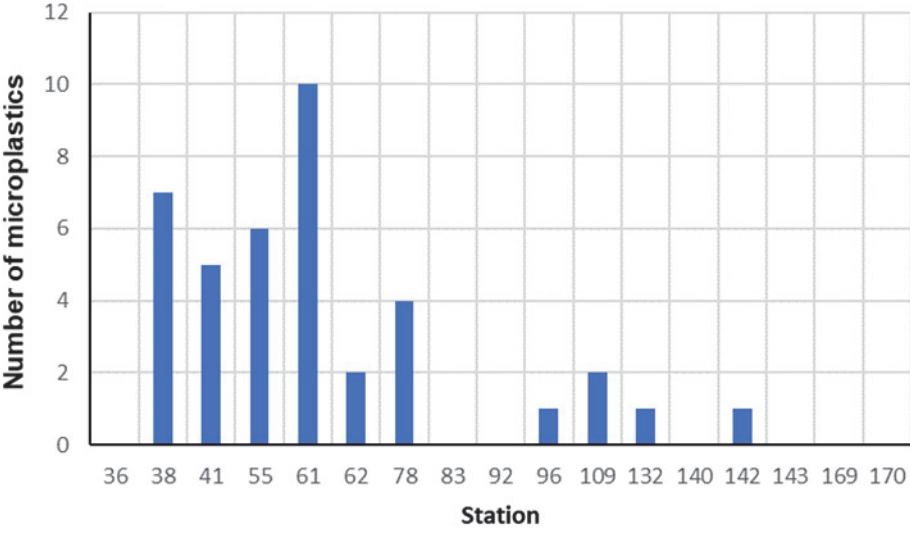


Figure 26. Number of microplastics found at each station

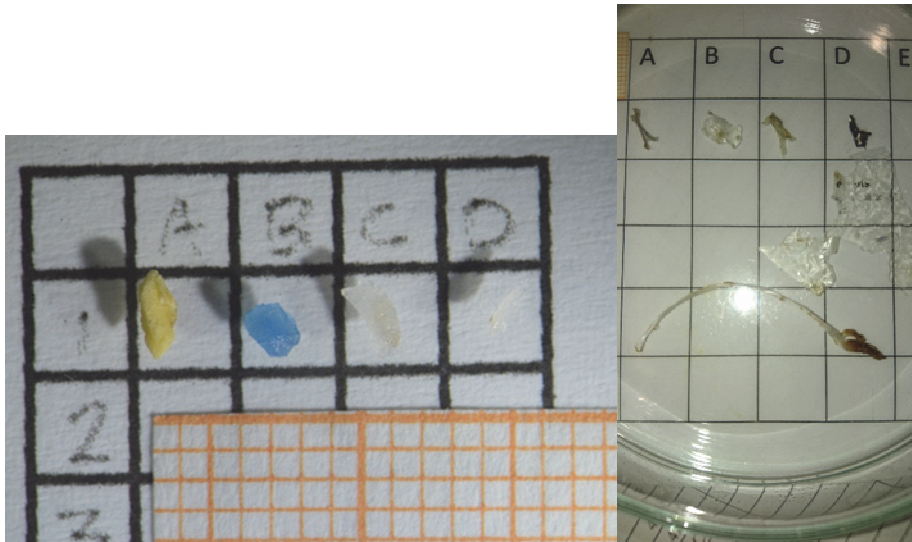


Figure 27. Microplastics found at the manta sample collected at the station 61

3.3 Sediment samples

Sediments were collected from 99 demersal trawls for habitat characterisation. Sediment samples are being analysed in South Africa, at the South African National Biobiodiversity institute (SANBI). During the study benthos and the granular properties (percentage of grain size) are examined. Once analysed, the information will contribute to the description of sea floor habitats in the area. The data will be analysed and reported separately.

3.4 Bottom mapping

Continuous recording of the seafloor depth was made, and registrations were stored in the Olex software database. No high resolution multibeam data was stored.

3.5 Abundance and distribution of demersal fish

The total catch densities (tonnes NM^{-2}) for the survey area are presented in Figure 28. Total catch density was calculated excluding the categories/families shown in parenthesis from each trawl station (jellyfish, bivalves, echinodermata, mesopelagic fish, pelagic fish, crabs, seaweed, isopods, gastropods, sponges, corals, cnidaria and garbage/waste). Most of trawls were made between 100 m and 800 m.

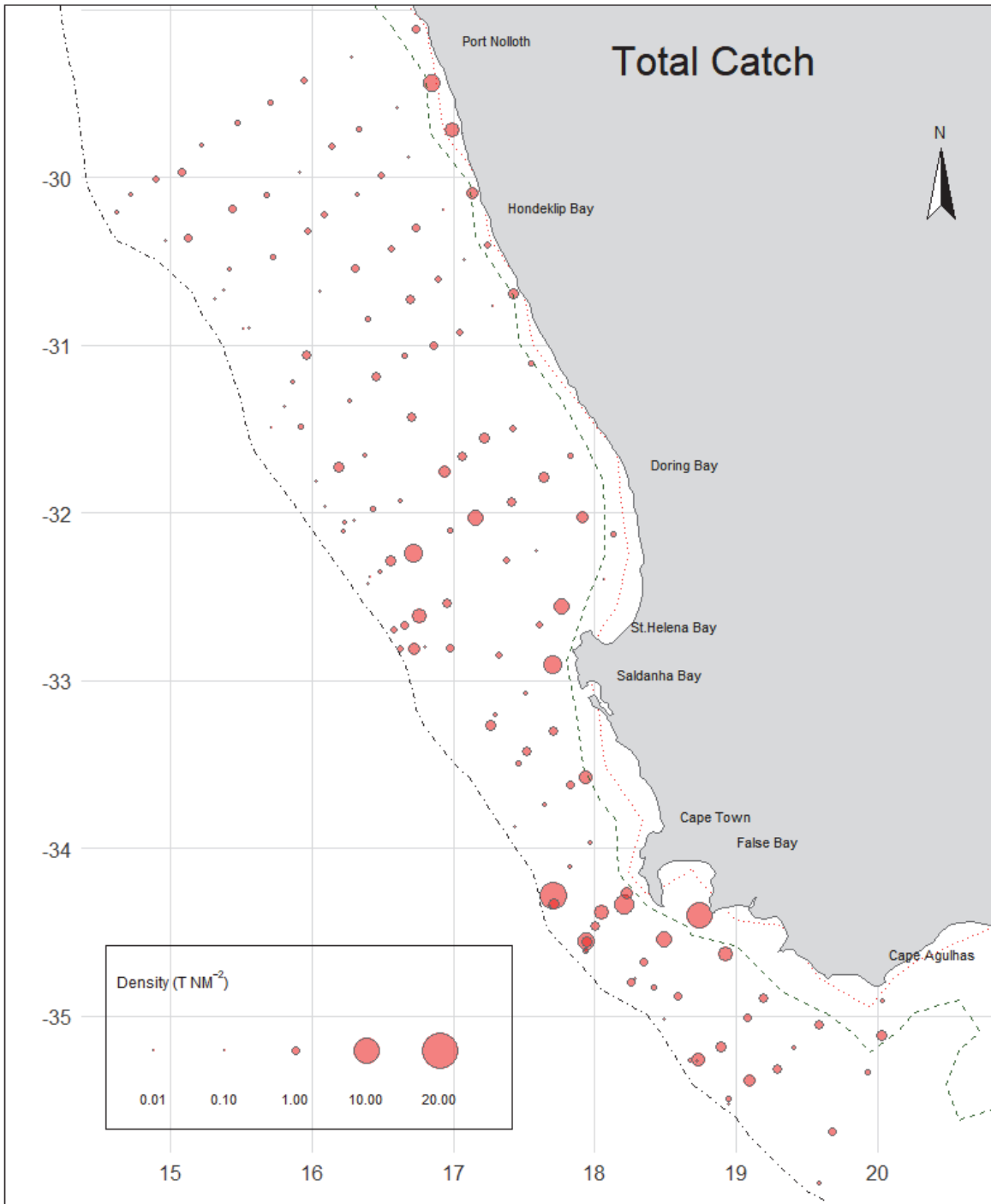


Figure 28. Spatial distribution of densities (tonnes NM⁻²) of demersal resources on the west coast of South Africa from Cape Agulhas to Orange River with all the valid trawl stations included

Densities increased from inshore to offshore west of Cape Agulhas Bank (i.e. from Cape Agulhas to Cape Town). Fish was generally in low densities between 100 m and 800 m contour decreasing between Cape Town and Saldanha Bay. Stations with higher densities were distributed in the mid-shelf off north of Saldanha Bay to Orange River. Those made within 100 m depth were dominated by juvenile fishes.

Merluccius capensis was found in large densities with decreasing density offshore between 100 m to 500 m depth contour off Bredasdorp in west of Cape Agulhas to Vanhynsdorp on

the west coast (Figure 29, left). The area with the largest density was off Cape Point and Saldanha Bay where catch rates between 25-50 kg h⁻¹ were recorded. Cape hake was recorded in lower abundance off Vanhynsdorp to the Orange River. Size distribution of *M. capensis* was wider in range compared to that of *M. paradoxus* and was multimodal (with modal peaks at 9.0, 16.0, 36.0 and 66.0 cm) with most fish within a size range between 16.0 and 41 cm (Annex VII, Figure VII.1). Small sized *M. capensis* were sampled inshore whereas larger fish were distributed offshore.

Deep water hake, *Merluccius paradoxus* was found in a narrow band in medium high concentration increasing from inshore to offshore between Cape Agulhas off Quoin Point (located west of Bredasdorp) and Cape Town (Figure 29, right). Largest densities were found off Cape Point between 100 to 800 m depth offshore. Low densities were found between Cape Town and Saldanha. Two distinct but parallel distributions between Saldanha and Orange River over 800 to 100 m depth contour with high catch rates from mid-shelf to offshore. Those sampled from inshore to mid-shelf within 250 m depth contour consisted of mostly small sized fish and juveniles. Length frequencies of deep-water hake sampled off the west coast had size ranging from 6 to 76 cm in total length (Annex VII, Figure VII.2). Size distribution of *M. paradoxus* was multimodal (with modal peaks at 20, 31 and 55 cm) consisting fish falling mostly within a size range between 16 and 35 cm and that of small sized fish was skewed to the right.

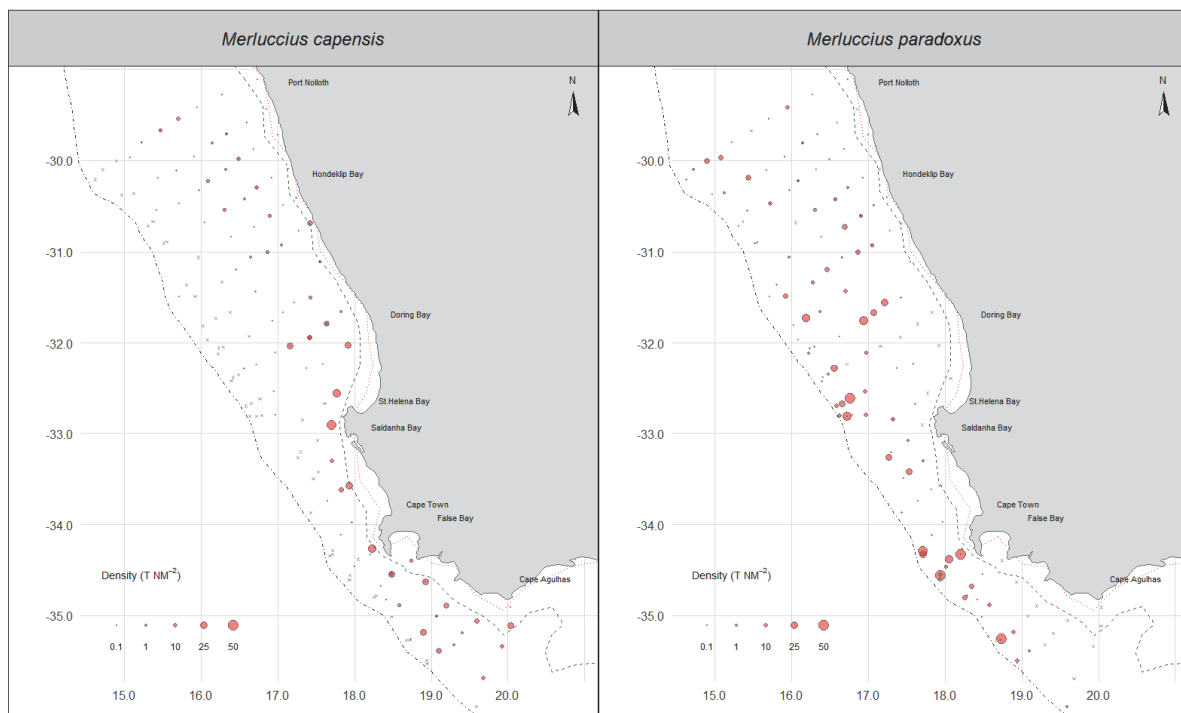


Figure 29. Spatial distribution of *M. capensis* and *M. paradoxus* based on catch rates (kg h⁻¹) on the west coast of South Africa from Cape Agulhas to Orange River

Monk (*Lophius vomerinus*), jacobever (*Helicolenus dactylopterus*), kingklip (*Genypterus capensis*) and west coast rock lobster (*Jasus lalandii*) and other fish species are important bycatch in the hake targeted fishery. Maps showing trawling locations with associated density distribution of monk, jacobever, kingklip and west coast rock lobster are shown in Figure 30.

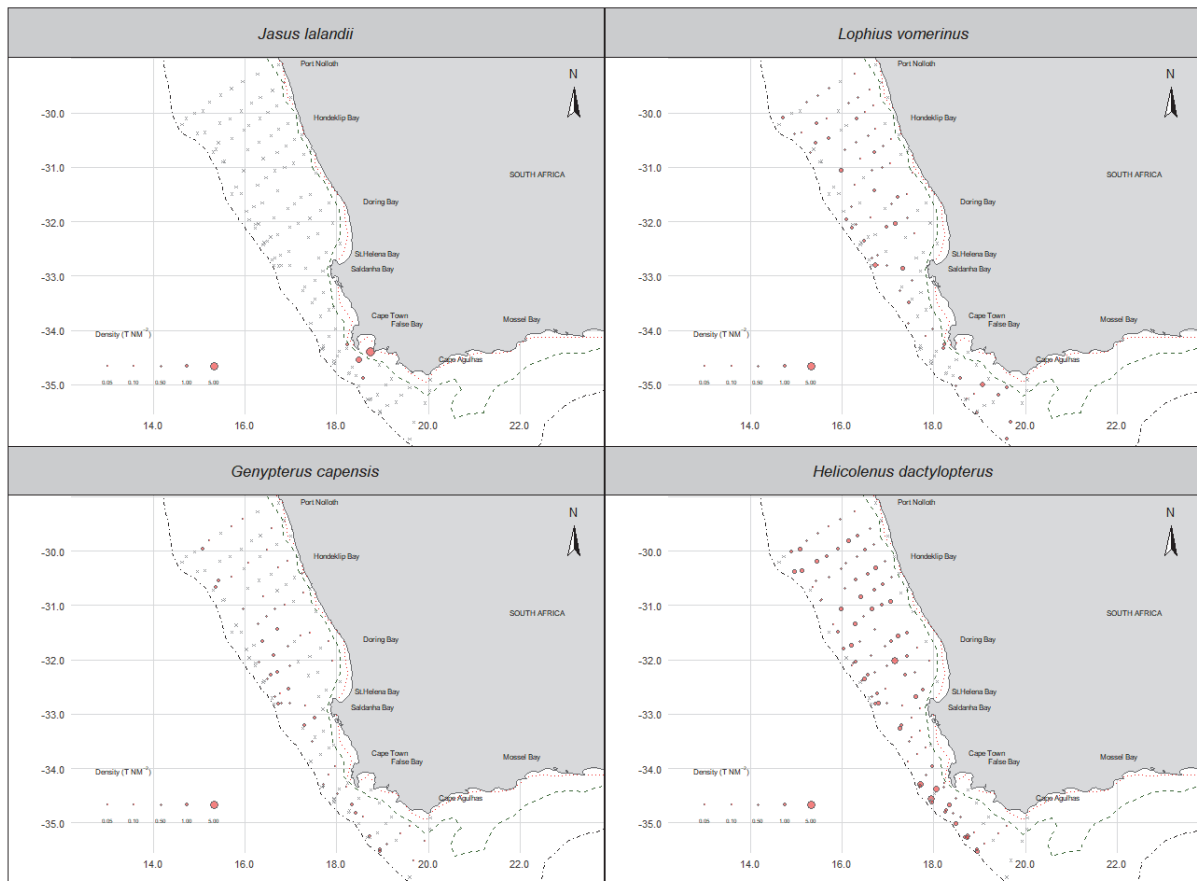


Figure 30. Spatial distribution of *Jasus lalandii*, *Lophius vomerinus*, *Genypterus capensis* and *Helicolenus dactylopterus* based on catch rates (kg h^{-1} , square root transformed values) on the west coast of South Africa from Cape Agulhas to Orange River

Monk was recorded in small densities on the slope to 800 m depth contour off west of Cape Agulhas to Orange River (Figure 30). It was confined to shallower depth off west of Cape Agulhas between Bredasdorp and Cape town with catch rates up to 14 kg h^{-1} . The area with larger densities was between Saldanha Bay and Springbok. Monk fish size distribution was bimodal with modal peaks at 13 cm and 26 cm in total length (Annex VII, Figure VII.3).

Jacopever was caught offshore in west of Cape Agulhas with high densities offshore Cape Point and in smaller densities between Saldanha Bay and Orange River (Figure 30). The size distribution was wide, dominated by small sized fish (Annex VII, Figure VII.4).

Kingklip was sampled offshore mostly deeper than the 500 m depth contour and the area with high densities was offshore Bredasdorp (west of Cape Agulhas) and between Lambert's Bay and Springok (west coast) (Figure 30). Its size distribution was wide compared other fish species with most fish abundant between 22 and 63 cm in total length (Annex VII, Figure VII.5).

West coast rock lobster was sampled mainly close to the coast off Cape Agulhas (between Hermanus and Cape Town) (Figure 30). A trawl haul with highest densities of rock lobsters was off Danger Point where catch rates of $30\text{-}35 \text{ kg h}^{-1}$ were observed. Rock lobster size

distribution ranged from 13 to 26 cm with most fish falling within 17 cm and 22 cm in total length (Annex VII, Figure VII.6).

3.5.1 Biomass estimates

For the calculation of the biomass index, the area of each sampled depth stratum was based on depth soundings from the Olex software's database on *Dr Fridtjof Nansen* (Table 6).

Biomass estimates have historically only been provided for the hake species with main focus on the *M. paradoxus*. The last bottom trawl survey in South Africa with the R/V *Dr Fridtjof Nansen* was carried out in 2013 and there is therefore a break in the time series. This report also provides estimates for by-catch species in the hake fishery. Table 8 provides the abundance and biomass estimates for the most frequently caught target species while their length weight relationships coefficients per stratum are provided in Table 9.

The estimated biomass of *M. paradoxus* was 215 057 tonnes while the biomass estimate of *M. capensis* was 183 453 tonnes. Monkfish was estimated at almost 13 723 tonnes, whereas kingklip was found to be almost 7 000 tonnes. Finally, jacoever (*Helicolenus dactylopterus*) was estimated at 43 419 tonnes. The catch rates-based biomass per region and depth stratum are provided in Table 10. Abundance and biomass per 5 cm length class for the two hake species by area is provided in Table 11. Both hake species consisted of relatively small individuals. For *M. paradoxus* and *M. capensis* the stock has historically been divided in fishable (>35 cm) and non-fishable biomass <35 cm). The fish <35 cm are considered to be recruits and should therefore not be part of the fishable stock (Table 11).

Table 8. Total biomass of the main target species based on length frequencies

<i>Species</i>	<i>Numbers (millions)</i>	<i>Biomass (tonnes)</i>
<i>Merluccius paradoxus</i>	1 552.373	215 739
<i>Merluccius capensis</i>	1 225.571	181 186
<i>Lophius vomerinus</i>	20.097	13 999
<i>Genypterus capensis</i>	6.956	5 917
<i>Helicolenus dactylopterus</i>	1 064.312	43 395

Table 9. Length – weight relationship coefficients per stratum for the main target species length-based biomass estimations

<i>Species</i>	<i>Area</i>	<i>a</i>	<i>b</i>
<i>Merluccius paradoxus</i>	NW	0.00662	3.03017
<i>Merluccius paradoxus</i>	SW	0.00488	3.11178
<i>Merluccius capensis</i>	NW	0.00762	3.00586
<i>Merluccius capensis</i>	SW	0.00496	3.13221
<i>Lophius vomerinus</i>	NW	0.01700	2.97620
<i>Lophius vomerinus</i>	SW	0.00399	3.36810
<i>Genypterus capensis</i>	NW	0.00151	3.27532
<i>Genypterus capensis</i>	SW	0.00074	3.46520
<i>Helicolenus dactylopterus</i>	NW	0.01424	2.99053
<i>Helicolenus dactylopterus</i>	SW	0.01300	3.05056

Table 10. Total biomass (tonnes) per depth stratum and region of the main target species based on catch rates. Coefficient of Variation (CV) of the biomass per species and area is also provided

<i>Species</i>	Region	<i>Depth strata</i>								Total	CV
		0-100m	100-200m	200-300m	300-400m	400-500m	500-600m	600-700m	700-800m		
<i>Austroglossus microlepis</i>	NW	229.32	74.39	0	0	0	0	0	0	303.71	0.57
<i>Austroglossus microlepis</i>	SW	20.57	14.80	0	0	0	0	0	0	35.37	0.70
<i>Austroglossus microlepis Total</i>		249.89	89.19	0	0	0	0	0	0	339.07	
<i>Beryx splendens</i>	NW	0	0	0	19.85	2.91	0	0	0	22.76	0.45
<i>Beryx splendens</i>	SW	0	0	0	33.51	11.94	0	0	0	45.45	0.76
<i>Beryx splendens Total</i>		0	0	0	53.35	14.85	0	0	0	68.21	
<i>Genypterus capensis</i>	NW	0	276.7	466.07	3268.13	1352.02	113.22	0	0	5476.14	0.12
<i>Genypterus capensis</i>	SW	0	131.52	255.91	782.37	235.10	36.30	0	0	1441.19	0.17
<i>Genypterus capensis Total</i>		0	408.22	721.98	4050.50	1587.12	149.52	0	0	6917.33	
<i>Helicolenus dactylopterus</i>	NW	0	6180.19	15773.18	3267.71	3442.52	761.94	0.95	0	29426.48	0.24
<i>Helicolenus dactylopterus</i>	SW	0	414.29	3197.46	5102.79	4542.47	735.69	0	0	13992.80	0.30
<i>Helicolenus dactylopterus Total</i>		0	6594.48	18970.63	8370.50	7985.10	1497.63	0.95	0	43419.29	
<i>Hoplostethus atlanticus</i>	NW	0	0	0	13.09	14.41	5.92	123.13	491.52	648.07	0.78
<i>Hoplostethus atlanticus</i>	SW	0	0	0	0	0.69	0.87	0	0	1.56	0.65
<i>Hoplostethus atlanticus Total</i>		0	0	0	13.09	15.10	6.79	123.13	491.52	649.62	0
<i>Jasus lalandii</i>	NW	102.65	18.50	0	0	0	0	0	0	121.15	0.67
<i>Jasus lalandii</i>	SW	48594.95	4447.29	374.22	0	7.73	0	0	0	53424.20	0.91
<i>Jasus lalandii Total</i>		48697.60	4465.79	374.22	0	7.73	0	0	0	53545.35	
<i>Lophius vomerinus</i>	NW	0	1403.55	4461.15	2029.62	561.57	839.98	197.06	0	9492.94	0.18
<i>Lophius vomerinus</i>	SW	91.09	2564.09	1037.54	221.31	166.97	149.35	0	0	4230.36	0.31
<i>Lophius vomerinus Total</i>		91.09	3967.64	5498.70	2250.93	728.54	989.33	197.06	0	13723.30	
<i>Merluccius capensis</i>	NW	5594.78	79355.74	20960.28	2853.04	102.41	0	19.73	0	108886.00	0.21
<i>Merluccius capensis</i>	SW	7467.71	55132.91	11481.63	484.43	0	0	0	0	74566.69	0.17
<i>Merluccius capensis Total</i>		13062.49	134488.65	32441.92	3337.48	102.41	0	19.73	0	183452.68	
<i>Merluccius paradoxus</i>	NW	90.17	14625.11	58179.83	39416.69	18145.81	6144.79	1558.76	2533.79	140694.93	0.14
<i>Merluccius paradoxus</i>	SW	0	1426.44	39251.02	17235.19	14755.24	1694.00	0	0	74361.90	0.34
<i>Merluccius paradoxus Total</i>		90.17	16051.56	97430.85	56651.88	32901.05	7838.79	1558.76	2533.79	215056.84	

Table 11. Numbers (millions) and biomass (tonnes) per region for the two species of hake (*M. capensis* and *M. paradoxus*) per 5 cm length groups. The numbers and biomass for the fishable (>36 cm) and non-fishable (<36 cm) fraction of the two species in the entire survey area are also provided

Length class	<i>Merluccius capensis</i>						<i>Merluccius paradoxus</i>					
	NW		SW		Total		NW		SW		Total	
	Numbers (millions)	Biomass (tonnes)	Numbers (millions)	Biomass (tonnes)	Numbers (millions)	Biomass (tonnes)	Numbers (millions)	Biomass (tonnes)	Numbers (millions)	Biomass (tonnes)	Numbers (millions)	Biomass (tonnes)
5-10	19.74	132.68	24.73	159.66	44.46	292.34	60.98	371.02	0.00	0.00	19.74	132.68
10-15	195.41	4672.30	53.83	1147.31	249.24	5819.61	224.92	4594.11	65.64	1161.95	195.41	4672.30
15-20	333.20	15819.86	125.64	5517.46	458.85	21337.32	323.06	15138.51	18.24	694.39	333.20	15819.86
20-25	80.41	7077.90	77.96	7510.40	158.36	14588.30	321.93	29640.23	24.37	2105.64	80.41	7077.90
25-30	32.40	5818.72	59.44	10781.08	91.84	16599.80	126.92	20459.62	102.12	17811.53	32.40	5818.72
30-35	49.81	14679.71	45.62	13819.09	95.43	28498.80	46.65	12957.78	109.35	28824.61	49.81	14679.71
35-40	42.80	18509.50	29.05	12808.25	71.85	31317.75	35.89	15006.29	24.42	9868.95	42.80	18509.50
40-45	19.40	12089.83	8.49	5463.82	27.88	17553.64	23.85	14300.16	11.58	7044.02	19.40	12089.83
45-50	3.44	3053.16	2.96	2738.91	6.40	5792.08	14.06	12103.62	2.95	2648.39	3.44	3053.16
50-55	2.49	2978.49	1.24	1583.04	3.74	4561.53	7.95	8632.12	1.31	1545.60	2.49	2978.49
55-60	7.68	11266.26	1.05	1797.02	8.73	13063.28	2.70	4039.65	1.31	1919.40	7.68	11266.26
60-65	2.74	5704.26	1.08	2385.70	3.82	8089.96	0.77	1401.41	0.38	727.25	2.74	5704.26
65-70	2.45	6053.01	1.74	4785.97	4.19	10838.98	0.49	1211.21	0.09	228.13	2.45	6053.01
70-75	0.18	576.53	0.23	766.63	0.41	1343.16	0.30	913.96	0.06	184.89	0.18	576.53
75-80	0.09	353.29	0.22	926.61	0.31	1279.90	0.00	0.00	0.06	204.14	0.09	353.29
80-85	0.00	0.00	0.04	209.48	0.04	209.48	0.00	0.00	0.00	0.00	0.00	0.00
Total	792.26	108785.49	433.31	72400.43	1225.57	181185.92	1190.47	140769.69	361.90	74968.91	792.26	108785.49
<36	710.97	48201.15	387.21	38935.01	1098.18	87136.16	1104.45	83161.26	319.72	50598.12	1424.18	133759.38
>36	81.30	60584.33	46.10	33465.43	127.39	94049.76	86.02	57608.42	42.18	24370.79	128.20	81979.21

An overview of all the samples collected during the current survey and the institutes responsible for their analysis is provided in Annex VIII.

3.6 Top predator observations

Cetaceans

Seventy-two hours and one minute (72h 1min) were spent on Primary watch, averaging at 2.66 hours per day over the duration of the cruise. Unfavourable weather conditions such as strong winds, mist and rain are all factors that contributed negatively and led to low numbers of hours on watch. A total of 400 individual whales and dolphins belonging to 11 different species were observed (Table 12 and Figure 30). The majority of sightings were made during the first 12 days of the cruise and mainly along the southwestern parts of the study area (Figure 31). This can largely be attributed to the majority of whales in the region, including the Southern Right (*Eubalaena australis*) and Humpback whales (*Megaptera novaeangliae*) being in the southern oceans this time of the year during the whales' annual summer feeding migration.

Table 12. Cetacean species and numbers observed

Species common name	Number
Common dolphin	350
Dusky dolphin	9
Heaviside's dolphin	6
Dolphin unidentified (like Heaviside's dolphin)	1
Fin whale	1
Humpback whale	9
Like Bryde's whale	11
Like Fin whale	1
Sei whale	1
Southern Right whale	8
Large Baleen whale unidentified	3

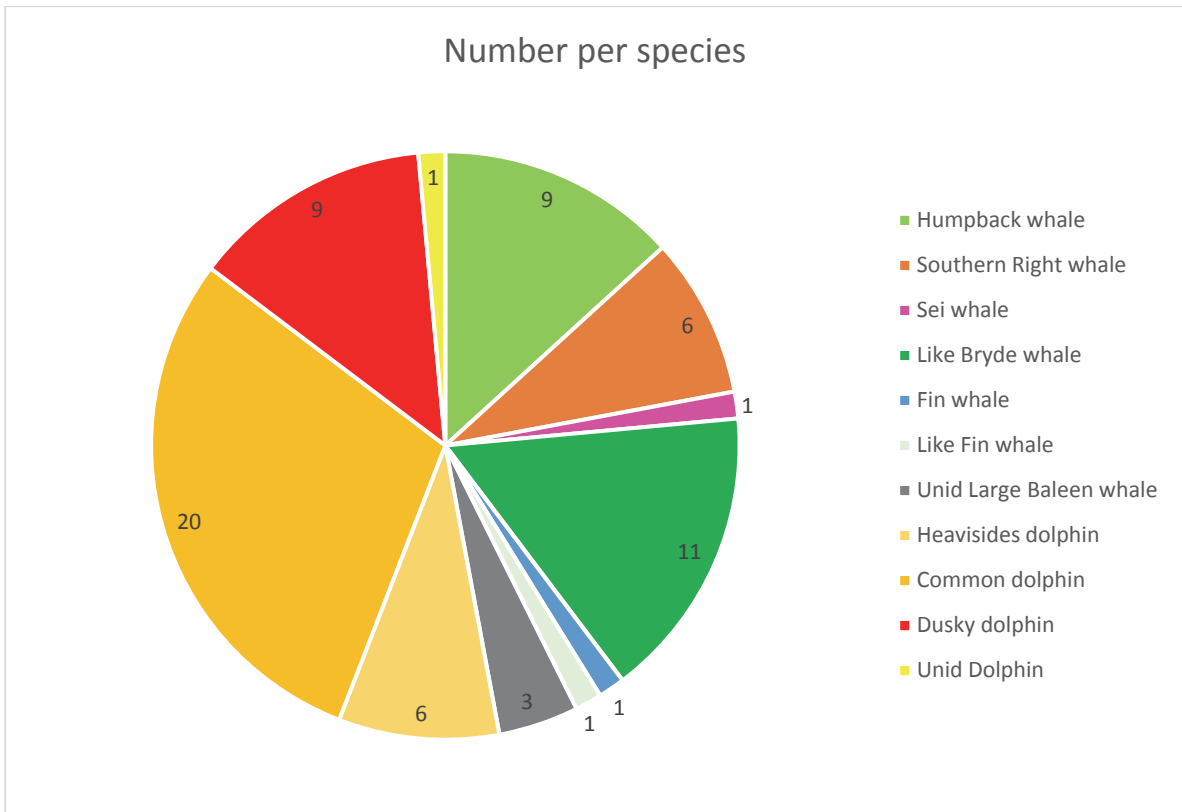


Figure 30. Number of animals per species observed (count numbers for common dolphin were deliberately reduced for better appearance)

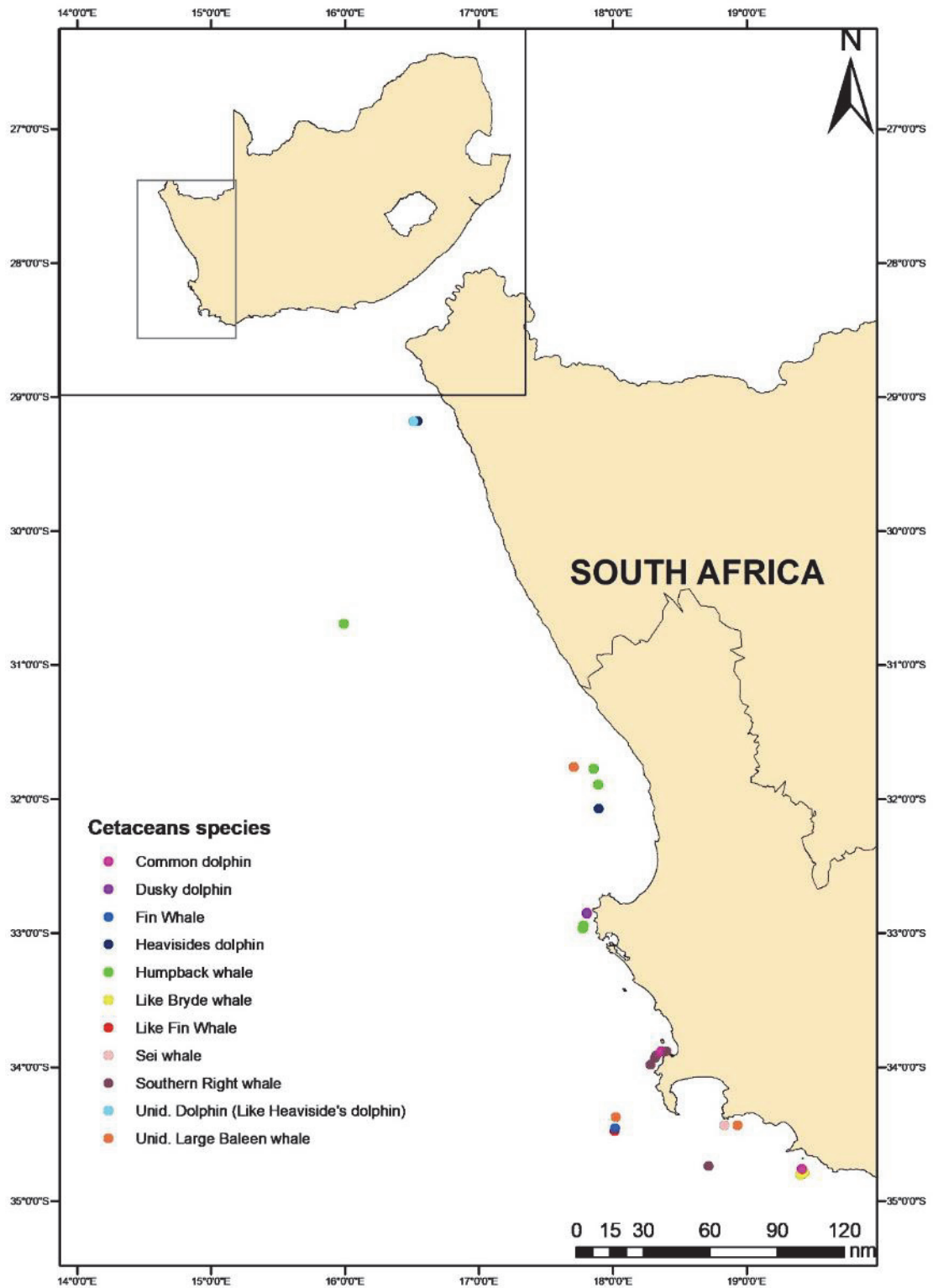


Figure 31. Distribution of marine mammals sighted along the western waters of South Africa

Seabirds

Fifty-seven hours of primary observations for seabirds were carried out during this cruise. As a result, a total of 7599 birds from 29 seabird taxa were identified and counted in 150 (10 min long) transects, of which 26 were identified to the species level (Table 13).

White-chinned petrels (*Procellaria aequinoctialis*) were the most abundant species encountered, with 1661 individuals recorded. Cape gannets (*Morus capensis*) were also fairly common but this could be attributed to the proximity of two of the biggest breeding locations for this species, at Bird Island-Lamberts Bay and Malgas Island in the mouth of Saldanha Bay respectively. The highest diversity was recorded in the vicinity of Cape Town, where 958 individual birds from 17 species were encountered (Figure 32). One Salvin's Albatross (*Thalassarche salvini*) and one Northern Royal Albatross (*Diomedea sanfordi*) were seen off the South Western Cape. These birds are rarely seen in southern African waters as both of them breed on islands off the New Zealand coast. On 24/03/2019, 7 Pomarine Jaegers (a hybrid skua) were spotted close inshore near the West coast town of Kleinsee (29.54757 °S, 16.71326 °E). Although not rare, they are not often seen in such numbers. The percentage of relative seabird abundance estimates per group is illustrated in Figure 33.

Table 13. Seabird species and numbers observed

Species common name	Number
Atlantic Yellow-nosed Albatross	163
Black-browed Albatross	538
Indian Yellow-nosed Albatross	399
Northern Royal Albatross	1
Salvin's Albatross	1
Shy Albatross	737
Unidentified Albatross	7
Cape Cormorant	467
Cape Gannet	1472
Hartlaub's Gull	1
Kelp Gull	58
Sabine's Gull	39
Parasitic Jaeger	3
African Penguin	22
Great-winged Petrel	13
White-chinned Petrel	1661
Soft-plumaged Petrel	3
Corv's Shearwater	395
Great Shearwater	764
Sooty Shearwater	88
Unidentified Shearwater	2
Wilson's Storm-Petrel	133
Pomarine Skua	10
Subantarctic Skua	124
Antarctic Tern	1
Common Tern	339
Greater Crested Tern	152
Unidentified - Common/Antarctic/Arctic Tern	4
Sandwich Tern	2
Total	7599

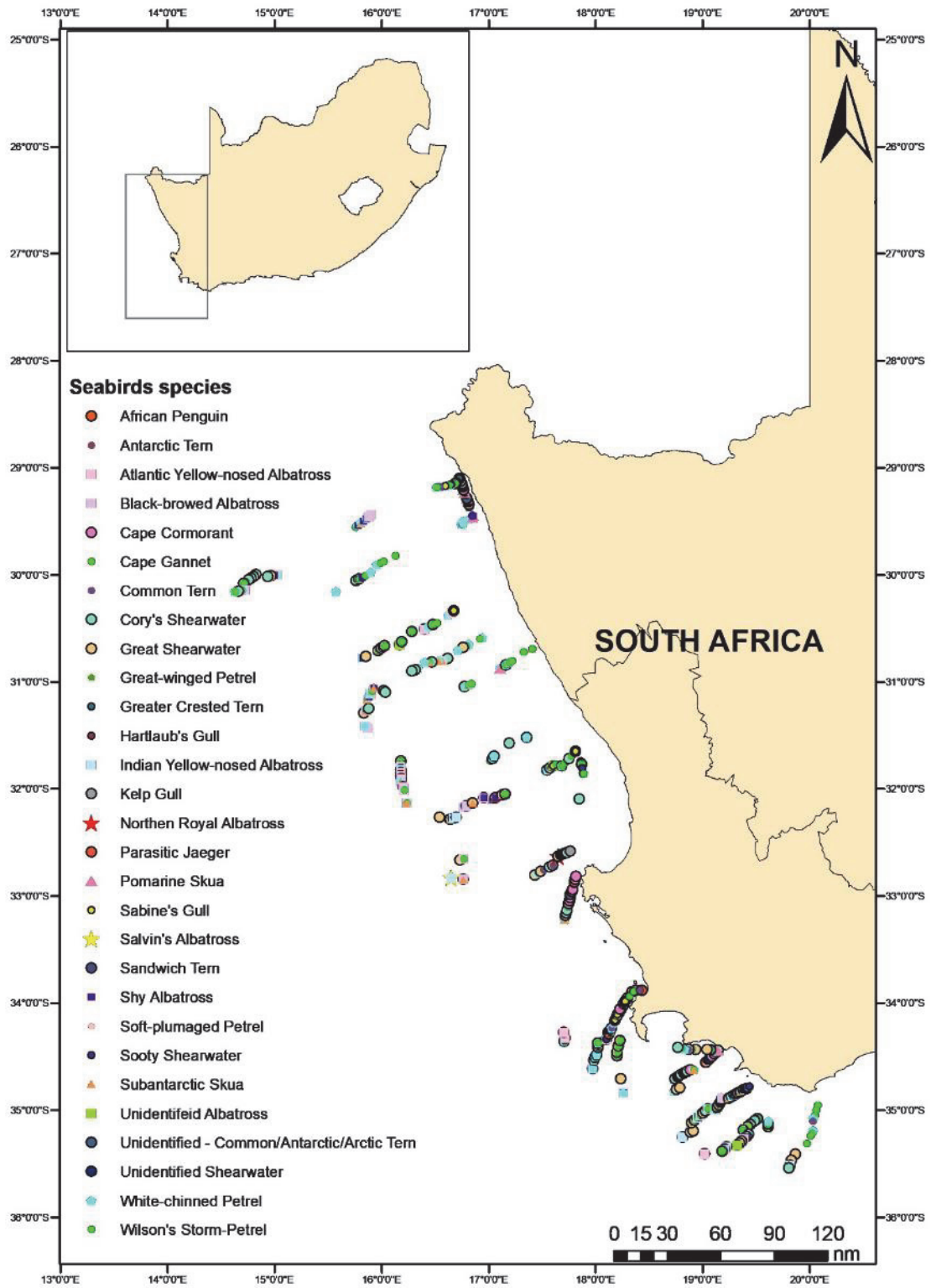


Figure 32. Distribution of seabirds along the western waters of South Africa

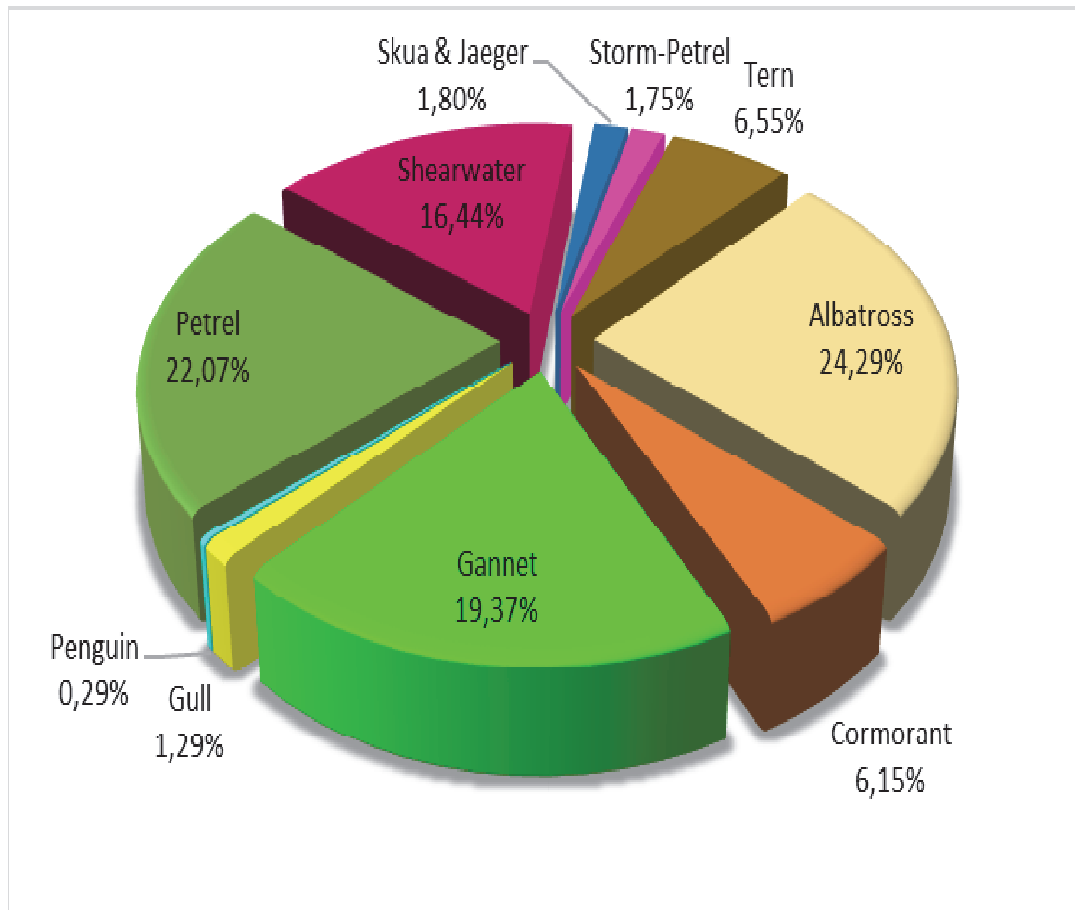


Figure 33. Relative abundance of seabirds per group

3.7 Concluding remarks

This report details the methods and data collected during the first part of the 2019 transboundary demersal survey at the south-eastern Atlantic and specifically off the coast of South Africa (Leg 2.1). Leg 2.1 covered the region from Cape Agulhas to 29°S with the main goal of estimating the demersal resources in the study area.

Overall, the survey was carried out according to the sailing order with inly few days of unfavourable weather that obstructed operations. Bottom trawling took place inside the 400 m isobath mostly during daytime, to avoid the effect of Diel Vertical Migration of hakes. Due to technical gear reasons, adverse weather conditions or improper calculations during the raising process of the sample weights to the total catch, 6 out of the 153 trawl stations were not able to be used in the biomass estimations. Due to adverse weather conditions a few plankton stations were also not carried out. CTD stations were carried out as planned. One of the objectives of this cruise has been to assist to establish the distribution (including migratory) and relative abundance of whales, dolphins and seabirds on the Southwest and West coasts of South Africa. Findings from this cruise will contribute to and improve the understanding of the recovery and distribution patterns of these previously threatened species.

An overview of all the data collected during the survey and their availability to partner countries is presented in Annex IX.

3.8 Regional synthesis

3.8.1 *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 34).

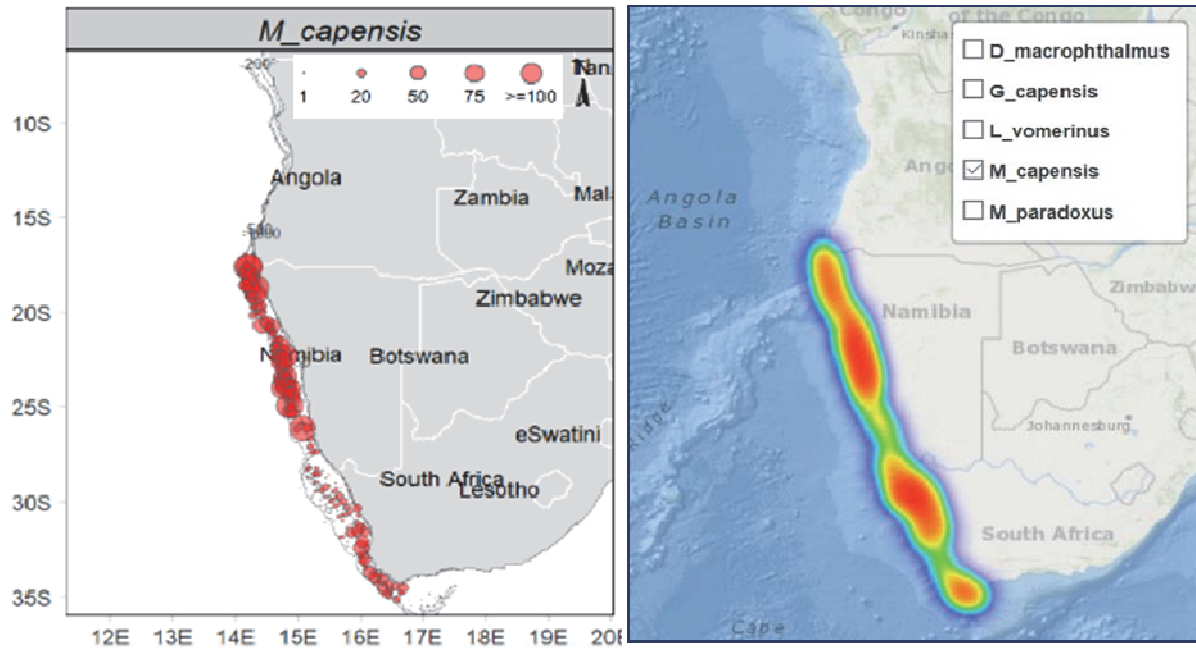


Figure 34. Distribution map for *Merluccius capensis* showing trawl catch rates (CPUE) in tonnes/NM² (left panel) and as a density heat-map (right panel)

Presenting these data in 10 cm length-classes (Figure 35) 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/NM²) in the size range 21-55 cm.

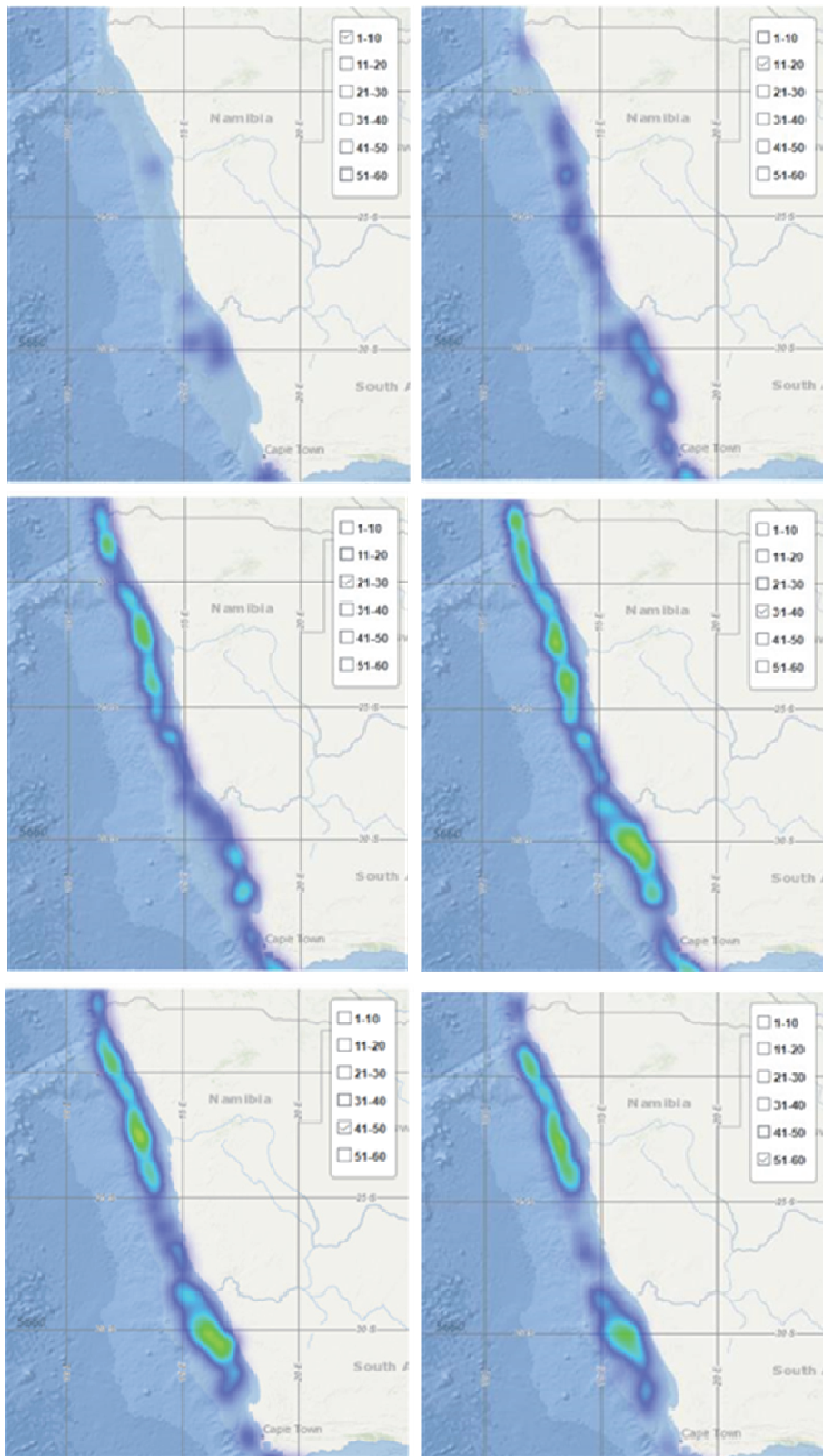


Figure 35. *Merluccius capensis* distribution in 10 cm length classes. Base map data sources: GEBCO, NOAA, CHS, OSU, CSUMB, National Geographic, DeLorme, NAVTEQ and Esri

In summary, the data collected during the March-May 2019 surveys would seem to lend some support the hypothesis that Cape hake occurs 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.

3.8.2 *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 36).

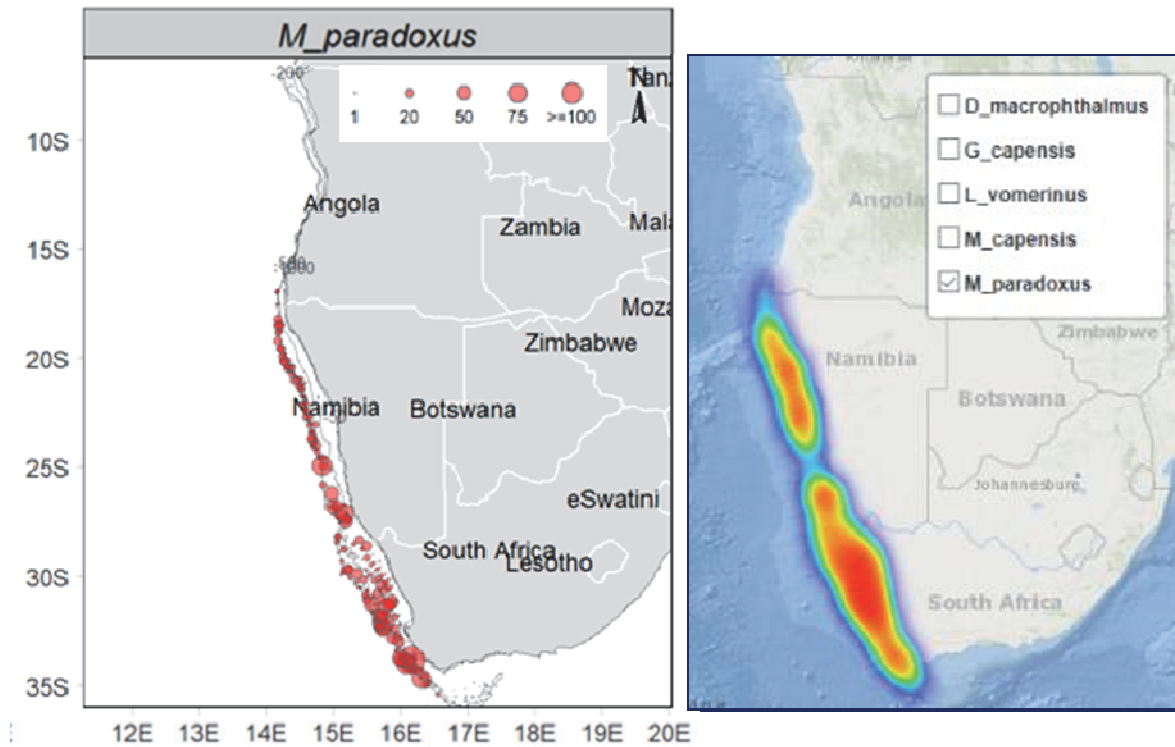


Figure 36. Distribution map for *Merluccius paradoxus* showing trawl catch rates (CPUE) in tonnes/NM2 (left panel) and as a density heat-map (right panel)

When the data are analysed in more depth, by length-classes (Figure 37), 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 grow 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.

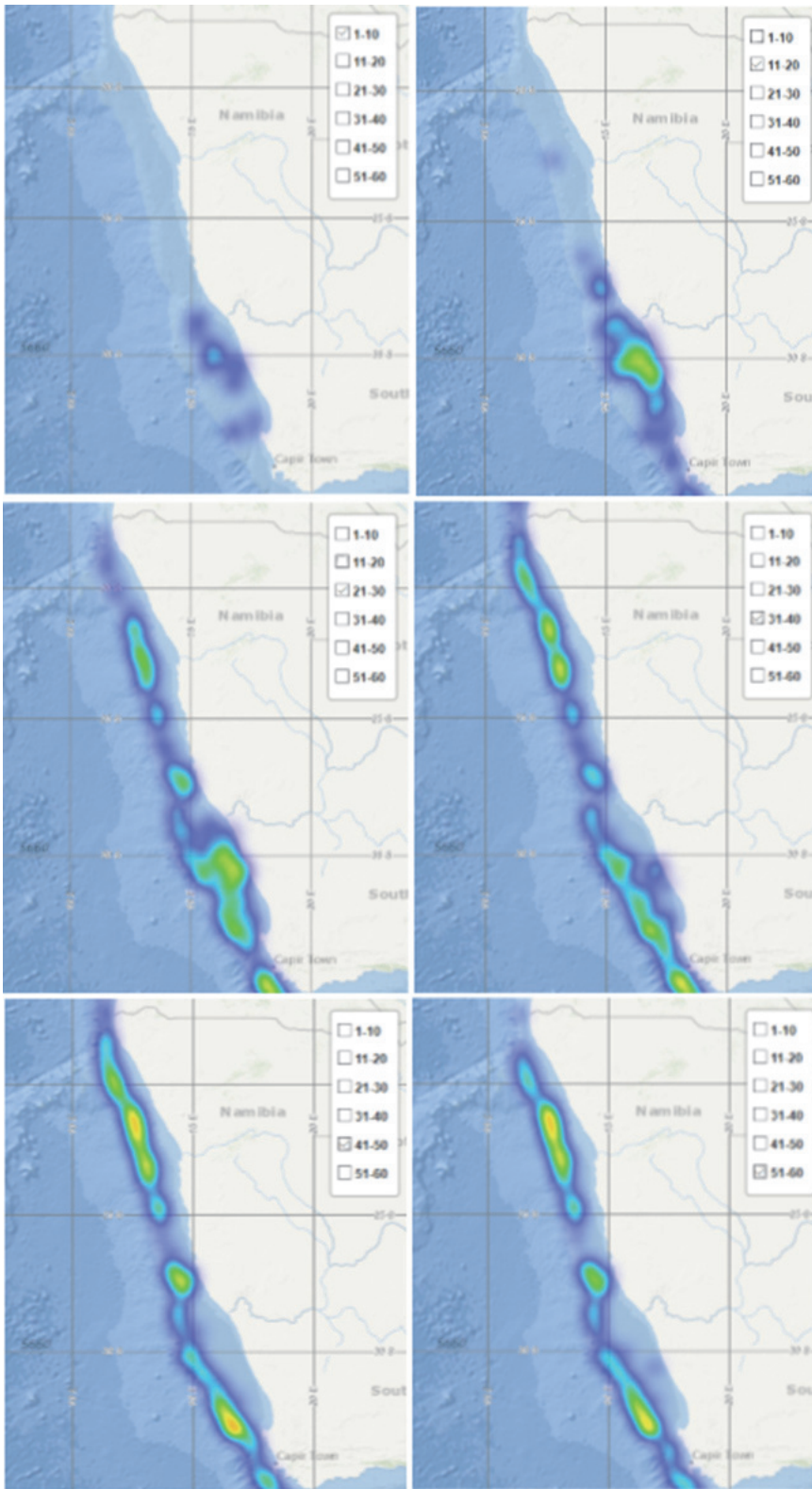


Figure 37. *Merluccius paradoxus* distribution in 10 cm length classes. Base map data sources: GEBCO, NOAA, CHS, OSU, CSUMB, National Geographic, DeLorme, NAVTEQ and Esri

This is consistent with the theory that *M. paradoxus* spawns in South Africa and then disperses into Namibia as the fish grow (Strømme *et al.*, 2016). 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/NM²) 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 that existing efforts for collaboration on the management of this species are strengthened. However, further research is required to determine the full migration cycle of this species, notably whether Namibian fish returns to South African waters to spawn.

3.8.3 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 38).

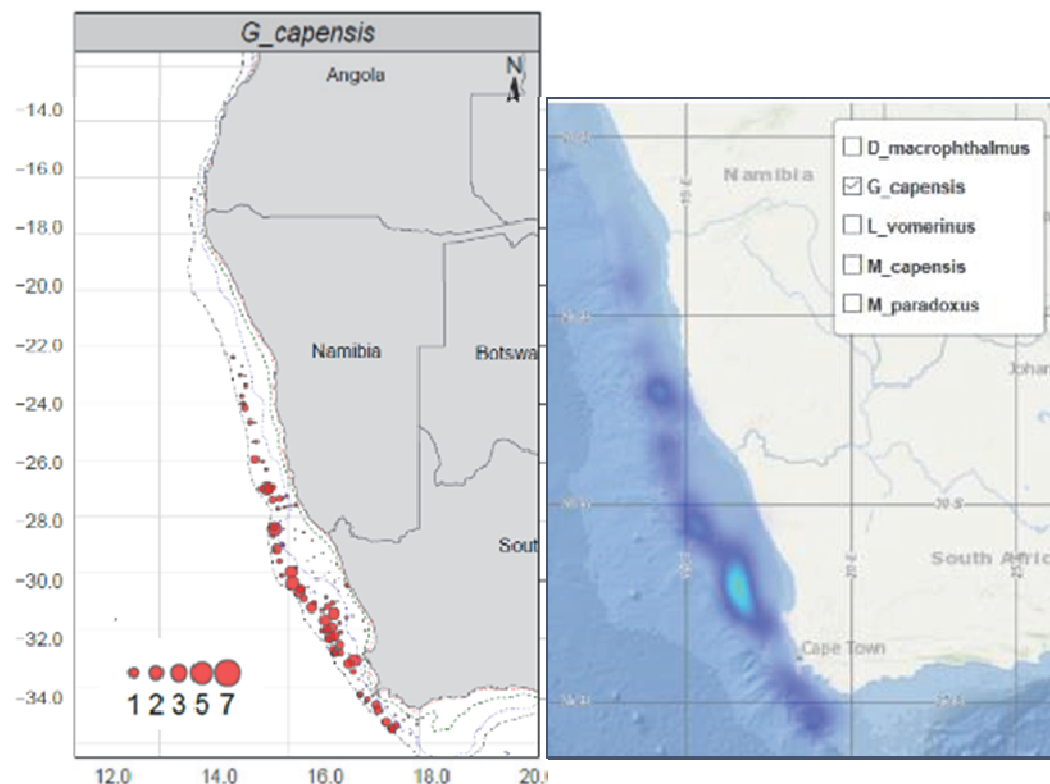


Figure 38. Distribution map for *Genypterus capensis* showing trawl catch rates (CPUE) in tonnes/NM² (left panel) and as a density heat-map (right panel)

When the data are presented in 10 cm length-classes (Figure 39) 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 Namibia. This species, based on the limited evidence presented here, appears to be a shared stock, albeit mostly occurring in South African waters.

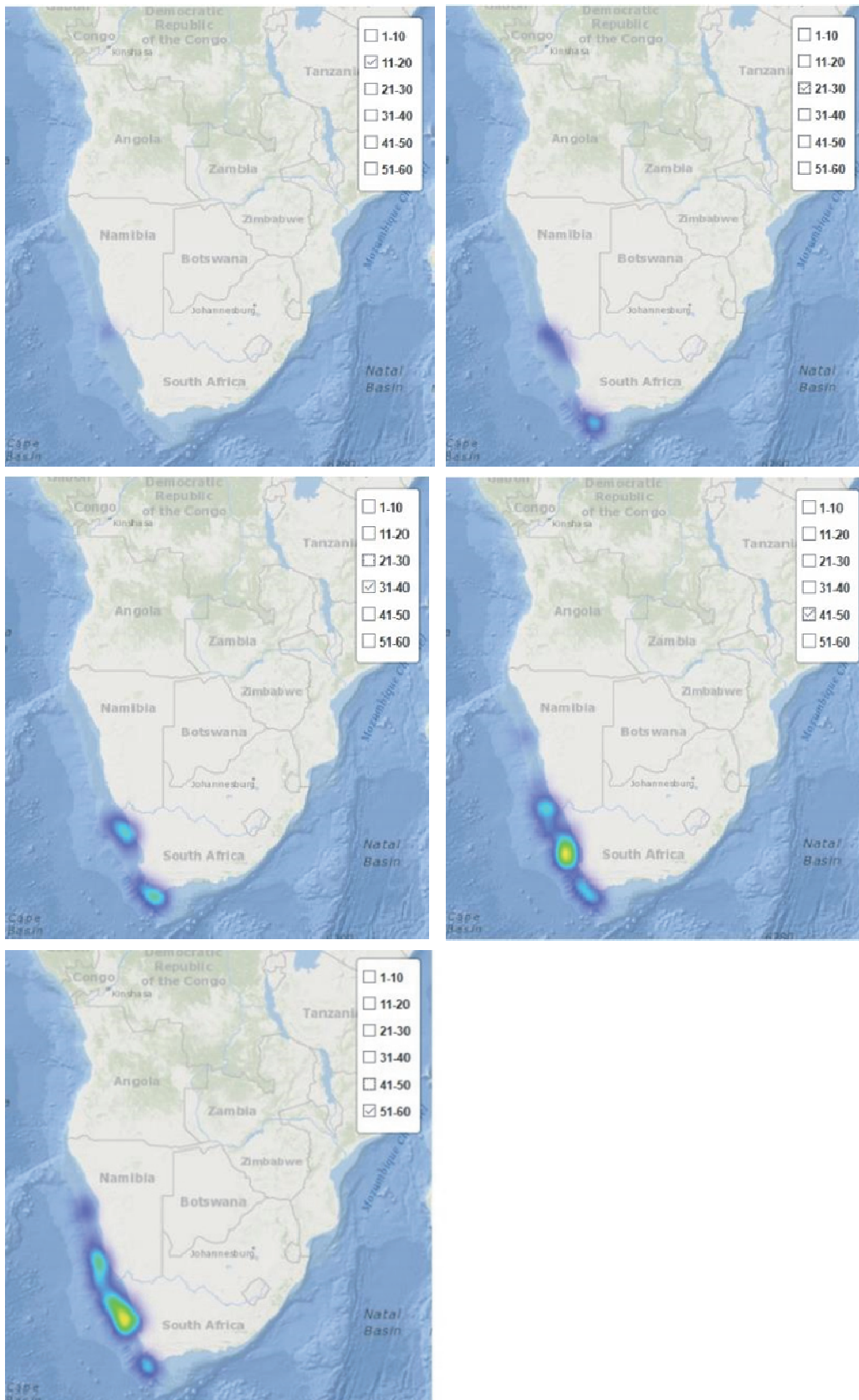


Figure 39. *Genypterus capensis* distribution in 10 cm length classes. Base map data sources: GEBCO, NOAA, CHS, OSU, CSUMB, National Geographic, DeLorme, NAVTEQ and Esri

3.8.4 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 40).

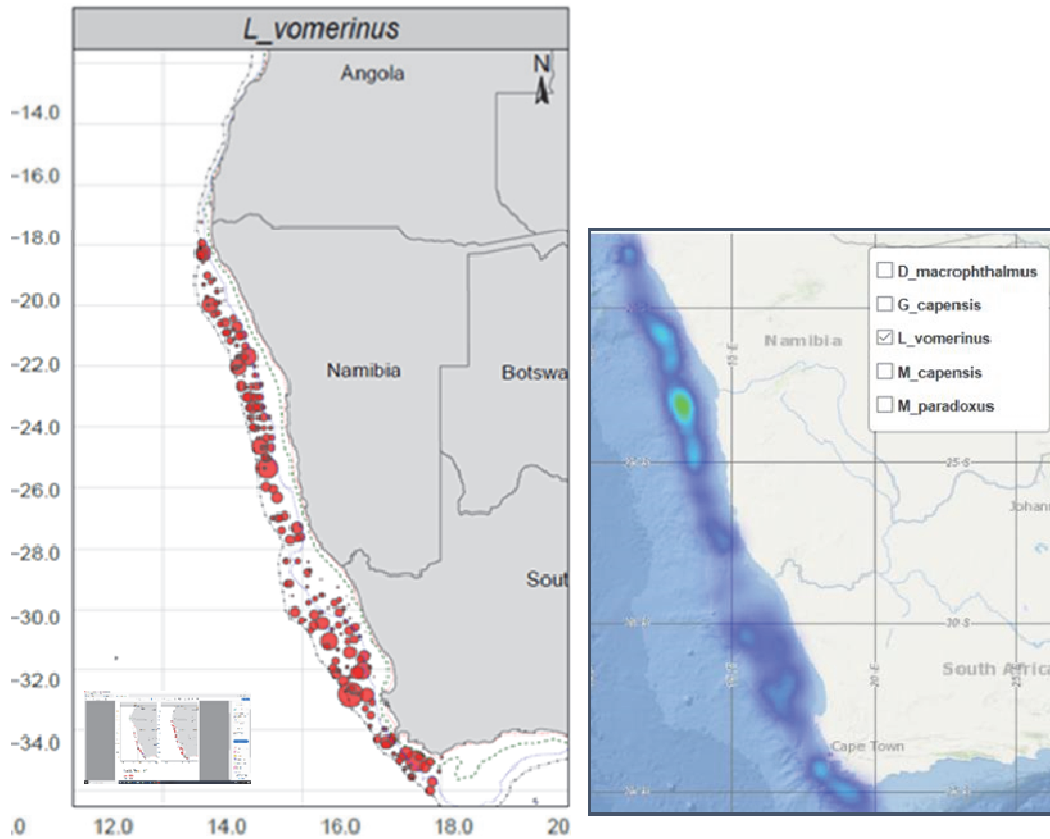


Figure 40. Distribution map for *Lophius vomerinus* showing trawl catch rates (CPUE) in tonnes/NM² (left panel) and as a density heat-map (right panel)

When the data are presented in 10 cm length-classes (Figure 41) 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.

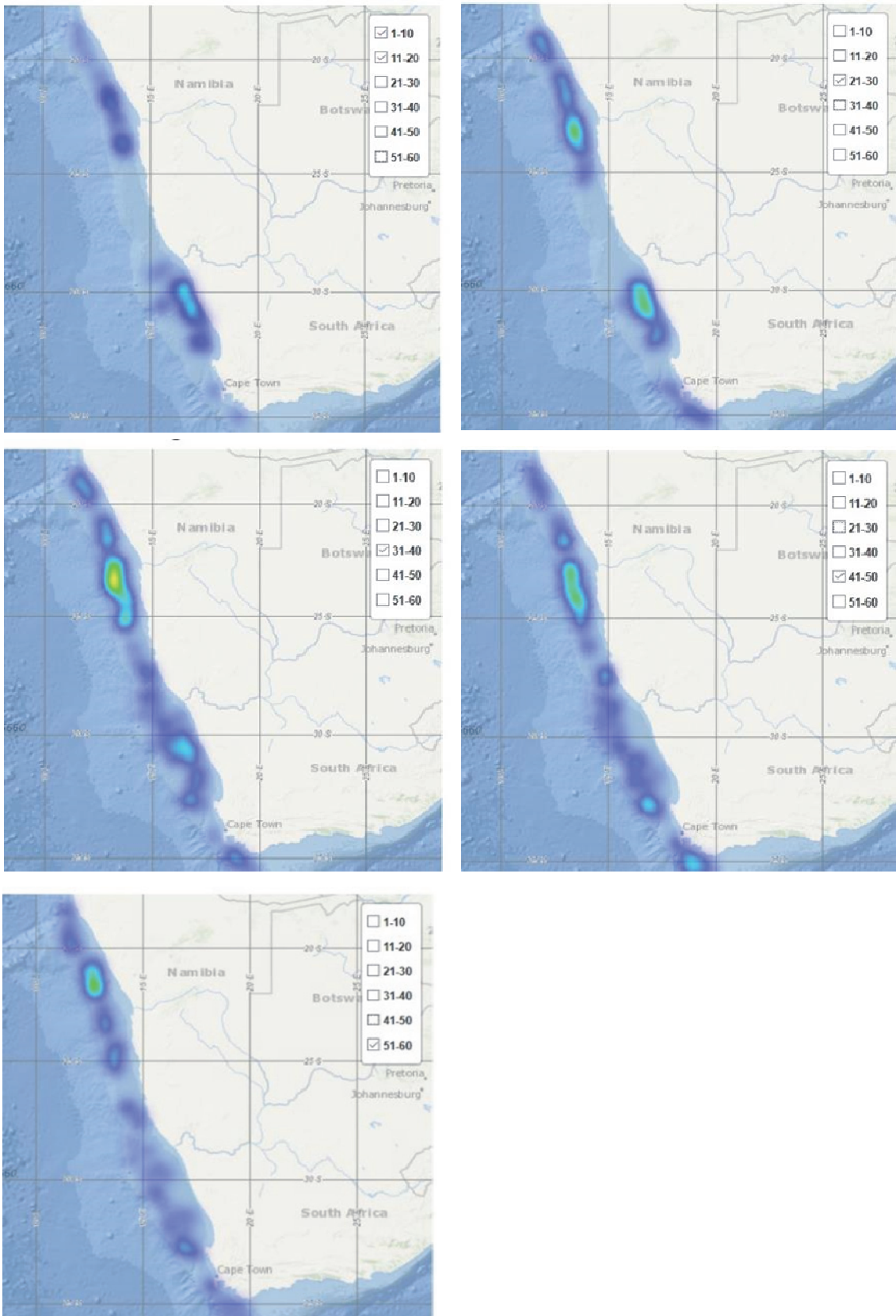


Figure 41. *Lophius vomerinus* distribution in 10 cm length classes. Base map data sources: GEBCO, NOAA, CHS, OSU, CSUMB, National Geographic, DeLorme, NAVTEQ and Esri

3.8.5 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 42).

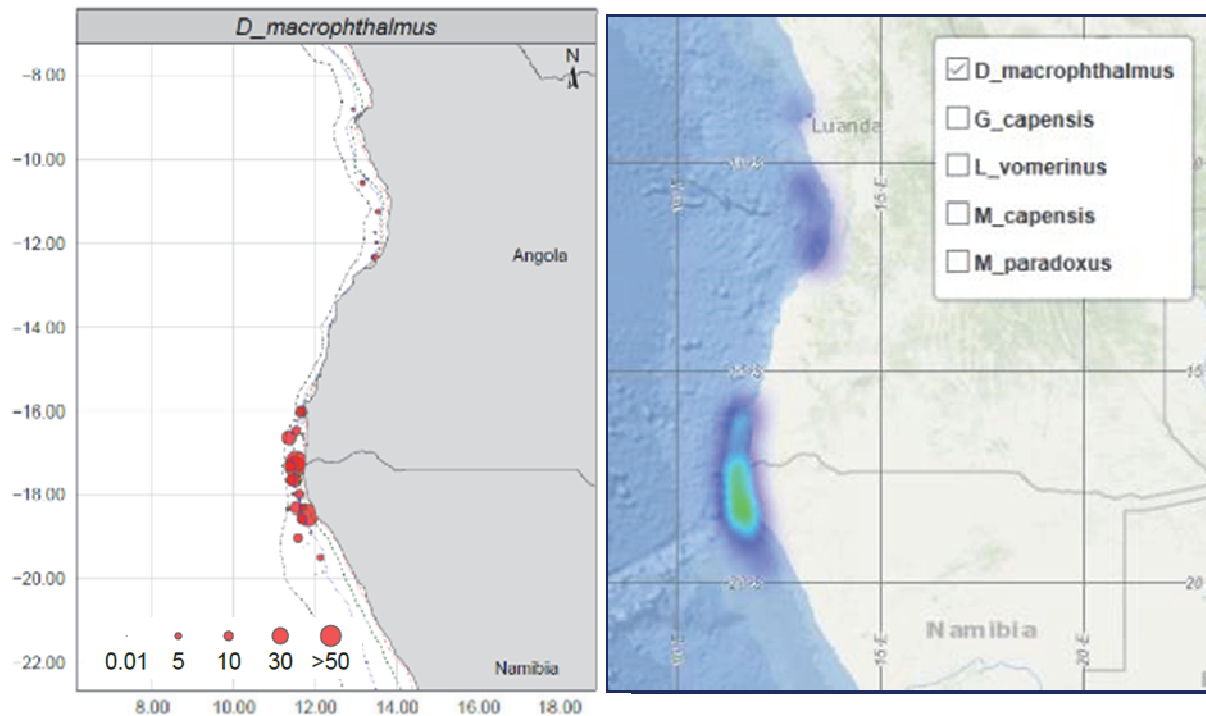


Figure 42. Distribution map for *Dentex macrophthalmus* showing trawl catch rates (CPUE) in tonnes/NM² (left panel) and as a density heat-map (right panel)

The CPUE data are presented in 5 cm length-classes (Figure 43, 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-eye 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 (migration?) is important.

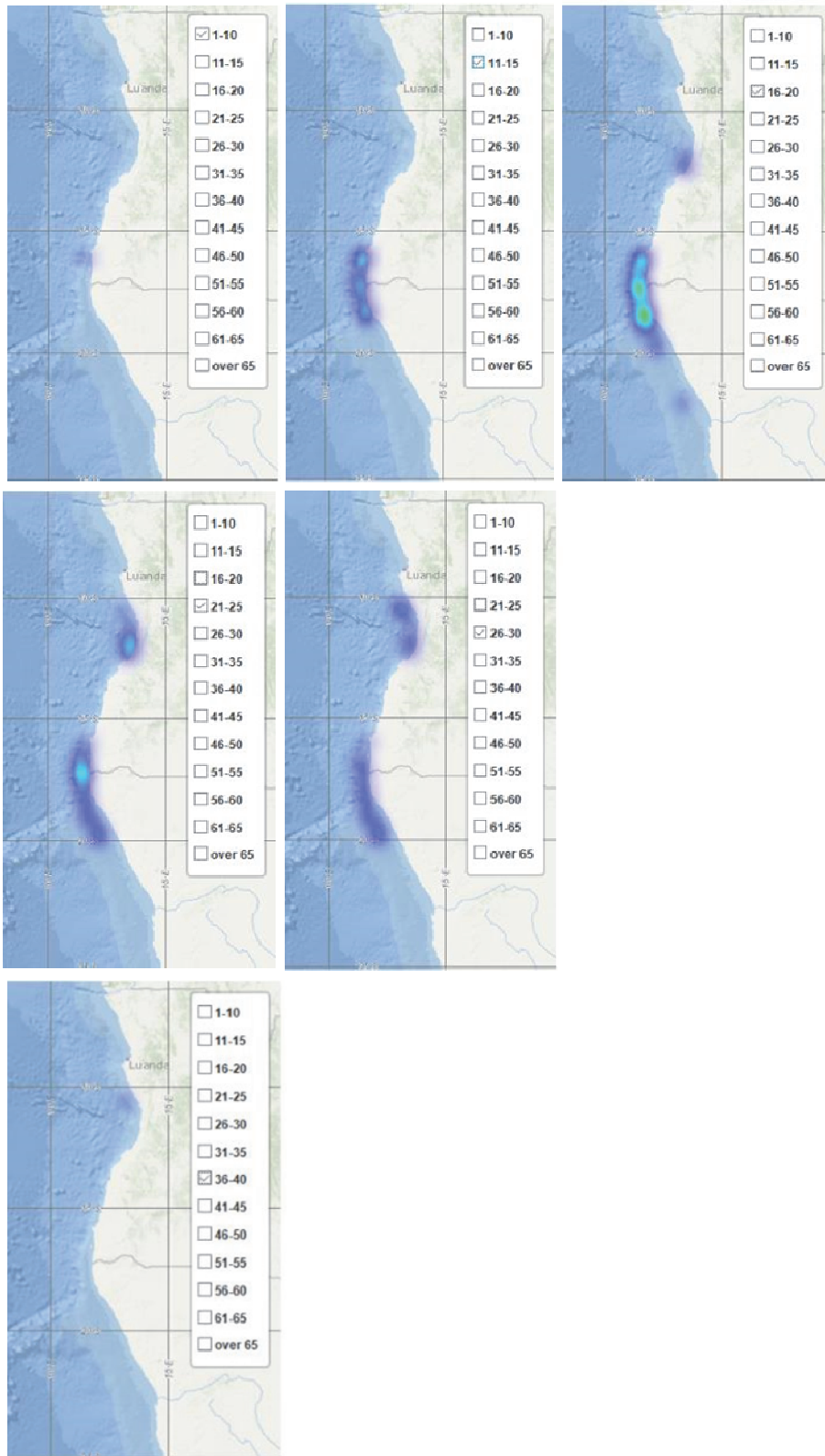


Figure 43. *Dentex macrophthalmus* distribution in 5 cm length classes. Base map data sources: GEBCO, NOAA, CHS, OSU, CSUMB, National Geographic, DeLorme, NAVTEQ and Esri

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ANNEX I. DESCRIPTION OF SAMPLING AT HYDROGRAPHIC TRANSECTS

Bottom Depth	Station Type
30 m	super station
75 m	CTD
100 m	super station
200 m	CTD
500 m	super station
1000 m	CTD

Bottle depths at super stations

Shallow Stations with depth 30 m	Intermediate Stations with depth 100 m	Deep Stations with depth 500 m	Extra deep Stations with depth 1 000 m	Extra deep Stations with depth 2 000 m
25	100	500	1 000	2 000
5	75	400	750	1 500
*FLU max	50	300	500	1 000
	25	200	400	750
	5	150	300	500
	*FLU max	100	200	200
		75	100	100
		50	75	75
		25	50	50
		5	25	25
		*FLU max	5	5
			*FLU max	*FLU max

ANNEX II. 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 checked on the 23.01.2017 in Sandviksflaket, Bergen, Norway using Cu64 for the 18 kHz, Cu60 for the 38 kHz, WC38.1 for the 70, 120 and 200 kHz, and the WC22 for the 333 kHz. The details of the settings for the 38-kHz echo sounder were as follows:

Transceiver2 menu (38 kHz)	
Transducer depth	5 8 m
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	26,95 dB
SA correction	0.03 dB
Angle sensitivity	21.9
3 dB beamwidth	6.22° along ship
	6.28 athwart ship
Alongship offset	0.10°
Athwardship offset	0.06°

Bottom detection menu Minimum level 50 Db

Fishing gear

The vessel has one small four-panel Åkrahamn pelagic trawl, one MultiPelt 624 trawl (Figure II.1, new in 2017) and one 'Gisund super bottom trawl'. The MultiPelt trawl was not used during the survey due to a problem on the winch system. The smallest pelagic trawl has 8 to 12 m vertical opening under normal operation, whereas the MultiPelt 624 trawl has 25 to 35 m opening.

The Super Gisund 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 2 000 kg. The door spreading is about 45 m when using restraining rope. Trawling was

conducted for species identification only and no restraining rope was therefore used during the survey.

The SCANMAR system was used during all trawl hauls. This equipment consists of sensors, a hydrophone, a receiver, a display unit and a battery charger. Communication between sensors and ship is based on acoustic transmission. The doors are fitted with sensors to provide information on their interdistance and angle, while a height sensor is fitted on the bottom trawl to measure the trawl opening and provide information on clearance and bottom contact.

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

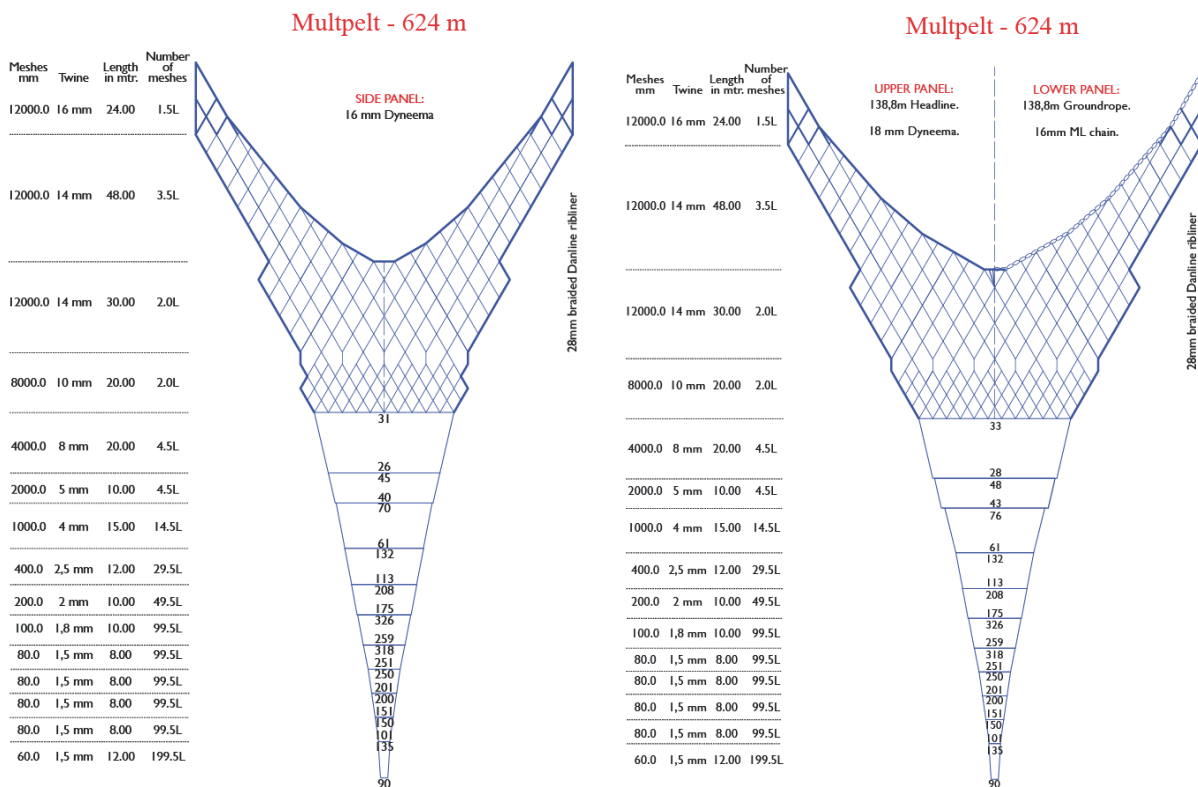


Figure II.1. Schematic drawing of the MultPelt 624

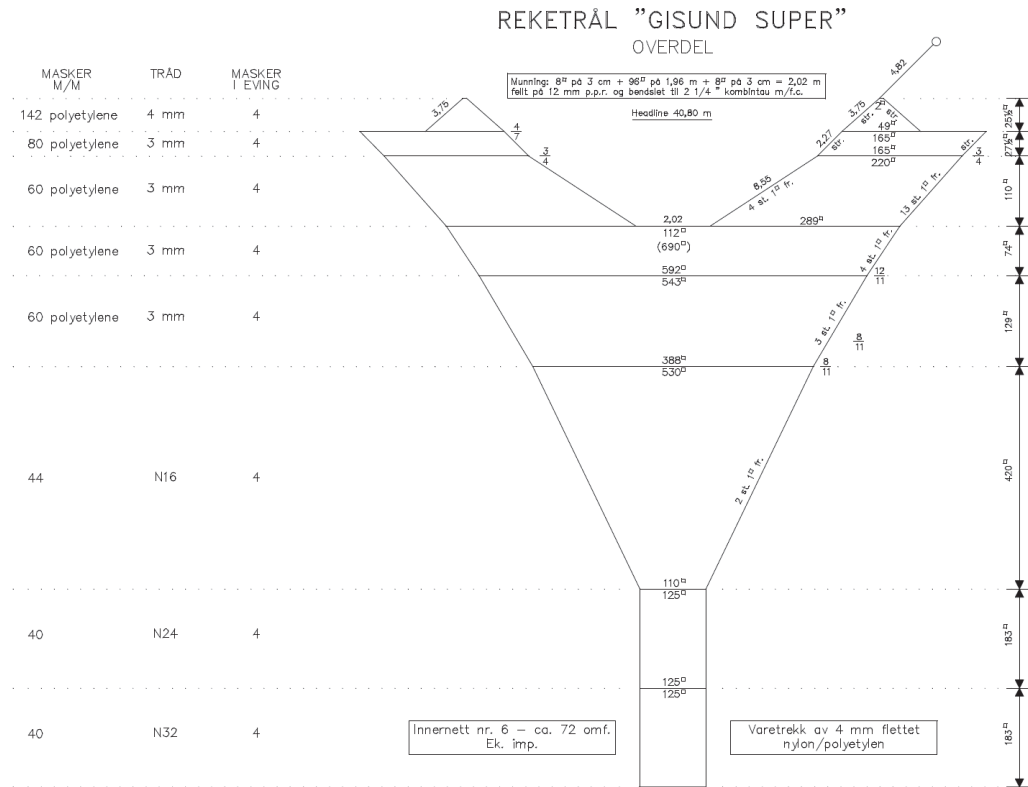
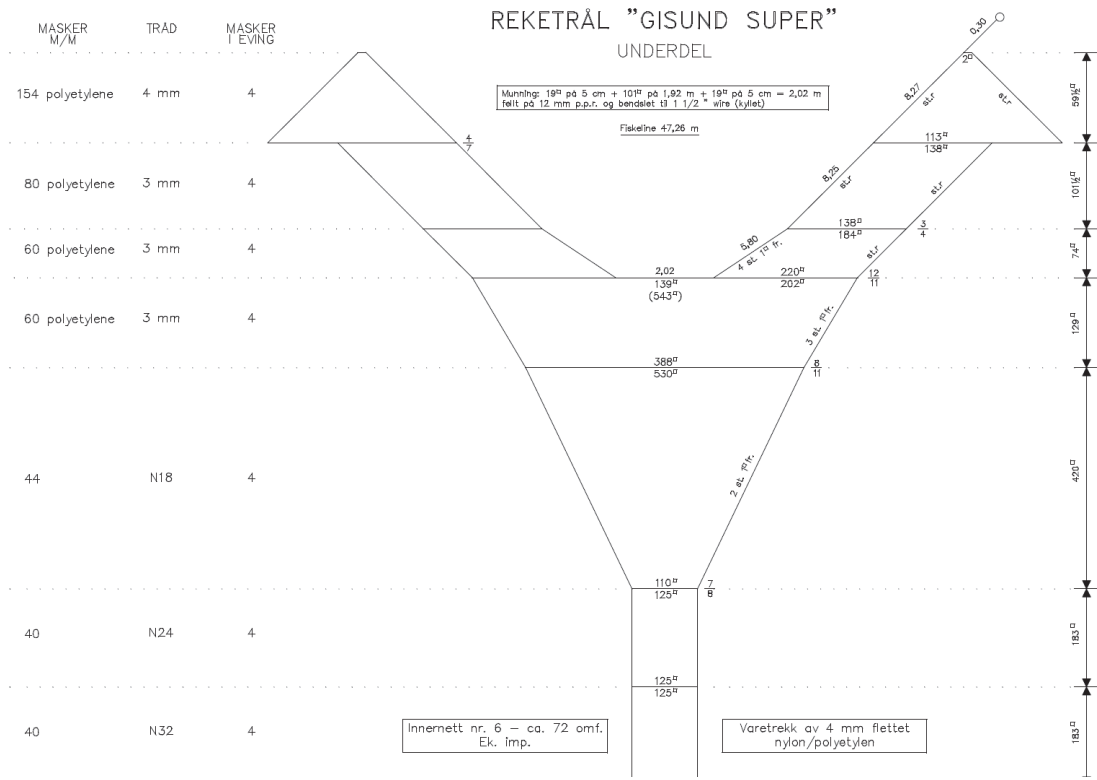


Figure II.3. Schematic drawing of the Super Gisund bottom trawl

ANNEX III. RECORDS OF FISHING STATIONS

R/V Dr. Fridtjof Nansen		SURVEY:2019402		STATION: 1	
DATE	:01/03/19	GEAR TYPE: BT NO:	1	POSITION:Lat	S 34°21,34
TIME	start stop duration			Lon	E 18°2,31
TIME	:06:32:33 08:57:06 144,6(min)				
LOG	:4505.64 4512.67 7.0				
FDEPTH:	278 265	Purpose	: 3	Region	: 6100
BDEPTH:	278 265	Gear cond.:	: 0	Validity	: 5
Towing dir:	0°	Speed	: 2.9 kn	Catch/hour:	: 0.05
Sorted	: 0	Total catch:	: 0.12		

SPECIES		CATCH/HOUR		% OF TOT. C		SAMP
	weight numbers					
J E L L Y F I S H	0.04	1	79.66			
PHROSINIDAE	0.01	6	16.95			
Trachurus capensis, juvenile	0.00	1	1.69			
Decapods, juvenile	0.00	2	0.85			
Decapods	0.00	0	0.85			
Total		0,05	100,00			

R/V Dr. Fridtjof Nansen		SURVEY:2019402		STATION: 2	
DATE	:01/03/19	GEAR TYPE: BT NO:	1	POSITION:Lat	S 33°58,02
TIME	start stop duration			Lon	E 18°11,63
TIME	:16:17:25 21:26:01 308,6(min)				
LOG	:4563.48 4579.11 9.9				
FDEPTH:	118 228	Purpose	: 3	Region	: 6100
BDEPTH:	118 228	Gear cond.:	: 0	Validity	: 5
Towing dir:	0°	Speed	: 3.0 kn	Catch/hour:	: 47.63
Sorted	: 245	Total catch:	: 244.97		

SPECIES		CATCH/HOUR		% OF TOT. C		SAMP
	weight numbers					
Maurollicus sp.	17.88	10642	37.54			
QUILLIDAE	11.29	2205	23.71			
MYCTOPHIDAE	10.49	6031	22.02			
Scomberesox simulans	5.02	139	10.54			1
S H A R K S	1.28	0	2.79			
Brama brama	0.83	0	1.64			
Lolliigunula sp.	0.45	7	0.95			
J E L L Y F I S H	0.10	0	0.20			
OCTOPODIDAE	0.09	13	0.20			
UNIDENTIFIED FISH	0.09	13	0.20			
Merluccius capensis, juvenile	0.05	20	0.11			
TRICHIURIDAE, juvenile	0.03	7	0.07			
NAUTILIDAE	0.02	0	0.03			
Total		47,63	100,00			

R/V Dr. Fridtjof Nansen		SURVEY:2019402		STATION: 3	
DATE	:02/03/19	GEAR TYPE: BT NO:	1	POSITION:Lat	S 34°27,93
TIME	start stop duration			Lon	E 18°0,39
TIME	:00:05:34 00:36:07 30,6 (min)				
LOG	:4596.65 4598.07 1.4				
FDEPTH:	310 310	Purpose	: 3	Region	: 6100
BDEPTH:	310 310	Gear cond.:	: 0	Validity	: 0
Towing dir:	0°	Speed	: 2.8 kn	Catch/hour:	: 628.83
Sorted	: 320	Total catch:	: 320.18		

SPECIES		CATCH/HOUR		% OF TOT. C		SAMP
	weight numbers					
Helicolenus dactylopterus	316.83	6546	50.38			
Merluccius paradoxus	171.06	98	27.20			3
Coelorinchus sp.	68.19	3278	10.84			
Lophius vomerinus	21.17	12	3.37			
Todarodes sagittatus	13.43	153	2.14			
Genypterus capensis	11.47	27	1.82			2
OCTOPODIDAE	5.15	4	0.82			
Merluccius capensis	4.40	2	0.70			186
Mullus barbatus	4.12	8	0.66			
Callionymus sp.	3.85	355	0.61			
J E L L Y F I S H	3.73	0	0.59			
Cruriraja parcomaculata	1.89	6	0.30			
ZEIDAE	1.30	2	0.21			
UNIDENTIFIED FISH	0.82	31	0.13			
S H R I M P S	0.51	27	0.08			
Chlorophthalmus sp.	0.43	4	0.07			
G A S T R O P O D S	0.20	6	0.03			
Eptatretus sp.	0.16	2	0.02			
PAGUROIDEA	0.08	2	0.01			
CRANCHIDAE	0.04	4	0.01			
Total		628,83	100,00			

R/V Dr. Fridtjof Nansen		SURVEY:2019402		STATION: 4	
DATE	:02/03/19	GEAR TYPE: BT NO:	1	POSITION:Lat	S 34°33,57
TIME	start stop duration			Lon	E 17°56,39
TIME	:02:02:15 02:24:29 22,2 (min)				
LOG	:4606.24 4607.44 1.2				
FDEPTH:	436 442	Purpose	: 3	Region	: 6100
BDEPTH:	436 442	Gear cond.:	: 0	Validity	: 0
Towing dir:	0°	Speed	: 3.2 kn	Catch/hour:	: 2009.65
Sorted	: 372	Total catch:	: 744.91		

SPECIES		CATCH/HOUR		% OF TOT. C		SAMP
	weight numbers					
Merluccius paradoxus	1534.64	3745	76.36			4
Helicolenus dactylopterus	350.94	1451	17.46			
Coelorinchus simorhynchus	89.46	1862	4.45			
Bassanago albescens	16.29	22	0.81			
Symbolophorus sp.	8.63	561	0.43			
Sea anemone sp	3.45	16	0.17			
Neocyttus rhomboidalis	1.73	5	0.09			
Notacanthus sp.	0.97	11	0.05			
Rajella barnardi	0.86	5	0.04			
Kuronezumia leonis	0.81	32	0.04			
Hymenocephalus sp.	0.44	32	0.02			
Nezumia sp.	0.43	32	0.02			
Physiculus capensis	0.38	16	0.02			0
PAGUROIDEA	0.32	22	0.02			
Callionymus sp.	0.22	32	0.01			
S H R I M P S	0.08	27	0.00			
Total		2009,65	100,00			

R/V Dr. Fridtjof Nansen		SURVEY:2019402		STATION: 5	
DATE	:02/03/19	GEAR TYPE: BT NO:	1	POSITION:Lat	S 34°36,43
TIME	start stop duration			Lon	E 17°56,03
TIME	:04:02:44 04:32:26 29,7 (min)				
LOG	:4614.18 4615.58 1.4				
FDEPTH:	575 585	Purpose	: 3	Region	: 6100
BDEPTH:	575 585	Gear cond.:	: 0	Validity	: 0
Towing dir:	0°	Speed	: 2.8 kn	Catch/hour:	: 372.85
Sorted	: 185	Total catch:	: 184.56		

SPECIES		CATCH/HOUR		% OF TOT. C		SAMP
	weight numbers					
Merluccius paradoxus	203.92	51	54.69			5
Coelorinchus acanthiger	111.15	2313	29.81			
Helicolenus dactylopterus	24.65	129	6.61			

Funchalia woodwardi		9.66		630		2.59	
S H R I M P S		3.76		626		1.01	
Lamprogrammus exutus		2.95		42		0.79	
Ebrinania costaeanae		2.93		8		0.79	
Malacocephalus occidentalis		2.59		12		0.69	
Sea anemone sp		2.10		8		0.56	
ENOPLOTEUTHIDAE		1.66		2		0.44	
Selachophidium guentheri		1.21		14		0.33	
Notacanthus sexspinis		1.07		14		0.29	
Nezumia micronychodon		1.07		158		0.29	
Todaropsis eblanae		0.93		8		0.25	
Phosichthys argenteus		0.79		16		0.21	
Symbolophorus sp.		0.71		53		0.19	
Rajella leopardus		0.48		2		0.13	
Ommastrephes bartrami		0.26		8		0.07	
Starfish		0.24		85		0.07	
Coelorinchus polli		0.24		2		0.07	
Chlorophthalmus agassizi		0.16		2		0.04	
Stoloteuthis leucoptera		0.12		2		0.03	
Myxine capensis		0.08		2		0.02	
Zeus capensis		0.08		6		0.02	
Starfish		0.04		2		0.01	
Sea anemone sp		0.00		2		0.00	
Total		372,85		100,00			

R/V Dr. Fridtjof Nansen		SURVEY:2019402		STATION: 6	
DATE	:02/03/19	GEAR TYPE: BT NO:	1	POSITION:Lat	S 34°22,83
TIME	start stop duration			Lon	E 18°3,00
TIME	:10:03:37 10:32:13 28,6 (min)				
LOG	:4636.14 4637.48 1.3				
FDEPTH:	282 281	Purpose	: 3	Region	: 6100
BDEPTH:	282 281	Gear cond.:	: 0	Validity	: 0
Towing dir:	0°	Speed	: 2.8 kn	Catch/hour:	: 1174.20
Sorted	: 280	Total catch:	: 559.70		

SPECIES		CATCH/HOUR		% OF TOT. C		SAMP
	weight numbers					
Merluccius paradoxus	769.09	3436	65.50			6
Helicolenus dactylopterus	281.37	4502	23.96			7
Lophius vomerinus	50.06	13	4.26			
Coelorinchus simorhynchus	32.56	0	2.77			
Zeus capensis	11.83	21	1.01			
MYCTOPHIDAE	9.82	0	0.84			
Todarodes sagittatus	8.98	105	0.76			
Parapagurus pilosimanus	2.43	0	0.21			
Rajella caudaspinosa	2.05	4	0.17			
Pyrosoma	1.68	0	0.14			
Rajella dissimilis	1.15	8	0.10			
Callionymus sp.	0.84	88	0.07			
J E L L Y F I S H	0.80	0	0.07			
Merluccius paradoxus, juvenile	0.76	29	0.06			
Trachurus capensis	0.50	4	0.04			
NOMEIDAE	0.15	4	0.01			
Total		1174,05	99,99			

R/V Dr. Fridtjof Nansen		SURVEY:2019402		STATION: 7	
DATE	:03/03/19	GEAR TYPE: BT NO:	1	POSITION:Lat	S 34°54,64
TIME	start stop duration			Lon	E 20°2,33
TIME	:07:29:45 07:59:51 30,1 (min)				
LOG	:4818.24 4819.90 1.7				
FDEPTH:	63 66	Purpose	: 3	Region	: 6100
BDEPTH:	63 66	Gear cond.:	: 0	Validity	: 0
Towing dir:	0°	Speed	: 3.3 kn	Catch/hour:	: 250.01
Sorted	: 125	Total catch:	: 125.42		

SPECIES		CATCH/HOUR		% OF TOT. C		SAMP
	weight numbers					
Gonorhynchus gonorhynchus	101.18	1874	40.47			
Squalus mitsukurii	32.69	58	13.08			
Merluccius capensis	27.39	52	10.96			8
Cheilodichthys capensis	21.01	32	8.40			
Pterogymnus lantarius	18.98	120	7.59			
Callorhynchus capensis	8.93	6	3.57			
Mustelus palumbes	7.12	4	2.85			
Loligo reynaudi	6.10	84	2.44			
Argyrozoona argyrozoona	3.39	6	1.36			
Cheilodichthys queketti	3.27	18	1.31			
Lophius vomerinus	3.07	2	1.23			
Galeichthys feliceps	3.03	12	1.21			
Halaelurus natalensis						

Total 1208,43 99,99

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 9
 DATE :03/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 35°20,26
 Lon E 19°55,74
 start stop duration
 TIME :13:19:39 13:50:51 31.2 (min)
 LOG : 4850.18 4851.70 1.5
 FDEPTH: 156 158
 BDEPTH: 156 158
 Towing dir: 0° wire out : 420 m
 Sorted : 236 Total catch: 235.72
 Purpose : 3
 Region : 6100
 Gear cond.: 0
 Validity : 0
 Speed : 2.9 kn
 Catch/hour: 453.31

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius capensis	218.83	642	48.27	11
Chelidonichthys capensis	132.58	258	29.25	
Loligo reynaudi	25.38	235	5.60	
Callorhynchus capensis	22.54	15	4.97	
Etrumeus whiteheadi	11.50	240	2.54	13
Trichiurus lepturus	6.31	4	1.39	
Zeus capensis	5.88	92	1.30	
Lophius vomerinus	4.81	8	1.06	
Trachurus capensis	4.73	40	1.04	12
Chelidonichthys queketti	4.12	23	0.91	
Merluccius capensis, juvenile	3.04	112	0.67	
Raja straeleni	2.73	4	0.60	
Genypteris capensis	2.04	19	0.45	14
Todaropsis eblanae	1.88	92	0.42	
Sepia australis	1.77	190	0.39	
Ophichthus serpens	1.65	0	0.36	
J E L L Y F I S H	1.42	60	0.31	
Holohalaelurus regani	1.04	4	0.23	
Scylliorhinus capensis	0.23	2	0.05	
Raja straeleni	0.23	2	0.05	0
Helicolenus dactylopterus	0.19	4	0.04	
Austroglossus microlepis	0.12	4	0.03	
Trichiurus lepturus, juvenile	0.12	4	0.03	
Gonorynchus gonorynchus	0.12	2	0.03	
Oratosquilla oratoria	0.04	2	0.01	
Callionymus sp.	0.02	6	0.00	
Total	453.31		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 10
 DATE :03/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 35°41,38
 Lon E 19°40,89
 start stop duration
 TIME :16:53:13 17:23:13 30.0 (min)
 LOG : 4877.73 4879.29 1.6
 FDEPTH: 182 183
 BDEPTH: 182 183
 Towing dir: 0° wire out : 550 m
 Sorted : 404 Total catch: 404.42
 Purpose : 3
 Region : 6100
 Gear cond.: 0
 Validity : 0
 Speed : 3.1 kn
 Catch/hour: 809.12

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius capensis	279.05	436	34.49	15
Squalus megalops	243.08	736	30.04	
Loligo reynaudi	77.07	2049	9.52	
Callorhynchus capensis	43.41	22	5.37	
Chelidonichthys capensis	38.65	66	4.78	
Lophius vomerinus	32.85	32	4.06	16
Holohalaelurus regani	23.73	12	2.93	
Lepidopus caudatus	18.49	26	2.28	
J E L L Y F I S H	14.68	374	1.81	
Galeorhinus sp.	7.88	8	0.97	
Chelidonichthys queketti	6.56	30	0.81	
Raja straeleni	6.32	8	0.78	
Holohalaelurus sp.	4.84	4	0.60	
Todaropsis eblanae	3.56	118	0.44	
Genypteris capensis	2.16	14	0.27	18
Zeus capensis	1.92	20	0.24	
Trachurus capensis	1.74	8	0.22	17
Scylliorhinus capensis	1.04	4	0.13	
Helicolenus dactylopterus	0.64	10	0.08	
Merluccius capensis, juvenile	0.48	100	0.06	
Cynoglossus capensis	0.40	6	0.05	
Sepia australis	0.40	28	0.05	
Paracallionymus costatus	0.08	12	0.01	
Champsodon sp.	0.04	6	0.00	
CORAL	0.02	2	0.00	
Argonauta argo	0.00	2	0.00	
Total	809.12		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 11
 DATE :03/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 35°57,56
 Lon E 19°36,01
 start stop duration
 TIME :20:10:29 20:39:54 29.4 (min)
 LOG : 4898.78 4900.23 1.5
 FDEPTH: 445 446
 BDEPTH: 445 446
 Towing dir: 0° wire out : 1080 m
 Sorted : 229 Total catch: 229.39
 Purpose : 3
 Region : 6100
 Gear cond.: 6
 Validity : 3
 Speed : 2.9 kn
 Catch/hour: 467.99

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Genypteris capensis	172.19	41	36.79	19
Helicolenus dactylopterus	165.29	1130	35.32	
Merluccius paradoxus	68.79	243	14.70	20
Coelorhinus caelorrhinus	29.38	330	6.28	
Basket star	7.39	0	1.58	
Notacanthus sexspinis	3.75	14	0.80	
PORIFERA (Sponges)	3.22	0	0.69	
Ophiuroidea indetCV1	3.02	0	0.65	
Zeus sp.	2.16	2	0.46	
Bassanago albescens	2.04	2	0.44	
SQUALIDAE	1.88	2	0.40	
Gorgonians	1.67	0	0.36	
MYCTOPHIDAE	0.98	135	0.21	
CIDARIDAE	0.86	6	0.18	
Physiculus capensis	0.78	43	0.17	
Nezumia sp.	0.65	135	0.14	
Squalus megalops	0.57	2	0.12	
Todaropsis eblanae	0.57	2	0.12	
Scleractinia	0.53	0	0.11	
MYCTOPHIDAE	0.37	24	0.08	0
G A S T R O P O D S	0.37	24	0.08	
S H R I M P S	0.29	190	0.06	0
PAGUROIDEA	0.24	20	0.05	
Solenocera africana	0.20	84	0.04	0
Myxine capensis	0.16	2	0.03	
CORAL	0.16	0	0.03	
Sea anemone sp	0.10	12	0.02	
UNIDENTIFIED FISH	0.08	4	0.02	
PAGUROIDEA	0.06	2	0.01	0
J E L L Y F I S H	0.04	4	0.01	
C R A B S	0.04	18	0.01	
Shrimps, small, non comm.	0.04	2	0.01	
Starfish	0.04	90	0.01	
BOTHIDAE	2.04	2	0.02	
Lithodes roxoi, juvenile	0.02	8	0.00	
OPHICHTHIDAE	0.00	2	0.00	
Total	467.99		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 12
 DATE :03/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 35°59,93
 Lon E 19°35,41
 start stop duration
 TIME :23:30:38 00:00:51 30.2 (min)
 LOG : 4906.95 4908.40 1.5
 FDEPTH: 586 578
 BDEPTH: 586 578
 Towing dir: 0° wire out : 1280 m
 Sorted : 166 Total catch: 166.42
 Purpose : 3
 Region : 6100
 Gear cond.: 0
 Validity : 0
 Speed : 2.9 kn
 Catch/hour: 330.31

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius paradoxus	96.06	308	29.08	21
Helicolenus dactylopterus	66.73	381	20.20	
Sea anemone sp	28.34	83	8.58	
Lophius vomerinus	28.10	12	8.51	22
Notacanthus sexspinis	21.12	191	6.39	
SQUALIDAE	16.04	62	4.86	
CONGRIDAE	14.51	60	4.39	
Starfish	8.06	0	2.44	
S H R I M P S	7.38	584	2.24	
Lampyctodes hectoris	7.30	101	2.21	
Malacocephalus laevis	5.60	12	1.69	
J E L L Y F I S H	5.16	0	1.56	
Starfish	4.13	6	1.25	
MYCTOPHIDAE	3.45	260	1.05	
Octopus sp.	3.26	54	0.99	
Chaceon maritae	2.98	12	0.90	23
Coelorhinus matamua	1.98	8	0.60	
Rajella leopardus	1.87	4	0.56	
Myxine capensis	1.39	18	0.42	
Todarodes angolensis	1.07	2	0.32	
Hoplostethus mediterraneus	1.03	10	0.31	
Ophichthus sp.	0.91	10	0.28	
MORIDAE	0.79	18	0.24	
MACROURIDAE	0.79	28	0.24	
Malacocephalus occidentalis	0.48	2	0.14	
Physiculus argenteus	0.40	4	0.07	
Ebinania costaeacanarie	0.36	8	0.11	
Ophiuroidea	0.24	6	0.07	
G A S T R O P O D S	0.20	4	0.06	
Argyroleucus sp.	0.18	4	0.05	
Physiculus capensis	0.16	8	0.05	
Neocyttus sp.	0.08	2	0.02	
Stereomastix sculpta	0.04	6	0.01	
Lithodes roxoi	0.04	2	0.01	
P O L Y C H A E T A	0.04	12	0.01	
Munida benguelae	0.04	8	0.01	
Total	330.31		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 13
 DATE :04/03/19 GEAR TYPE: BT NO: 2 POSITION:Lat S 35°3,36
 Lon E 19°35,62
 start stop duration
 TIME :06:12:20 06:45:44 33.4 (min)
 LOG : 4964.27 4965.81 1.5
 FDEPTH: 149 148
 BDEPTH: 149 148
 Towing dir: 0° wire out : 350 m
 Sorted : 338 Total catch: 620.00
 Purpose : 3
 Region : 6100
 Gear cond.: 0
 Validity : 0
 Speed : 2.8 kn
 Catch/hour: 1113.44

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Chelidonichthys capensis	434.41	839	39.02	27
Merluccius capensis	330.82	1282	27.92	26
Callorhynchus capensis	77.97	50	7.00	
Loligo reynaudi	71.57	501	6.43	
Lepidopus caudatus	58.36	31	5.24	
Lophius vomerinus	21.88	31	1.96	28
Sepia australis	19.14	1595	1.72	
Cynoglossus capensis	19.14	505	1.72	
Rostoraja alba	18.68	4	1.68	
Mustelus palumbes	14.33	5	1.29	
Zeus capensis	11.21	185	1.01	
Holohalaelurus regani	10.94	18	0.98	
Paracallionymus costatus	6.20	1552	0.56	
Starfish	5.07	598	0.46	
CIDARIDAE	5.00	47	0.45	
Merluccius capensis, juvenile	4.70	304	0.42	
Raja straeleni	3.67	7	0.33	
Genypteris capensis	3.33	34	0.30	
Squalus megalops	3.00	7	0.27	24
Etrumeus whiteheadi	2.67	68	0.24	29
Helicolenus dactylopterus	2.47	54	0.22	25
J E L L Y F I S H	1.73	111	0.16	
Pterygosquilla capensis	1.54	171	0.14	
Rajella leopardus	1.40	4	0.13	
Todaropsis eblanae	1.33	45	0.12	
Trachurus capensis	0.80	7	0.07	30
Myxine capensis	0.80	18	0.07	
Afrololigo mercatoris	0.73	210	0.07	
G A S T R O P O D S	0.28	11	0.03	
PAGUROIDEA	0.20	38	0.02	
Funchalia woodwardi	0.10	23	0.01	
C R A B S	0.10	23	0.01	
Total	1113.60		100.01	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 14
 DATE :04/03/19 GEAR TYPE: BT NO: 2 POSITION:Lat S 35°11,60
 Lon E 19°24,51
 start stop duration
 TIME :09:27:51 09:58:21 30.5 (min)
 LOG : 4981.58 4983.10 1.5
 FDEPTH: 168 168
 BDEPTH: 168 168
 Towing dir: 0° wire out : 460 m
 Sorted : 244 Total catch: 244.31
 Purpose : 3
 Region : 6100
 Gear cond.: 0
 Validity : 0
 Speed : 3.0 kn
 Catch/hour: 480.61

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius capensis	164.50	4330	34.23	31
Etrumeus whiteheadi	89.94	271	18.71	31
Merluccius capensis, juvenile	52.17	35	10.86	33
Lophius vomerinus	37.38	41	7.78	32
Afrololigo mercatoris	24.63	291	5.12	
Chelidonichthys capensis	18.83	35	3.92	
ECHINOMETRIDAE	17.70	163	3.68	
Callorhynchus capensis	11.57	8	2.40	
Chelidonichthys queketti	8.97	35	1.87	
Sepia australis	8.79	942	1.83	
Holohalaelurus regani	7.04	22	1.47	
Mustelus palumbes	6.33	4	1.32	
Zeus capensis	6.30	79	1.31	
Todaropsis eblanae	4.96	240	1.03	
Raja straeleni	4.41	2	0.92	
Cynoglossus capensis	3.62	75	0.75	
Squalus megalops	2.68	8	0.56	
Genypteris capensis	2.09	12	0.43	36
Starfish	1.85	102	0.38	
Helicolenus dactylopterus	1.54	43	0.32	35
G A S T R O P O D S	1.02	45	0.29	
DIOGENIDAE	0.71	77	0.15	
Paracallionymus costatus	0.59	126	0.12	
B I V A L V E S	0.51	63	0.11	
Bathypolypus valdiviae	0.47	8	0.10	
Trachurus capensis, juvenile	0.35	69	0.07	

Trachurus capensis	0.35	2	0.07	34	Total	415.19	100.00
Exodromidia sp.	0.31	26	0.07				
Anala bullioides	0	24	0.05				
Sepia hieronisi	0.24	8	0.05				
Pterygoquilla capensis	0.08	6	0.02				
Merluccius capensis, juvenile	0.08	22	0.02				
Champsodon capensis	0.02	2	0.00				
Waste General	0.00	2	0.00				
Plastic	0.00	2	0.00				
Total	480.61		100.00				

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 18
DATE :04/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 35°31,41
Lon E 18°56,78
start stop duration Purpose : 3
TIME :20:13:27 20:44:08 30.7 (min) Region : 6100
LOG : 5032.14 5033.76 1.6 gear cond.: 0
FDEPTH: 528 530 Validity : 0
BDEPTH: 528 530 Speed : 3.2 kn
Towing dir: 0° wire out : 1250 m Catch/hour: 250.99
sorted : 128 Total catch: 128.34

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 15
DATE :04/03/19 GEAR TYPE: BT NO: 2 POSITION:Lat S 35°19,36
Lon E 19°17,99
start stop duration Purpose : 3
TIME :11:52:51 12:23:15 30.4 (min) Region : 6100
LOG : 4995.02 4996.60 1.6 gear cond.: 0
FDEPTH: 184 185 Validity : 0
BDEPTH: 184 185 Speed : 3.1 kn
Towing dir: 0° wire out : 525 m Catch/hour: 868.42
sorted : 154 Total catch: 440.00

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
PAGURIDAE	414.05	3831	47.68	
Merluccius capensis	106.31	243	12.24	37
Squalus megalops	54.11	136	6.23	
Loliginella sp.	48.01	791	5.53	
Chelidonichthys capensis	46.09	91	5.31	
Sepia australis	35.48	3549	4.09	
Sea urchin	32.20	746	3.71	
Paracallionymus costatus	25.19	7411	2.90	
J E L L Y F I S H	22.82	0	2.63	
Chelidonichthys queketti	18.19	97	2.09	
Cynoglossus capensis	11.75	199	1.35	
Callorhynchus capensis	11.52	6	1.33	
Rajella leopardus	7.80	12	0.90	
Pyrosoma	6.78	509	0.78	
Starfish	6.55	154	0.75	
Scyllorhinus capensis	4.97	12	0.57	
Merluccius capensis, juvenile	2.71	679	0.31	
Dipturus pullopunctatus	2.26	12	0.26	
AMPHIZOA (Sea anemones)	2.03	12	0.23	
XANTHIDAE	1.92	160	0.22	
Sea anemone sp	1.81	549	0.21	
Congipodus spinifer	1.81	30	0.21	
G A S T R O P O D S	1.58	81	0.18	
RAJIDAE	1.13	6	0.13	
Lepidopus caudatus	0.68	12	0.08	
Coelorinchus sp.	0.45	51	0.05	
Bathypolypus valdiviae	0.17	18	0.02	
Total	868.39		100.00	

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Helicolenus dactylopterus	61.56	540	24.53	48
Merluccius paradoxus	45.10	49	17.97	45
Dipturus doutrei	24.88	2	9.91	
Coelorinchus matamua	24.80	368	9.88	
Lophius vomerinus	23.51	8	9.37	47
Genypterus capensis	22.45	6	8.94	46
S H R I M P S	11.15	696	4.44	
Coelorinchus simorhynchus	9.70	137	3.86	
Sea anemone sp	8.41	25	3.35	
Notacanthus sexspinis	6.73	127	2.68	
Mustelus palumbes	4.34	2	1.73	
Nezumia sp.	1.49	39	0.59	
Coelorinchus acanthiger	1.33	141	0.53	
Stereomastis sculpata	0.70	104	0.28	
Enteractopus magnificus	0.66	2	0.26	
Malacocephalus laevis	0.63	2	0.25	
Todaropsis eblanae	0.47	7	0.19	
Aristaeomorpha foliacea	0.47	123	0.19	
Phosichthys argenteus	0.35	6	0.14	
Pyrosoma	0.31	41	0.12	
Hoplostethus atlanticus	0.31	2	0.12	
Todarodes angolensis	0.27	2	0.11	
MYCTOPHIDAE	0.20	14	0.08	
Bathyrcongiger vicinus	0.20	2	0.08	
Hoplostethus mediterraneus	0.20	180	0.08	
Histioteuthis miranda	0.16	2	0.06	
Nezumia milleri	0.16	16	0.06	
Malacocephalus occidentalis	0.12	4	0.05	
Starfish	0.12	29	0.05	
Rochinia sp.	0.12	2	0.05	
Aglaura or ctenophora	0.04	6	0.02	
Lycoteuthis lorigera	0.04	2	0.02	
Paracallionymus costatus	0.02	10	0.01	
Nezumia micronychodon	0.02	4	0.01	
J E L L Y F I S H	0.02	4	0.01	
Shark eggs	0.00	2	0.00	
Total	250.99		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 16
DATE :04/03/19 GEAR TYPE: BT NO: 2 POSITION:Lat S 35°23,16
Lon E 19°6,17
start stop duration Purpose : 3
TIME :14:21:05 14:51:25 30.3 (min) Region : 6100
LOG : 5008.48 5010.00 1.5 gear cond.: 0
FDEPTH: 236 239 Validity : 0
BDEPTH: 236 239 Speed : 3.0 kn
Towing dir: 0° wire out : 640 m Catch/hour: 1582.59
sorted : 213 Total catch: 800.00

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
PAGURIDAE	622.34	54912	39.32	
Merluccius capensis	439.62	649	27.78	40
Trachurus capensis	153.52	2115	9.70	
Coelorinchus matamua	126.88	1747	8.02	
Merluccius paradoxus	104.00	499	6.57	39
Squalus megalops	75.29	12	1.60	
Genypterus capensis	18.97	61	1.20	38
Lepidopus caudatus	12.94	45	0.82	
Chelidonichthys queketti	10.39	40	0.66	
Starfish	10.16	144	0.64	
Pyrosoma	8.43	649	0.53	
Holohlaelurus regani	7.53	3	0.48	
Paracallionymus costatus	7.53	24	0.48	
Cynoglossus capensis	6.62	136	0.42	
Todaropsis eblanae	5.57	77	0.35	
Helicolenus dactylopterus	5.42	227	0.34	41
Loligo reynaudi	4.22	32	0.27	
Zeus capensis	3.46	8	0.22	
J E L L Y F I S H	3.01	204	0.19	
Merluccius paradoxus, juvenile	1.96	423	0.12	
Unidentified crab	1.51	8	0.10	
Unidentified crab	1.43	16	0.09	
Sepia australis	0.90	107	0.06	
Austrosossia enigmatica	0.60	32	0.04	
Champsodon capensis	0.30	32	0.02	
Unidentified crab	0.19	8	0.01	
Total	1582.77		100.01	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 19
DATE :05/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 35°16,19
Lon E 18°40,60
start stop duration Purpose : 3
TIME :00:21:55 00:52:04 30.2 (min) Region : 6100
LOG : 5058.39 5059.91 1.5 gear cond.: 0
FDEPTH: 586 568 Validity : 0
BDEPTH: 586 568 Speed : 3.0 kn
Towing dir: 0° wire out : 1310 m Catch/hour: 366.39
sorted : 184 Total catch: 184.11

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Coelorinchus braueri	262.17	6241	71.56	
Helicolenus dactylopterus	16.80	265	6.77	49
Ebinania costaeacnariae	12.04	64	4.38	
Merluccius paradoxus	14.81	12	4.04	
J E L L Y F I S H	8.80	0	2.40	
Nezumia micronychodon	7.00	834	1.91	
Notacanthus sexspinis	5.85	123	1.60	
Lophius vomerinus	4.94	2	1.35	
Nezumia sp.	4.58	90	1.25	
Lepidion capensis	2.91	40	0.79	
S H R I M P S	2.71	507	0.74	
MACROURIDAE	1.63	30	0.45	
Pyrosoma	1.51	82	0.41	
PRICANTHIDAE, juvenile	1.35	38	0.37	
Unid. juvenile fishes, juvenile	1.07	40	0.29	
Oreosoma atlanticum	1.00	2	0.27	
MYCTOPHIDAE	0.96	88	0.26	
Uroconger sp.	0.96	2	0.26	
Stereomastis sculpata	0.72	8	0.19	
OPHICHTHIDAE	0.56	8	0.15	
Selachophidium guentheri	0.52	2	0.14	
GONOSTOMATIDAE	0.28	4	0.08	
Diaphus sp.	0.28	10	0.08	
Synchiropus sp.	0.28	4	0.08	
Raja sp., juvenile	0.24	2	0.07	
Nezumia milleri	0.20	2	0.05	
SQUALIDAE	0.16	2	0.04	
OPHIDIIDAE	0.08	2	0.02	
Argyroleucus sp.	0.04	2	0.01	
Total	366.39		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 17
DATE :04/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 35°29,66
Lon E 18°56,50
start stop duration Purpose : 3
TIME :18:05:28 18:35:17 29.8 (min) Region : 6100
LOG : 5025.52 5027.03 1.5 gear cond.: 0
FDEPTH: 454 452 Validity : 0
BDEPTH: 454 452 Speed : 3.0 kn
Towing dir: 0° wire out : 1060 m Catch/hour: 415.19
sorted : 206 Total catch: 206.21

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius paradoxus	274.95	954	66.22	44
Helicolenus dactylopterus	50.38	296	12.13	43
Genypterus capensis	33.54	18	8.08	42
Squalus mitsukurii	11.80	4	2.84	
Kuronezumia leonis	10.83	207	2.61	
Lophius vomerinus	7.37	2	1.77	
Aristeus varidens	6.16	570	1.48	
Afrololigo mercatoris	4.01	2	0.97	
MYCTOPHIDAE	2.78	199	0.67	
Coelorinchus matamua	2.13	70	0.51	
Aristaeomorpha foliacea	2.05	733	0.49	
Notacanthus sexspinis	1.33	16	0.32	
Sea anemone sp	1.17	4	0.28	
Scyllorhinus capensis	1.13	2	0.27	
Beryx splendens	0.77	2	0.18	
MACROURIDAE	0.77	44	0.18	
Paracallionymus costatus	0.72	155	0.17	
J E L L Y F I S H	0.60	32	0.15	
Todaropsis eblanae	0.56	4	0.14	
Stereomastis sculpata	0.44	64	0.11	
Bathyrcongiger vicinus	0.36	2	0.09	
Aglaura or ctenophora	0.32	207	0.08	
Physiculus capensis	0.28	10	0.07	
PYROSOMIDAE	0.24	10	0.06	
Nezumia micronychodon	0.20	12	0.05	
Rossia enigmatica	0.12	2	0.03	
Starfish	0.12	20	0.03	
Rajella leopardus	0.04	2	0.02	
S H A R K S, juvenile	0.04	2	0.02	
Total	415.19		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 20
DATE :05/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 35°16,13
Lon E 18°43,26
start stop duration Purpose : 3
TIME :02:11:59 02:52:22 30.4 (min) Region : 6100
LOG : 5067.88 5069.40 1.5 gear cond.: 0
FDEPTH: 435 434 Validity : 0
BDEPTH: 435 434 Speed : 3.0 kn
Towing dir: 0° wire out : 1075 m Catch/hour: 199.22
sorted : 101 Total catch: 100.87

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Helicolenus dactylopterus	75.94	1084	38.12	50
Merluccius paradoxus	52.42	95	26.31	52
Coelorinchus simorhynchus	29.07	642	14.59	
Coelorinchus matamua	11.30	320	5.67	
Aristaeomorpha foliacea	5.02	2123	2.52	
Notacanthus sexspinis	4.54	73	2.28	
J E L L Y F I S H	3.63	166	1.82	
Coelorinchus braueri	3.52	130	1.76	
Lophius vomerinus	2.88	2	1.45	
Nezumia sp.	2.05	89	1.03	51
Bristle worms	1.70	510	0.85	
MYCTOPHIDAE	1.22	39	0.61	
Paracallionymus costatus	0.83	113	0.42	
Malacocephalus laevis	0.75	2	0.38	
Stereomastis sculpata	0.67	99	0.34	
Funchia woodwardi	0.55	45	0.28	
Sea anemone sp	0.55	2	0.28	
Lycoteuthis lorigera	0.55	18	0.28	
Pyrosoma	0.51	39	0.26	
Todaropsis eblanae	0.36	2	0.18	
Beryx splendens	0.32	2	0.16	
Nezumia milleri	0.00	24	0.08	
Nezumia micronychodon	0.16	20	0.08	
Rossia enigmatica	0.16	4	0.08	
Physiculus capensis	0.12	6	0.06	
Rajella leopardus	0.04	2	0.02	
S H A R K S, juvenile	0.04	2	0.02	
Total	199.22		100.00	

Starfish	0.04	12	0.02
Hoplostethus mediterraneus	0.04	10	0.01
Epigonus dentatus	0.02	2	0.01
Munida benguelae	0.02	2	0.01
Total	199,22		100,00

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 21
 DATE :05/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 35°15,46
 start stop duration Lon E 18°44,12
 TIME :04:25:30 04:56:00 30.5 (min) Purpose : 3
 LOG : 5072.88 5074.37 1.5 Region : 6100
 FDEPTH: 372 367 Gear cond.: 0
 BDEPTH: 372 367 Validity : 0
 Towing dir: 0° Wire out : 790 m Speed : 2.9 kn
 Sorted : 256 Total catch: 880.00 Catch/hour: 1731.15

Loligo reynaudi	28.72	208	4.72
Callorhynchus capensis	27.06	20	4.45
Galeorhinus sp.	21.92	2	3.60
Lophius vomerinus	18.24	6	3.00
Zeus capensis	17.96	136	2.95
Sepia australis	9.93	827	1.63
Lepidopus caudatus	9.30	4	1.53
Rajella leopardus	4.75	2	0.78
Holohalaelurus regani	3.32	6	0.55
Merluccius capensis, juvenile	2.65	107	0.44
J E L L Y F I S H	2.10	0	0.34
C E P H A L O P O D A	1.03	309	0.17
Todaropsis eblanae	0.59	28	0.10
Cynoglossus capensis	0.36	6	0.06
Jasus lalandii	0.32	2	0.05
Mullus barbatus	0.04	2	0.01
Total	608,15		100,00

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius paradoxus	1339.64	6456	77.38	56
Helicolenus dactylopterus	169.59	1802	9.80	54
Coelorinchus simorhynchus	85.81	2626	4.96	
Coelorinchus matamua	42.09	1287	2.43	
Merluccius capensis	31.81	28	1.84	55
Genypterus capensis	25.17	49	1.45	53
Zeus capensis	10.56	22	0.61	
Todaropsis eblanae	6.09	55	0.35	
Beryx splendens	3.79	8	0.22	
Malacocephalus laevis	3.11	14	0.18	
J E L L Y F I S H	2.84	218	0.16	
Sea anemone sp	2.71	14	0.16	
Emmelichthys nitidus nitidus	2.44	8	0.14	
Paracallionymus costatus	2.17	299	0.13	
Pyrosoma	1.08	75	0.06	
Loligo reynaudi	0.81	8	0.05	
Notacanthus sexspinis	0.54	8	0.03	
Cynoglossus capensis	0.27	8	0.02	
Starfish	0.27	38	0.02	
Funchalia woodwardi	0.14	8	0.01	
Lycoteuthis lorigera	0.14	28	0.01	
Stereomastis sculpita	0.14	41	0.01	
Pterygosquilla capensis	0.07	8	0.00	
Total	1731,27		100,01	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 22
 DATE :05/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 35°10,86
 start stop duration Lon E 18°53,78
 TIME :06:57:00 07:28:41 31.7 (min) Purpose : 3
 LOG : 5085.85 5087.45 1.6 Region : 6100
 FDEPTH: 223 222 Gear cond.: 0
 BDEPTH: 223 222 Validity : 0
 Towing dir: 0° Wire out : 570 m Speed : 3.0 kn
 Sorted : 253 Total catch: 1950.00 Catch/hour: 3692.02

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Engraulis encrasicolus	11635.87	936234	62.79	
Etrumeus whiteheadi	4907.73	117117	26.44	
Pterygosquilla capensis	1366.36	186132	7.36	
Scomber japonicus	404.33	7669	2.18	
Sardinops sagax	223.08	2092	1.20	
Starfish	6.97	2092	0.04	
Total	18564,35		100,00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 26
 DATE :05/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 35°0,99
 start stop duration Lon E 18°29,12
 TIME :22:03:16 22:23:48 20.5 (min) Purpose : 3
 LOG : 5190.47 5191.49 1.0 Region : 6100
 FDEPTH: 566 554 Gear cond.: 0
 BDEPTH: 566 554 Validity : 0
 Towing dir: 0° Wire out : 1250 m Speed : 3.0 kn
 Sorted : 57 Total catch: 57.18 Catch/hour: 167.12

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Trachurus capensis	2614.15	10995	70.81	181
Merluccius capensis	570.05	356	15.44	183
Merluccius paradoxus	244.35	812	6.62	182
Loligo reynaudi	105.25	670	2.85	
Lepidopus caudatus	45.44	28	1.23	
Chelidonichthys capensis	40.68	87	1.10	
Rajella leopardus	14.07	8	0.38	
Mustelus palumbes	11.59	4	0.31	
Coelorinchus simorhynchus	10.81	87	0.29	
Chelidonichthys queketti	6.83	30	0.18	
Thyrsites atun	6.70	6	0.18	
Todaropsis eblanae	5.69	30	0.15	
Callorhynchus capensis	5.23	2	0.14	
Lophius vomerinus	3.94	6	0.11	180
Sepia australis	2.28	115	0.06	
Helicolenus dactylopterus	2.28	87	0.06	184
Paracallionymus costatus	1.14	72	0.03	
Holohalaelurus regani	0.95	2	0.03	
Scylliorhinus capensis	0.64	2	0.02	
Total	3692,04		100,00	

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Helicolenus dactylopterus	68.50	4390	40.99	61
Merluccius paradoxus	27.71	20	16.58	63
Lophius vomerinus	17.83	6	10.67	62
MACRURIDAE	15.17	44	9.08	0
Funchalia woodwardi	11.46	1011	6.86	
Notacanthus sexspinis	4.15	35	2.48	
Coelorinchus sp.	3.97	26	2.38	
MACRURIDAE	3.92	140	2.34	
MYCTOPHIDAE	2.98	219	1.78	
Ebinania costaecanarie	2.63	12	1.57	
Uroconger sp.	1.26	3	0.75	
S H R I M P S	1.26	167	0.75	
OPHIDIIDAE	1.17	12	0.70	
Malacocephalus laevis	1.05	3	0.63	
Raja straeleni	0.85	6	0.51	
PHOSICHTHYIDAE	0.70	12	0.42	
MORIDAE	0.64	38	0.38	
Cynoglossus zanzibarensis	0.47	6	0.28	
SQUILLIDAE	0.44	3	0.26	
Hoplostethus mediterraneus	0.41	3	0.24	
OPHICHTHYIDAE	0.26	3	0.16	
Diaphus sp.	0.15	6	0.09	
Starfish	0.10	3	0.06	
Munida sp.	0.02	3	0.01	
Argyrolepiscus sp.	0.01	9	0.01	
Stereomastis sculpita	0.01	3	0.01	
Hoplostethus mediterraneus, juvenile	0.00	3	0.00	
Total	167,12		100,00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 23
 DATE :05/03/19 GEAR TYPE: BT NO: 2 POSITION:Lat S 35°0,37
 start stop duration Lon E 19°4,65
 TIME :09:38:43 10:09:07 30.4 (min) Purpose : 3
 LOG : 5103.13 5104.43 1.3 Region : 6100
 FDEPTH: 175 174 Gear cond.: 0
 BDEPTH: 175 174 Validity : 0
 Towing dir: 0° Wire out : 420 m Speed : 2.6 kn
 Sorted : 179 Total catch: 358.60 Catch/hour: 708.00

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 27
 DATE :06/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 34°49,60
 start stop duration Lon E 18°25,17
 TIME :01:36:08 02:07:39 31.5 (min) Purpose : 3
 LOG : 5203.05 5204.89 1.9 Region : 6100
 FDEPTH: 352 353 Gear cond.: 0
 BDEPTH: 352 353 Validity : 0
 Towing dir: 0° Wire out : 1005 m Speed : 3.5 kn
 Sorted : 51 Total catch: 437.96 Catch/hour: 437.96

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius capensis	118.32	211	16.71	59
Lophius vomerinus	113.78	140	16.07	57
Loligo reynaudi	109.83	1092	15.51	
Chelidonichthys capensis	73.64	180	10.40	
Callorhynchus capensis	68.94	22	9.74	
PARAPAGURIDAE	57.36	5117	8.10	
Sea urchin	54.52	1009	7.70	
Sepia australis	18.88	1572	2.67	
Squalus megalops	14.78	41	2.09	
Synchiropus sp.	8.22	3599	1.73	
RAJIDAE	10.19	22	1.44	
J E L L Y F I S H	10.19	308	1.44	
Cynoglossus zanzibarensis	9.96	306	1.41	
Leucoraja wallacei	9.64	6	1.36	
Holohalaelurus regani	9.17	45	1.29	
Lepidopus caudatus	8.22	10	1.16	
Merluccius capensis	6.72	1765	0.95	58
Chelidonichthys queketti	5.69	34	0.80	
Starfish	5.30	164	0.75	
Chelidonichthys capensis	2.53	14	0.36	0
Genypterus capensis	2.21	18	0.31	
Etrumeus whiteheadi	2.06	38	0.29	
Lolliguncula sp.	1.58	101	0.22	
Congioopodus spinifer	0.87	10	0.12	
MAJIDAE	0.48	38	0.07	
Helicolenus dactylopterus	0.48	53	0.07	
Pyrosoma	0.16	22	0.02	
Total	727,74		102,79	

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Coelorinchus simorhynchus	258.71	6600	59.07	
Merluccius paradoxus	35.76	204	8.16	66
Genypterus capensis	28.60	38	6.53	65
Helicolenus dactylopterus	19.77	59	4.51	64
J E L L Y F I S H	19.48	0	4.45	
Zeus capensis	12.79	15	2.92	
Synchiropus sp.	12.50	147	2.85	
Merluccius capensis	12.22	6	2.79	67
Sepia hieronis	9.46	59	2.16	
Maurolicus muelleri	7.34	36701	1.68	
Trachurus capensis	5.67	15	1.29	
Holohalaelurus regani, juvenile	4.07	175	0.93	
S H R I M P S	3.81	655	0.87	
Lophius vomerinus	3.47	4	0.79	
Merluccius capensis	2.14	467	0.49	68
Rajella caudaspinosa	0.95	2	0.22	
Argonauta argo	0.47	2	0.11	
Todaropsis eblanae	0.36	15	0.08	
Austrosquilla enigmatica	0.20	15	0.05	
Sepia australis	0.18	15	0.04	
Total	437,95		100,00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 24
 DATE :05/03/19 GEAR TYPE: BT NO: 2 POSITION:Lat S 34°53,58
 start stop duration Lon E 19°11,85
 TIME :12:01:51 12:32:11 30.3 (min) Purpose : 3
 LOG : 5115.87 5117.30 1.4 Region : 6100
 FDEPTH: 155 156 Gear cond.: 0
 BDEPTH: 155 156 Validity : 0
 Towing dir: 0° Wire out : 370 m Speed : 2.8 kn
 Sorted : 307 Total catch: 307.42 Catch/hour: 608.15

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 28
 DATE :06/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 34°52,97
 start stop duration Lon E 18°35,05
 TIME :04:38:01 05:08:09 30.1 (min) Purpose : 3
 LOG : 5217.99 5219.46 1.5 Region : 6100
 FDEPTH: 223 224 Gear cond.: 0
 BDEPTH: 223 224 Validity : 0
 Towing dir: 0° Wire out : 540 m Speed : 2.9 kn
 Sorted : 190 Total catch: 700.00 Catch/hour: 1393.96

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius capensis	412.30	1171	67.80	60
Chelidonichthys capensis	47.56	0	7.82	

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Trachurus capensis	57.72	2280	41.09	71
Merluccius paradoxus	260.51	986	18.69	70
Merluccius capensis	176.20	271	12.64	69
Loligo reynaudi	136.30	721	9.78	
Mustelus palumbes	57.55	14	4.13	
Jasus lalandii	38.36	155	2.75	74

Lophius vomerinus	24.45	36	1.75	75
Leptodopus caudatus	23.32	30	1.67	
Chelidonichthys capensis	23.04	50	1.65	
Zeus capensis	10.96	44	0.79	
Coelorinchus simorhynchus	10.54	127	0.76	
Etrumeus whiteheadi	9.56	114	0.69	
Helicolenus dactylopterus	9.56	269	0.69	73
Callorhynchus capensis	9.13	8	0.66	
Squalus megalops	7.69	8	0.55	
Todaropsis eblanae	4.78	119	0.34	
Thyrssites atun	4.64	8	0.33	
J E L L Y F I S H	4.22	114	0.30	
Coelorinchus matamua	3.80	58	0.27	
Genypterus capensis	3.09	16	0.22	72
Septia australis	0.70	78	0.05	
Holohalaelurus regani	0.64	7	0.05	
SCYLIORHINIDAE, juvenile	0.42	106	0.03	
Paracallionymus costatus	0.42	58	0.03	
Champsodon capensis	0.28	30	0.02	
Holohalaelurus regani, juvenile	0.28	22	0.02	
Afrololigo mercatoris	0.21	92	0.02	
Merluccius paradoxus, juvenile	0.14	36	0.01	
Emmelichthys nitidus nitidus	0.14	8	0.01	
Cynoglossus capensis	0.14	8	0.01	
Total	1393.80		99.99	

LOG : 5333.84	5335.43	1.6	Region : 6100
FDEPTH: 428	440		Gear cond.: 0
BDEPTH: 428	440		Validity : 0
Towing dir: 0°	Wire out : 1120 m		Speed : 3.1 kn
Sorted : 143	Total catch : 491.00		Catch/hour: 891.09
SPECIES			
	weight	numbers	% OF TOT. C
Helicolenus dactylopterus	505.53	3071	56.73
Merluccius paradoxus	256.95	905	28.84
Coelorinchus sp.	106.20	2123	11.92
Loligo reynaudi	10.48	69	1.18
Genypterus capensis	5.49	8	0.62
Jasus lalandii	2.50	20	0.28
Symbolophorus sp.	1.00	95	0.11
Sea anemone sp.	0.88	8	0.10
CHLOROPHTHALMIDAE	0.44	8	0.05
MORIDAE	0.31	26	0.04
Starfish	0.31	63	0.04
Notacanthus cf sexspinus	0.25	8	0.03
S H R I M P S	0.25	81	0.03
Austrorossia enigmatica	0.25	8	0.03
MACROURIDAE	0.25	38	0.03
Stereomastis sculpata	0.06	8	0.01
Total	891.16		100.01

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 29
DATE :06/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 34°45,66
Lon E 18°44,78
TIME :07:19:53 07:53:16 31.4 (min)
LOG : 5234.11 5235.94 1.8
FDEPTH: 175 174
BDEPTH: 175 174
Towing dir: 0° wire out : 470 m
Sorted : 112 Total catch: 350.00
Purpose : 3
Region : 6100
Gear cond.: 0
Validity : 5
Speed : 3.5 kn
Catch/hour: 669.43

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 33
DATE :06/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 34°36,59
Lon E 17°56,48
TIME :23:51:13 00:21:25 30.2 (min)
LOG : 5340.11 5341.58 1.5
FDEPTH: 564 562
BDEPTH: 564 562
Towing dir: 0° wire out : 1260 m
Sorted : 105 Total catch: 104.66
Purpose : 3
Region : 6100
Gear cond.: 0
Validity : 0
Speed : 2.9 kn
Catch/hour: 207.94

SPECIES			
	weight	numbers	% OF TOT. C
Merluccius capensis	224.70	534	33.57
Jasus lalandii	103.54	505	15.47
Lophius vomerinus	79.77	88	11.92
J E L L Y F I S H	58.55	488	8.75
Loligo reynaudi	53.22	564	7.95
Septia australis	31.89	2389	4.76
Chelidonichthys capensis	31.31	71	4.68
Merluccius paradoxus	20.41	3399	3.05
Callorhynchus capensis	8.80	6	1.31
Merluccius paradoxus	7.65	42	1.14
Leucoraja wallacei	7.27	10	1.09
Zeus capensis	6.61	71	0.99
Scyliorhinus capensis	6.39	4	0.95
Trachurus capensis	4.75	13	0.71
Mustelus palumbes	4.25	2	0.63
Afrololigo mercatoris	2.53	958	0.38
Squalus megalops	2.33	6	0.35
Helicolenus dactylopterus	2.32	99	0.35
Etrumeus whiteheadi	2.20	25	0.33
Paracallionymus costatus	2.20	319	0.33
Leptodopus caudatus	1.62	59	0.24
Rajella leopards	1.42	4	0.21
Todaropsis eblanae	1.39	48	0.21
Argonauta argo	1.16	13	0.17
Genypterus capensis	1.04	13	0.16
Cynoglossus capensis	0.81	31	0.12
Holohalaelurus regani	0.77	6	0.11
Champsodon capensis	0.35	42	0.05
SCYLIORHINIDAE	0.12	31	0.02
Total	669.40		100.00

SPECIES			
	weight	numbers	% OF TOT. C
Helicolenus dactylopterus	103.51	481	49.78
Coelorinchus simorhynchus	69.93	1234	33.63
Centroscyllium crepidater	7.63	2	3.67
Merluccius merluccius	6.66	6	3.17
Nezumia sp.	6.48	93	3.11
Notacanthus sexspinus	4.41	66	2.12
S H R I M P S	3.50	477	1.68
Malacocephalus laevis	3.22	12	1.55
Loligo reynaudi	0.44	4	0.21
MORIDAE	0.38	10	0.18
MYCTOPHIDAE	0.32	40	0.15
OPHICHTHIDAE	0.28	4	0.13
Diaphus sp.	0.28	10	0.13
Austrorossia enigmatica	0.28	6	0.13
Starfish	0.16	66	0.08
Sea anemone sp	0.14	2	0.07
CHORDATA	0.14	2	0.07
Hoplostethus sp.	0.08	119	0.04
MACROURIDAE	0.08	12	0.04
NOTOSUDIDAE	0.06	2	0.03
PAGUROIDEA	0.02	2	0.01
Stereomastis sculpata	0.01	2	0.00
Synchiropus sp.	0.01	2	0.00
Argyropelecus sp.	0.00	2	0.00
Total	207.94		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 30
DATE :06/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 34°37,94
Lon E 18°55,79
TIME :09:44:33 10:14:40 30.1 (min)
LOG : 5249.98 5251.35 1.4
FDEPTH: 142 139
BDEPTH: 142 139
Towing dir: 0° wire out : 400 m
Sorted : 425 Total catch: 770.02
Purpose : 3
Region : 6100
Gear cond.: 0
Validity : 0
Speed : 2.7 kn
Catch/hour: 1534.41

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 34
DATE :07/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 34°32,62
Lon E 18°29,28
TIME :04:35:30 05:05:52 30.4 (min)
LOG : 5368.74 5370.41 1.7
FDEPTH: 175 174
BDEPTH: 175 174
Towing dir: 0° wire out : 500 m
Sorted : 125 Total catch: 1100.00
Purpose : 3
Region : 6100
Gear cond.: 0
Validity : 0
Speed : 3.3 kn
Catch/hour: 2173.91

SPECIES			
	weight	numbers	% OF TOT. C
Merluccius capensis	508.76	2553	33.16
Loligo reynaudi	198.56	1652	12.94
Paracallionymus costatus	163.12	26	10.63
Jasus lalandii	146.37	606	9.54
PORTUNIDAE	131.72	4	8.58
Etrumeus whiteheadi	122.55	2019	7.99
Chelidonichthys capensis	87.04	295	5.67
Cynoglossus capensis	80.12	4	5.22
Callorhynchus capensis	40.85	22	2.66
Lycoteuthis longiriga	18.41	4	1.20
Pterygosquilla capensis	16.17	2423	1.05
Septia australis	9.46	524	0.62
J E L L Y F I S H	4.91	33	0.32
Merluccius capensis	2.24	112	0.15
Afrololigo mercatoris	2.17	652	0.14
Scomber japonicus	1.01	8	0.07
Trachurus capensis	0.80	8	0.05
Zeus capensis	0.58	16	0.04
Total	1534.83		100.03

SPECIES			
	weight	numbers	% OF TOT. C
Loligo reynaudi	628.22	9158	28.90
Merluccius capensis	584.61	2320	26.89
Chelidonichthys capensis	317.77	907	14.62
Jasus lalandii	312.19	2182	14.36
Merluccius capensis	251.50	12575	11.57
Merluccius paradoxus	20.38	18	0.95
Zeus capensis	12.56	71	0.58
Etrumeus whiteheadi	9.77	105	0.45
Leucoraja wallacei	8.37	18	0.39
Septia australis	7.33	682	0.34
Helicolenus dactylopterus	6.28	89	0.29
Paracallionymus costatus	4.88	401	0.22
J E L L Y F I S H	3.14	71	0.14
Rajella caudaspinosa	2.09	18	0.10
Todaropsis eblanae	1.40	71	0.06
LOLIGINIDAE	1.05	419	0.05
Coelorinchus acanthiger	0.70	18	0.03
Cynoglossus capensis	0.70	18	0.03
Coelorinchus matamua	0.35	18	0.02
Leptodopus caudatus	0.35	71	0.02
MYCTOPHIDAE	0.05	36	0.00
Total	2173.87		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 31
DATE :06/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 34°23,84
Lon E 18°44,49
TIME :15:56:40 16:07:25 10.8 (min)
LOG : 5289.09 5289.52 0.4
FDEPTH: 84 83
BDEPTH: 84 83
Towing dir: 0° wire out : 200 m
Sorted : 267 Total catch: 350.00
Purpose : 3
Region : 6100
Gear cond.: 0
Validity : 0
Speed : 2.4 kn
Catch/hour: 3069.77

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 35
DATE :07/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 34°40,47
Lon E 18°20,56
TIME :07:55:23 08:26:10 30.8 (min)
LOG : 5389.77 5391.20 1.4
FDEPTH: 361 345
BDEPTH: 361 345
Towing dir: 0° wire out : 900 m
Sorted : 103 Total catch: 279.97
Purpose : 3
Region : 6100
Gear cond.: 0
Validity : 0
Speed : 2.8 kn
Catch/hour: 545.57

SPECIES			
	weight	numbers	% OF TOT. C
Etrumeus whiteheadi	1644.87	46716	53.58
Jasus lalandii	1190.70	346	38.79
Merluccius capensis	163.11	2210	5.31
Callorhynchus capensis	43.88	73	1.43
Chelidonichthys capensis	17.00	50	0.55
J E L L Y F I S H	5.98	636	0.19
Scomber japonicus	2.30	50	0.07
Sardinops sagax	0.92	28	0.03
Afrololigo mercatoris	0.69	346	0.02
Trachurus capensis	0.46	17	0.02
Pterygosquilla capensis	0.23	28	0.01
Leptodopus caudatus	0.23	28	0.01
Total	3070.38		100.02

SPECIES			
	weight	numbers	% OF TOT. C
Merluccius paradoxus	375.64	148	68.85
Helicolenus dactylopterus	56.22	251	10.30
Coelorinchus simorhynchus	51.92	855	9.52
Genypterus capensis	26.00	14	4.76
Maurollicus muelleri	18.87	28324	3.46
Merluccius capensis	6.00	2	1.10
J E L L Y F I S H	3.00	300	0.55
Merluccius paradoxus, juvenile	1.75	134	0.32
Aequorea forskalea	1.70	31	0.31
Actinoptera sp 3	1.35	6	0.25
Squalus megalops	1.33	2	0.24
Paracallionymus costatus	0.50	51	0.09
MYCTOPHIDAE	0.40	205	0.07
Stereomastis sculpata	0.20	16	0.04
Physiculus capensis	0.20	12	0.04
Champsodon capensis	0.20	12	0.04
Leptodopus caudatus	0.10	6	0.02
Starfish	0.10	12	0.02
Tripteryophycis gilchristi	0.05	6	0.01
Nezumia milleri	0.05	16	0.01
Pterygosquilla capensis	0.03	6	0.00

Total 545.60 100.00

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 36
 DATE :07/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 34°46,74
 Lon E 18°16,94
 start stop duration Purpose : 3
 TIME :10:02:37 10:38:52 36.2 (min) Region : 6100
 LOG : 5400.06 5401.81 1.8 Gear cond.: 0
 FDEPTH: 504 502 Validity: 0
 BDEPTH: 504 502 Speed : 2.9 kn
 Towing dir: 0° wire out : 1135 m Catch/hour: 117.91
 Sorted : 71 Total catch: 71.22

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Merluccius paradoxus	50.86	93	43.14
Helicolenus dactylopterus	21.52	103	18.25
Nezumia sp.	20.36	50	17.27
Coelorrinchus simorhynchus	8.48	84	7.19
Lophius vomerinus	6.23	2	5.28
J E L L Y F I S H	2.65	88	2.25
J E L L Y F I S H	2.22	60	1.88
Notacanthus sexspinis	1.19	13	1.01
Ebinania costaeacarie	1.03	10	0.87
Hoplostethus mediterraneus	0.60	51	0.51
Sea anemone sp	0.46	2	0.39
Synphobranchus kaupii	0.46	3	0.39
Phosichthys argenteus	0.43	10	0.37
Malacocephalus laevis	0.40	2	0.34
MYCTOPHIDAE	0.23	108	0.20
S H R I M P S	0.23	35	0.20
PYROSOMIDAE	0.20	3	0.17
Nezumia micronychodon	0.10	30	0.08
Synchriopus sp.	0.10	8	0.08
Starfish	0.10	15	0.08
Lithodes ferox	0.04	3	0.03
Stereomastis sculpta	0.02	7	0.02
Total	117.91		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 37
 DATE :07/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 34°48,08
 Lon E 18°15,39
 start stop duration Purpose : 3
 TIME :11:51:40 12:22:01 30.3 (min) Region : 6100
 LOG : 5406.82 5408.45 1.6 Gear cond.: 0
 FDEPTH: 561 560 Validity: 0
 BDEPTH: 561 560 Speed : 3.2 kn
 Towing dir: 0° wire out : 1435 m Catch/hour: 504.25
 Sorted : 255 Total catch: 254.98

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Merluccius paradoxus	433.65	340	86.00
Helicolenus dactylopterus	35.00	150	6.94
Coelorrinchus braueri	27.53	625	5.46
Phosichthys argenteus	1.74	24	0.35
Hoplostethus mediterraneus	1.46	30	0.29
Rajella caudaspinosa	1.11	2	0.22
S H R I M P S	1.03	61	0.20
J E L L Y F I S H	0.63	40	0.13
S H R I M P S	0.51	51	0.10
MYCTOPHIDAE	0.36	10	0.07
Synphobranchus kaupii	0.36	2	0.07
Notacanthus sexspinis	0.24	4	0.05
Alloctytus verrucosus	0.16	2	0.03
Starfish	0.12	12	0.02
Coelorrinchus matamua	0.12	2	0.02
Coelorrinchus simorhynchus	0.12	2	0.02
Pyrosoma	0.08	4	0.02
Nezumia micronychodon	0.04	4	0.01
Total	504.25		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 38
 DATE :07/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 34°20,06
 Lon E 18°12,74
 start stop duration Purpose : 3
 TIME :15:26:33 15:56:37 30.1 (min) Region : 6100
 LOG : 5435.60 5437.07 1.5 Gear cond.: 0
 FDEPTH: 283 280 Validity: 0
 BDEPTH: 283 280 Speed : 2.9 kn
 Towing dir: 0° wire out : 760 m Catch/hour: 2853.34
 Sorted : 359 Total catch: 1430.00

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Merluccius paradoxus	2511.58	10827	88.02
Coelorrinchus simorhynchus	123.17	1636	4.32
Callorhynchus capensis	87.01	40	3.05
Coelorrinchus matamua	30.95	435	1.08
Lophius vomerinus	25.19	16	0.88
Octopus vulgaris	19.06	4	0.67
MYCTOPHIDAE	11.37	2843	0.40
Merluccius paradoxus	9.63	341	0.34
Merluccius capensis	8.69	16	0.30
Helicolenus dactylopterus	7.98	160	0.28
Zeus capensis	3.32	16	0.12
Genypterus capensis	3.16	8	0.11
Chelidichthys capensis	3.16	8	0.11
Squalus megalops	2.53	8	0.09
Trachurus capensis	2.05	8	0.07
Todaropsis eblanae	1.90	56	0.07
Coelorrinchus braueri	1.74	48	0.06
Aequorea forskalea	0.47	8	0.02
Loliguncula sp.	0.32	8	0.01
J E L L Y F I S H	0.08	32	0.00
Total	2853.35		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 39
 DATE :07/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 34°15,98
 Lon E 18°13,84
 start stop duration Purpose : 3
 TIME :17:00:45 17:30:47 30.0 (min) Region : 6100
 LOG : 5442.75 5444.22 1.5 Gear cond.: 0
 FDEPTH: 164 167 Validity: 0
 BDEPTH: 164 167 Speed : 2.9 kn
 Towing dir: 0° wire out : 410 m Catch/hour: 1198.84
 Sorted : 214 Total catch: 600.02

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Merluccius capensis	853.87	1067	71.22
Merluccius capensis, juvenile	109.39	5471	9.13
Zeus capensis	79.83	342	6.66
Jasus lalandi	41.09	220	3.43
Chelidichthys capensis	36.17	68	3.02
Lophius vomerinus	22.62	18	1.89
Callorhynchus capensis	21.05	34	1.76
Merluccius paradoxus	14.56	68	1.21
Todaropsis eblanae	12.09	645	1.01
Loligo reynaudi	2.58	34	0.21
Brama brama	2.30	12	0.19
Scomber japonicus	0.67	6	0.06
Starfish	0.56	74	0.05
Sepia australis	0.45	30	0.04
Paracallionymus costatus	0.34	24	0.03
Pterygosquilla capensis	0.34	12	0.03

Sepia hieronis 0.34 6 0.03
 Lepidopus caudatus 0.23 6 0.02
 Helicolenus dactylopterus 0.17 12 0.01
 Pyrosoma 0.11 6 0.01
 Sea anemone sp 0.11 6 0.01
 Total 1198.87 100.00

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 40
 DATE :07/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 34°20,44
 Lon E 17°40,73
 start stop duration Purpose : 3
 TIME :23:31:54 00:02:04 30.2 (min) Region : 6100
 LOG : 5485.28 5487.04 1.8 Gear cond.: 0
 FDEPTH: 548 554 Validity: 0
 BDEPTH: 548 554 Speed : 3.5 kn
 Towing dir: 0° wire out : 1480 m Catch/hour: 137.86
 Sorted : 69 Total catch: 69.30

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Merluccius paradoxus	60.22	46	43.68
Coelorrinchus sp.	28.01	645	20.32
Helicolenus dactylopterus	24.19	32	17.55
Bathyraya sp.	12.81	2	9.29
Notacanthus sexspinis	4.22	42	3.06
S H R I M P S	2.31	173	1.67
MYCTOPHIDAE	1.51	113	1.10
PHOSICHTHYIDAE	0.84	12	0.61
Chauliodus sp**	0.80	8	0.58
Malacocephalus laevis	0.80	2	0.58
OPHIDIIDAE	0.52	6	0.38
Stereomastis sculpta	0.44	2	0.32
Brama brama	0.36	2	0.26
Neocyttus rhomboidalis	0.28	2	0.20
Hoplostethus atlanticus	0.24	10	0.17
RAJIDAE	0.18	2	0.13
Nezumia micronychodon	0.16	10	0.12
Total	137.86		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 41
 DATE :08/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 34°19,69
 Lon E 17°42,81
 start stop duration Purpose : 3
 TIME :06:18:00 06:49:57 32.0 (min) Region : 6100
 LOG : 5507.18 5508.72 1.5 Gear cond.: 0
 FDEPTH: 445 444 Validity: 0
 BDEPTH: 445 444 Speed : 2.9 kn
 Towing dir: 0° wire out : 1080 m Catch/hour: 724.36
 Sorted : 386 Total catch: 385.83

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Merluccius paradoxus	647.36	1082	89.35
Helicolenus dactylopterus	31.29	163	4.32
Octopus vulgaris	9.20	6	1.27
Genypterus capensis	7.96	11	1.10
Coelorrinchus matamua	7.02	197	0.97
S H R I M P S	5.75	344	0.79
Coelorrinchus simorhynchus	5.60	94	0.77
Centrolophus niger	5.30	2	0.73
Beryx splendens	2.48	13	0.34
Todaropsis eblanae	0.79	4	0.11
J E L L Y F I S H	0.56	21	0.08
Brama brama	0.54	2	0.08
Bassanago albescens	0.38	2	0.05
OPHICHTHYIDAE	0.32	2	0.03
Starfish	0.09	17	0.01
Stereomastis sculpta	0.02	2	0.00
Total	724.56		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 42
 DATE :08/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 34°17,14
 Lon E 17°42,66
 start stop duration Purpose : 3
 TIME :08:53:04 09:24:34 31.5 (min) Region : 6100
 LOG : 5516.86 5518.26 1.4 Gear cond.: 0
 FDEPTH: 400 402 Validity: 0
 BDEPTH: 400 402 Speed : 2.7 kn
 Towing dir: 0° wire out : 980 m Catch/hour: 1448.08
 Sorted : 180 Total catch: 760.00

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Merluccius paradoxus	1047.76	3125	72.36
Helicolenus dactylopterus	368.35	638	25.44
Lophius vomerinus	17.57	4	1.21
Genypterus capensis	13.45	15	0.93
J E L L Y F I S H	0.79	48	0.05
Starfish	0.25	55	0.02
Total	1448.17		100.01

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 43
 DATE :08/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 34°6,79
 Lon E 17°49,60
 start stop duration Purpose : 3
 TIME :12:15:06 12:45:15 30.1 (min) Region : 6100
 LOG : 5534.62 5536.29 1.7 Gear cond.: 0
 FDEPTH: 274 281 Validity: 0
 BDEPTH: 274 281 Speed : 3.3 kn
 Towing dir: 0° wire out : 805 m Catch/hour: 135.99
 Sorted : 68 Total catch: 68.31

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Merluccius paradoxus	97.23	0	71.50
Merluccius capensis	15.01	22	11.04
Helicolenus dactylopterus	9.99	94	7.35
Coelorrinchus sp.	6.97	127	5.12
MYCTOPHIDAE	3.34	2090	2.46
Lophius vomerinus	1.53	2	1.13
J E L L Y F I S H	0.76	6	0.56
Genypterus capensis	0.54	2	0.40
Todaropsis eblanae	0.28	4	0.20
PAGUROIDEA	0.16	14	0.12
Merluccius sp.	0.08	10	0.06
Starfish	0.06	12	0.04
Synchriopus sp.	0.04	4	0.03
Total	135.99		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 44
 DATE :08/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 33°58,26
 Lon E 17°58,03
 start stop duration Purpose : 3
 TIME :15:09:22 15:40:05 30.7 (min) Region : 6100
 LOG : 5551.78 5553.19 1.4 Gear cond.: 0
 FDEPTH: 194 200 Validity: 0
 BDEPTH: 194 200 Speed : 2.8 kn
 Towing dir: 0° wire out : 540 m Catch/hour: 898.44
 Sorted : 221 Total catch: 460.00

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
PAGUROIDEA	600.03	56250	66.79
Merluccius capensis	67.11	2012	7.47

Merluccius capensis	45.91	156	5.11	134
Chelidonichthys capensis	32.66	78	3.64	
Helicolenus dactylopterus	24.78	1428	2.76	
Paracallionymus costatus	21.53	1793	2.40	132
Zeus capensis	13.65	45	1.52	
Lolligoncula mercatoris***	13.16	4938	1.47	
Leucoraja wallacei	11.29	21	1.26	
Rajella leopardus	9.67	6	1.08	
Todaropsis eblanae	9.43	314	1.05	
Callorhynchus capensis	8.70	6	0.97	
Lophius vomerinus	6.66	86	0.74	131
Holohalaelurus regani	6.50	74	0.72	
Merluccius paradoxus	4.23	21	0.47	135
Echinus gilchristi ?	3.33	285	0.37	
J E L L Y F I S H	3.09	168	0.34	
RANELLIIDAE (=CYMATIIDAE)	2.60	74	0.29	
Loligo reynaudi	2.44	25	0.27	
DROMIIDAE	2.03	102	0.23	
CIDARIIDAE	1.87	14	0.21	
Starfish	1.63	70	0.18	
G E N Y P T E R U S	1.14	10	0.13	133
G A S T R O P O D S	1.06	236	0.12	
Cynoglossus capensis	1.06	29	0.12	
Mursia sp.	0.89	74	0.10	
Lepidopus caudatus	0.81	21	0.09	
Myxine capensis	0.41	6	0.05	
Congiopodus spinifer	0.24	6	0.03	
FASCIOLARIIDAE	0.24	10	0.03	
Sepia hieronis	0.24	14	0.03	
Maurolicus muelleri	0.24	6	0.03	
Total	898.64		100.02	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 45
DATE :08/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 33°52,24
Lon E 17°25,87
TIME :20:06:59 20:37:06 duration 30.1 (min)
LOG : 5584.61 5385.06 Purpose : 3
Region : 6100
FDEPTH: 573 579 Gear cond.: 0
BDEPTH: 573 579 Validity : 0
Towing dir: 0° wire out : 1330 m Speed : 2.9 kn
Sorted : 90 Total catch: 90.26 Catch/hour: 179.73

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius paradoxus	82.00	163	45.63	137
Coelorinchus braueri	45.08	771	25.08	
J E L L Y F I S H	23.14	1119	12.87	
Lophius vomerinus	6.53	4	3.63	138
MYCTOPHIDAE	4.14	621	2.30	
Notacanthus sexspinus	4.10	42	2.28	
Helicolenus dactylopterus	2.39	20	1.33	139
Laemonema laureysi	2.27	28	1.26	
Malacocephalus laevis	2.15	2	1.20	
Etmopterus sp.	1.75	22	0.98	
Plesionika martia	1.27	211	0.71	
Phosichthys argenteus	1.08	52	0.60	
Selachophidium guentheri	0.88	12	0.49	
Ebinania costaeacariae	0.84	2	0.47	
UNIDENTIFIED FISH	0.72	6	0.40	
Nezumia micronychodon	0.40	72	0.22	
OPHICHTHIDAE	0.23	2	0.13	
Nansenia macrolepis	0.16	8	0.09	
Myxine capensis	0.16	2	0.09	
PARALEPIDIDAE	0.12	8	0.07	
Pyrosoma	0.08	2	0.04	
Rajella leopardus	0.08	7	0.04	
Dietemoides parini, juvenile	0.05	12	0.03	
Lestidium atlanticum	0.04	2	0.02	0
Argyropelecus sp.	0.04	2	0.02	
Iniototeuthis capensis	0.02	4	0.01	
Chauliodus sp.	0.01	2	0.01	
Total	179.73		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 46
DATE :08/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 33°52,59
Lon E 17°27,81
TIME :22:20:18 22:32:29 duration 12.2 (min)
LOG : 5592.76 5593.31 Purpose : 3
Region : 6100
FDEPTH: 479 480 Gear cond.: 7
BDEPTH: 479 480 Validity : 5
Towing dir: 0° wire out : 1050 m Speed : 2.7 kn
Sorted : 0 Total catch: 0.00 Catch/hour: 0.00

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
NOCATCH	0.00	0	0.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 48
DATE :09/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 33°37,36
Lon E 17°49,60
TIME :11:26:41 11:57:02 duration 30.4 (min)
LOG : 5650.27 5651.73 Purpose : 3
Region : 6100
FDEPTH: 186 188 Gear cond.: 0
BDEPTH: 186 188 Validity : 0
Towing dir: 0° wire out : 550 m Speed : 2.9 kn
Sorted : 94 Total catch: 252.50 Catch/hour: 499.18

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius capensis	361.86	7145	72.49	143
Galeorhinus sp.	59.31	2	11.88	

Paracallionymus costatus	16.75	1257	3.35	
MYCTOPHIDAE	12.79	5162	2.56	
CHIRIDAE	9.61	4	1.62	
Merluccius paradoxus	9.25	480	1.85	144
Todaropsis eblanae	5.98	138	1.20	
Aegueora forskalea	5.61	146	1.12	
Euleptorhamphus viridis	3.59	2981	0.72	
Helicolenus dactylopterus	3.50	249	0.70	145
Afrololigo mercatoris	3.13	783	0.63	
Zeus capensis	2.76	10	0.55	
Loligo reynaudi	1.66	24	0.33	
Chelidonichthys capensis	1.66	6	0.33	
Sepia australis	0.78	6	0.16	
Lepidopus caudatus	0.64	42	0.13	
Lophius vomerinus	0.28	10	0.06	
Genypteris capensis	0.09	6	0.02	
Total	499.25		100.01	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 49
DATE :09/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 33°34,44
Lon E 17°55,88
TIME :13:34:52 14:05:16 duration 30.4 (min)
LOG : 5660.66 5661.95 Purpose : 3
Region : 6100
FDEPTH: 159 158 Gear cond.: 0
BDEPTH: 159 158 Validity : 0
Towing dir: 0° wire out : 420 m Speed : 2.5 kn
Sorted : 72 Total catch: 388.66 Catch/hour: 766.84

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius capensis	594.10	7551	77.47	146
Dipturus sp.	108.52	2	14.15	
Callorhynchus capensis	14.88	10	1.94	
Stereomastis sculpata	13.22	3307	1.72	
Todaropsis eblanae	13.04	412	1.70	
Chelidonichthys capensis	7.86	28	1.03	
Afrololigo mercatoris	3.58	760	0.47	
Aegueora forskalea	3.04	81	0.40	
Paracallionymus costatus	3.04	251	0.40	
Sepia australis	2.68	126	0.35	
MYCTOPHIDAE	1.79	331	0.23	
Helicolenus dactylopterus	0.72	55	0.09	
Trachurus capensis	0.36	10	0.05	
Total	766.82		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 50
DATE :10/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 33°29,75
Lon E 17°27,82
TIME :03:32:17 04:04:00 duration 31.7 (min)
LOG : 5770.99 5772.46 Purpose : 3
Region : 6100
FDEPTH: 479 479 Gear cond.: 0
BDEPTH: 479 479 Validity : 0
Towing dir: 0° wire out : 1100 m Speed : 2.8 kn
Sorted : 153 Total catch: 153.03 Catch/hour: 289.65

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Notacanthus sexspinus	111.90	799	38.63	
Coelorinchus simorhynchus	44.37	261	15.32	
Bassanago albescens	42.66	70	14.73	
Merluccius paradoxus	29.98	23	10.35	149
Lophius vomerinus	19.72	4	6.81	150
Coelorinchus matamua	15.37	265	5.31	
Genypteris capensis	9.56	2	3.30	
Etmopterus cf brachyurus	6.89	34	2.38	148
Helicolenus dactylopterus	5.68	34	1.96	147
MYCTOPHIDAE	0.76	40	0.26	
Holohalaelurus regani	0.68	2	0.24	
Octopus vulgaris	0.42	2	0.14	
Myxine capensis	0.34	4	0.12	
Tripteroptychus gilchristi	0.26	9	0.09	
Starfish	0.23	44	0.08	
Hoplostethus atlanticus	0.19	2	0.07	
Hymenocephalus sp.	0.11	6	0.04	
Coelorinchus braueri	0.11	9	0.04	
Todaropsis eblanae	0.08	4	0.03	
Charybdis smithii	0.08	2	0.03	
J E L L Y F I S H	0.08	2	0.03	
Physiculus capensis	0.04	2	0.01	
Nezumia micronychodon	0.04	6	0.01	
RANELLIIDAE (=CYMATIIDAE)	0.04	2	0.01	
Argyropelecus aculeatus	0.04	4	0.01	
Merrhippolyte agulhasensis	0.04	19	0.01	
Pterygosquilla capensis	0.02	2	0.01	
Stoloteuthis sp.	0.01	2	0.00	
Total	289.67		100.01	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 51
DATE :10/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 33°25,42
Lon E 17°31,57
TIME :06:49:29 07:20:15 duration 30.8 (min)
LOG : 5783.46 5784.78 Purpose : 3
Region : 6100
FDEPTH: 412 415 Gear cond.: 0
BDEPTH: 412 415 Validity : 0
Towing dir: 0° wire out : 900 m Speed : 2.6 kn
Sorted : 192 Total catch: 360.10 Catch/hour: 702.18

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius paradoxus	547.62	437	77.99	152
Coelorinchus simorhynchus	57.75	649	8.22	
Brama brama	34.73	27	4.95	151
Bassanago albescens	29.31	74	4.17	
Coelorinchus matamua	8.50	148	1.21	
Symblophorus boops	7.84	411	1.12	
Helicolenus dactylopterus	3.52	19	0.50	153
MYCTOPHIDAE	3.23	969	0.46	
Rajella caudaspina	3.08	4	0.44	
Lycoteuthis lorigera	1.69	119	0.24	
Starfish	1.54	60	0.22	
Todaropsis eblanae	1.03	4	0.15	
Notacanthus sexspinus	0.81	12	0.11	
Rossia enigmatica	0.29	8	0.04	
Plesionika martia	0.26	4	0.04	
Kuronezumia leonis	0.22	23	0.03	
Physiculus capensis	0.15	12	0.02	
Stereomastis sculpata	0.11	4	0.02	
Champsodon capensis	0.07	16	0.01	
Tripteroptychus gilchristi	0.07	4	0.01	
Phosichthys argenteus	0.07	4	0.01	
J E L L Y F I S H	0.07	8	0.01	
G A S T R O P O D S	0.07	4	0.01	
Haliporoides triarthrus	0.05	8	0.01	
Sea anemone sp	0.04	4	0.01	
Total	702.13		99.99	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 52
DATE :10/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 33°18,35
Lon E 17°42,80
TIME :09:34:04 10:04:32 duration 30.5 (min)
LOG : 5799.14 5800.65 Purpose : 3
Region : 6100

FDEPTH: 187 186 Gear cond.: 0 start stop duration Lon E 17'15,71
 BDEPTH: 187 186 Validity: 0 TIME :22:47:43 23:10:28 22.7 (min) Purpose : 3
 Towing dir: 0° Wire out : 480 m LOG : 5874.19 5875.27 1.1 Region : 6100
 Sorted : 133 Total catch: 750.00 Catch/hour: 1476.86

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP	SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers				weight	numbers		
MYCTOPHIDAE	1009.49	378603	68.35		Merluccius paradoxus	559.74	1683	73.22	166
Merluccius capensis	288.77	1376	19.55	154	Helicolenus dactylopterus	116.78	343	15.28	167
Merluccius paradoxus	107.43	5372	7.27	155	Coelorinchus matamua	35.83	383	4.69	
J E L L Y F I S H	23.53	201	1.59		Bassanago albescens	30.92	40	4.05	
Callorhynchus capensis	15.76	12	1.07		Lophius vomerinus	13.67	5	1.79	168
Afrololigo mercatoris	11.54	522	0.78		Notacanthus sexspinis	2.96	18	0.39	
Chelidonichthys capensis	8.88	12	0.60		MYCTOPHIDAE	1.48	145	0.19	
Stereomastis sculpita	4.22	268	0.29		Scomberesox simulans	1.11	8	0.14	
Helicolenus dactylopterus	2.00	57	0.14	156	Malacocephalus laevis	0.84	3	0.11	
Trichiurus lepturus	1.78	112	0.12		PAGUROIDEA	0.26	24	0.03	
Sardinops sagax	1.11	12	0.08		MACROURIDEA	0.26	21	0.03	
Callionymus sp.	1.11	134	0.08		Paracallionymus costatus	0.21	24	0.03	
Septia australis	0.89	91	0.06		MORIDAE	0.16	5	0.02	
Starfish	0.45	24	0.03		Stereomastis sculpita	0.11	13	0.01	
					Starfish	0.05	3	0.01	
Total	1476.95	100,01			Lestrolepis sp.	0.05	3	0.01	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 53
 DATE :10/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 32°54,41
 start stop duration Lon E 17°42,02
 TIME :15:15:34 15:46:37 31.1 (min) Purpose : 3
 LOG : 5838.84 5840.24 1.4 Region : 6100
 FDEPTH: 162 163 Gear cond.: 0
 BDEPTH: 162 163 Validity: 0
 Towing dir: 0° Wire out : 410 m Speed : 2.7 kn
 Sorted : 140 Total catch: 1090.00 Catch/hour: 2106.28

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP	SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers				weight	numbers		
Merluccius capensis	1185.90	32931	56.30	157	Merluccius paradoxus	264.75	648	66.15	172
MYCTOPHIDAE	850.62	212655	40.38		Lophius vomerinus	66.48	26	16.61	170
Chelidonichthys capensis	32.60	75	1.55		Merluccius paradoxus	26.10	373	6.52	171
Pterygosquilla capensis	15.85	1586	0.75		Coelorinchus simorhynchus	12.00	217	3.00	
Leucoraja wallacei	5.64	2	0.27		Todaropsis eblanae	8.05	120	2.01	
Septia australis	4.49	271	0.21		Coelorinchus matamua	4.86	112	1.21	
Aequorea forskalea	4.19	91	0.20		Helicolenus dactylopterus	3.91	76	0.98	
Helicolenus dactylopterus	3.59	315	0.17	158	Callorhynchus capensis	3.55	2	0.89	
Todaropsis eblanae	1.50	91	0.07		Zeus capensis	1.95	4	0.49	
LAMINARIA SP.	0.90	15	0.04		Sympagurus dimorphus	1.79	201	0.45	
Afrololigo mercatoris	0.90	495	0.04		HOLHAELELURUS regani	1.39	2	0.35	
					J E L L Y F I S H	1.20	114	0.30	
Total	2106.17	99,99			Trachurus capensis	1.10	10	0.27	174

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 54
 DATE :10/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 33°4,73
 start stop duration Lon E 17°31,03
 TIME :18:12:35 18:43:04 30.5 (min) Purpose : 3
 LOG : 5853.81 5855.22 1.4 Region : 6100
 FDEPTH: 338 345 Gear cond.: 0
 BDEPTH: 338 345 Validity: 0
 Towing dir: 0° Wire out : 800 m Speed : 2.8 kn
 Sorted : 142 Total catch: 141.56 Catch/hour: 278.65

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP	SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers				weight	numbers		
Merluccius paradoxus	109.33	402	39.24	162	Merluccius paradoxus	68.06	942	11.34	176
Coelorinchus simorhynchus	58.35	565	20.94		Aequorea forskalea	50.08	129	8.34	
Genypteris capensis	51.97	14	18.65	161	Scomber japonicus	40.66	515	6.77	
MYCTOPHIDAE	17.24	517	6.19		Chelidonichthys capensis	10.70	22	1.78	
Coelorinchus matamua	13.11	201	4.70		Callorhynchus capensis	7.93	4	1.32	
Lophius vomerinus	11.93	6	4.28	159	Paracallionymus costatus	3.43	258	0.57	
Helicolenus dactylopterus	4.80	45	1.72	160	Afrololigo mercatoris	1.71	664	0.29	
PORIFERA (Sponges)	4.29	12	1.54		Todaropsis eblanae	1.71	44	0.29	
Zeus capensis	2.56	6	0.92		Sympagurus dimorphus	1.71	173	0.29	
G A S T R O P O D S	0.83	51	0.30		J E L L Y F I S H	0.86	22	0.14	
Ophidurus sp.	0.79	6	0.28		Maurollicus muelleri	0.86	215	0.14	
Todaropsis eblanae	0.71	10	0.25		Lepidopus caudatus	0.43	22	0.07	
Symbiolophorus boops	0.59	33	0.21						
Paracallionymus costatus	0.47	49	0.17		Total	600.35	100,00		
Plesionika martia	0.47	354	0.17						
Parapagurus bouyeri	0.43	3	0.16						
Maurollicus muelleri	0.24	132	0.08						
J E L L Y F I S H	0.12	6	0.04						
Thouarella	0.12	6	0.04						
Kuronezumia leonis	0.08	8	0.03						
Physiculus capensis	0.08	4	0.03						
Mursia sp.	0.04	6	0.01						
Myxine capensis	0.04	4	0.01						
Rochinia sp.	0.04	6	0.01						
Aphroditae indetCV1	0.02	2	0.01						
Starfish	0.00	4	0.00						
LAMINARIA SP.	0.00	0	0.00						
Pterygosquilla capensis	0.00	0	0.00						
Macropodia indetCV1	0.00	2	0.00						
Soft corals	0.00	2	0.00						
Afrololigo mercatoris	0.00	16	0.00						
Total	278.65	100,00							

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 55
 DATE :10/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 33°12,27
 start stop duration Lon E 17°17,76
 TIME :21:08:34 21:38:31 30.0 (min) Purpose : 3
 LOG : 5868.76 5870.43 1.7 Region : 6100
 FDEPTH: 396 409 Gear cond.: 0
 BDEPTH: 396 409 Validity: 0
 Towing dir: 0° Wire out : 1120 m Speed : 3.4 kn
 Sorted : 117 Total catch: 116.58 Catch/hour: 233.55

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP	SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers				weight	numbers		
Merluccius paradoxus	84.78	182	36.30	163	Merluccius capensis	806.43	34554	30.67	177
Helicolenus dactylopterus	58.02	427	24.84	164	Chelidonichthys capensis	90.03	223	3.42	
Genypteris capensis	39.63	12	16.97	165	Pterygosquilla capensis	42.48	3488	1.62	
Coelorinchus matamua	27.05	335	11.58		J E L L Y F I S H	39.31	191	1.49	
Octopus vulgaris	17.71	2	7.58		Helicolenus dactylopterus	25.99	1777	0.99	178
MYCTOPHIDAE	1.52	176	0.65		Callorhynchus capensis	25.36	64	0.96	
Cruriraja hullei	0.80	2	0.34		Todaropsis eblanae	3.49	127	0.13	
Zeus capensis	0.64	2	0.27		Trichiurus lepturus	1.27	96	0.05	
Coronaster volsellatus	0.56	0	0.24		Septia australis	0.64	32	0.02	
Malacocephalus laevis	0.48	2	0.21		PHOSICHTHYIDAE	0.32	255	0.01	
S H R I M P S	0.44	220	0.19		Callionymus sp.	0.32	32	0.01	
Sympagurus dimorphus	0.40	34	0.17						
Tripterophycis gilchristi	0.36	20	0.15		Total	2629.46	100,00		
Paracallionymus costatus	0.28	50	0.12						
Scomberesox saurus	0.28	2	0.12						
Nezumia sp.	0.12	14	0.05						
UNIDENTIFIED FISH	0.12	6	0.05						
Austrorossia enigmatica	0.12	2	0.05						
Stereomastis sculpita	0.08	10	0.03						
Epatretus hexatrema	0.08	2	0.03						
Rochinia sp.	0.04	4	0.02						
Starfish	0.04	4	0.02						
Total	233.55	100,00							

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 56
 DATE :10/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 33°15,91

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Aequorea forskalea	33.54	852	75.96	

start stop duration Lon E 17'15,71
 TIME :22:47:43 23:10:28 22.7 (min) Purpose : 3
 LOG : 5874.19 5875.27 1.1 Region : 6100
 FDEPTH: 463 441 Gear cond.: 0
 BDEPTH: 463 441 Validity: 0
 Towing dir: 0° Wire out : 1000 m Speed : 2.9 kn
 Sorted : 290 Total catch: 289.72 Catch/hour: 764.43

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Merluccius paradoxus	559.74	1683	73.22	166
Helicolenus dactylopterus	116.78	343	15.28	167
Coelorinchus matamua	35.83	383	4.69	
Bassanago albescens	30.92	40	4.05	
Lophius vomerinus	13.67	5	1.79	168
Notacanthus sexspinis	2.96	18	0.39	
MYCTOPHIDAE	1.48	145	0.19	
Scomberesox simulans	1.11	8	0.14	
Malacocephalus laevis	0.84	3	0.11	
PAGUROIDEA	0.26	24	0.03	
MACROURIDEA	0.26	21	0.03	
Paracallionymus costatus	0.21	24	0.03	
MORIDAE	0.16	5	0.02	
Stereomastis sculpita	0.11	13	0.01	
Starfish	0.05	3	0.01	
Lestrolepis sp.	0.05	3	0.01	
Total	764.43	100,00		

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 57
 DATE :11/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 32°51,15
 start stop duration Lon E 17°19,40
 TIME :04:41:11 05:11:18 30.1 (min) Purpose : 3
 LOG : 5906.07 5907.49 1.4 Region : 6100
 FDEPTH: 305 306 Gear cond.: 0
 BDEPTH: 305 306 Validity: 0
 Towing dir: 0° Wire out : 730 m Speed : 2.8 kn
 Sorted : 201 Total catch: 200.84 Catch/hour: 400.21

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Merluccius paradoxus	264.75	648	66.15	172
Lophius vomerinus	66.48	26	16.61	170
Merluccius paradoxus	26.10	373	6.52	171
Coelorinchus simorhynchus	12.00	217	3.00	
Todaropsis eblanae	8.05	120	2.01	
Coelorinchus matamua	4.86	112	1.21	
Helicolenus dactylopterus	3.91	76	0.98	
Callorhynchus capensis	3.55	2	0.89	
Zeus capensis	1.95	4	0.49	
Sympagurus dimorphus	1.79	201	0.45	
HOLHAELELURUS regani	1.39	2	0.35	
J E L L Y F I S H	1.20	114	0.30	
Trachurus capensis	1.10	10	0.27	174
Paracallionymus costatus	1.08	139	0.27	
Genypteris capensis	0.72	2	0.18	173
Malacocephalus laevis	0.68	4	0.17	
URCHINS	0.32	6	0.08	
Austrorossia enigmatica	0.16	4		

GOBIIDAE 7.57 453 17.15
 Pterygosquilla capensis 2.51 208 5.68
 Austroglossus microlepis 0.21 4 0.47
 G A S T R O P O D S 0.16 6 0.37
 Merluccius capensis 0.08 4 0.19
 P O L Y C H A E T A 0.08 12 0.19

FDEPTH: 122 123 Gear cond.: 0
 BDEPTH: 122 123 Validity: 0
 Towing dir: 0° Wire out : 360 m Speed : 3.3 kn
 Sorted : 264 Total catch: 780.00 Catch/hour: 1537.96

Total 44.16 100.00

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
Merluccius capensis	608.88	14733	39.59
Aequorea forskalea	561.27	10024	36.49
PORIFERA (Sponges)	180.87	270	11.76
Todaropsis eblanae	53.44	1337	3.48
Chelidonichthys capensis	51.46	130	3.35
Callorhynchus capensis	40.49	53	2.63
Brama brama	34.31	18	2.23
Genypterus capensis	2.16	6	0.14
Helicolenus dactylopterus	1.40	101	0.09
Loligo reynaudi	1.17	12	0.08
DRUMIIDAE	0.93	124	0.06
SQUILLIDAE	0.82	65	0.05
Sepia australis	0.58	18	0.04
Lepidopus caudatus	0.18	6	0.01
Starfish	0.06	12	0.00
Total	1538.01	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 61
 DATE :11/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 32°7,63
 start stop duration Lon E 18°7,76
 TIME :16:00:03 16:30:08 30.1 (min) Purpose : 3
 LOG : 5975.69 5977.19 1.5 Region : 6100
 FDEPTH: 106 106 Gear cond.: 0
 BDEPTH: 106 106 Validity: 0
 Towing dir: 0° wire out : 340 m Speed : 3.0 kn
 Sorted : 68 Total catch: 68.14 Catch/hour: 135.87

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
Aequorea forskalea	96.67	2164	71.15
Pterygosquilla capensis	25.56	1322	18.81
Sufflogobius bibarbus	10.53	927	7.75
Fishing gears	2.51	7	1.85
Exodromidia sp.	0.32	18	0.23
VOLUTIDAE	0.28	18	0.21
Total	135.87	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 66
 DATE :12/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 32°13,56
 start stop duration Lon E 17°35,25
 TIME :15:12:36 15:41:49 29.2 (min) Purpose : 3
 LOG : 6132.56 6134.00 1.4 Region : 6100
 FDEPTH: 168 169 Gear cond.: 0
 BDEPTH: 168 169 Validity: 0
 Towing dir: 0° wire out : 440 m Speed : 3.0 kn
 Sorted : 82 Total catch: 81.77 Catch/hour: 167.96

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
MYCTOPHIDAE	72.88	2730	43.39
Merluccius paradoxus	26.62	754	15.85
Aequorea forskalea	19.92	94	11.86
Helicolenus dactylopterus	14.63	1138	8.71
Sepia australis	11.63	415	6.92
Paracallionymus costatus	4.27	493	2.54
Afrololigo mercatoris	3.20	1602	1.91
Merluccius capensis	3.12	12	1.86
Maurolicus muelleri	3.08	1541	1.83
Merluccius paradoxus	2.22	12	1.32
Leucoraja wallacei	1.97	2	1.17
Todaropsis eblanae	1.68	31	1.00
Trachurus capensis	1.44	6	0.86
Lophius vomerinus	0.41	6	0.24
Cynoglossus capensis	0.37	2	0.22
Scomber japonicus	0.21	2	0.12
Sardinops sagax	0.12	2	0.07
Lepidopus caudatus	0.08	6	0.05
Pelagia noctiluca	0.08	2	0.05
Starfish	0.02	4	0.01
Total	167.96	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 62
 DATE :12/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 31°56,18
 start stop duration Lon E 17°24,87
 TIME :04:33:59 05:04:05 30.1 (min) Purpose : 3
 LOG : 6054.70 6056.09 1.4 Region : 6100
 FDEPTH: 156 154 Gear cond.: 0
 BDEPTH: 156 154 Validity: 0
 Towing dir: 0° wire out : 470 m Speed : 2.8 kn
 Sorted : 139 Total catch: 360.00 Catch/hour: 717.37

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
Merluccius capensis	288.25	813	40.18
Merluccius capensis	266.00	6538	37.08
PORIFERA (Sponges)	41.09	84	5.73
Sepia australis	32.60	2329	4.55
Helicolenus dactylopterus	22.05	1941	3.07
Paracallionymus costatus	16.56	1461	2.31
Chelidonichthys capensis	13.35	32	1.86
Aequorea forskalea	11.28	359	1.57
Callorhynchus capensis	9.83	6	1.37
Lophius vomerinus	5.69	22	0.79
Cynoglossus capensis	2.80	32	0.39
Trachurus capensis	2.28	16	0.32
Todaropsis eblanae	1.76	42	0.25
Loligo reynaudi	0.93	6	0.13
Pterygosquilla capensis	0.93	58	0.13
Etrumeus whiteheadi	0.83	16	0.12
Exodromidia sp.	0.52	32	0.07
Afrololigo mercatoris	0.21	12	0.03
Zeus capensis	0.10	78	0.01
Maurolicus muelleri	0.10	94	0.01
Physiculus capensis	0.05	6	0.01
Turritella	0.04	6	0.01
Total	717.26	99.98	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 67
 DATE :12/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 32°17,26
 start stop duration Lon E 17°22,47
 TIME :17:04:41 17:35:07 30.4 (min) Purpose : 3
 LOG : 6144.12 6145.66 1.5 Region : 6100
 FDEPTH: 206 212 Gear cond.: 0
 BDEPTH: 206 212 Validity: 0
 Towing dir: 0° wire out : 570 m Speed : 3.0 kn
 Sorted : 74 Total catch: 222.68 Catch/hour: 439.07

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
Merluccius paradoxus	191.07	5337	43.52
MYCTOPHIDAE	131.38	49266	29.92
Helicolenus dactylopterus	29.96	2041	6.82
Merluccius paradoxus	18.43	126	4.20
Octopus vulgaris	15.58	2	3.55
Aequorea forskalea	15.26	57	3.48
Merluccius capensis	12.55	35	2.86
Chelidonichthys capensis	7.91	12	1.80
Paracallionymus costatus	5.99	639	1.37
Callorhynchus capensis	2.68	2	0.61
Sepia australis	2.26	130	0.52
Lepidopus caudatus	1.70	126	0.39
Cynoglossus capensis	1.47	24	0.34
Maurolicus muelleri	0.79	538	0.18
Holohalaelurus regani	0.79	2	0.18
Afrololigo mercatoris	0.57	199	0.13
Etrumeus whiteheadi	0.34	6	0.08
Sympagurus dimorphus	0.34	30	0.08
Total	439.08	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 63
 DATE :12/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 31°47,33
 start stop duration Lon E 17°38,42
 TIME :07:05:42 07:38:24 32.7 (min) Purpose : 3
 LOG : 6071.70 6073.30 1.6 Region : 6100
 FDEPTH: 137 138 Gear cond.: 0
 BDEPTH: 137 138 Validity: 0
 Towing dir: 0° wire out : 380 m Speed : 2.9 kn
 Sorted : 164 Total catch: 550.00 Catch/hour: 1009.17

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
Merluccius capensis	439.84	10996	43.58
PORIFERA (Sponges)	274.45	306	27.20
Aequorea forskalea	151.46	692	15.01
Merluccius capensis	102.09	301	10.12
Callorhynchus capensis	12.29	7	1.22
Brama brama	11.01	6	1.09
Sepia australis	4.32	211	0.43
Chelidonichthys capensis	4.08	13	0.40
Paracallionymus costatus	2.40	283	0.24
Pterygosquilla capensis	2.28	103	0.23
Helicolenus dactylopterus	2.16	169	0.21
Todaropsis eblanae	0.96	37	0.10
J E L L Y F I S H	0.72	79	0.07
Exodromidia sp.	0.48	42	0.05
MYCTOPHIDAE	0.36	103	0.04
Lepidopus caudatus	0.24	13	0.02
Afrololigo mercatoris	0.06	26	0.01
Total	1009.24	100.01	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 68
 DATE :12/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 32°32,55
 start stop duration Lon E 16°57,34
 TIME :22:04:01 22:34:09 30.1 (min) Purpose : 3
 LOG : 6172.74 6174.26 1.5 Region : 6100
 FDEPTH: 309 311 Gear cond.: 0
 BDEPTH: 309 311 Validity: 0
 Towing dir: 0° wire out : 760 m Speed : 3.0 kn
 Sorted : 210 Total catch: 210.00 Catch/hour: 418.19

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
Merluccius paradoxus	229.44	1065	54.87
Coelorhynchus braueri	99.36	245	23.76
Merluccius capensis	30.13	22	7.21
Genypterus capensis	23.21	8	5.55
Zeus capensis	18.43	32	4.41
MYCTOPHIDAE	10.39	3895	2.49
Malacocephalus laevis	3.14	4	0.75
Helicolenus dactylopterus	2.48	20	0.59
Loligo reynaudi	0.92	14	0.22
Callionymus sp.	0.33	50	0.08
PAGUROIDEA	0.33	16	0.08
AUSTROROSSIA sp.	0.03	2	0.01
Total	418.19	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 64
 DATE :12/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 31°39,48
 start stop duration Lon E 17°49,74
 TIME :09:26:34 09:57:25 30.9 (min) Purpose : 3
 LOG : 6088.23 6089.79 1.6 Region : 6100
 FDEPTH: 122 121 Gear cond.: 0
 BDEPTH: 122 121 Validity: 0
 Towing dir: 0° wire out : 360 m Speed : 3.0 kn
 Sorted : 182 Total catch: 181.93 Catch/hour: 353.83

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
Aequorea forskalea	166.52	667	47.06
Merluccius capensis	138.17	2838	39.05
SQUILLIDAE	22.60	941	6.39
Callorhynchus capensis	6.50	8	1.84
Lepidopus caudatus	6.07	4	1.71
Chelidonichthys capensis	5.45	16	1.54
Todaropsis eblanae	3.50	117	0.99
Genypterus capensis	2.12	2	0.60
Austroglossus microlepis	1.75	6	0.49
GOBIIDAE	0.29	31	0.08
G A S T R O P O D S	0.29	21	0.08
MYCTOPHIDAE	0.27	107	0.08
Afrololigo mercatoris	0.16	62	0.04
Callionymus sp.	0.10	19	0.03
Starfish	0.06	16	0.02
Total	353.83	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 69
 DATE :13/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 32°48,12
 start stop duration Lon E 16°58,46
 TIME :01:11:33 01:42:13 30.7 (min) Purpose : 3
 LOG : 6189.07 6190.69 1.6 Region : 6100
 FDEPTH: 351 357 Gear cond.: 0
 BDEPTH: 351 357 Validity: 0
 Towing dir: 0° wire out : 935 m Speed : 3.2 kn
 Sorted : 130 Total catch: 260.00 Catch/hour: 508.47

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
Merluccius paradoxus	246.66	1064	48.51
Coelorhynchus braueri	112.96	2323	22.22
Merluccius capensis	46.36	25	9.12
Total	405.98	100.00	

Zeus capensis	21.39	37	4.21	
Octopus vulgaris	19.28	2	3.79	
Gerytherus capensis	18.46	14	3.63	
Malacocephalus laevis	12.38	55	2.43	
Helicolenus dactylopterus	11.95	47	2.35	219
Lophius vomerinus	7.59	4	1.49	220
Hexactinellida indetCV1	3.72	4	0.73	
Holohalaelurus regani	2.43	8	0.48	
Loligo reynaudi	1.22	8	0.24	
Opisthobranch	0.68	4	0.13	
CALLIONYMIDAE	0.65	90	0.13	
Starfish	0.57	25	0.11	
MYCTOPHIDAE	0.50	188	0.10	
Mursia cristimanus	0.43	8	0.08	
MYXINIDAE	0.32	4	0.06	
C R A B S	0.25	29	0.05	
G A S T R O P O D S	0.25	16	0.05	
Austrorossia enigmatica	0.14	4	0.03	
OPHICHTHIDAE	0.14	4	0.03	
Sympagurus dimorphus	0.11	8	0.02	
JELLYFISH	0.11	4	0.02	
Total	508.56		100.02	

Hoplostethus atlanticus	57.03	330	13.19	
Nezumia micronychodon	21.65	176	5.01	
Neocyttus rhomboidealis	15.80	106	3.65	
Opisthoteuthis agassizi	14.43	9	3.34	
Notacanthus cf sexspinus	2.64	24	0.61	
Selachophidium guentheri	2.11	31	0.49	
SERGESTIDAE	1.94	541	0.45	
Aegourea forskaelea	1.76	13	0.41	
Phosichthys argenteus	1.67	66	0.39	
Sebastes capensis	1.19	2	0.27	
J E L L Y F I S H	1.06	55	0.24	
Ancistrocheirus lesueurii	0.84	4	0.19	
Etmopterus spinax	0.75	2	0.17	
Synaphobranchus kaupii	0.66	7	0.15	
Etmopterus brachyurus	0.57	2	0.13	
Malacocephalus laevis	0.57	7	0.13	
Apristurus saldanha	0.53	2	0.12	
Funchalia woodwardi	0.35	33	0.08	
PASIPHAIDAE	0.22	22	0.05	
Chauliodus sp.	0.13	2	0.03	
MYXINIDAE	0.09	2	0.02	
Lycoteuthis lorigera	0.04	2	0.01	
Argentina euchus	0.04	2	0.01	
S H R I M P S	0.04	9	0.01	0
Total	432.30		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 70
DATE :13/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 32°48,05
start stop duration Lon E 16°47,61
TIME :03:56:52 04:27:07 30.3 (min)
LOG : 6203.22 6204.75 1.5
FDEPTH: 445 446
BDEPTH: 445 446
Towing dir: 0° wire out : 1160 m
Sorted : 109 Total catch: 109.38
Purpose : 3
Region : 6100
Gear cond.: 0
Validity : 0
Speed : 3.0 kn
Catch/hour: 216.87

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 73
DATE :13/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 32°41,97
start stop duration Lon E 16°35,14
TIME :11:00:35 11:31:02 30.5 (min)
LOG : 6224.12 6225.70 1.6
FDEPTH: 670 668
BDEPTH: 670 668
Towing dir: 0° wire out : 1510 m
Sorted : 247 Total catch: 247.30
Purpose : 3
Region : 6100
Gear cond.: 0
Validity : 0
Speed : 3.1 kn
Catch/hour: 487.13

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Helicolenus dactylopterus	71.50	432	32.97	222
Merluccius paradoxus	31.53	103	14.54	224
Bassanago albescens	29.66	36	13.68	
Coelorinchus simorhynchus	22.49	397	10.37	
Coelorinchus matamua	17.61	660	8.12	
Gerytherus capensis	16.06	6	7.41	223
Notacanthus sexspinus	9.16	81	4.22	
Lophius vomerinus	3.49	2	1.61	225
Zeus capensis	3.33	6	1.54	
Symplrophorus boops	2.78	188	1.28	
Merhippolyte agulhasensis	1.55	773	0.71	
Todaropsis eblanae	1.11	12	0.51	
Hoplostethus atlanticus	0.95	10	0.44	
Holohalaelurus regani	0.91	4	0.42	
MYCTOPHIDAE	0.83	313	0.38	
Malacocephalus laevis	0.71	6	0.33	
Trachurus capensis	0.48	2	0.22	226
Nezumia milleri	0.44	52	0.20	
J E L L Y F I S H	0.40	28	0.18	
Stereomastis sculptata	0.32	63	0.15	
Paracallionymus costatus	0.32	56	0.15	
Rossia enigmatica	0.28	14	0.13	
Myxine capensis	0.24	4	0.11	
Starfish	0.16	12	0.07	
Stoloteuthis sp.	0.12	67	0.05	
Physiculus capensis	0.12	6	0.05	
Lycoteuthis lorigera	0.12	4	0.05	
Scomberesox saurus	0.08	2	0.04	
Tripterophycis gilchristi	0.04	6	0.02	
Merluccius paradoxus, juvenile	0.04	20	0.02	
Maurilicus muelleri	0.04	34	0.02	
Sepia dubia	0.02	2	0.01	
Brissidae	0.01	2	0.00	
Lestidium atlanticum	0.00	2	0.00	
Metal waste	0.00	0	0.00	
Total	216.87		100.00	

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius paradoxus	300.20	244	61.63	233
Hoplostethus atlanticus	39.47	77	8.10	
Coelorinchus braueri	39.40	585	8.09	
Ancistrocheirus lesueurii	22.97	16	4.71	0
UNIDENTIFIED FISH	22.57	4	4.83	0
SERGESTIDAE	15.92	305	3.27	
Coelorinchus matamua	10.95	53	2.25	
Funchalia woodwardi	10.12	1083	2.08	
Notacanthus cf sexspinus	9.57	81	1.97	
Phosichthys argenteus	6.58	258	1.35	
Nezumia micronychodon	2.84	65	0.38	
Selachophidium guentheri	2.01	20	0.41	
Etmopterus spinax	1.34	2	0.27	
Todarodes angolensis	0.87	2	0.18	0
Myxine capensis	0.47	8	0.10	
Sebastes capensis	0.39	2	0.08	
MYCTOPHIDAE	0.39	83	0.08	
Synaphobranchus kaupii	0.35	10	0.07	
Neocyttus rhomboidealis	0.16	4	0.03	
Astronesthes indicus	0.16	2	0.03	
Chauliodus sloani	0.16	4	0.03	
Atolla sp	0.08	0	0.02	
Argentina euchus	0.08	4	0.02	
Alloctytus verrucosus	0.08	2	0.02	0
Total	487.13		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 71
DATE :13/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 32°48,81
start stop duration Lon E 16°43,51
TIME :06:22:19 06:52:58 30.7 (min)
LOG : 6210.73 6212.30 1.6
FDEPTH: 527 562
BDEPTH: 527 562
Towing dir: 0° wire out : 1250 m
Sorted : 320 Total catch: 1120.00
Purpose : 3
Region : 6100
Gear cond.: 0
Validity : 0
Speed : 3.1 kn
Catch/hour: 2192.50

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 74
DATE :13/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 32°40,39
start stop duration Lon E 16°39,21
TIME :13:09:25 13:40:59 31.6 (min)
LOG : 6230.99 6232.31 1.3
FDEPTH: 465 459
BDEPTH: 465 459
Towing dir: 0° wire out : 930 m
Sorted : 351 Total catch: 350.82
Purpose : 3
Region : 6100
Gear cond.: 0
Validity : 0
Speed : 2.5 kn
Catch/hour: 666.96

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius paradoxus	1126.20	951	51.37	230
Notacanthus sexspinus	695.05	6558	31.70	
Lophius vomerinus	202.30	123	9.23	228
Gerytherus capensis	25.22	8	1.16	
Helicolenus dactylopterus	25.05	117	1.14	227
Coelorinchus braueri	22.72	1034	1.04	
Trachyrincus scabrus	20.26	356	0.92	
Aristeus cf varidens	14.65	3142	0.67	
Selachophidium guentheri	10.54	104	0.48	
Bassanago albescens	7.94	22	0.36	
Chaceon maritae	6.84	8	0.36	
Coelorinchus simorhynchus	5.89	69	0.27	
Aristaeopsis edwardsiana	5.61	1055	0.26	
Rajella leopardus	5.44	4	0.25	
Etmopterus brachyurus	4.52	55	0.21	
Coelorinchus matamua	3.56	27	0.16	
Malacocephalus laevis	1.92	8	0.09	
Chaceon macphersoni	1.64	8	0.08	0
Nezumia micronychodon	1.23	178	0.06	
Ebinania costaeacanarie	1.10	8	0.05	
Neocyttus rhomboidealis	1.10	22	0.05	
Nezumia milleri	0.96	110	0.04	
P O L Y C H A E T A	0.58	14	0.03	
Merluccius paradoxus	0.55	35	0.03	231
Paracallionymus costatus	0.41	104	0.02	
Tripterophycis gilchristi	0.41	35	0.02	
MYCTOPHIDAE	0.41	55	0.02	
Phosichthys argenteus	0.14	14	0.01	
Epigonus telescopus	0.14	8	0.01	
Lycoteuthis lorigera	0.14	27	0.01	
Starfish	0.08	22	0.00	
Hoplostethus sp.	0.05	35	0.00	
Rossia enigmatica	0.03	8	0.00	
Total	2192.78		100.01	

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius paradoxus	530.30	639	79.51	234
Ruvettus pretiosus	49.51	4	7.42	
Helicolenus dactylopterus	17.03	101	2.55	236
Bassanago albescens	15.89	29	2.38	
Funchalia woodwardi	13.69	1283	2.05	
Gerytherus capensis	12.62	6	1.89	237
Coelorinchus matamua	10.42	188	1.56	
Lophius vomerinus	6.62	6	0.99	235
Phosichthys argenteus	4.11	245	0.62	
MYCTOPHIDAE	1.67	502	0.25	
Coelorinchus braueri	1.44	65	0.22	
Notacanthus sexspinus	1.14	6	0.17	
Nezumia milleri	0.42	19	0.06	
Ancistrocheirus lesueurii	0.34	21	0.05	
Starfish	0.34	59	0.05	
Physiculus capensis	0.27	11	0.04	
Hoplostethus atlanticus	0.27	7	0.04	
Tripterophycis gilchristi	0.19	10	0.03	
Epigonus telescopus	0.19	6	0.03	
Selachophidium guentheri	0.11	2	0.02	
MYXINIDAE	0.11	2	0.02	
CALLIONYMIDAE	0.11	19	0.02	
Stoloteuthis sp.	0.11	29	0.02	
Merluccius paradoxus	0.04	10	0.01	
Total	666.96		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 72
DATE :13/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 32°48,57
start stop duration Lon E 16°37,82
TIME :08:41:15 09:08:31 27.3 (min)
LOG : 6217.06 6218.17 1.1
FDEPTH: 796 783
BDEPTH: 796 783
Towing dir: 0° wire out : 1400 m
Sorted : 196 Total catch: 196.48
Purpose : 3
Region : 6100
Gear cond.: 0
Validity : 0
Speed : 2.4 kn
Catch/hour: 432.30

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 75
DATE :13/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 32°37,14
start stop duration Lon E 16°45,90
TIME :15:28:58 15:59:10 30.2 (min)
LOG : 6239.91 6241.30 1.4
FDEPTH: 394 392
BDEPTH: 394 392
Towing dir: 0° wire out : 790 m
Sorted : 336 Total catch: 860.00
Purpose : 3
Region : 6100
Gear cond.: 0
Validity : 0
Speed : 2.8 kn
Catch/hour: 1708.61

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius paradoxus	248.58	216	57.50	232
Coelorinchus braueri	57.60	937	13.32	

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius paradoxus	1529.13	4462	92.42	238
Helicolenus dactylopterus	32.45	139	1.90	240
Brama brama	27.77	16	1.63	239
Coelorinchus simorhynchus	26.85	326	1.57	
Lophius vomerinus	15.16	12	0.89	241
Bassanago albescens	5.19	6	0.30	
MYCTOPHIDAE	3.66	687	0.21	
Gerytherus capensis	3.66	6	0.21	242
Todaropsis eblanae	3.15	22	0.18	
Todarodes angolensis	2.85	6	0.17	
Malacocephalus laevis	2.03	16	0.12	
Symplrophorus boops	2.03	127	0.12	
Uroconger lepturus	1.83	6	0.11	
Starfish	1.22	189	0.07	
Phosichthys argenteus	0.41	22	0.02	
Lycoteuthis lorigera	0.31	52	0.02	
Nezumia milleri	0.31	42	0.02	
Merluccius paradoxus	0.20	48	0.01	243
Epigonus pandionis	0.20	16	0.01	

Stereomastis sculpata	0.20	6	0.01	Paracallionymus costatus	0.08	16	0.02
Hoplostethus atlanticus	0.12	6	0.01	Starfish	0.02	10	0.01
Tripteroptychus gilchristi	0.10	6	0.01	Argyropelecus aculeatus	0.01	2	0.00
Total	1708.87		100.02	Total	343.28		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 76
 DATE :13/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 32°25.43
 start stop duration Lon E 16°23.56
 TIME :23:06:20 23:36:35 30.2 (min) Purpose : 3
 LOG : 6290.59 6292.14 1.6 Region : 6100
 FDEPTH: 643 644 Gear cond.: 0
 BDEPTH: 643 644 Validity : 0
 Towing dir: 0° Wire out : 1480 m Speed : 3.1 kn
 Sorted : 72 Total catch: 72.17 Catch/hour: 143.19

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 79
 DATE :14/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 32°16.96
 start stop duration Lon E 16°33.49
 TIME :06:19:44 06:50:15 30.5 (min) Purpose : 3
 LOG : 6312.84 6314.26 1.4 Region : 6100
 FDEPTH: 378 373 Gear cond.: 0
 BDEPTH: 378 373 Validity : 0
 Towing dir: 0° Wire out : 900 m Speed : 2.8 kn
 Sorted : 316 Total catch: 950.00 Catch/hour: 1867.63

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Merluccius paradoxus	79.01	55.18	244
Funchalia woodwardi	21.51	15.02	
Coelorinchus braueri	7.34	5.13	
Phosichthys argenteus	6.79	4.74	
Neocyttus rhomboidalis	6.47	4.52	
SERGESTIDAE	3.97	2.77	
Hoplostethus atlanticus	2.70	1.88	
Nezumia micronychodon	2.70	1.88	
CRANCHIIDAE	2.34	1.64	
NEOSCOPELIDAE	2.24	1.57	
MYCTOPHIDAE	1.07	0.75	
Coelorinchus sp.	0.71	0.50	
Sebastes capensis	0.71	0.50	
Scomberesox saurus	0.71	0.50	
Lycoteuthis lorigera	0.67	0.47	
Etmopterus sp.	0.63	0.44	
Selachophidium guentheri	0.60	0.42	
Malacocephalus laevis	0.56	0.39	
MACROURIDAE	0.36	0.25	0
DIRETIDAE	0.32	0.22	
Melanostomias sp.	0.32	0.22	
S H R I M P S	0.32	0.22	
Histioteuthis miranda	0.20	0.14	
Kuronezumia leonis	0.20	0.14	
Notacanthus sexspinis	0.20	0.14	
PARALEPIDIDAE	0.16	0.11	
Notacanthus sp.	0.16	0.11	
Xenodermichthys sp.	0.08	0.06	
Chauliodus sp.	0.08	0.06	
Nansenia macrolepis	0.04	0.03	
Argyropelecus sp.	0.02	0.01	
Starfish	0.02	0.01	
Etmopterus sculptus	0.00	0.00	
Total	143.19	100.00	

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Lepidopus caudatus	770.30	916	41.24
Merluccius paradoxus	739.79	1773	39.61
Coelorinchus simorhynchus	69.42	1209	3.72
Merluccius capensis	64.93	24	3.48
Zeus capensis	62.51	134	3.35
Coelorinchus matamua	42.71	692	2.29
Genypterus capensis	41.21	28	2.21
Helicolenus dactylopterus	35.00	232	1.87
Brama brama	18.42	12	0.99
Holohalaelurus regani	7.02	24	0.38
Octopus vulgaris	6.33	2	0.34
Malacocephalus laevis	3.92	18	0.21
Todaropsis eblanae	3.80	35	0.20
Beryx splendens	0.92	6	0.05
Starfish	0.36	6	0.02
Actiniaria sp 3	0.35	6	0.02
Argentina euchus	0.35	6	0.02
Nezumia milleri	0.23	59	0.01
Rossia enigmatica	0.12	12	0.01
Tripteroptychus gilchristi	0.03	6	0.00
Argyropelecus aculeatus	0.01	6	0.00
Paracallionymus costatus	0.01	12	0.00
Total	1867.75	100.01	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 80
 DATE :14/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 32°14.23
 start stop duration Lon E 16°42.99
 TIME :08:53:33 09:24:48 31.3 (min) Purpose : 3
 LOG : 6325.02 6326.46 1.4 Region : 6100
 FDEPTH: 330 330 Gear cond.: 0
 BDEPTH: 330 330 Validity : 0
 Towing dir: 0° Wire out : 800 m Speed : 2.8 kn
 Sorted : 348 Total catch: 910.00 Catch/hour: 1746.64

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Merluccius paradoxus	796.45	1737	45.60
Merluccius paradoxus	681.61	3430	39.02
Merluccius capensis	74.49	52	4.26
Genypterus capensis	38.65	52	2.21
Brama brama	38.25	21	2.19
Paracallionymus costatus	38.23	81	1.94
Malacocephalus laevis	31.22	61	1.79
Torpedo nobiliana	12.45	6	0.71
Coelorinchus matamua	11.04	171	0.63
Lepidopus caudatus	10.34	31	0.59
Helicolenus dactylopterus	7.63	56	0.44
Lophius vomerinus	5.42	6	0.31
Todaropsis eblanae	5.32	52	0.30
Plastic	0.00	2	0.00
Total	1746.69	100.00	

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Merluccius paradoxus	200.35	2916	47.55
MYCTOPHIDAE	78.46	19614	18.62
Lophius vomerinus	49.22	44	11.68
Helicolenus dactylopterus	15.47	297	3.67
Brama brama	13.62	8	3.23
Coelorinchus matamua	13.46	264	3.20
Thyrssites atun	11.96	4	2.84
Genypterus capensis	7.06	19	1.68
Merluccius capensis	6.21	12	1.47
Lepidopus caudatus	6.13	60	1.46
Leucoraja wallacei	5.28	4	1.25
Rajella leopardus	3.47	2	0.82
Raja straeleni	3.36	2	0.80
Paracallionymus costatus	1.74	145	0.41
Etrumeus whiteheadi	1.00	12	0.24
Holohalaelurus regani	1.00	14	0.24
Trachurus capensis	1.00	8	0.24
JELLYFISH	0.85	25	0.20
Malacocephalus laevis	0.69	2	0.16
Todaropsis eblanae	0.58	10	0.14
SOULLIDAE	0.17	10	0.04
PHOSICHTHYIDAE	0.14	100	0.03
Merluccius paradoxus	0.06	12	0.01
Afrololigo mercatoris	0.06	35	0.01
ISOPODS	0.01	4	0.00
Total	421.34	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 81
 DATE :14/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 32°6.05
 start stop duration Lon E 16°58.42
 TIME :12:04:49 12:35:56 31.1 (min) Purpose : 3
 LOG : 6343.79 6345.35 1.6 Region : 6100
 FDEPTH: 268 267 Gear cond.: 0
 BDEPTH: 268 267 Validity : 0
 Towing dir: 0° Wire out : 705 m Speed : 3.0 kn
 Sorted : 218 Total catch: 218.46 Catch/hour: 421.34

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Merluccius paradoxus	136.39	389	39.73
Helicolenus dactylopterus	101.42	574	29.54
Lophius vomerinus	37.28	4	10.86
Coelorinchus simorhynchus	19.77	349	5.76
Genypterus capensis	15.23	2	4.44
Bassanago albescens	12.60	20	3.67
Coelorinchus matamua	9.25	197	2.69
Todarodes angolensis	3.55	6	1.03
Malacocephalus laevis	2.31	10	0.67
Merhippolyte agulhasensis	1.75	658	0.51
Coelorinchus braueri	0.56	28	0.16
Notacanthus sexspinis	0.44	8	0.13
Hoplostethus atlanticus	0.40	54	0.12
Todaropsis eblanae	0.36	0	0.10
NOTOSUDIDAE	0.36	2	0.10
Scomberesox saurus	0.28	2	0.08
Tripteroptychus gilchristi	0.24	12	0.07
Rajella leopardus, juvenile	0.24	14	0.07
Ophiusurus serpens	0.16	2	0.05
MYCTOPHIDAE	0.12	30	0.03
Nezumia milleri	0.12	10	0.03
Epigonus pandionis	0.12	4	0.03
Physiculus capensis	0.08	4	0.02
Stereomastis sculpata	0.08	12	0.02
Symblophorus boops	0.08	4	0.02

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Merluccius paradoxus	456.01	6160	23.91
Merluccius capensis	243.33	72998	12.76
Paracallionymus costatus	128.71	11370	6.75
Raja straeleni	137.68	31	6.17
Coelorinchus capensis	93.78	62	4.92
Lophius vomerinus	78.45	337	4.11
Aequorea forskalea	66.81	645	3.50
Todaropsis eblanae	30.65	1042	1.61
Cynoglossus capensis	30.65	308	1.61
Septia australis	28.19	1258	1.48

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 82
 DATE :14/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 32°1.84
 start stop duration Lon E 17°9.43
 TIME :14:29:56 15:01:04 31.1 (min) Purpose : 3
 LOG : 6356.95 6358.29 1.3 Region : 6100
 FDEPTH: 216 216 Gear cond.: 0
 BDEPTH: 216 216 Validity : 0
 Towing dir: 0° Wire out : 550 m Speed : 2.6 kn
 Sorted : 62 Total catch: 990.00 Catch/hour: 1907.51

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Helicolenus dactylopterus	553.46	33222	29.01
Merluccius capensis	456.01	6160	23.91
MYCTOPHIDAE	243.33	72998	12.76
Paracallionymus costatus	128.71	11370	6.75
Raja straeleni	137.68	31	6.17
Coelorinchus capensis	93.78	62	4.92
Lophius vomerinus	78.45	337	4.11
Aequorea forskalea	66.81	645	3.50
Todaropsis eblanae	30.65	1042	1.61
Cynoglossus capensis	30.65	308	1.61
Septia australis	28.19	1258	1.48

Merluccius capensis	24.52	92	1.29	269	FDEPTH: 286	279	Gear cond.: 0	
Holohalaelurus regani	19.00	461	1.00		BDEPTH: 286	279	Validity: 0	
Loligo reynaudi	15.94	31	0.84		Towing dir: 0°	Wire out: 660 m	Speed: 3.0 kn	
Trachurus capensis	6.74	62	0.35	268	Sorted: 218	Total catch: 570.00	Catch/hour: 1114.73	
Coelorinchus matamua	4.29	154	0.22					
Lepidopus caudatus	3.07	123	0.16					
Exodromidia sp.	1.84	31	0.10					
Etrumeus whiteheadi	1.84	31	0.10					
Maurollicus muelleri	1.23	1166	0.06					
Afrololigo mercatoris	0.61	216	0.03					
Hydrozoa spp.	0.46	31	0.02					
Pterygosquilla capensis	0.25	62	0.01					
Total	1907.49		100.00					
R/V Dr. Fridtjof Nansen	SURVEY:2019402		STATION: 83					
DATE :14/03/19	GEAR TYPE: BT NO: 1		POSITION:Lat S 31°58,52		Lon E 16°25,64			
TIME :20:02:43	start	stop	duration	Purpose : 3				
LOG : 6397.61	6399.04		1.4	Region : 6100				
FDEPTH: 395	395			Gear cond.: 0				
BDEPTH: 395	395			Validity: 0				
Towing dir: 0°	Wire out : 890 m			Speed : 2.7 kn				
Sorted : 122	Total catch: 121.54			Catch/hour: 231.79				
SPECIES	CATCH/HOUR	% OF TOT. C	SAMP					
weight	numbers							
Merluccius paradoxus	83.04	265	35.82					
Helicolenus dactylopterus	75.30	406	32.48					
Genypteris capensis	26.51	11	11.44					
Zeus capensis	17.85	34	7.70					
Coelorinchus simorhynchus	11.21	99	4.84					
Coelorinchus matamua	8.77	172	3.78					
Epigonus denticulatus	5.68	2	2.45					
Holohalaelurus regani	0.84	10	0.36					
Todaropsis eblanae	0.65	19	0.28					
Symbolophorus boops	0.57	48	0.25					
Sea anemone sp	0.50	4	0.21					
Cynoglossus capensis	0.31	6	0.13					
Paracallionymus costatus	0.27	32	0.12					
Austrorossia enigmatica	0.11	4	0.05					
Myxine capensis	0.08	2	0.03					
Merluccius capensis	0.08	2	0.03					
Rochinia sp.	0.02	2	0.01					
Sepia hieronis	0.01	2	0.00					
Starfish	0.00	2	0.00					
Amalda bullioides	0.00	2	0.00					
Physiculus capensis	0.00	0	0.00					
Total	231.79		100.00					
R/V Dr. Fridtjof Nansen	SURVEY:2019402		STATION: 84					
DATE :14/03/19	GEAR TYPE: BT NO: 1		POSITION:Lat S 32°2,49		Lon E 16°17,56			
TIME :22:40:58	start	stop	duration	Purpose : 3				
LOG : 6408.48	6410.05		1.6	Region : 6100				
FDEPTH: 462	462			Gear cond.: 0				
BDEPTH: 462	462			Validity: 0				
Towing dir: 0°	Wire out : 1030 m			Speed : 3.1 kn				
Sorted : 73	Total catch: 72.68			Catch/hour: 141.86				
SPECIES	CATCH/HOUR	% OF TOT. C	SAMP					
weight	numbers							
Merluccius paradoxus	70.46	152	49.67	273				
Helicolenus dactylopterus	28.07	109	19.79	272				
Coelorinchus matamua	17.06	533	12.03					
Genypteris capensis	11.28	4	7.95	275				
Lophius vomerinus	5.54	2	3.91	274				
Starfish	1.76	20	1.24					
Coelorinchus sp.	1.48	6	1.05					
Malacocephalus laevis	1.44	8	1.02					
Todaropsis eblanae	0.94	2	0.66					
Phosichthys argenteus	0.74	6	0.52					
Diaphus sp.	0.55	2	0.39					
Hoplostethus sp.	0.43	16	0.30					
MYCTOPHIDAE	0.43	80	0.30					
Austrorossia enigmatica	0.35	10	0.25					
Paracallionymus costatus	0.23	31	0.17					
Aequorea sp.	0.21	4	0.15					
MYXINIDAE	0.20	2	0.14					
S H R I M P S	0.18	105	0.12					
Tripteryphycis gilchristi	0.16	10	0.11					
Epigonus pandionis	0.08	4	0.06					
MACROURIDEA	0.08	0	0.06					
Stereomastis sculpta	0.08	20	0.06					
Physiculus capensis	0.06	4	0.04					
OPHICHTHIDAE	0.06	2	0.04					
Total	141.86		100.00					
R/V Dr. Fridtjof Nansen	SURVEY:2019402		STATION: 85					
DATE :15/03/19	GEAR TYPE: BT NO: 1		POSITION:Lat S 31°55,59		Lon E 16°37,48			
TIME :02:28:11	start	stop	duration	Purpose : 3				
LOG : 6430.76	6431.86		1.1	Region : 6100				
FDEPTH: 339	338			Gear cond.: 0				
BDEPTH: 339	338			Validity: 0				
Towing dir: 0°	Wire out : 850 m			Speed : 2.9 kn				
Sorted : 71	Total catch: 71.32			Catch/hour: 186.29				
SPECIES	CATCH/HOUR	% OF TOT. C	SAMP					
weight	numbers							
Merluccius paradoxus	41.32	256	22.18	277				
Genypteris capensis	41.06	37	22.04	276				
Coelorinchus matamua	39.97	366	21.45					
Zeus capensis	33.38	63	17.92					
Helicolenus dactylopterus	7.10	44	3.81	278				
Ocotopus vulgaris	4.65	3	2.50					
Lophius vomerinus	3.87	3	2.08	279				
RAJIDAE	3.40	3	1.82					
PORIFERA (Sponges)	1.78	78	0.95					
Malacocephalus laevis	1.67	5	0.90					
Todarodes angolensis	1.67	3	0.90					
Holohalaelurus regani	1.46	3	0.79					
Epigonus telescopus	1.04	13	0.56					
MYCTOPHIDAE	0.89	444	0.48					
Paracallionymus costatus	0.68	112	0.36					
Austrorossia enigmatica	0.63	18	0.34					
Lepidopus caudatus	0.47	3	0.25					
Maurollicus muelleri	0.47	353	0.25					
Todaropsis eblanae	0.31	3	0.17					
OPHICHTHIDAE	0.26	3	0.14					
Chlorophthalmus sp.	0.13	3	0.07					
Exodromidia sp.	0.05	5	0.03					
S H R I M P S	0.01	8	0.01					
Argyropelecus aculeatus	0.01	3	0.00					
OPISTHOBRANCHIA	0.01	3	0.00					
Total	186.29		100.00					
R/V Dr. Fridtjof Nansen	SURVEY:2019402		STATION: 86					
DATE :15/03/19	GEAR TYPE: BT NO: 1		POSITION:Lat S 31°45,40		Lon E 16°56,16			
TIME :05:51:07	start	stop	duration	Purpose : 3				
LOG : 6453.16	6454.69		1.5	Region : 6100				
FDEPTH: 169	176			Gear cond.: 0				
BDEPTH: 169	176			Validity: 0				
Towing dir: 0°	Wire out : 465 m			Speed : 3.0 kn				
Sorted : 358	Total catch: 358.24			Catch/hour: 712.21				
SPECIES	CATCH/HOUR	% OF TOT. C	SAMP					
weight	numbers							
Merluccius capensis	198.61	1398	27.89	299				
PORIFERA (Sponges)	150.54	370	21.14					
Rostrosaja alba	89.46	2	12.56	298				
Merluccius paradoxus	59.20	1286	8.31	302				
JELLYFISH	51.29	0	7.20					
Callorhynchus capensis	40.91	22	5.74					
Helicolenus dactylopterus	39.92	60	5.61	300				
Sepia australis	30.93	1131	4.34					
Brama brama	25.61	14	3.60					
Todaropsis eblanae	8.51	165	1.19					
Chelidonichthys capensis	3.74	6	0.52					
SQUILLIDAE	3.42	115	0.48					
Trachurus capensis	2.35	16	0.33	301				
Paracallionymus costatus	1.83	211	0.26					

	weight	numbers	% OF TOT. C	SAMP
Lophius vomerinus	1.39	6	0.20	304
CIDARIDAE	0.87	12	0.12	
Genypterus capensis	0.23	2	0.03	303
Merluccius paradoxus, juvenile	0.72	46	0.10	
Cynoglossus capensis	0.48	6	0.07	
Jasus lalandii	0.44	4	0.06	
MYCTOPHIDAE	0.36	133	0.05	
Loligo reynaudi	0.28	2	0.04	
Lepidopus caudatus	0.24	14	0.03	
Coelorinchus matamua	0.10	6	0.01	
Holohalaelurus regani	0.08	6	0.01	
Exodromidia sp.	0.08	8	0.01	
PHOSICHTHYIDAE	0.02	8	0.00	
Total	712.21		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 90
DATE :15/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 31°6,45
start stop duration Lon E 17°33,11
TIME :15:23:53 15:53:25 29.5 (min) Purpose : 3
LOG : 6512.20 6513.51 1.3 Region : 6100
FDEPTH: 134 135 Gear cond.: 0
BDEPTH: 134 135 Validity : 0
Towing dir: 0° wire out : 370 m Speed : 2.7 kn
Sorted : 148 Total catch: 147.85 Catch/hour: 300.41

	weight	numbers	% OF TOT. C	SAMP
Merluccius paradoxus	133.01	523	48.73	321
Genypterus capensis	48.47	32	17.76	323
Zeus capensis	35.15	74	12.88	
Coelorinchus simorhynchus	14.91	148	5.46	
Malacocephalus laevis	14.71	10	5.39	
Helicolenus dactylopterus	10.96	47	4.02	322
Coelorinchus matamua	5.82	94	2.13	
Holohalaelurus regani	3.31	12	1.21	
Epigonus pandionis	2.67	49	0.98	
Trachurus capensis	0.79	7	0.29	324
Lycoteuthis lorigera	0.74	15	0.27	
Rossia enigmatica	0.44	12	0.16	
Cynoglossus capensis	0.39	5	0.14	
Beryx splendens	0.39	2	0.14	
Todaropsis eblanae	0.35	2	0.13	
Hoplostethus atlanticus	0.30	5	0.11	
Paracallionymus costatus	0.25	37	0.09	
MYCTOPHIDAE	0.10	7	0.04	
Cyttus traversi	0.10	2	0.04	
J E L L Y F I S H	0.05	2	0.02	
ISOPODS	0.02	5	0.01	
Hymenocephalus sp.	0.01	2	0.00	
Total	272.93		100.00	

	weight	numbers	% OF TOT. C	SAMP
Merluccius capensis	114.19	2952	38.01	307
Rostroraja alba	60.95	2	20.29	305
Aequorea forskalea	50.51	496	16.81	
Cheilodichthys capensis	30.76	79	10.24	
Callorhynchus capensis	11.50	4	3.83	
Septia australis	10.65	333	3.54	
Todaropsis eblanae	8.37	392	2.79	
Merluccius capensis	6.14	20	2.04	306
Pterygosquilla capensis	4.47	224	1.49	
Jasus lalandii	0.65	6	0.22	
Afrololigo mercatoris	0.53	158	0.18	
Cynoglossus capensis	0.49	4	0.16	
Merluccius paradoxus	0.45	2	0.15	309
Paracallionymus costatus	0.20	20	0.07	
Lophius vomerinus	0.12	2	0.04	308
Sufflogobius bibarbatus	0.12	43	0.04	
Bathyteuthis abyssicola	0.10	6	0.03	
Exodromidia sp.	0.10	4	0.03	
Physiculus capensis	0.04	2	0.01	
MYCTOPHIDAE	0.04	12	0.01	
Lepidopus caudatus	0.01	2	0.00	
Maurollicus muelleri	0.00	8	0.00	
Starfish	0.01	2	0.00	
Zeus capensis	0.00	2	0.00	
Total	300.41		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 91
DATE :15/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 31°9,15
start stop duration Lon E 17°19,50
TIME :17:43:46 18:16:31 32.8 (min) Purpose : 3
LOG : 6527.17 6528.84 1.7 Region : 6100
FDEPTH: 184 183 Gear cond.: 0
BDEPTH: 184 183 Validity : 2
Towing dir: 0° wire out : 540 m Speed : 3.1 kn
Sorted : 64 Total catch: 119.94 Catch/hour: 219.66

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 94
DATE :16/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 31°43,59
start stop duration Lon E 16°11,36
TIME :06:10:07 06:41:12 31.1 (min) Purpose : 3
LOG : 6609.17 6610.49 1.3 Region : 6100
FDEPTH: 452 453 Gear cond.: 0
BDEPTH: 452 453 Validity : 0
Towing dir: 0° wire out : 1050 m Speed : 2.5 kn
Sorted : 249 Total catch: 500.00 Catch/hour: 964.94

	weight	numbers	% OF TOT. C	SAMP
Merluccius paradoxus	776.28	1052	80.45	326
Helicolenus dactylopterus	61.52	288	6.38	327
Bassanago albescens	49.81	71	5.16	
Malacocephalus laevis	17.07	37	1.77	
Lophius vomerinus	16.37	14	1.70	328
Brama brama	14.82	14	1.54	325
Coelorinchus simorhynchus	10.63	87	1.10	
Coelorinchus matamua	10.24	114	1.06	
Zeus capensis	2.02	6	0.21	
Sympagurus dimorphus	1.09	56	0.11	
Selachophidium guentheri	1.01	14	0.10	
MYCTOPHIDAE	0.93	409	0.10	
Rossia enigmatica	0.70	25	0.07	
Notacanthus sexspinus	0.62	10	0.06	
Paracallionymus costatus	0.47	102	0.05	
Epigonus pandionis	0.16	14	0.02	
Tripterygopsis gilchristi	0.16	6	0.02	
Symblophorus boops	0.16	10	0.02	
Coelorinchus acanthiger	0.16	17	0.02	
PARALEPIDIDAE	0.16	6	0.02	
Nansenia cf macrolepis	0.16	6	0.02	
Starfish	0.09	25	0.01	
Hymenocephalus sp.	0.08	14	0.01	
Mertipolyte agulhasensis	0.08	21	0.01	
Phormosoma sp.	0.07	14	0.01	
Total	964.84		99.99	

	weight	numbers	% OF TOT. C	SAMP
Merluccius paradoxus	72.77	857	33.13	312
Merluccius capensis	55.40	114	25.22	311
Cheilodichthys capensis	12.28	22	5.59	
Raja straeleni	11.47	7	5.22	
Cynoglossus capensis	10.78	161	4.91	
Holohalaelurus regani	10.51	253	4.79	
J E L L Y F I S H	10.24	103	4.66	
Paracallionymus costatus	8.96	1125	4.08	
Callorhynchus capensis	8.64	4	3.94	
Maurollicus muelleri	6.49	1227	2.95	
Rajella leopardus	4.14	2	1.88	
Helicolenus dactylopterus	2.68	240	1.22	313
Solenocera africana	1.82	304	0.83	
Genypterus capensis	1.36	7	0.62	314
Todaropsis eblanae	0.97	103	0.44	
Septia australis	0.43	22	0.20	
Trachurus capensis	0.40	4	0.18	310
Lophius vomerinus	0.16	5	0.07	
Coelorinchus matamua	0.11	5	0.05	
Pterygosquilla capensis	0.03	4	0.01	
Physiculus capensis	0.00	2	0.00	
Total	219.64		99.99	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 92
DATE :15/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 31°25,87
start stop duration Lon E 16°42,49
TIME :23:15:03 23:45:09 30.1 (min) Purpose : 3
LOG : 6567.07 6568.69 1.6 Region : 6100
FDEPTH: 304 311 Gear cond.: 0
BDEPTH: 304 311 Validity : 0
Towing dir: 0° wire out : 790 m Speed : 3.2 kn
Sorted : 152 Total catch: 350.00 Catch/hour: 697.67

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 95
DATE :16/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 32°3,27
start stop duration Lon E 16°13,79
TIME :10:05:02 10:35:25 30.4 (min) Purpose : 3
LOG : 6632.38 6633.89 1.5 Region : 6100
FDEPTH: 545 543 Gear cond.: 0
BDEPTH: 545 543 Validity : 0
Towing dir: 0° wire out : 1245 m Speed : 3.0 kn
Sorted : 87 Total catch: 86.68 Catch/hour: 171.14

	weight	numbers	% OF TOT. C	SAMP
Merluccius paradoxus	69.69	85	40.72	329
Ruvettus pretiosus	57.69	8	33.71	
Helicolenus dactylopterus	9.16	61	5.35	330
Todarodes angolensis	6.71	4	3.92	
Funchalia woodwardi	6.63	584	3.88	
Malacocephalus laevis	5.92	24	3.46	
Coelorinchus braueri	5.84	229	3.41	
Selachophidium guentheri	3.16	34	1.85	
Phosichthys argenteus	2.65	122	1.55	
Notacanthus cf sexspinus	1.30	32	0.76	
Etmopterus sculptus	1.26	24	0.74	
Nezumia micronychodon	0.36	10	0.21	
Rossia enigmatica	0.24	6	0.14	
Lycoteuthis lorigera	0.20	4	0.12	
JELLYFISH	0.14	4	0.08	
PAGUROIDEA	0.12	4	0.07	
Starfish	0.06	14	0.03	
Total	171.14		100.00	

	weight	numbers	% OF TOT. C	SAMP
Merluccius paradoxus	296.58	2647	42.51	319
Coelorinchus matamua	124.29	1850	17.82	
Zeus capensis	58.86	193	8.44	
Lophius vomerinus	54.07	14	7.75	315
Genypterus capensis	52.11	38	7.47	316
Merluccius capensis	50.65	28	7.26	317
Helicolenus dactylopterus	15.97	161	2.29	318
Trachurus capensis	15.15	74	2.17	320
Malacocephalus laevis	6.12	24	0.88	
Squalus sp.	5.98	6	0.86	
Holohalaelurus regani	5.84	42	0.84	
Raja straeleni	5.22	2	0.75	
Maurollicus muelleri	3.15	3150	0.45	
Epigonus telescopus	2.01	42	0.29	
Callionymus sp.	0.73	130	0.10	
Cynoglossus capensis	0.73	10	0.10	
Sympagurus dimorphus	0.05	10	0.01	
S H R I M P S	0.05	14	0.01	
Total	697.55		99.98	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 93
DATE :16/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 31°39,64
start stop duration Lon E 16°22,52
TIME :03:20:46 03:45:05 24.3 (min) Purpose : 3
LOG : 6595.22 6596.34 1.3 Region : 6100
FDEPTH: 0 368 Gear cond.: 0
BDEPTH: 368 368 Validity : 0
Towing dir: 0° wire out : 930 m Speed : 3.3 kn
Sorted : 111 Total catch: 110.58 Catch/hour: 272.93

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 96
DATE :16/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 32°6,80
start stop duration Lon E 16°13,18
TIME :12:30:56 13:01:26 30.5 (min) Purpose : 3
LOG : 6640.16 6641.76 1.6 Region : 6100
FDEPTH: 611 610 Gear cond.: 0
BDEPTH: 611 610 Validity : 0
Towing dir: 0° wire out : 1450 m Speed : 3.1 kn
Sorted : 131 Total catch: 131.40 Catch/hour: 258.40

	weight	numbers	% OF TOT. C	SAMP
Merluccius paradoxus	99.98	69	38.69	331
Lophius vomerinus	36.11	8	13.97	332
Ruvettus pretiosus	31.11	4	12.04	
Histioteuthis miranda	17.38	29	6.73	
Coelorinchus braueri	14.67	366	5.68	
Phosichthys argenteus	11.33	287	4.38	
Malacocephalus laevis	9.52	33	3.68	
Funchalia woodwardi	7.63	673	2.95	
Glyphus marsupialis	5.90	1105	2.28	
Cruriraja parcomaculata	5.59	12	2.16	
Selachophidium guentheri	4.05	37	1.57	
Coelorinchus matamua	3.66	12	1.42	
Etmopterus sculptus	1.81	28	0.70	
Nezumia micronychodon	1.57	98	0.61	
Todarodes angolensis	1.46	2	0.56	
Sea anemone sp	1.46	2	0.56	
Neosopelus macrolepidotus	1.10	6	0.43	
ALEPOCEPHALIDAE	1.06	31	0.41	0
Notacanthus cf sexspinus	0.63	12	0.24	
Myxine capensis	0.55	8	0.21	
Astronesthes sp	0.43	6	0.17	
Helicolenus dactylopterus	0.35	2	0.14	333
Chaceon maritae	0.28	2	0.11	334
Laemonema laureysi	0.28	0	0.11	0
Diretmoides parini	0.24	6	0.09	
Rossia enigmatica	0.20	6	0.08	

Starfish	0.04	8	0.02
PARALEPIDIDAE	0.03	2	0.01
Total	258.40		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 97
 DATE :16/03/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 31°57.78
 start stop duration Lon E 16°5.16
 TIME :15:37:33 16:07:46 30.2 (min)
 LOG : 6651.85 6653.05 1.2
 FDEPTH: 651 651
 BDEPTH: 651 651
 Towing dir: 0° wire out : 1270 m
 Sorted : 79 Total catch: 79.26

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Merluccius paradoxus	35.06	28	336
Coelorinchus acanthiger	30.93	381	
Centrophorus granulosus	21.32	4	
Lophius vomerinus	17.00	4	335
Bathyraxia smithii	14.33	2	
Phosichthys argenteus	6.04	143	
Malacocephalus laevis	5.52	20	
Nezumia micronychodon	4.77	83	
Funchalia woodwardi	4.53	425	
Notacanthus sexspinus	3.45	54	
Selachophidium guentheri	2.22	22	
Ommastrephes bartrami	1.91	2	
Hymenocephalus sp.	1.79	14	
Sebastes capensis	1.31	6	
Neoscopelus macrolepidotus	1.11	78	
Etmopteris spinax	1.11	22	
Plesionika martia	1.07	201	
Rajella leopardus	0.87	10	
Sergia sp.	0.71	153	
Actinoptera sp 3	0.52	2	
Ophichthus serpentinus	0.36	2	
Myxine capensis	0.28	4	
Lycoteuthis lorigera	0.28	8	
Austrosossia enigmatica	0.24	10	
Chaceon maritae	0.20	2	
Ebinania costaecanarie	0.16	4	
Scopelosaurus hamiltoni	0.12	2	
MYCTOPHIDAE	0.04	10	
Pyrosoma	0.04	6	
Hydrolagus africanus	0.04	2	
PARALEPIDIDAE	0.04	2	
Total	157.37		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 98
 DATE :16/03/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 31°48.47
 start stop duration Lon E 16°1.54
 TIME :18:20:23 18:51:00 30.6 (min)
 LOG : 6662.29 6663.77 1.5
 FDEPTH: 565 561
 BDEPTH: 565 561
 Towing dir: 0° wire out : 1270 m
 Sorted : 69 Total catch: 69.13

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Helicolenus dactylopterus	41.79	216	337
Bathyraxia smithii	27.87	4	
Merluccius paradoxus	24.11	25	338
Coelorinchus acanthiger	9.72	280	
Centrophorus granulosus	8.55	2	
Malacocephalus laevis	8.31	35	
Selachophidium guentheri	3.80	33	
Rajella leopardus	2.86	2	
Hydrolagus sp.	1.25	7	
Etmopteris spinax	1.18	16	
Ommastrephes bartrami	0.98	2	
Nezumia micronychodon	0.98	8	
Phosichthys argenteus	0.94	33	
Notacanthus cf sexspinus	0.90	22	
Funchalia woodwardi	0.71	2	
Symbolophorus boops	0.35	45	
Hoplostethus atlanticus	0.31	2	
Uroconger lepturus	0.27	2	
Myxine capensis	0.12	2	
Starfish	0.08	22	
Plesionika martia	0.08	18	
Nezumia milleri	0.08	2	
Epigonon denticulatus	0.08	2	
PARALEPIDIDAE	0.04	2	
Laemonema laureysi	0.04	8	
Paracallionymus costatus	0.04	6	
Rossia enigmatica	0.04	2	
Hymenocephalus sp.	0.02	2	
Total	135.50		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 99
 DATE :17/03/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 31°29.59
 start stop duration Lon E 15°42.69
 TIME :01:24:12 01:54:48 30.6 (min)
 LOG : 6707.34 6708.80 1.5
 FDEPTH: 675 682
 BDEPTH: 675 682
 Towing dir: 0° wire out : 1520 m
 Sorted : 73 Total catch: 73.00

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Coelorinchus braueri	85.22	686	
Nezumia micronychodon	16.71	233	
Merluccius paradoxus	7.84	4	340
Merluccius capensis	6.55	4	339
Coelorinchus simorhynchus	5.18	27	
Sebastes capensis	2.78	8	
Funchalia woodwardi	2.27	425	
Hoplostethus atlanticus	2.12	4	
Etmopteris sp.	1.84	8	
Selachophidium guentheri	1.65	53	
Phosichthys argenteus	1.61	35	
Chauliodus sp.	1.49	55	
Ebinania costaecanarie	1.29	2	
MYCTOPHIDAE	1.25	131	
DIRETMIDAE	1.02	4	
Atolla sp	0.98	245	
S H R I M P S	0.78	235	
Chrysaora fulgida	0.71	2	
Neocyttus sp.	0.55	6	
Histioteuthis sp.	0.55	6	
Notacanthus sexspinus	0.47	10	
Photoneustes sp.	0.39	6	
Paradiplospinus gracilis	0.39	2	
Malacosteus sp.	0.24	22	
Bathypolypus valdiviae	0.20	2	
Xenodermichthys sp.	0.16	6	
Hydrolagus mirabilis, juvenile	0.12	4	
Melanostomias sp.	0.12	2	
MYXINIDAE	0.12	2	
Neonesthes capensis	0.12	4	

Gonostoma sp.	0.08	2	0.05
J E L L Y F I S H	0.08	18	0.05
Howella sp	0.05	2	0.03
Austrosossia enigmatica	0.04	2	0.03
MELAMPHIDAE	0.03	2	0.02
Idiacanthus sp.	0.03	2	0.02
DICERATIIDAE	0.03	2	0.02
Starfish	0.03	8	0.02
Sternoptyx sp.	0.03	6	0.02
UNIDENTIFIED FISH, juvenile	0.02	2	0.02
Lolligo reynaudi	0.02	2	0.01
NOTOSUIDAE	0.01	2	0.01
Total	143.14		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 100
 DATE :17/03/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 31°29.11
 start stop duration Lon E 15°55.32
 TIME :04:06:53 04:37:51 31.0 (min)
 LOG : 6723.49 6725.00 1.5
 FDEPTH: 526 526
 BDEPTH: 526 526
 Towing dir: 0° wire out : 1270 m
 Sorted : 221 Total catch: 221.14

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Merluccius paradoxus	319.19	399	341
Helicolenus dactylopterus	47.52	209	342
Coelorinchus braueri	21.09	221	
Centrophorus squamosus	12.60	2	
Selachophidium guentheri	5.97	74	
Hydrolagus sp.	4.77	6	
Nezumia micronychodon	3.22	60	
Malacocephalus laevis	3.02	12	
Kuronezumia leonis	2.40	6	
Cruriraja sp.	2.05	2	
Coelorinchus matamua	1.43	8	
Notacanthus sexspinus	1.32	21	
Hymenocephalus sp.	0.70	14	
Phosichthys argenteus	0.70	19	
Funchalia woodwardi	0.66	79	
Plesionika martia	0.43	97	
Bassanago albescens	0.38	2	
Bathypolypus valdiviae	0.35	2	
Hoplostethus atlanticus	0.23	2	
Paracallionymus costatus	0.23	37	
Alloctytus verrucosus	0.12	2	
Bathyraxia smithii	0.08	2	
MYCTOPHIDAE	0.04	21	
Physiculus capensis	0.04	2	
Argyroleucus aculeatus	0.02	2	
Stereomastis sculpata	0.01	2	
Starfish	0.00	6	
Total	428.56		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 101
 DATE :17/03/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 31°21.68
 start stop duration Lon E 15°48.33
 TIME :08:58:31 08:55:57 31.4 (min)
 LOG : 6736.48 6737.65 1.2
 FDEPTH: 566 566
 BDEPTH: 566 566
 Towing dir: 0° wire out : 1100 m
 Sorted : 90 Total catch: 90.10

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Coelorinchus braueri	51.15	590	
Merluccius paradoxus	36.87	36	343
Centrophorus granulosus	13.03	2	
Histioteuthis miranda	10.27	17	
Nezumia micronychodon	8.21	193	
S H R I M P S	6.26	1565	
Phosichthys argenteus	4.50	80	
Coelorinchus simorhynchus	4.39	13	
DIRETMIDAE	4.32	90	
Etmopteris sp.	3.59	57	
Hydrolagus mirabilis	3.24	8	
Unidentified	3.05	458	
Funchalia woodwardi	2.67	174	
Selachophidium guentheri	2.48	25	
Helicolenus dactylopterus	2.48	8	
Rajella dissimilis	2.44	2	
MYCTOPHIDAE	1.95	162	
Ommastrephes bartrami	1.60	2	
Diretmoides parini	1.56	2	
Melanostomias sp.	0.99	23	
Howella sp.	0.84	53	
Unidentified	0.80	4	
Notacanthus sexspinus	0.73	17	
Hoplostethus atlanticus	0.65	4	
Malacocephalus laevis	0.39	4	
Xenodermichthys copei	0.36	17	
Echiostoma barbartum	0.31	4	
Starfish	0.31	74	
Myxine capensis	0.29	2	
Neoscopelus sp.	0.23	6	
Neocyttus rhomboidalis	0.23	2	
Aplatophis chauliodus	0.23	8	
Stomias sp.	0.22	36	
Ebinania costaecanarie	0.19	2	
Unidentified	0.19	2	
Idiacanthus atlanticus	0.15	4	
NEOSCOPELIDAE	0.12	4	
Neonesthes sp.	0.11	4	
NEMICHTHYIDAE	0.10	4	
Rosenblattia robusta	0.08	2	
Gonostoma sp.	0.08	2	
NOMEIDAE	0.04	2	
Atolla sp	0.04	10	
Scopelosaurus ahlstromi	0.04	2	
Stomias sp.	0.03	2	
PARALEPIDIDAE	0.02	8	
Sternoptyx sp.	0.02	6	
Stereomastis sculpata	0.02	4	
DICERATIIDAE	0.02	2	
OREOSOMATIDAE	0.01	2	
DICERATIIDAE	0.01	2	
Total	171.94		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 102
 DATE :17/03/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 31°13.21
 start stop duration Lon E 15°52.08
 TIME :11:03:35 11:35:03 31.5 (min)
 LOG : 6747.54 6749.14 1.6
 FDEPTH: 486 485
 BDEPTH: 486 485
 Towing dir: 0° wire out : 1270 m
 Sorted : 238 Total catch: 237.67

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Merluccius paradoxus	272.98	379	60.24

Genypterus capensis	42.40	15	9.36	
Unidentified	25.85	13	5.71	
Coelorinchus simorhynchus	20.40	305	4.50	
Lophius vomerinus	15.94	4	3.52	
Malacocephalus laevis	14.87	59	3.28	
Helicolenus dactylopterus	12.13	59	2.68	
Ruvettus pretiosus	8.58	2	1.89	
DIAGENIDAE	7.89	311	1.74	
Hydrolagus mirabilis	6.29	8	1.39	
Selachophidium guentheri	5.76	67	1.27	
Starfish	5.11	957	1.13	
Bathyrcongonger vicinus	3.13	10	0.69	
Coelorinchus braueri	2.94	200	0.65	
Phosichthys argenteus	1.37	46	0.30	
Notacanthus cf sexspinus	1.18	19	0.26	
S H R I M P S	1.11	166	0.24	
Paracallionymus costatus	0.61	97	0.13	
Sea anemone sp	0.61	6	0.13	
Beryx splendens	0.57	4	0.13	
Coelorinchus matamua	0.46	15	0.10	
Austrosossia enigmatica	0.38	13	0.08	
Nezumia micronychodon	0.38	17	0.08	
Myxine capensis	0.34	6	0.08	
Lycoteuthis lorigera	0.31	6	0.07	
Hymenocephalus sp	0.29	31	0.06	
Stereomastis sculpta	0.23	51	0.05	
Unidentified	0.16	2	0.03	
G A S T R O P O D S	0.15	6	0.03	
PORIFERA (Sponges)	0.11	2	0.03	
Chaceon maritae	0.08	6	0.02	
MYCTOPHIDAE	0.08	13	0.02	
Howella sp.	0.08	4	0.02	
Electrona risso	0.07	8	0.02	
Cryptosaras couesii	0.06	2	0.01	
DIRETMIDAE	0.05	2	0.01	
Xenodermichthys copei	0.04	2	0.01	
Ebinania costaeacanarie	0.04	2	0.01	
PAGUROIDEA	0.04	4	0.01	
Rochinia sp.	0.03	6	0.01	
Idiacanthus sp.	0.02	2	0.00	
GALATHEIDAE	0.02	6	0.00	
MYCTOPHIDAE	0.01	2	0.00	0
Total	453.14		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 103
DATE :17/03/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 31°3,66 Lon E 15°57,88
TIME :13:50:59 14:22:44 31.8 (min) Purpose : 3
LOG : 6761.09 6762.47 1.4 Region : 6100
FDEPTH: 355 354 Gear cond.: 0
BDEPTH: 355 354 Validity : 0
Towing dir: 0° wire out : 720 m Speed : 2.6 kn
Sorted : 257 Total catch: 430.00 Catch/hour: 812.60

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Coelorinchus matamua	198.37 1782	24.41	
Epigonus pandionis	147.94 2774	18.21	
Merluccius paradoxus	114.32 306	14.07	348
Helicolenus dactylopterus	103.13 909	12.69	346
Lophius vomerinus	78.05 45	9.60	345
Scyllorhinus capensis	44.74 140	5.51	
Loligo reynaudi	43.67 340	5.37	
Lepidopus caudatus	23.64 23	2.91	
Holohalaelurus regani	14.41 45	1.77	
PARAPAGURIDEA	9.67 2071	1.19	
Genypterus capensis	8.66 11	1.07	347
Starfish	4.99 11	0.61	
Zeus capensis	4.93 8	0.61	
Octopus vulgaris	4.68 4	0.58	
PORIFERA (Sponges)	3.48 8	0.43	
Paracallionymus costatus	3.03 378	0.37	
Starfish	2.02 274	0.25	0
Hoplostethus atlanticus	0.89 23	0.11	
Cyttus traversi	0.51 4	0.06	
Spatangus capensis	0.49 4	0.06	
Beryx splendens	0.38 8	0.05	
Austrosossia enigmatica	0.25 21	0.03	
PORIFERA (Sponges)	0.06 4	0.01	0
Sepia australis	0.06 11	0.01	
Champsodon capensis	0.03 4	0.00	
Exodromidia sp.	0.03 4	0.00	
TURBINELLIDAE (=VASIDAE)	0.02 4	0.00	
Rochinia sp.	0.01 4	0.00	
Total	812.46	99.98	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 104
DATE :17/03/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 31°19,81 Lon E 16°16,31
TIME :18:29:36 18:59:52 30.3 (min) Purpose : 3
LOG : 6785.21 6786.84 1.6 Region : 6100
FDEPTH: 431 431 Gear cond.: 0
BDEPTH: 431 431 Validity : 0
Towing dir: 0° wire out : 1050 m Speed : 3.2 kn
Sorted : 145 Total catch: 145.02 Catch/hour: 287.54

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Merluccius paradoxus	162.95 347	56.67	352
Helicolenus dactylopterus	75.98 188	26.42	349
Coelorinchus simorhynchus	10.83 8	3.77	
Coelorinchus matamua	7.65 85	2.66	
Genypterus capensis	6.54 4	2.28	350
Bassanago albescens	5.31 4	1.85	
Lophius vomerinus	4.80 4	1.67	351
Symbolophorus boops	3.89 242	1.35	
Rajella dissimilis	2.66 4	0.92	
Hydrolagus sp.	2.10 2	0.73	
Uroconger lepturus	1.35 2	0.47	
Notacanthus sexspinus	1.03 14	0.36	
PTERASTERIDAE	0.65 2	0.23	
Paracallionymus costatus	0.28 58	0.10	
Pelagia noctiluca	0.28 14	0.10	
Phosichthys argenteus	0.24 6	0.08	
Hoplostethus atlanticus	0.20 20	0.07	
Sympagurus dimorphus	0.18 8	0.06	
Myxine capensis	0.16 2	0.06	
Physiculus capensis	0.12 8	0.04	
Lycoteuthis lorigera	0.12 4	0.04	
Starfish	0.08 20	0.03	
Stereomastis sculpta	0.06 10	0.02	
Rossia enigmatica	0.04 2	0.01	
Tripterygion gilchristi	0.04 4	0.01	
TURBINELLIDAE (=VASIDAE)	0.02 2	0.01	
Total	287.54	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 105
DATE :17/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 31°11,58 Lon E 16°27,36
TIME :23:01:43 23:25:12 23.5 (min) Purpose : 3
LOG : 6800.98 6802.12 1.1 Region : 6100
FDEPTH: 315 314 Gear cond.: 0
BDEPTH: 315 314 Validity : 0

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Merluccius paradoxus	191.90 3427	38.45	375
Merluccius capensis	108.99 282	21.84	376
Helicolenus dactylopterus	60.92 3654	12.21	374
MYCTOPHIDAE	26.51 13254	5.31	

Towing dir: 0° wire out : 775 m Speed : 2.9 kn
Sorted : 121 Total catch: 230.00 Catch/hour: 586.24

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Merluccius paradoxus	329.78 2699	56.25	354
Zeus capensis	115.03 252	19.62	
Merluccius capensis	84.41 46	14.40	356
Coelorinchus matamua	18.32 214	3.12	
Genypterus capensis	16.48 20	2.81	355
Helicolenus dactylopterus	8.43 84	1.44	353
Holohalaelurus regani	7.37 15	1.26	
Lepidopus caudatus	1.94 5	0.33	
Maurolicus muelleri	1.55 1165	0.26	
Trachurus capensis	0.97 5	0.17	357
Todaropsis eblanae	0.78 10	0.13	
Paracallionymus costatus	0.58 102	0.10	
Sepia australis	0.39 10	0.07	
Chlorophthalmus agassizi	0.22 5	0.04	
MYCTOPHIDAE	0.02 5	0.00	
PARALEPIDIDAE	0.01 5	0.00	
Total	586.27	100.01	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 106
DATE :18/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 31°3,69 Lon E 16°39,15
TIME :04:42:52 05:13:05 30.2 (min) Purpose : 3
LOG : 6817.60 6819.02 1.4 Region : 6100
FDEPTH: 254 254 Gear cond.: 0
BDEPTH: 254 254 Validity : 0
Towing dir: 0° wire out : 750 m Speed : 2.8 kn
Sorted : 250 Total catch: 250.06 Catch/hour: 496.64

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Zeus capensis	135.69 651	27.32	
Merluccius capensis	89.73 75	18.07	360
Merluccius paradoxus	63.67 763	12.82	361
Helicolenus dactylopterus	56.19 681	11.31	359
Coelorinchus simorhynchus	22.80 264	4.59	
Callorhynchus capensis	13.19 4	2.66	
Octopus vulgaris	13.15 2	2.65	
Lophius vomerinus	11.52 14	2.32	363
Etrumeus whiteheadi	11.40 143	2.30	362
Squalus mitsukurii	11.32 4	2.28	
Cynoglossus capensis	10.53 137	2.12	
Genypterus capensis	9.61 14	1.94	364
Coelorinchus matamua	8.46 105	1.70	
Chelidomichthys queketti	7.15 32	1.44	
Trachurus capensis	6.40 40	1.29	358
Holohalaelurus regani	6.00 24	1.21	
Leucoraja wallacei	5.60 2	1.13	
Paracallionymus costatus	4.65 435	0.94	
Merluccius paradoxus	3.14 588	0.63	365
Todaropsis eblanae	2.66 50	0.54	
Phormosoma sp.	0.68 6	0.14	
Sympagurus dimorphus	0.68 85	0.14	
Mustelus palumbes	0.54 2	0.11	
Congioodus spinifer	0.42 2	0.08	
Austrosossia enigmatica	0.40 20	0.08	
J E L V F S H	0.28 0	0.06	
Rossia enigmatica	0.20 83	0.04	
NEMICHTHYIDAE	0.12 2	0.02	
Spatangus capensis	0.12 4	0.02	
Afrololigo mercatoris	0.12 36	0.02	
Chlorophthalmus agassizi	0.10 2	0.02	
Champsodon capensis	0.06 4	0.01	
Pterygosquilla capensis	0.04 6	0.01	
Sepia hieronis	0.02 4	0.00	
Sipunculida	0.01 2	0.00	
Exodromidia sp.	0.01 2	0.00	
ISOPODS	0.01 4	0.00	
Starfish	0.01 4	0.00	
Total	496.64	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 107
DATE :18/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 31°0,09 Lon E 16°51,83
TIME :06:54:57 07:26:54 32.0 (min) Purpose : 3
LOG : 6830.25 6831.77 1.5 Region : 6100
FDEPTH: 226 225 Gear cond.: 0
BDEPTH: 226 225 Validity : 0
Towing dir: 0° wire out : 580 m Speed : 2.8 kn
Sorted : 126 Total catch: 390.00 Catch/hour: 732.17

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Merluccius paradoxus	365.46 3920	49.23	366
Merluccius capensis	188.84 287	25.79	367
Helicolenus dactylopterus	42.53 1185	5.81	368
Paracallionymus costatus	17.81 1483	2.43	
Holohalaelurus regani	16.87 66	2.30	
Lophius vomerinus	15.11 36	2.06	370
Chelidomichthys capensis	14.64 19	2.06	
Trachurus capensis	14.53 101	1.98	369
Aequorea forskalea	8.43 30	1.15	
Thyrssites atun	8.20 8	1.12	
Cynoglossus capensis	6.80 77	0.93	
Afrololigo mercatoris	6.44 240	0.88	
Loligo vulgaris	6.33 8	0.86	
Maurolicus muelleri	5.27 2636	0.72	
Callorhynchus capensis	3.42 2	0.47	
Coelorinchus matamua	3.28 36	0.45	
Todaropsis eblanae	3.16 71	0.43	
Merluccius paradoxus	3.16 124	0.43	373
Genypterus capensis	1.29 8	0.18	371
Austrosossia enigmatica	1.06 66	0.14	
Etrumeus whiteheadi	1.06 13	0.14	372
Coelorinchus simorhynchus	0.94 36	0.13	
Exodromidia sp.	0.70 54	0.10	
Ophichthus serpentinus	0.59 8	0.08	
Zeus capensis	0.47 8	0.06	
Sepia australis	0.23 19	0.03	
MYCTOPHIDAE	0.23 47	0.03	
Pterygosquilla capensis	0.23 30	0.03	
Total	732.08	99.99	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 108
DATE :18/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 30°55,56 Lon E 17°2,98
TIME :08:46:50 09:17:30 30.7 (min) Purpose : 3
LOG : 6841.37 6842.83 1.5 Region : 6100
FDEPTH: 202 201 Gear cond.: 0
BDEPTH: 202 201 Validity : 0
Towing dir: 0° wire out : 580 m Speed : 2.9 kn
Sorted : 93 Total catch: 255.00 Catch/hour: 499.02

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Merluccius paradoxus	191.90 3427	38.45	375
Merluccius capensis	108.99 282	21.84	376
Helicolenus dactylopterus	60.92 3654	12.21	374
MYCTOPHIDAE	26.51 13254	5.31	

Brama brama	24.20	12	4.85
Paracallionymus costatus	17.05	1703	3.42
Holohalaelurus regani	11.15	170	2.23
Chelidonichthys capensis	10.10	22	2.02
Callorhinchus capensis	9.16	6	1.84
Cynoglossus capensis	8.10	159	1.62
Aequorea forskalea	5.26	190	1.05
PHOSICHTHYDAE	4.52	3393	0.91
Lophius vomerinus	4.00	43	0.80
Coelorhynchus braueri	3.89	205	0.78
Trachurus capensis	2.84	18	0.57
Sepia australis	2.63	174	0.53
Merluccius paradoxus	2.00	133	0.40
PORIFERA (Sponges)	1.37	22	0.27
Leucoraja wallacei	1.29	2	0.26
Chelidonichthys queketti	1.16	6	0.23
Todaropsis eblanae	0.53	18	0.11
PAGUROIDEA	0.42	37	0.08
Lepidopus caudatus	0.32	12	0.06
Afrololigo mercatoris	0.32	68	0.06
Sea urchin	0.21	6	0.04
Squilla sp.	0.21	18	0.04
Total	499.05		100.01

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 109
 DATE :18/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 30°46,08
 start stop duration Lon E 17°16,80
 TIME :12:27:29 12:58:06 30.6 (min) Purpose : 3
 LOG : 6858.56 6860.17 1.6 Region : 6100
 FDEPTH: 143 140 Gear cond.: 0
 BDEPTH: 143 140 Validity : 0
 Towing dir: 0° wire out : 360 m Speed : 3.2 kn
 Sorted : 55 Total catch: 55.24 Catch/hour: 108.24

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
J E L L Y F I S H	weight numbers		
Thyrssites atun	26.73 1082	24.69	
Merluccius capensis	21.63 8	19.99	
Brama brama	11.95 39	11.04	381
Callorhinchus capensis	10.54 4	9.74	
MYCTOPHIDAE	9.95 6	9.20	
Merluccius paradoxus	7.52 2257	6.95	380
Chelidonichthys capensis	6.43 131	5.94	
Todaropsis eblanae	3.33 6	3.08	
Oratosquilla oratoria	2.51 61	2.32	
Sepia australis	2.31 133	2.14	
Maurolicus sp.	1.96 69	1.81	
Afrololigo mercatoris	1.84 2763	1.70	
Genypterus capensis	0.51 153	0.47	382
Cynoglossus capensis	0.27 2	0.25	
Sufflogobius bibarbatatus	0.24 2	0.22	
Lophius vomerinus	0.24 74	0.22	
Holohalaelurus regani	0.12 2	0.11	
Paracallionymus costatus	0.08 2	0.07	
Lepidopus caudatus	0.04 6	0.04	
C R A B S	0.04 6	0.04	
Total	108.24	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 110
 DATE :18/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 30°41,43
 start stop duration Lon E 17°25,58
 TIME :15:37:43 16:07:46 30.1 (min) Purpose : 3
 LOG : 6871.81 6873.27 1.5 Region : 6100
 FDEPTH: 99 97 Gear cond.: 0
 BDEPTH: 99 97 Validity : 0
 Towing dir: 0° wire out : 280 m Speed : 2.9 kn
 Sorted : 54 Total catch: 850.00 Catch/hour: 1696.61

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
Aequorea forskalea	965.29 25383	56.90	
Merluccius capensis	447.64 11192	26.38	384
MYCTOPHIDAE	117.54 35261	6.93	
Chelidonichthys capensis	71.27 469	4.20	
Sufflogobius bibarbatatus	31.89 5972	1.88	
Afrololigo mercatoris	20.63 6190	1.22	
Callorhinchus capensis	14.05 18	0.83	
Pasiptae sp.	7.50 938	0.44	
Trachurus capensis	7.50 345	0.44	383
Pterygosquilla capensis	5.00 220	0.29	
Cynoglossus capensis	2.50 32	0.15	
Sepia australis	1.88 64	0.11	0
Todaropsis eblanae	1.88 158	0.11	
Jasusalandii	0.84 8	0.05	
Lepidopus caudatus	0.63 64	0.04	
Paracallionymus costatus	0.63 32	0.04	
Total	1696.66	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 111
 DATE :19/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 30°24,33
 start stop duration Lon E 17°14,52
 TIME :04:35:38 05:05:42 30.1 (min) Purpose : 3
 LOG : 6899.34 6900.77 1.4 Region : 6100
 FDEPTH: 122 121 Gear cond.: 0
 BDEPTH: 122 121 Validity : 0
 Towing dir: 0° wire out : 380 m Speed : 2.9 kn
 Sorted : 13 Total catch: 149.19 Catch/hour: 297.69

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
Callorhinchus capensis	89.99 178	30.23	
Merluccius capensis	63.49 106	21.33	386
Pasiptae sp.	53.66 53668	18.03	
Chelidonichthys capensis	27.26 70	9.16	
Aequorea forskalea	25.12 698	8.44	
Sufflogobius bibarbatatus	10.14 3043	3.41	
Genypterus capensis	9.38 14	3.15	385
MYCTOPHIDAE	7.33 2201	2.46	
Merluccius paradoxus	5.31 60	1.78	387
Austroglossus microlepis	2.12 12	0.71	389
Todaropsis eblanae	1.40 94	0.47	
Pterygosquilla capensis	0.66 80	0.22	
Afrololigo mercatoris	0.62 110	0.21	
PORIFERA (Sponges)	0.52 4	0.17	
Sepia australis	0.31 40	0.11	
Lepidopus caudatus	0.20 16	0.07	
VOLUTIDAE	0.08 8	0.03	
Etrumeus whiteheadi	0.04 2	0.01	
Trachurus capensis	0.04 2	0.01	388
ANTHOZOA (Sea anemones)	0.02 2	0.01	
Total	297.69	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 112
 DATE :19/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 30°29,17
 start stop duration Lon E 17°4,21
 TIME :06:50:51 07:21:41 30.8 (min) Purpose : 3
 LOG : 6911.91 6913.31 1.4 Region : 6100
 FDEPTH: 154 157 Gear cond.: 0
 BDEPTH: 154 157 Validity : 0
 Towing dir: 0° wire out : 390 m Speed : 2.7 kn

Sorted : 35 Total catch: 126.14 Catch/hour: 245.41

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
Aequorea forskalea	71.79 2031	29.25	
Merluccius paradoxus	47.78 656	19.47	395
PORIFERA (Sponges)	33.15 82	13.51	
Etrumeus whiteheadi	31.05 535	12.65	391
Merluccius capensis	18.29 45	7.45	390
Helicolenus dactylopterus	7.79 687	3.17	
MYCTOPHIDAE	6.86 2572	2.80	
Pterygosquilla capensis	4.73 506	1.93	
Callorhinchus capensis	4.63 4	1.89	
Maurolicus muelleri	4.04 4035	1.64	
Chelidonichthys capensis	3.77 10	1.54	
Merluccius paradoxus	3.66 304	1.49	396
Todaropsis eblanae	2.48 89	1.01	
Sepia australis	2.37 89	0.96	
Plastic	0.62 2	0.25	
Afrololigo mercatoris	0.58 864	0.24	
Brissidae	0.41 19	0.17	
Exodromidia sp.	0.35 31	0.14	
Trachurus capensis	0.31 2	0.13	392
Lepidopus caudatus	0.27 16	0.11	
Lophius vomerinus	0.19 2	0.08	393
Paracallionymus costatus	0.17 23	0.07	
Pelagia noctiluca	0.06 10	0.02	
Bathyteuthis abyssicola	0.04 2	0.02	
RANELLIDAE (=CYMATIIDAE)	0.02 2	0.01	
Total	245.42	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 113
 DATE :19/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 30°36,56
 start stop duration Lon E 16°53,88
 TIME :09:02:03 09:33:07 31.1 (min) Purpose : 3
 LOG : 6923.18 6925.10 1.4 Region : 6100
 FDEPTH: 188 192 Gear cond.: 0
 BDEPTH: 188 192 Validity : 0
 Towing dir: 0° wire out : 460 m Speed : 2.6 kn
 Sorted : 120 Total catch: 300.00 Catch/hour: 579.52

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
Merluccius paradoxus	157.23 1708	27.13	397
Merluccius capensis	154.32 243	26.63	398
PORIFERA (Sponges)	88.41 122	15.26	
Helicolenus dactylopterus	44.88 3545	7.74	399
J E L L Y F I S H	32.47 936	5.60	
Etrumeus whiteheadi	25.69 369	4.43	401
Loligo reynaudi	22.30 539	3.85	
Lophius vomerinus	17.16 44	2.96	402
Brama brama	10.28 6	1.77	
Paracallionymus costatus	7.85 732	1.36	
Sepia australis	6.11 234	1.05	
Emmelichthys nitidus nitidus	2.62 6	0.45	
Holohalaelurus regani	1.94 35	0.33	
Trachurus capensis	1.65 12	0.28	
Merluccius paradoxus	1.36 99	0.23	404
Congiopodus spinifer	1.26 12	0.22	
Cynoglossus capensis	1.26 25	0.22	
Genypterus capensis	0.97 6	0.17	
Afrololigo mercatoris	0.48 189	0.08	
Maurolicus sp.	0.39 292	0.07	
Coelorhynchus matamua	0.20 12	0.03	
CIDARIDAE	0.20 6	0.03	
Lepidopus caudatus	0.20 6	0.03	
C R A B S	0.10 21	0.02	
Austrorossia enigmatica	0.10 12	0.02	
Zeus capensis	0.05 6	0.01	
Total	579.46	99.99	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 114
 DATE :19/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 30°43,61
 start stop duration Lon E 16°41,90
 TIME :11:30:25 12:01:07 30.7 (min) Purpose : 3
 LOG : 6936.73 6938.15 1.4 Region : 6100
 FDEPTH: 230 233 Gear cond.: 0
 BDEPTH: 230 233 Validity : 0
 Towing dir: 0° wire out : 555 m Speed : 2.8 kn
 Sorted : 127 Total catch: 290.00 Catch/hour: 566.78

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
Merluccius paradoxus	428.38 55	75.58	406
Helicolenus dactylopterus	27.07 967	4.78	407
Lophius vomerinus	26.89 63	4.74	408
Merluccius capensis	22.71 31	4.01	405
Callorhinchus capensis	14.07 6	2.48	
Callionymus sp.	11.22 762	1.98	
PORIFERA (Sponges)	5.88 27	1.04	
MYCTOPHIDAE	5.34 2672	0.94	
Todaropsis eblanae	5.17 76	0.91	
Maurolicus sp.	4.90 3674	0.86	
Coelorhynchus matamua	4.19 125	0.74	
Cynoglossus capensis	3.65 68	0.64	
Holohalaelurus regani	3.56 27	0.63	
Etrumeus whiteheadi	2.41 27	0.42	409
Afrololigo mercatoris	0.45 166	0.08	
Sardinops sagax	0.36 6	0.06	
Sepia australis	0.27 10	0.05	
Rossia enigmatica	0.27 14	0.05	
Merluccius paradoxus, juvenile	0.04 10	0.01	
Starfish	0.03 6	0.00	
Total	566.84	100.01	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 115
 DATE :19/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 30°50,49
 start stop duration Lon E 16°23,74
 TIME :14:37:33 15:07:36 30.1 (min) Purpose : 3
 LOG : 6955.62 6956.94 1.3 Region : 6100
 FDEPTH: 272 274 Gear cond.: 0
 BDEPTH: 272 274 Validity : 0
 Towing dir: 0° wire out : 670 m Speed : 2.6 kn
 Sorted : 250 Total catch: 249.83 Catch/hour: 498.65

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
Lepidopus caudatus	158.36 3210	31.76	
Helicolenus dactylopterus	66.99 816	13.43	410
Zeus capensis	47.58 317	9.54	
Squalus mitsukurii	35.77 22	7.17	
Brama brama	32.97 20	6.61	413
Merluccius capensis	30.82 16	6.18	415
Merluccius paradoxus	29.50 232	5.92	416
Coelorhynchus simorhynchus	24.47 238	4.91	
Coelorhynchus matamua	17.29 174	3.47	
Malacocephalus laevis	13.69 150	2.75	
Todaropsis eblanae	13.37 170	2.68	
Callorhinchus capensis	6.83 2	1.37	411
Genypterus capensis	4.15 6	0.83	412
Lophius vomerinus	3.11 4	0.62	
Chelidonichthys capensis	3.11 2	0.62	
Chelidonichthys queketti	2.83 20	0.57	

Holohalaelurus regani 2.75 10 0.55
 Paracallionymus costatus 2.36 208 0.47
 Trachurus capensis 0.96 2 0.29
 J E L L Y F I S H 0.84 0 0.17
 ANTHOZOA (Sea anemones) 0.58 4 0.12
 Merluccius paradoxus 0.16 16 0.03
 Sepia australis 0.06 2 0.01
 Chlorophthalmus agassizi 0.02 2 0.00
 Exodromidia sp. 0.02 2 0.00
 Starfish 0.02 2 0.00
 Mursia cristimanus 0.02 2 0.00

Total 498.65 100.00

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 116
 DATE :19/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 30°54.26
 start stop duration Lon E 15°30.98
 TIME :23:03:28 23:34:30 31.0 (min) Purpose : 3
 LOG : 7016.10 7017.75 1.7 Region : 6100
 FDEPTH: 543 541 Gear cond.: 0
 BDEPTH: 543 541 Validity : 0
 Towing dir: 0° Wire out : 1310 m Speed : 3.2 kn
 Sorted : 51 Total catch: 50.73 Catch/hour: 98.13

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius paradoxus	54.62	56	55.66	418
Helicolenus dactylopterus	6.62	27	6.74	417
Coelorinchus braueri	6.15	184	6.27	
ONYCHOTEUTHIDAE	6.00	4	6.11	
S H R I M P S	4.49	373	4.57	
Selachophidium guentheri	3.64	39	3.71	
Malacocephalus laevis	3.09	10	3.15	
Hydrolagus mirabilis	2.86	4	2.92	
Zeus capensis	2.48	10	2.52	
Nezumia micronychodon	1.97	39	2.01	
Macrastrephes bartramii	1.82	7	1.85	
Lycoteuthis lorigera	1.66	27	1.70	
Congiopodus spinifer	0.43	4	0.43	
Lithodes ferox	0.39	2	0.39	
C R A B S	0.39	4	0.39	
Phosichthys argenteus	0.27	12	0.28	
Notacanthus sexspinis	0.25	8	0.26	
Todaropsis eblanae	0.23	2	0.24	
J E L L Y F I S H	0.19	4	0.20	
Chauliodus sp.	0.15	2	0.16	
Hoplostethus atlanticus	0.15	2	0.16	
Etmoreptherus sp.	0.12	2	0.12	
Starfish	0.04	19	0.04	
MYCTOPHIDAE	0.04	4	0.04	
MORIDAE	0.04	0	0.04	
Holohalaelurus regani	0.02	2	0.02	
Bristle worms (straws)	0.02	2	0.02	
CORAL	0.01	2	0.01	
Total	98.13		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 117
 DATE :20/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 30°53.56
 start stop duration Lon E 15°32.98
 TIME :00:27:35 00:57:47 30.2 (min) Purpose : 3
 LOG : 7020.75 7022.30 1.6 Region : 6100
 FDEPTH: 464 444 Gear cond.: 0
 BDEPTH: 464 444 Validity : 0
 Towing dir: 0° Wire out : 1120 m Speed : 3.1 kn
 Sorted : 68 Total catch: 67.72 Catch/hour: 134.54

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius paradoxus	78.91	1766	58.65	419
Genypterus capensis	20.98	4	15.59	
Helicolenus dactylopterus	10.37	34	7.71	420
Centroscymnus sp.	8.38	2	6.23	
Cruriraja hullei	7.91	6	5.88	
Lycoteuthis lorigera	2.42	46	1.80	
Coelorinchus braueri	1.39	36	1.03	
Coelorinchus matamua	1.23	16	0.92	
OPHICHTHIDAE	0.68	2	0.50	
Epigonus sp.	0.64	38	0.47	
Tripterophycis gilchristi	0.40	20	0.30	
Physiculus capensis	0.20	8	0.15	
MYCTOPHIDAE	0.20	12	0.15	
Notacanthus sexspinis	0.20	4	0.15	
Hymenocephalus sp.	0.16	12	0.12	
Oratosquilla oratoria	0.16	50	0.12	
Nezumia micronychodon	0.12	4	0.09	0
Austrorossia enigmatica	0.08	4	0.06	
Stereomastis sculpata	0.04	10	0.03	
Synchropus sp.	0.04	4	0.03	
Starfish	0.04	16	0.03	
Total	134.54		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 118
 DATE :20/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 30°40.81
 start stop duration Lon E 16°3.17
 TIME :07:36:19 08:06:33 30.2 (min) Purpose : 3
 LOG : 7053.89 7055.28 1.4 Region : 6100
 FDEPTH: 207 208 Gear cond.: 0
 BDEPTH: 207 208 Validity : 0
 Towing dir: 0° Wire out : 540 m Speed : 2.7 kn
 Sorted : 43 Total catch: 42.65 Catch/hour: 84.64

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius capensis	32.27	22	38.13	424
Helicolenus dactylopterus	10.84	141	12.80	422
Zeus capensis	10.20	46	12.05	
Lophius vomerinus	6.79	8	8.02	421
Squalus megalops	5.56	8	6.57	
Emmelichthys nitidus nitidus	5.16	52	6.10	
Cruriraja hullei	3.97	4	4.69	
Todaropsis eblanae	2.38	56	3.52	
Helicolenus dactylopterus	2.46	10	2.91	
Congiopodus spinifer	1.79	6	2.11	
Sepia australis	0.52	40	0.61	
Leucoraja wallacei	0.48	2	0.56	
Loligo feynaudi	0.36	2	0.42	
Cynoglossus capensis	0.28	2	0.33	
Scyliorhinus capensis	0.20	4	0.23	
Pelagia noctiluca	0.16	4	0.19	
Ophichthus serpentinus	0.16	2	0.19	
Starfish	0.11	34	0.13	
Paracallionymus costatus	0.08	8	0.09	
Spatangus capensis	0.08	2	0.09	
J E L L Y F I S H	0.08	2	0.09	
Monolele microstoma	0.08	8	0.09	
Stereomastis sculpata	0.03	6	0.04	
Sympagurus dimorphus	0.02	2	0.02	
Trachurus capensis	0.01	4	0.01	423
ISOPODS	0.00	4	0.01	
Total	84.64		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 119

DATE :20/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 30°32.27
 start stop duration Lon E 16°18.05
 TIME :10:53:25 11:23:35 30.2 (min) Purpose : 3
 LOG : 7073.08 7074.58 1.5 Region : 6100
 FDEPTH: 244 246 Gear cond.: 0
 BDEPTH: 244 246 Validity : 0
 Towing dir: 0° Wire out : 610 m Speed : 3.0 kn
 Sorted : 143 Total catch: 310.00 Catch/hour: 616.71

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius paradoxus	207.23	2409	33.60	426
Merluccius capensis	192.86	151	31.27	425
Lepidopus caudatus	75.96	117	12.32	
Zeus capensis	47.31	306	7.67	
Helicolenus dactylopterus	22.37	318	3.63	427
Todaropsis eblanae	21.94	294	3.56	
Lophius vomerinus	14.02	18	2.27	428
Coelorinchus matamua	11.79	109	1.91	
Rajella leopardus	8.35	6	1.35	
Helicolenus dactylopterus	6.45	6	1.05	
Squalus megalops	3.96	6	0.64	
Helicolenus dactylopterus	1.38	10	0.22	
Paracallionymus costatus	0.95	88	0.15	
Congiopodus spinifer	0.86	10	0.14	
Trachurus capensis	0.60	6	0.10	
Merluccius capensis	0.26	32	0.04	429
Austrorossia enigmatica	0.22	10	0.04	
Actiniaria sp 3	0.09	18	0.01	
Sepia australis	0.04	6	0.01	
Affrololigo mercatoris	0.04	18	0.01	
Total	616.66		99.99	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 120
 DATE :20/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 30°25.46
 start stop duration Lon E 16°33.91
 TIME :14:00:17 14:30:09 29.9 (min) Purpose : 3
 LOG : 7090.68 7092.03 1.4 Region : 6100
 FDEPTH: 212 211 Gear cond.: 0
 BDEPTH: 212 211 Validity : 0
 Towing dir: 0° Wire out : 580 m Speed : 2.7 kn
 Sorted : 107 Total catch: 270.00 Catch/hour: 542.53

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius paradoxus	195.44	2273	36.02	431
Merluccius capensis	108.04	109	19.91	430
Etrumeus whiteheadi	54.78	74	10.10	435
Helicolenus dactylopterus	50.41	1455	9.29	433
Helicolenus dactylopterus	24.90	36	4.59	
J E L L Y F I S H	19.31	301	3.56	
Todaropsis eblanae	15.75	249	2.90	
Holohalaelurus regani	12.91	98	2.38	
Callorhynchus capensis	10.27	6	1.89	
Brama brama	9.66	6	1.78	
Cynoglossus capensis	7.22	98	1.33	
Lophius vomerinus	7.22	36	1.33	436
Maurollicus sp.	6.61	36	1.22	
Paracallionymus costatus	5.90	551	1.09	
Helicolenus dactylopterus	3.76	22	0.69	
Sympagurus dimorphus	1.93	22	0.36	
Merluccius paradoxus	1.93	275	0.36	432
Coelorinchus matamua	1.93	26	0.36	
Affrololigo mercatoris	1.12	561	0.21	
Austrorossia enigmatica	0.92	86	0.17	
Trachurus capensis	0.81	6	0.15	434
Congiopodus spinifer	0.71	12	0.13	
PAGUROIDEA	0.51	42	0.09	
Sepia australis	0.31	12	0.06	
Oratosquilla oratoria	0.10	26	0.02	
Starfish	0.05	6	0.01	
Sea anemone sp	0.01	26	0.00	
Total	542.51		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 121
 DATE :20/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 30°17.93
 start stop duration Lon E 16°43.88
 TIME :16:09:40 16:40:53 31.2 (min) Purpose : 3
 LOG : 7102.68 7104.24 1.6 Region : 6100
 FDEPTH: 189 187 Gear cond.: 0
 BDEPTH: 189 187 Validity : 0
 Towing dir: 0° Wire out : 550 m Speed : 3.0 kn
 Sorted : 180 Total catch: 390.00 Catch/hour: 749.52

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius capensis	259.35	505	34.60	438
Etrumeus whiteheadi	195.09	2842	26.03	443
Merluccius paradoxus	116.15	2266	15.50	439
Helicolenus dactylopterus	74.02	2314	9.88	444
Merluccius capensis	23.17	1741	3.09	440
Thyrstites atun	22.10	8	2.95	437
PORIFERA (Sponges)	9.28	13	1.24	
Todaropsis eblanae	8.48	300	1.13	
Cynoglossus capensis	7.51	154	1.00	
Sepia australis	6.22	352	0.78	
Holohalaelurus regani	5.81	106	0.83	
Paracallionymus costatus	5.33	553	0.71	
Helicolenus dactylopterus	3.07	10	0.41	
Scomber japonicus	2.99	29	0.40	
J E L L Y F I S H	2.74	33	0.37	
Lophius vomerinus	1.78	17	0.24	441
Coelorinchus simorhynchus	1.61	81	0.22	
Echinasteridae indetCV1	1.45	6	0.19	
Coelorinchus matamua	1.05	50	0.14	
Zeus capensis	0.73	6	0.10	442
Sardinops sagax	0.65	10	0.09	
Austrorossia enigmatica	0.40	29	0.05	
Brissidae	0.28	10	0.04	
Affrololigo mercatoris	0.24	98	0.03	
Mursia cristimanus	0.03	6	0.00	
Pterygosquilla capensis	0.02	13	0.00	
Total	749.52		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 122
 DATE :21/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 30°11.62
 start stop duration Lon E 16°55.67
 TIME :04:34:26 05:04:51 30.4 (min) Purpose : 3
 LOG : 7182.21 7183.81 1.6 Region : 6100
 FDEPTH: 148 150 Gear cond.: 0
 BDEPTH: 148 150 Validity : 0
 Towing dir: 0° Wire out : 420 m Speed : 3.2 kn
 Sorted : 91 Total catch: 90.69 Catch/hour: 178.92

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
PORIFERA (Sponges)	129.87	0	72.58	
J E L L Y F I S H	12.79	0	7.15	
Helicolenus dactylopterus	9.51	892	5.32	445
Merluccius paradoxus	9.31	349	5.20	446
Lepidopus caudatus	5.13	385	2.87	
Todaropsis eblanae	1.82	95	1.01	
Sepia australis	1.82	174	1.01	

Merluccius paradoxus	1.72	71	0.96	449
Sufflogobius bibarbatatus	1.50	562	0.84	
Paracallionymus costatus	1.14	209	0.64	
Merluccius capensis	0.71	2	0.40	448
Pasiphae sp.	0.61	1466	0.34	
Chelidonichthys capensis	0.59	2	0.33	
Cynoglossus capensis	0.59	10	0.33	
Solenocera africana	0.43	4	0.24	
Pterygosquilla capensis	0.43	37	0.24	
MYCTOPHIDAE	0.36	83	0.20	
Exodromidia sp.	0.24	26	0.13	
Afrololigo mercatoris	0.16	53	0.09	
Genypteris capensis	0.08	2	0.04	447
Maurolicus muelleri	0.08	93	0.04	
Champsodon capensis	0.04	2	0.02	
OREOSOMATIDAE, juvenile	0.02	2	0.01	
Total	178.93		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 123
DATE :21/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 30°5,75
start stop duration Lon E 17°8,31
TIME :06:53:48 07:24:25 30.6 (min) Purpose : 3
LOG : 7197.53 7199.07 1.5 Region : 6100
FDEPTH: 97 97 Gear cond.: 0
BDEPTH: 97 97 Validity : 0
Towing dir: 0° wire out : 280 m Speed : 3.0 kn
Sorted : 69 Total catch: 500.00 Catch/hour: 979.75

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Callorhynchus capensis	235.53	282	26.08
J E L L Y F I S H	223.32	5679	22.79
Sufflogobius bibarbatatus	192.72	26279	19.67
Chelidonichthys capensis	189.77	592	19.37
Rostroraja alba	48.13	4	4.91
Merluccius capensis	25.50	390	2.60
Todaropsis eblanae	9.66	700	0.99
Chirodropus gorilla	8.05	14	0.82
Raja straeleni	6.78	4	0.69
Chrysaora fulgida	5.91	14	0.60
Etrumeus whiteheadi	5.10	686	0.52
Pterygosquilla capensis	4.03	310	0.41
MYCTOPHIDAE	3.22	739	0.33
Engraulis encrasicolus	0.81	149	0.08
Austroglossus microlepis	0.54	14	0.05
Afrololigo mercatoris	0.54	202	0.05
Champsodon capensis	0.17	14	0.02
Total	979.76		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 124
DATE :21/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 29°43,10
start stop duration Lon E 16°59,85
TIME :10:57:46 11:28:06 30.3 (min) Purpose : 3
LOG : 7225.01 7226.52 1.5 Region : 6100
FDEPTH: 87 90 Gear cond.: 0
BDEPTH: 87 90 Validity : 0
Towing dir: 0° wire out : 265 m Speed : 3.0 kn
Sorted : 27 Total catch: 600.00 Catch/hour: 1186.55

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Sufflogobius bibarbatatus	677.39	113514	57.09
Chelidonichthys capensis	153.58	382	12.94
Callorhynchus capensis	138.79	113	11.70
J E L L Y F I S H	133.05	2472	11.21
Euphausiacea	21.29	21251	1.79
Oratosquilla oratoria	13.69	914	1.15
Engraulis encrasicolus	12.17	1141	1.03
Etrumeus whiteheadi	12.17	1066	1.03
Afrololigo mercatoris	6.84	173	0.58
Austroglossus microlepis	4.56	77	0.38
Merluccius capensis	3.80	77	0.32
Todaropsis eblanae	3.80	344	0.32
Raja straeleni	2.41	2	0.20
Trachurus capensis	2.28	40	0.19
Merluccius paradoxus	0.76	40	0.06
Total	1186.59		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 125
DATE :21/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 29°52,41
start stop duration Lon E 16°41,02
TIME :15:24:15 15:54:00 29.7 (min) Purpose : 3
LOG : 7246.80 7248.07 1.3 Region : 6100
FDEPTH: 155 156 Gear cond.: 0
BDEPTH: 155 156 Validity : 0
Towing dir: 0° wire out : 450 m Speed : 2.6 kn
Sorted : 39 Total catch: 39.36 Catch/hour: 79.41

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Hexanchus griseus	36.80	2	46.34
J E L L Y F I S H	9.52	0	11.99
Helicolenus dactylopterus	8.51	751	10.72
Merluccius paradoxus	7.06	141	8.89
Pterygosquilla capensis	4.88	365	6.15
Todaropsis eblanae	3.51	147	4.42
Maurolicus muelleri	3.15	4721	3.96
Merluccius capensis	1.69	6	2.13
Austroglossus microlepis	1.45	20	1.83
Lophius vomerinus	0.85	8	1.07
Sepia australis	0.73	67	0.91
Cynoglossus capensis	0.48	6	0.61
Afrololigo mercatoris	0.36	123	0.46
Starfish	0.20	2	0.25
Jasus lalandii	0.20	2	0.25
Total	79.41		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 126
DATE :22/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 29°59,21
start stop duration Lon E 16°29,63
TIME :04:32:11 05:02:07 29.9 (min) Purpose : 3
LOG : 7283.56 7285.17 1.6 Region : 6100
FDEPTH: 175 179 Gear cond.: 0
BDEPTH: 175 179 Validity : 0
Towing dir: 0° wire out : 550 m Speed : 3.2 kn
Sorted : 107 Total catch: 250.00 Catch/hour: 501.17

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Merluccius capensis	298.29	493	59.52
Merluccius paradoxus	88.96	2468	17.75
Helicolenus dactylopterus	29.50	1844	5.89
Merluccius capensis	14.66	1157	2.93
Sepia australis	14.11	848	2.82
Paracallionymus costatus	11.29	1768	2.25
PORIFERA (Sponges)	11.11	10	2.22
J E L L Y F I S H	10.38	0	2.07
Cynoglossus capensis	7.19	150	1.44
Mustelus palumbes	6.88	6	1.37
Lophius vomerinus	4.85	36	0.97
Todaropsis eblanae	0.82	42	0.16

Genypteris capensis	0.64	6	0.13	470
Holohalaelurus regani	0.60	12	0.12	
Coelocinchus macanua	0.46	20	0.09	
Solenocera africana	0.41	46	0.08	
Maurolicus muelleri	0.36	206	0.07	
Uroconger lepturus	0.27	10	0.05	
Austrorossia enigmatica	0.09	6	0.02	
Afrololigo mercatoris	0.09	42	0.02	
Zeus capensis	0.09	6	0.02	
Pelagia noctiluca	0.03	10	0.01	
Exodromidia sp.	0.03	6	0.01	
Pterygosquilla capensis	0.02	6	0.00	
Total	501.16		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 127
DATE :22/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 30°6,14
start stop duration Lon E 16°19,56
TIME :07:03:08 07:34:01 30.9 (min) Purpose : 3
LOG : 7297.65 7298.94 1.3 Region : 6100
FDEPTH: 187 188 gear cond.: 0
BDEPTH: 187 188 Validity : 0
Towing dir: 0° wire out : 550 m Speed : 2.5 kn
Sorted : 117 Total catch: 116.95 Catch/hour: 227.23

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Merluccius capensis	81.65	130	35.93
Chelidonichthys capensis	30.66	58	13.49
Etrumeus whiteheadi	25.22	367	11.10
Lophius vomerinus	20.25	45	8.91
Merluccius paradoxus	18.50	251	8.14
Todaropsis eblanae	13.25	255	5.83
Paracallionymus costatus	11.00	748	4.84
Helicolenus dactylopterus	8.74	311	3.85
Mustelus palumbes	6.57	2	2.89
Cynoglossus capensis	2.99	47	1.32
Zeus capensis	1.98	23	0.87
Sepia australis	1.40	70	0.62
Chelidonichthys queketti	1.05	6	0.46
Leucoraja wallacei	1.01	4	0.44
Squalus megalops	0.82	2	0.36
Octopus vulgaris	0.51	2	0.22
Afrololigo mercatoris	0.35	128	0.15
Genypteris capensis	0.33	2	0.15
Merluccius paradoxus	0.23	16	0.10
Trachurus capensis	0.23	2	0.10
Aegourea forskalea	0.16	4	0.07
Holohalaelurus regani	0.16	4	0.07
Uroconger lepturus	0.12	2	0.05
Brissidae	0.05	2	0.02
Starfish	0.02	2	0.01
ISOPODS	0.00	2	0.00
Total	227.24		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 128
DATE :22/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 30°13,54
start stop duration Lon E 16°5,09
TIME :09:55:13 10:22:24 30.2 (min) Purpose : 3
LOG : 7314.09 7315.51 1.4 Region : 6100
FDEPTH: 210 214 gear cond.: 0
BDEPTH: 210 214 Validity : 0
Towing dir: 0° wire out : 600 m Speed : 2.8 kn
Sorted : 232 Total catch: 231.58 Catch/hour: 460.25

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Merluccius capensis	148.82	266	32.33
Merluccius paradoxus	99.25	1316	21.56
Dipturus sp.	69.56	2	15.11
Lepidopus caudatus	45.18	89	9.80
Squalus megalops	28.62	14	6.22
Todaropsis eblanae	15.46	304	3.36
Paragaleus pectoralis	11.65	4	2.53
Holohalaelurus regani	8.51	40	1.85
Paracallionymus costatus	7.04	479	1.53
Callorhynchus capensis	6.36	4	1.38
Helicolenus dactylopterus	6.24	187	1.36
Chelidonichthys capensis	2.98	4	0.65
Raja straeleni	2.94	2	0.64
Merluccius paradoxus	2.03	151	0.44
Leucoraja wallacei	1.39	2	0.30
Zeus capensis	1.35	16	0.29
Genypteris capensis	0.99	6	0.22
Sepia australis	0.64	30	0.14
Chelidonichthys queketti	0.60	4	0.13
Etrumeus whiteheadi	0.56	6	0.12
Afrololigo mercatoris	0.12	42	0.03
Champsodon capensis	0.04	2	0.01
Total	460.25		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 129
DATE :22/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 30°19,28
start stop duration Lon E 15°58,34
TIME :11:55:18 12:25:33 30.3 (min) Purpose : 3
LOG : 7323.15 7324.56 1.4 Region : 6100
FDEPTH: 228 232 gear cond.: 0
BDEPTH: 228 232 Validity : 0
Towing dir: 0° wire out : 610 m Speed : 2.8 kn
Sorted : 113 Total catch: 750.00 Catch/hour: 1487.60

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Lepidopus caudatus	1241.53	6573	83.46
Zeus capensis	102.60	569	6.90
Merluccius paradoxus	58.97	674	3.96
Merluccius capensis	48.92	54	3.29
Todaropsis eblanae	12.69	173	0.85
Helicolenus dactylopterus	11.90	173	0.80
Holohalaelurus regani	4.50	14	0.30
Conglopus spinifer	4.50	28	0.30
Chelidonichthys queketti	1.59	14	0.11
Paracallionymus costatus	0.40	28	0.03
Total	1487.60		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 130
DATE :22/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 30°28,24
start stop duration Lon E 15°43,12
TIME :14:56:57 15:26:15 29.2 (min) Purpose : 3
LOG : 7339.70 7342.23 2.5 Region : 6100
FDEPTH: 268 280 gear cond.: 0
BDEPTH: 268 280 Validity : 0
Towing dir: 0° wire out : 650 m Speed : 206.0 kn
Sorted : 187 Total catch: 399.08 Catch/hour: 820.03

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Merluccius paradoxus	503.67	4662	61.42
Lophius vomerinus	93.50	66	11.40
Merluccius capensis	59.35	47	7.24
Coelocinchus simorhynchus	24.78	631	3.02
Dipturus pullopus	15.00	2	1.83

Coelorinchus matamua	14.48	353	1.77	
Holohalaelurus regani	13.80	35	1.68	
Malacocephalus laevis	12.43	103	1.52	
Helicolenus dactylopterus	11.84	282	1.44	489
Zeus capensis	10.98	23	1.34	
PAGUROIDEA	10.05	1358	1.23	
Torpedo nobiliana	9.99	2	1.22	
Epigonus telescopus	8.60	134	1.05	
Cynoglossus capensis	6.73	115	0.82	
Todaropsis eblanae	5.45	82	0.66	
Merluccius paradoxus	5.43	364	0.66	490
Spatangus capensis	3.58	47	0.44	
Squalus megalops	2.73	6	0.33	
Genypterus capensis	2.62	6	0.32	493
Paracallionymus costatus	1.62	201	0.20	
MYCTOPHIDAE	0.85	413	0.10	
Maurolicus muelleri	0.77	436	0.09	
Octopus vulgaris	0.68	6	0.08	
Austrorossia enigmatica	0.68	31	0.08	
Septia australis	0.17	10	0.02	
Brissidae	0.14	10	0.02	
Bathyteuthis abyssicola	0.14	6	0.02	
Pterygosquilla capensis	0.12	23	0.02	
Exodromidia sp.	0.05	14	0.01	
Actiniaria sp 3	0.02	6	0.00	
Total	820.23		100.02	

Chauliodus sp.	0.37	16	0.23	
Melanostomias sp.	0.23	2	0.15	
MACROURIDAE	0.22	1	0.13	
Rajella leopardus	0.18	5	0.12	
S H R I M P S	0.18	32	0.12	
Myxine sp.	0.14	2	0.09	
Neoscopelus sp.	0.09	5	0.06	
Cruriraja hulleyi	0.09	2	0.06	
J E L Y F I S H	0.06	7	0.03	
Electrona risso	0.04	5	0.02	
Starfish	0.04	11	0.02	
DIRETMIDAE	0.02	2	0.01	
DICERATIIDAE	0.01	2	0.01	
Argyropelecus sp.	0.00	2	0.00	
Total	157.48		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 134
DATE :23/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 30°11,30
start stop duration Lon E 15°26,37
TIME :06:35:33 07:06:00 30.4 (min) Purpose : 3
LOG : 7426.29 7427.82 1.5 Region : 6100
FDEPTH: 245 244 Gear cond.: 0
BDEPTH: 245 244 Validity : 0
Towing dir: 0° Wire out : 720 m Speed : 3.0 kn
sorted : 135 Total catch: 410.00 Catch/hour: 808.15

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 131
DATE :22/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 30°32,85
start stop duration Lon E 15°25,09
TIME :18:11:20 18:41:55 30.6 (min) Purpose : 3
LOG : 7359.23 7360.86 1.6 Region : 6100
FDEPTH: 305 311 Gear cond.: 0
BDEPTH: 305 311 Validity : 0
Towing dir: 0° Wire out : 790 m Speed : 3.2 kn
sorted : 160 Total catch: 160.32 Catch/hour: 314.56

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Merluccius paradoxus	470.11	4579	58.17
Zeus capensis	70.34	278	8.70
Helicolenus dactylopterus	58.23	676	7.01
Merluccius capensis	42.78	35	5.29
Lophius vomerinus	32.98	12	4.08
Coelorinchus simorhynchus	20.29	179	2.51
Lepidopus caudatus	16.26	71	2.01
Raja straeleni	13.99	4	1.73
Todaropsis eblanae	12.22	152	1.51
Chelidonichthys queketti	11.19	65	1.38
Loligo vulgaris	7.73	12	0.96
Thyrssites atun	6.58	4	0.81
Cynoglossus capensis	6.46	81	0.80
Coelorinchus matamua	6.23	81	0.77
Etrumeus whiteheadi	5.65	53	0.70
Squalus mitsukurii	4.89	6	0.60
Malacocephalus laevis	3.81	41	0.47
Merluccius paradoxus	3.69	203	0.46
Holohalaelurus regani	3.07	14	0.38
Gorgonocephalus eucnemis	2.88	6	0.36
Epigonus denticulatus	1.73	30	0.21
Trachurus capensis	1.73	12	0.21
Paracallionymus costatus	1.61	221	0.20
Aequorea forskalea	1.04	6	0.13
Cruriraja hulleyi	0.92	18	0.11
Afrololigo mercatoris	0.46	221	0.06
Selachophidium guentheri	0.35	6	0.04
Starfish	0.28	6	0.03
Emmelichthys nitidus nitidus	0.23	6	0.03
Austrorossia enigmatica	0.23	24	0.03
Ophiuroidea indetCv1	0.11	12	0.01
ISPODUS	0.01	18	0.00
Mierspenaeopsis hardwickii	0.01	6	0.00
Total	808.10		99.99

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 135
DATE :23/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 30°6,38
start stop duration Lon E 15°40,53
TIME :09:03:33 09:32:48 29.3 (min) Purpose : 3
LOG : 7440.87 7442.29 1.4 Region : 6100
FDEPTH: 219 217 Gear cond.: 0
BDEPTH: 219 217 Validity : 0
Towing dir: 0° Wire out : 620 m Speed : 2.9 kn
sorted : 111 Total catch: 420.00 Catch/hour: 861.54

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 132
DATE :22/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 30°40,12
start stop duration Lon E 15°22,31
TIME :20:19:37 20:49:41 30.1 (min) Purpose : 3
LOG : 7368.94 7370.63 1.7 Region : 6100
FDEPTH: 405 410 Gear cond.: 0
BDEPTH: 405 410 Validity : 0
Towing dir: 0° Wire out : 1070 m Speed : 3.4 kn
sorted : 49 Total catch: 48.96 Catch/hour: 97.69

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Lepidopus caudatus	523.58	3097	61.93
Merluccius capensis	67.12	41	7.79
Galeorhinus galeus	48.68	2	5.65
Mustelus palumbes	45.30	41	5.26
Helicolenus dactylopterus	37.80	644	4.39
Holohalaelurus regani	27.07	142	3.14
Leucoraja wallacei	22.45	29	2.61
Chelidonichthys queketti	17.69	109	2.05
Zeus capensis	13.40	35	1.56
Callorhynchus capensis	12.06	8	1.40
Chelidonichthys capensis	10.99	8	1.28
Todaropsis eblanae	7.24	275	0.84
Lophius vomerinus	5.09	8	0.59
Congioopus spinifer	4.42	35	0.51
Merluccius paradoxus	2.15	269	0.25
CALLIONYMIDAE	1.74	148	0.20
Septia australis	1.47	82	0.17
Coelorinchus matamua	1.07	14	0.12
Trachurus capensis	0.94	8	0.11
Afrololigo mercatoris	0.67	248	0.08
Cynoglossus capensis	0.54	8	0.06
Austrorossia enigmatica	0.14	14	0.02
Total	861.62		100.01

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 136
DATE :23/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 29°57,81
start stop duration Lon E 15°54,53
TIME :11:37:38 12:08:02 30.4 (min) Purpose : 3
LOG : 7456.28 7457.88 1.6 Region : 6100
FDEPTH: 196 198 Gear cond.: 0
BDEPTH: 196 198 Validity : 0
Towing dir: 0° Wire out : 525 m Speed : 3.2 kn
sorted : 87 Total catch: 87.49 Catch/hour: 172.62

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Genypterus capensis	48.93	26	50.08
Merluccius paradoxus	27.26	56	27.90
Coelorinchus matamua	4.87	227	4.98
Cruriraja parcomaculata	3.43	2	3.51
Coelorinchus simorhynchus	2.83	94	2.90
Uroconger lepturus	2.47	4	2.53
Epigonus denticulatus	1.80	108	1.84
Helicolenus dactylopterus	1.80	14	1.84
Notacanthus sexspinis	1.28	8	1.31
Zeus capensis	0.84	2	0.86
Todaropsis eblanae	0.60	4	0.61
Malacocephalus laevis	0.36	2	0.37
Chlorophthalmus agassizi	0.24	4	0.25
Stereomastix sculpta	0.20	72	0.20
MYCTOPHIDAE	0.16	12	0.16
Physiculus capensis	0.16	2	0.16
Hymenocephalus sp.	0.12	4	0.12
Starfish	0.12	8	0.12
Tripterophycis gilchristi	0.12	14	0.12
Paracallionymus costatus	0.12	24	0.12
Total	97.69		100.00

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Helicolenus dactylopterus	41.51	758	24.05
Galeorhinus galeus	35.91	2	20.80
Merluccius capensis	33.62	36	19.48
Merluccius paradoxus	18.03	278	10.45
Etrumeus whiteheadi	7.26	105	4.21
Callorhynchus capensis	5.29	2	3.06
Merluccius paradoxus	4.89	367	2.83
PORIFERA (Sponges)	4.77	326	2.77
Holohalaelurus regani	4.46	24	2.58
Thyrssites atun	3.59	2	2.08
Todaropsis eblanae	2.35	65	1.36
J E L Y F I S H	1.62	14	0.94
Septia australis	1.54	124	0.89
Coelorinchus matamua	1.34	10	0.78
Lophius vomerinus	1.22	2	0.71
Loligo reynaudi	1.14	2	0.66
Genypterus capensis	0.91	4	0.53
Congioopus spinifer	0.71	8	0.41
Cynoglossus capensis	0.43	6	0.25
Zeus capensis	0.32	4	0.18
Trachurus capensis	0.32	2	0.18
CALLIONYMIDAE	0.32	30	0.18

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 133
DATE :22/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 30°43,23
start stop duration Lon E 15°18,46
TIME :23:59:48 00:25:56 26.1 (min) Purpose : 3
LOG : 7380.33 7381.94 1.2 Region : 6100
FDEPTH: 696 700 Gear cond.: 0
BDEPTH: 696 700 Validity : 0
Towing dir: 0° Wire out : 1430 m Speed : 2.8 kn
sorted : 69 Total catch: 68.58 Catch/hour: 157.48

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Coelorinchus braueri	65.35	698	41.50
Merluccius paradoxus	26.68	44	16.94
Nezumia micronychodon	12.35	204	7.84
Lophius vomerinus	11.80	7	7.49
C E P H A L O P O D A	8.50	92	5.40
Funchalia woodwardi	7.03	501	4.46
VAMPYROTEUTHIDAE	6.15	5	3.91
Neocyttus rhomboidalis	5.37	18	3.41
Coelorinchus matamua	3.54	9	2.25
Hydrotagus mirabilis	2.02	11	1.28
Phosichthys argenteus	1.88	32	1.20
Alloctytus verrucosus	1.79	23	1.14
Lycoteuthis longiriga	1.65	5	1.05
Notacanthus sexspinis	0.73	7	0.47
MYCTOPHIDAE	0.51	37	0.32
Etmopterus sp.	0.46	9	0.29

Chelidonichthys queketti	0.28	2	0.16
Sympagurus dimorphus	0.20	2	0.11
Sardinops sagax	0.16	2	0.09
Phosichthys argenteus	0.14	179	0.08
Afrololigo mercatoris	0.12	41	0.07
Starfish	0.12	6	0.07
Sea anemone sp	0.02	2	0.01
C R A B S	0.02	2	0.01
Austrorossia enigmatica	0.02	2	0.01
Total	172.62		100.00

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 137
 DATE :23/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 29°48,86
 start stop duration Purpose : 3
 TIME :14:02:51 14:33:17 30.4 (min) Region : 6100
 LOG : 7472.42 7473.93 1.5 Gear cond.: 0
 FDEPTH: 185 182 Validity : 0
 BDEPTH: 185 182 Speed : 3.0 kn
 Towing dir: 0° Wire out : 510 m Catch/hour: 439.70
 Sorted : 81 Total catch: 222.93

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius paradoxus	132.68	3097	30.17	528
Merluccius capensis	90.68	174	20.62	527
Helicolenus dactylopterus	56.86	3043	12.93	526
Etrumeus whiteheadi	54.60	740	12.42	524
CALLIONYMIDAE	25.20	2219	5.73	
Sepia australis	22.29	1014	5.07	
Lophius vomerinus	17.45	22	3.97	525
J E L L Y F I S H	9.48	174	2.16	
Todaropsis eblanae	7.54	152	1.71	
MYCTOPHIDAE	5.49	4120	1.25	
Merluccius paradoxus	5.38	475	1.22	529
Thyrssites atun	2.06	2	0.42	
CIDARIDAE	4.05	18	0.49	
Chelidonichthys capensis	1.94	6	0.44	
Cynoglossus capensis	1.08	28	0.24	
Holoהלאלורוס regani	0.97	12	0.22	
Sardinops sagax	0.65	6	0.15	
Oratosquilla oratoria	0.54	22	0.12	
Lepidopus caudatus	0.22	12	0.05	
Coelorinchus matamua	0.22	18	0.05	
Afrololigo mercatoris	0.22	77	0.05	
Phosichthys argenteus	0.11	77	0.02	
Austrorossia enigmatica	0.08	6	0.02	
Total	439.78		100.02	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 138
 DATE :23/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 29°42,86
 start stop duration Purpose : 3
 TIME :16:06:05 16:36:40 30.6 (min) Region : 6100
 LOG : 7484.06 7485.68 1.6 Gear cond.: 0
 FDEPTH: 169 168 Validity : 0
 BDEPTH: 169 168 Speed : 3.2 kn
 Towing dir: 0° Wire out : 520 m Catch/hour: 803.92
 Sorted : 123 Total catch: 410.00

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
PORIFERA (Sponges)	312.06	525	38.82	
Etrumeus whiteheadi	115.97	1486	14.43	533
Merluccius capensis	111.36	231	13.85	531
Merluccius paradoxus	69.89	114	8.69	534
Aequorea forskalea	55.04	1608	6.85	
Helicolenus dactylopterus	33.92	2312	4.22	532
Paracallionymus costatus	16.51	2247	2.05	
Todaropsis eblanae	16.13	302	2.01	
Raja straeleni	13.65	4	1.70	
Merluccius capensis	10.37	1037	1.29	535
Lophius vomerinus	10.24	135	1.27	536
Sepia australis	9.35	480	1.16	
Sardinops sagax	8.96	110	1.11	
MYCTOPHIDAE	7.55	2829	0.94	
Scomber japonicus	3.97	39	0.49	
Cynoglossus capensis	3.58	65	0.45	
Thyrssites atun	3.45	7	0.43	530
Octopus sp.	0.64	8	0.08	
Maurolicus muelleri	0.38	263	0.05	
Lepidopus caudatus	0.38	14	0.05	
Exodromidia sp.	0.38	27	0.05	
Afrololigo mercatoris	0.13	59	0.02	
Holoהלאלורוס regani	0.08	8	0.01	
Total	804.00		100.01	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 139
 DATE :24/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 29°35,12
 start stop duration Purpose : 3
 TIME :04:38:06 05:08:31 30.4 (min) Region : 6100
 LOG : 7557.39 7559.00 1.6 Gear cond.: 0
 FDEPTH: 149 150 Validity : 0
 BDEPTH: 149 150 Speed : 3.2 kn
 Towing dir: 0° Wire out : 470 m Catch/hour: 114.33
 Sorted : 58 Total catch: 57.96

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius paradoxus	40.39	1142	35.33	538
J E L L Y F I S H	20.47	0	17.91	
Merluccius capensis	14.16	37	12.39	537
Sufflogobius bibarbatus	8.92	1114	7.80	543
Helicolenus dactylopterus	8.76	730	7.66	540
Sepia australis	5.68	229	4.97	
Todaropsis eblanae	5.48	146	4.80	
Chelidonichthys capensis	3.16	10	2.76	
Merluccius capensis	2.49	168	2.17	539
Pterygosquilla capensis	1.14	91	1.00	
Paracallionymus costatus	0.95	158	0.83	
Cynoglossus capensis	0.67	8	0.59	
Congiopodus spinifer	0.47	2	0.41	
Solenocera africana	0.47	43	0.41	
Genypterus capensis	0.28	4	0.24	542
Afrololigo mercatoris	0.24	47	0.21	
Exodromidia sp.	0.13	22	0.11	
Lophius vomerinus	0.12	2	0.10	541
Pelagia noctiluca	0.12	8	0.10	
Aequorea forskalea	0.08	8	0.07	
ARCIDAE	0.05	14	0.04	
Maurolicus muelleri	0.04	45	0.03	
Lepidopus caudatus	0.04	4	0.03	
Champsodon capensis	0.02	2	0.02	
Stoloteuthis sp	0.01	6	0.01	
Total	114.33		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 140
 DATE :24/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 29°26,35
 start stop duration Purpose : 3
 TIME :07:20:34 07:51:07 30.6 (min) Region : 6100
 LOG : 7576.82 7578.27 1.5 Gear cond.: 0
 FDEPTH: 95 93 Validity : 0
 BDEPTH: 95 93 Speed : 3.0 kn

Towing dir: 0° Wire out : 290 m Speed : 2.9 kn
 Sorted : 45 Total catch: 800.00 Catch/hour: 1571.19

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Sufflogobius bibarbatus	1209.21	84336	76.96	546
Aequorea forskalea	178.45	0	11.36	
Chelidonichthys capensis	122.64	310	7.81	
Austrorossia enigmatica	15.85	104	1.01	
Merluccius capensis	15.16	35	0.96	547
Pasiiphae sp.	13.09	17984	0.83	
Jasus lalandii	7.58	71	0.48	544
Mustelus palumbes	3.02	2	0.19	
Pterygosquilla capensis	2.07	104	0.13	
Etrumeus whiteheadi	2.07	173	0.13	
Squalus acanthias	1.06	2	0.07	
Afrololigo mercatoris	0.99	277	0.06	
Total	1571.20		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 141
 DATE :24/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 29°6,84
 start stop duration Purpose : 3
 TIME :10:34:15 11:04:25 30.2 (min) Region : 6100
 LOG : 7600.03 7601.74 1.7 Gear cond.: 0
 FDEPTH: 77 80 Validity : 0
 BDEPTH: 77 80 Speed : 3.4 kn
 Towing dir: 0° Wire out : 260 m Catch/hour: 397.88
 Sorted : 67 Total catch: 200.00

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Sufflogobius bibarbatus	110.99	2081	27.89	
Callorhynchus capensis	108.12	48	27.17	
Etrumeus whiteheadi	48.61	1194	12.22	548
J E L L Y F I S H	36.31	1158	9.13	
Merluccius capensis	36.17	674	9.09	549
Chelidonichthys capensis	35.29	229	8.87	
Merluccius paradoxus	8.93	191	2.25	550
Afrololigo mercatoris	3.95	1977	0.99	
Engraulis capensis	3.52	748	0.88	
Funchalia woodwardi	2.78	8347	0.70	
Cynoglossus capensis	1.32	24	0.33	
Jasus lalandii	1.17	8	0.29	
Trachurus capensis	0.44	191	0.11	
Sardinops sagax	0.29	52	0.07	
Total	397.90		100.01	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 142
 DATE :24/03/19 GEAR TYPE: BT NO: 1 POSITION:Lat S 29°11,08
 start stop duration Purpose : 3
 TIME :13:36:18 14:10:07 33.8 (min) Region : 6100
 LOG : 7616.32 7617.30 1.0 Gear cond.: 0
 FDEPTH: 133 133 Validity : 5
 BDEPTH: 133 133 Speed : 1.7 kn
 Towing dir: 0° Wire out : 0 m Catch/hour: 0.00
 Sorted : 0 Total catch: 0.00

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

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 143
 DATE :25/03/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 29°57,95
 start stop duration Purpose : 3
 TIME :04:54:54 05:26:36 31.7 (min) Region : 6100
 LOG : 7710.89 7712.48 1.6 Gear cond.: 0
 FDEPTH: 370 370 Validity : 0
 BDEPTH: 370 370 Speed : 3.0 kn
 Towing dir: 0° Wire out : 850 m Catch/hour: 1173.13
 Sorted : 247 Total catch: 620.00

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius paradoxus	381.65	1480	32.53	554
Lepidopus caudatus	297.19	360	25.33	551
Helicolenus dactylopterus	106.04	420	9.04	551
Epigonus telescopus	74.97	1247	6.39	
Sea anemone sp	55.25	513	4.71	
Genypterus capensis	53.77	38	4.58	553
Coelorinchus simorhynchus	51.07	889	4.35	
Coelorinchus matamua	35.07	554	2.99	
Mustelus palumbes	24.74	15	2.11	
Centrolophus niger	18.66	2	1.59	
Merluccius capensis	17.86	9	1.52	552
Malacocephalus laevis	8.37	34	0.71	
Holoהלאלורוס regani	7.53	25	0.64	
Cruriraja hullei	7.35	6	0.63	
Scyliorhinus capensis	6.75	15	0.57	
Rajella dissimilis	5.49	9	0.47	
Todaropsis eblanae	3.35	34	0.29	
Hymenocephalus italicus	3.26	475	0.28	
Starfish	2.95	146	0.22	
Hydrolagus sp.	2.42	2	0.21	
Cynoglossus capensis	1.77	25	0.15	
Spatangus capensis	1.49	15	0.13	
Austrorossia enigmatica	1.21	131	0.10	
Beryx splendens	1.02	9	0.09	
Paracallionymus costatus	0.84	178	0.07	
Cyttus traversi	0.65	15	0.06	
Unidentified	0.56	6	0.05	
Parapagurus bouveri	0.56	28	0.05	
Hoplostethus atlanticus	0.47	19	0.04	
RANELLIDAE (=CYMATIIDAE)	0.47	6	0.04	
Tripterygius gilchristi	0.37	38	0.03	
Pelagia noctiluca	0.19	25	0.02	
Merluccius paradoxus	0.19	6	0.02	555
Rochinia sp.	0.09	9	0.01	
Symblophorus boops	0.09	9	0.01	
Dorhynchus thomsoni	0.02	6	0.00	
Total	1173.34		100.02	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 144
 DATE :25/03/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 30°0,54
 start stop duration Purpose : 3
 TIME :07:22:27 07:52:05 29.6 (min) Region : 6100
 LOG : 7723.00 7724.44 1.4 Gear cond.: 0
 FDEPTH: 459 459 Validity : 0
 BDEPTH: 459 459 Speed : 2.9 kn
 Towing dir: 0° Wire out : 1050 m Catch/hour: 647.77
 Sorted : 152 Total catch: 320.00

SPECIES	weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius paradoxus	452.73	1036	69.89	557
Helicolenus dactylopterus	49.27	358	7.61	556
Funchalia woodwardi	28.03	3233	4.33	
Bassanago albescens	18.35	30	2.83	
Parapagurus bouveri	16.82	719	2.60	
Cruriraja hullei	16.73	22	2.58	
Urocyon lepturus	14.19	30	2.19	
Coelorinchus matamua	7.14	43	1.10	

Malacocephalus laevis	6.71	26	1.04
Sea anemone sp	6.29	57	0.97
Epigonus telescopus	5.69	387	0.88
Nezumia milleri	3.91	99	0.60
PORIFERA (Sponges)	3.57	111	0.55
Hydrolagus sp.	3.08	4	0.48
Coelorinchus simorhynchus	2.21	30	0.34
Hymenocephalus italicus	2.04	192	0.32
Phosichthys argenteus	1.70	107	0.26
Selachophidium guentheri	1.19	22	0.18
Coelorinchus acanthiger	1.11	91	0.17
Rajella dissimilis	1.11	6	0.17
Brissidae	1.02	277	0.16
Aequorea forskalea	0.77	6	0.12
GORGONOCEPHALIDAE	0.64	6	0.10
Rochinia sp.	0.51	10	0.08
Starfish	0.47	10	0.07
Austrorossia enigmatica	0.34	38	0.05
Todaropsis eblanae	0.34	6	0.05
Physiculus capensis	0.34	10	0.05
Ophichthus serpentinus	0.34	6	0.05
Pelagia noctiluca	0.34	73	0.05
Paracallionymus costatus	0.17	14	0.03
Tripterophycis gilchristi	0.17	14	0.03
Sepia hieronis	0.17	22	0.03
TURBINELLIDAE (=VASIDAE)	0.13	14	0.02
Stoloteuthis sp	0.09	18	0.01
Total	647.67		99.98

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 145
 DATE :25/03/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 30°6.03
 start stop duration Lon E 14°43.11
 TIME :10:19:33 10:50:09 30.6 (min) Purpose : 3
 LOG : 7736.72 7738.16 1.4 Region : 6100
 FDEPTH: 512 512 Gear cond.: 0
 BDEPTH: 512 512 Validity: 0
 Towing dir: 0° wire out : 1225 m Speed : 2.8 kn
 Sorted : 136 Total catch: 136.03 Catch/hour: 266.64

TIME :17:40:07 18:10:12 30.0 (min) Purpose : 3
 LOG : 7770.94 7772.49 1.6 Region : 6100
 FDEPTH: 527 527 Gear cond.: 0
 BDEPTH: 529 527 Validity: 0
 Towing dir: 0° wire out : 0 m Speed : 0.0 kn
 Sorted : 79 Total catch: 79.09 Catch/hour: 158.13

SPECIES		CATCH/HOUR	% OF TOT. C	SAMP
	weight	numbers		
Helicolenus dactylopterus	75.65	250	47.84	561
Lophius vomerinus	13.36	2	8.45	562
RAJIDAE	11.24	2	7.11	
Coelorinchus acanthiger	10.92	442	6.90	
Malacocephalus laevis	9.68	36	6.12	
Starfish	9.60	4798	6.07	
Funchalia woodwardi	4.92	526	3.11	
Chaceon chuni	4.52	54	2.86	
Hydrolagus sp.	4.40	6	2.78	
Selachophidium guentheri	3.48	48	2.20	
Rajella barnardi	3.16	4	2.00	
Lithodes ferox	3.08	6	1.95	
Merluccius paradoxus	2.20	22	1.39	563
Melanostomias sp.	0.36	4	0.23	
Notacanthus sexspinis	0.36	6	0.23	
Hymenocephalus sp.	0.32	24	0.20	
Myxine capensis	0.20	4	0.13	
Epigonus telescopus	0.16	4	0.10	
MYCTOPHIDAE	0.16	14	0.10	
Stereomastis sculpta	0.10	4	0.07	
Physiculus capensis	0.08	6	0.05	
Oreosoma atlanticum	0.08	2	0.05	
Ebinania costaecanarie	0.04	2	0.03	
Austrorossia enigmatica	0.02	2	0.01	
Rajella dissimilis	0.02	2	0.01	
Rajella caudaspinoso	0.02	2	0.01	
Stoloteuthis sp	0.01	4	0.01	
Total	158.13		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 148
 DATE :25/03/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 30°21.53
 start stop duration Lon E 15°7.33
 TIME :20:34:43 21:05:07 30.5 (min) Purpose : 3
 LOG : 7787.45 7783.97 1.5 Region : 6100
 FDEPTH: 412 412 Gear cond.: 0
 BDEPTH: 412 412 Validity: 0
 Towing dir: 0° wire out : 0 m Speed : 0.0 kn
 Sorted : 378 Total catch: 377.98 Catch/hour: 744.79

SPECIES		CATCH/HOUR	% OF TOT. C	SAMP
	weight	numbers		
Merluccius paradoxus	117.77	178	44.17	559
Sebastes capensis	40.46	214	15.17	
Lophius vomerinus	31.68	10	11.88	558
Funchalia woodwardi	13.41	1341	5.03	
RAJIDAE	10.23	2	3.84	
Cruriraja hulleyi	7.72	2	2.90	
Genypterus capensis	7.68	2	2.88	
Coelorinchus simorhynchus	7.33	133	2.75	
Selachophidium guentheri	5.29	76	1.98	
Coelorinchus simorhynchus	4.67	74	1.75	0
Rajella caudaspinoso	4.35	6	1.63	
Solenocera africana	3.21	804	1.21	
Hydrolagus sp.	1.80	4	0.68	
CHLIDOPTERIDAE	1.72	2	0.65	
Lycoteuthis lorigera	1.49	4	0.56	
Actinae sp.	1.41	6	0.53	
Austrorossia enigmatica	0.86	49	0.32	
Ebinania costaecanarie	0.86	2	0.32	
Phosichthys argenteus	0.74	25	0.28	
Rajella barnardi	0.59	2	0.22	
Notacanthus sexspinis	0.51	6	0.19	
PAGUROIDEA	0.51	51	0.19	
Malacocephalus laevis	0.47	2	0.18	
Astropectinidae	0.43	4	0.16	
Myxine sp.	0.35	4	0.13	
Neocyttus rhomboidalis	0.31	4	0.22	
Paracallionymus costatus	0.24	41	0.09	
Rochinia sp.	0.20	67	0.07	
Argyroleucus sladeni	0.16	4	0.06	
Hoplostethus atlanticus	0.12	2	0.04	
Anemones, coral	0.04	6	0.01	
Stereomastis sp.	0.02	4	0.01	
Total	266.64		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 146
 DATE :25/03/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 30°12.54
 start stop duration Lon E 14°37.22
 TIME :13:34:30 14:08:22 33.9 (min) Purpose : 3
 LOG : 7749.99 7751.42 1.4 Region : 6100
 FDEPTH: 749 754 Gear cond.: 0
 BDEPTH: 749 754 Validity: 0
 Towing dir: 0° wire out : 1140 m Speed : 2.5 kn
 Sorted : 138 Total catch: 138.48 Catch/hour: 245.31

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 149
 DATE :26/03/19 GEAR TYPE: BT NO: 99 POSITION:Lat S 29°48.30
 start stop duration Lon E 15°13.43
 TIME :04:28:10 04:58:30 30.3 (min) Purpose : 3
 LOG : 7825.65 7827.08 1.4 Region : 6100
 FDEPTH: 231 224 Gear cond.: 0
 BDEPTH: 231 224 Validity: 0
 Towing dir: 0° wire out : 0 m Speed : 0.0 kn
 Sorted : 113 Total catch: 189.21 Catch/hour: 374.29

SPECIES		CATCH/HOUR	% OF TOT. C	SAMP
	weight	numbers		
Coelorinchus simorhynchus	54.49	342	22.21	
Merluccius paradoxus	47.09	35	19.19	560
Ruvettus pretiosus	31.07	2	12.67	
OMMASTREPHIDAE	21.01	14	8.56	
OCTOPODIDAE	13.68	19	5.57	
Rajella barnardi	13.25	16	5.40	
Notacanthus sexspinis	11.30	276	4.61	
Glypto marsupialis	8.86	1897	3.61	
Coelorinchus matama	7.83	48	3.19	
Pharimosoma placenta	6.59	193	2.69	
Sebastes capensis	4.00	9	1.63	
Selachophidium guentheri	3.29	37	1.34	
Chaceon chuni	3.05	48	1.24	
Phosichthys argenteus	3.05	62	1.24	
Etmopterus sculpus	2.41	14	0.98	
Funchalia woodwardi	2.27	260	0.92	
Nezumia milleri	2.13	43	0.87	
Diretmoides sp.	1.38	23	0.56	
Cruriraja pacomaculata	1.17	2	0.48	
Kuronezumia leonis	1.13	2	0.46	
Lycoteuthis sp.	1.06	2	0.43	
Xenodermichthys copei	0.81	57	0.33	
Cranchia scabra	0.69	2	0.28	
Synaphobranchus affinis	0.60	5	0.25	
Neoscolepus macrolepidotus	0.57	18	0.23	
GORGONOCEPHALIDAE	0.50	4	0.20	
Neocyttus rhomboidalis	0.46	2	0.19	
Idiacanthus atlanticus	0.35	7	0.14	
Starfish	0.25	62	0.10	
HISTIOTEUTHIDAE	0.21	4	0.09	
Hydrolagus sp.	0.18	4	0.07	
Epigonus sp.	0.14	2	0.06	
ZOARCIDAE	0.09	4	0.04	
Symbiolophorus boops	0.07	4	0.03	
Sympagurus dimorphus	0.07	4	0.03	
Scleractinia	0.07	9	0.03	
Chautilodius sp.	0.07	2	0.03	
Lampanyctus sp.	0.04	5	0.01	
Avocettina sp.	0.01	2	0.01	
Stoloteuthis sp.	0.01	2	0.00	
Electrona risso	0.01	2	0.00	
Total	245.31		100.00	

SPECIES		CATCH/HOUR	% OF TOT. C	SAMP
	weight	numbers		
Callorhynchus capensis	69.36	24	18.53	
Merluccius capensis	59.26	63	15.83	570
Zeus capensis	42.83	309	11.44	
Squalus megalops	40.79	71	10.90	
Cheilodichthys queketti	39.33	224	10.51	
Cynoglossus capensis	16.83	188	4.50	
Helicolenus dactylopterus	14.72	216	3.93	565
Sympagurus dimorphus	13.73	2574	3.67	
Sepia australis	9.44	884	2.52	
Emmelichthys nitidus nitidus	8.84	113	2.36	
Lophius vomerinus	8.45	4	2.26	564
Holohalaelurus regani	6.27	28	1.68	
Todaropsis eblanae	5.08	83	1.36	
Genypterus capensis	4.82	14	1.29	569
Thyrssites atun	4.29	4	1.15	567
Congiolepis spinifer	4.09	24	1.09	
VOLUTIDAE	3.37	4	0.90	
Coelorinchus simorhynchus	3.10	24	0.83	
Uroconger lepturus	2.31	57	0.62	
Trachurus capensis	2.11	14	0.56	571
Rajella dissimilis	1.78	4	0.48	
Dicologlossa cuneata	1.78	133	0.48	
Merluccius capensis	1.58	368	0.42	568
Paracallionymus costatus	1.39	297	0.37	
Spatangus capensis	1.19	14	0.32	
Loligo reynaudi	1.12	4	0.30	
Malacocephalus laevis	0.99	4	0.26	
RANELLIDAE (=CYMATIIDAE)	0.79	14	0.21	
Etrumeus whiteheadi	0.73	8	0.19	572
Coelorinchus matama	0.73	8	0.19	
Macrorhamphosus scolopax	0.73	34	0.19	
Starfish	0.67	123	0.18	
Pelagia noctiluca	0.66	32	0.18	
Merluccius paradoxus	0.53	4	0.14	566
Sepia hieronis	0.33	24	0.09	
E C H I N O D E R M A T A	0.12	53	0.03	

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 147
 DATE :25/03/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 30°22.67
 start stop duration Lon E 14°57.84

Stereomastis sculpta	0.04	14	0.01
Mursia sp.	0.04	4	0.01
Iniocteus capensis	0.03	4	0.01
Hoplostethus atlanticus	0.01	4	0.00
Shark eggs	0.01	8	0.00
Champsodon capensis	0.01	4	0.00
Total	374.31		100.00

XANTHIDAE	0.07	8	0.01
OLIVIDAE	0.07	30	0.01
PHOSICHTHYIDAE	0.04	26	0.01
Total	553.03		99.99

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 150
DATE :26/03/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 29°40,39
start stop duration Lon E 15°28,31
TIME :07:18:14 07:47:33 29.3 (min) Purpose : 3
LOG : 7846.12 7847.40 1.3 Region : 6100
FDEPTH: 195 195 Gear cond.: 0
BDEPTH: 195 195 Validity : 0
Towing dir: 0° wire out : 580 m Speed : 2.6 kn
Sorted : 58 Total catch: 172.52 Catch/hour: 353.03

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight	numbers	
Merluccius capensis	135.96	209	38.51
Merluccius capensis	27.29	5847	7.73
Galeorhinus galeus	24.56	2	6.96
Chelidonichthys capensis	24.54	43	6.95
Helicolenus dactylopterus	14.78	360	4.19
Spatangus capensis	14.31	223	4.05
Paracallionymus costatus	13.65	1461	3.87
Callorhinchus capensis	12.11	6	3.43
Chelidonichthys queketti	9.95	78	2.82
Squalus megalops	9.74	20	2.76
Raja straeleni	9.54	10	2.70
Septia australis	9.47	1015	2.68
Cynoglossus capensis	8.53	129	2.42
Lophius vomerinus	8.02	6	2.27
Lepidopus caudatus	6.82	125	1.93
Mustelus palumbes	5.89	2	1.67
Thyrssites atun	4.38	2	1.24
Holohalaelurus regani	3.11	14	0.88
Todaropsis eblanae	2.84	104	0.81
Emmelichthys nitidus nitidus	2.84	100	0.81
Zeus capensis	1.52	29	0.43
Afrololigo mercatoris	1.33	475	0.38
Dicologlossa cuneata	0.76	33	0.22
Ophiuroidea	0.70	6	0.20
Starfish	0.39	53	0.11
Exodromidia sp.	0.02	6	0.01
Total	353.06		100.01

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 152
DATE :26/03/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 29°25,32
start stop duration Lon E 15°56,89
TIME :12:31:24 13:01:53 30.5 (min) Purpose : 3
LOG : 7882.69 7884.27 1.6 Region : 6100
FDEPTH: 178 178 Gear cond.: 0
BDEPTH: 178 178 Validity : 0
Towing dir: 0° wire out : 490 m Speed : 3.1 kn
Sorted : 155 Total catch: 311.01 Catch/hour: 612.02

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight	numbers	
Merluccius paradoxus	253.10	9733	41.36
JELLYFISH	110.80	0	18.10
Paracallionymus costatus	67.63	5634	11.05
Brama brama	43.18	20	7.05
Merluccius capensis	32.68	67	5.34
MYCTOPHIDAE	19.75	9871	3.23
Thyrssites atun	18.10	8	2.96
Septia australis	14.18	708	2.32
Etrumeus whiteheadi	9.01	130	1.47
Helicolenus dactylopterus	8.86	510	1.45
Chelidonichthys capensis	7.99	20	1.31
ECHINOMETRIDAE	6.19	138	1.01
Lepidopus caudatus	4.96	2	0.81
Coelorinchus matamua	2.74	75	0.45
Cynoglossus capensis	2.66	55	0.44
PHOSICHTHYIDAE	2.43	1212	0.40
Sebastes capensis	2.19	4	0.36
Todaropsis eblanae	2.04	63	0.33
Genypterus capensis	0.86	4	0.14
Lepidopus caudatus	0.86	47	0.14
Starfish	0.47	79	0.08
Oratosquilla oratoria	0.39	39	0.06
Sardinops sagax	0.24	4	0.04
G A S T R O P O D S	0.16	8	0.03
PORIFERA (Sponges)	0.16	4	0.03
Afrololigo mercatoris	0.16	39	0.03
Exodromidia sp.	0.16	20	0.03
C R A B S	0.08	8	0.01
Zeus capensis	0.04	4	0.01
Total	612.08		100.01

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 151
DATE :26/03/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 29°32,96
start stop duration Lon E 15°42,20
TIME :10:00:40 10:31:05 30.4 (min) Purpose : 3
LOG : 7864.67 7866.23 1.6 Region : 6100
FDEPTH: 179 179 Gear cond.: 0
BDEPTH: 179 179 Validity : 0
Towing dir: 0° wire out : 525 m Speed : 3.1 kn
Sorted : 156 Total catch: 280.32 Catch/hour: 553.08

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight	numbers	
Merluccius capensis	278.22	353	50.30
Coelorinchus matamua	54.48	531	9.85
ECHINOMETRIDAE	44.82	604	8.10
Chelidonichthys capensis	39.85	93	7.20
Etrumeus whiteheadi	29.19	438	5.28
Merluccius paradoxus	13.57	2036	2.45
Paracallionymus costatus	12.93	1385	2.34
JELLYFISH	8.67	0	1.57
Callorhinchus capensis	8.59	4	1.55
Raja straeleni	8.38	16	1.52
Holohalaelurus regani	8.03	39	1.45
Lophius vomerinus	7.96	8	1.44
Lepidopus caudatus	6.39	16	1.16
Brama brama	5.47	4	0.99
Septia australis	5.26	462	0.95
Zeus capensis	4.90	97	0.89
Sympagurus dimorphus	3.05	229	0.55
Todaropsis eblanae	2.34	51	0.42
Chelidonichthys queketti	1.99	16	0.36
Helicolenus dactylopterus	1.92	412	0.35
Cynoglossus capensis	1.63	22	0.30
Sebastes capensis	1.42	8	0.26
Merluccius paradoxus	0.92	8	0.17
G A S T R O P O D S	0.60	12	0.11
Congiopodus spinifer	0.57	8	0.10
Genypterus capensis	0.50	4	0.09
Afrololigo mercatoris	0.50	746	0.09
Starfish	0.28	26	0.05
Sardinops sagax	0.28	8	0.05
PORIFERA (Sponges)	0.14	4	0.03

R/V Dr. Fridtjof Nansen SURVEY:2019402 STATION: 153
DATE :26/03/19 GEAR TYPE: BT NO: 27 POSITION:Lat S 29°16,89
start stop duration Lon E 16°16,46
TIME :15:56:32 16:27:13 30.7 (min) Purpose : 3
LOG : 7904.17 7905.82 1.7 Region : 6100
FDEPTH: 158 154 Gear cond.: 0
BDEPTH: 158 154 Validity : 0
Towing dir: 0° wire out : 440 m Speed : 3.2 kn
Sorted : 35 Total catch: 83.85 Catch/hour: 164.04

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight	numbers	
Pterygosquilla capensis	40.48	2758	24.68
Merluccius capensis	32.26	70	19.66
Aequorea forskalea	22.14	603	13.49
Merluccius paradoxus	12.51	260	7.63
Raja straeleni	8.22	2	5.01
Brama brama	7.90	4	4.82
Chelidonichthys capensis	6.58	18	4.01
Todaropsis eblanae	5.84	162	3.56
Paracallionymus costatus	4.77	548	2.91
Merluccius capensis	4.28	428	2.61
Helicolenus dactylopterus	3.05	211	1.86
Etrumeus whiteheadi	2.80	59	1.71
Sufflogobius bibarbus	2.47	248	1.51
Septia australis	2.39	149	1.45
Lophius vomerinus	1.88	2	1.14
Octopus vulgaris	1.68	2	1.03
Brissidae	1.15	67	0.70
Genypterus capensis	0.74	10	0.45
Cynoglossus capensis	0.74	14	0.45
Starfish	0.66	96	0.40
Septia hieronis	0.33	10	0.20
Exodromidia sp.	0.33	78	0.20
Pelagia noctiluca	0.33	25	0.20
Macropipus australis	0.17	6	0.10
Sardinops sagax	0.17	6	0.10
RANELLIDAE (=CYMATIIDAE)	0.11	119	0.07
Afrololigo mercatoris	0.08	22	0.05
Coelorinchus matamua	0.01	6	0.01
Total	164.07		100.02

ANNEX IV. BIOLOGY STAGES

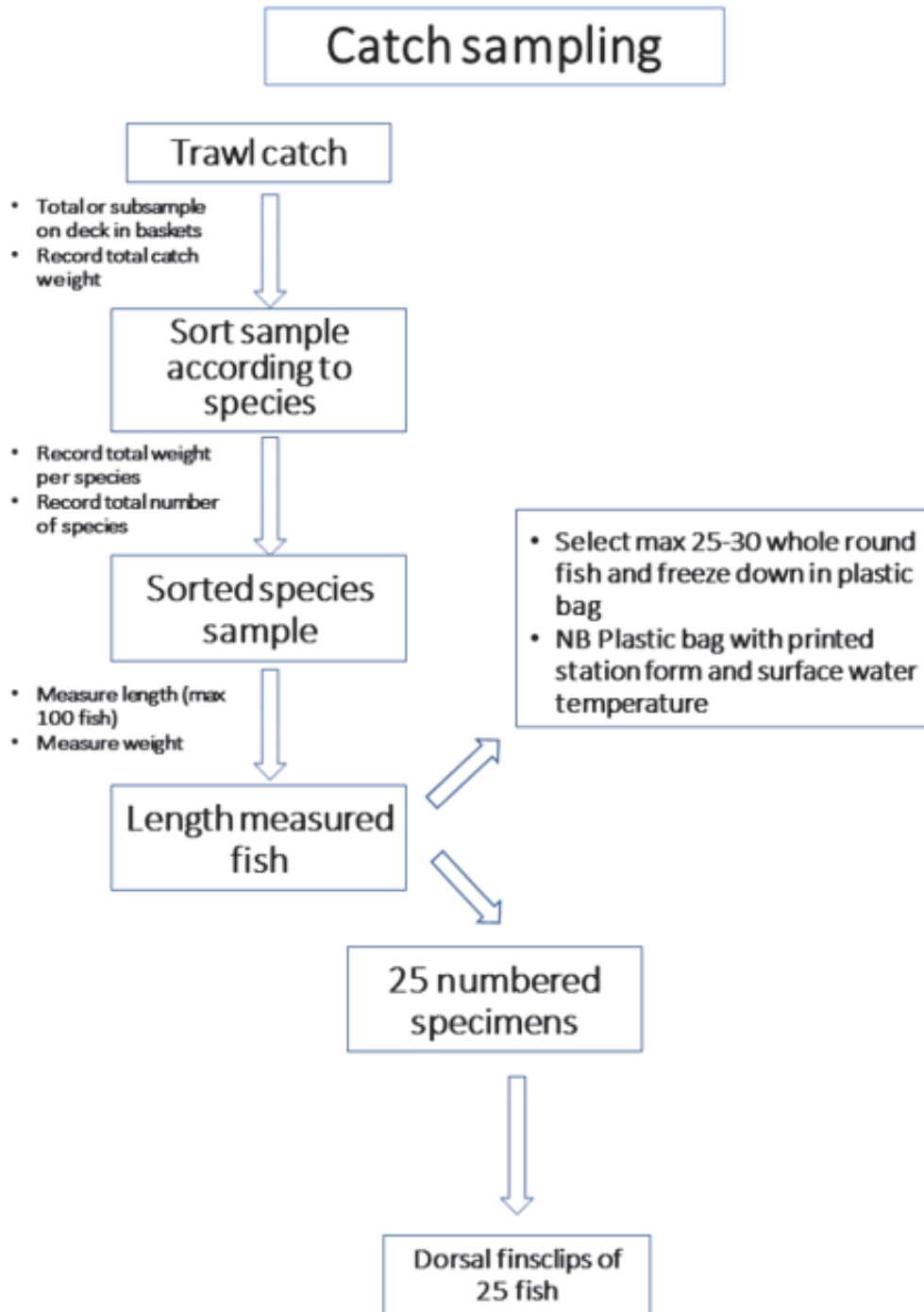
Sexual maturity

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

Stomach content

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

ANNEX V. OVERVIEW OF SAMPLING PROCEDURES IN THE FISH LAB



ANNEX VI. HYDROGRAPHY SENSORS AND WATER CHEMISTRY QUALITY ASSURANCE

pH, chlorophyll a and phaeopigment samples were measured in duplicates (or greater if a value appeared suspect). Total alkalinity samples were measured in triplicates. Statistics for measurement agreements for these measurements are seen below.

Parameter	Sample count	Standard Deviation
pH	140	0.006 (total scale)
Total alkalinity	140	1.60 $\mu\text{mol/kg}$
Chlorophyll a	156	0.020 mg/m^3
Phaeopigments	156	0.046 mg/m^3

CTD dissolved oxygen and salinity value validity statistics

Parameter	Sample Count	Percent Drift from Sensor Calibration Coefficient
Dissolved Oxygen	14	0.2 %

Parameter	Sample Count	Average Difference Between Sensor and Salinometer
Salinity	15	0.004

CTD sensors

Type	Serial Number	Model	Calibration Date
Deck unit	11-1082	SBE 11plus	N/A
Fluorometer	4892	WET Labs ECO-AFL fluorometer	08.11.2017
Pressure sensor	09P75372-1160	DigiQuartz	22.07.2013
Underwater unit	127957	SBE 9plus 6800m	20.10.2018
Water sampler	32-0972	SBE 32 6800m	N/A
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
Submersible pump	52147	SBE 5T	2014
Submersible pump	054196	SBE 5T	N/A
Temperature sensor	31602	SBE 3plus 6800m	18.12.2018
Temperature sensor	03P4537	SBE 3plus 6800m	18.12.2018
Sonar Altimeter	1186	Benthos PSA-916	08.2005
Par sensor	1123	PAR-LOG ICSW	12.10.2017

Thermosalinograph sensors

Type	Serial Number	Model	Calibration Date
Thermosalinograph	21-3418	SBE21	06.04.2016
Fluorometer	3418	SBE21	06.04.2016
Conductivity sensor	3418	SBE21	06.04.2016
Temperature sensor	0880	SBE38	23.03.2016
Temperature sensor	257S	9702011 WETStar	20.04.2015

ANNEX VII. LENGTH FREQUENCY DISTRIBUTIONS OF SELECTED SPECIES

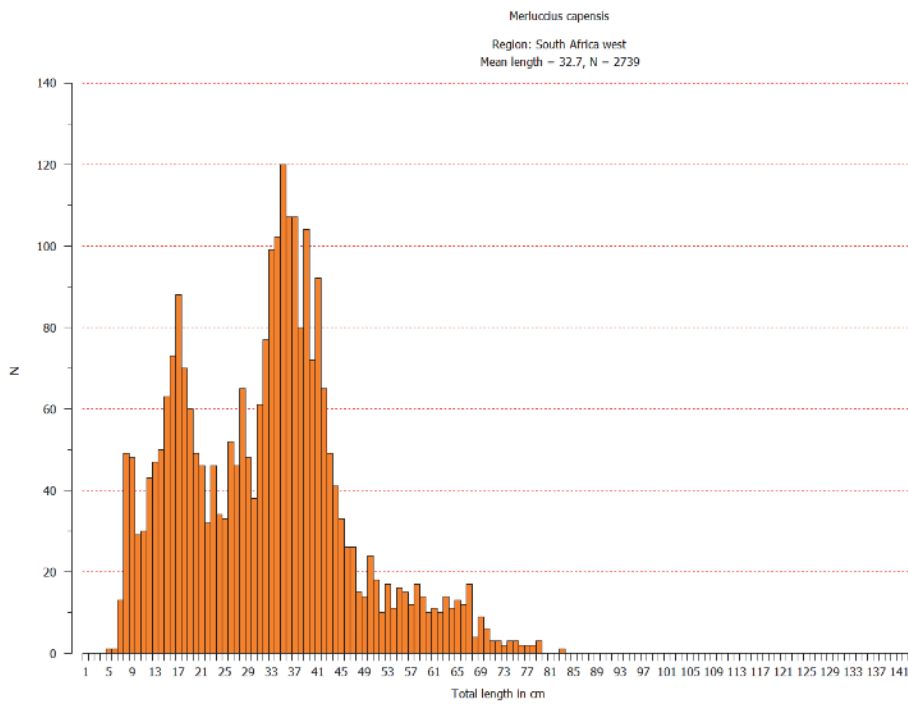


Figure VII.1. Length histogram of *Merluccius capensis*

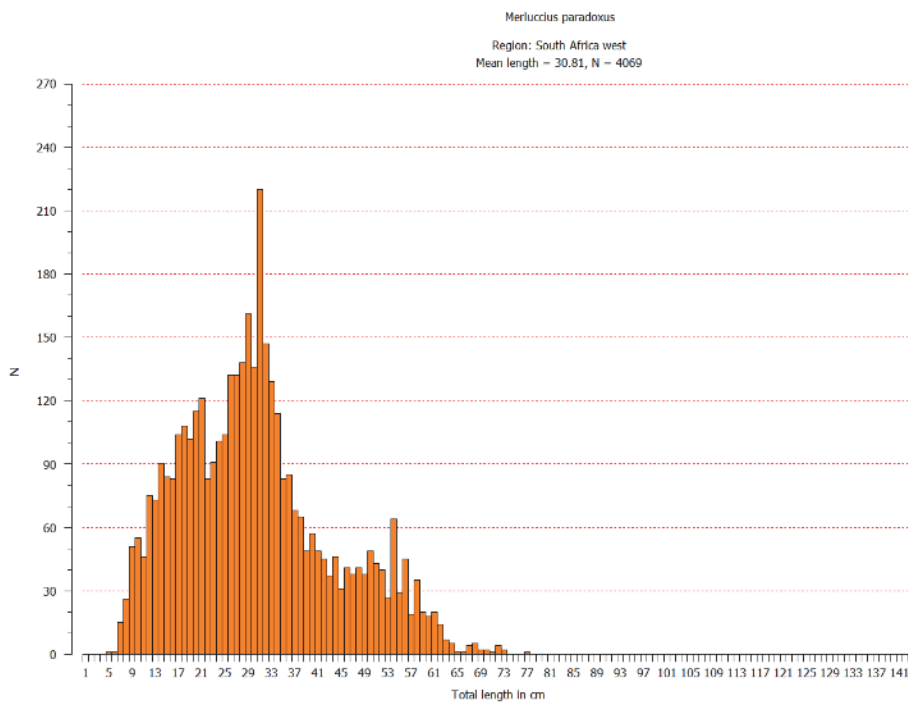


Figure VII.2. Length histogram of *Merluccius paradoxus*

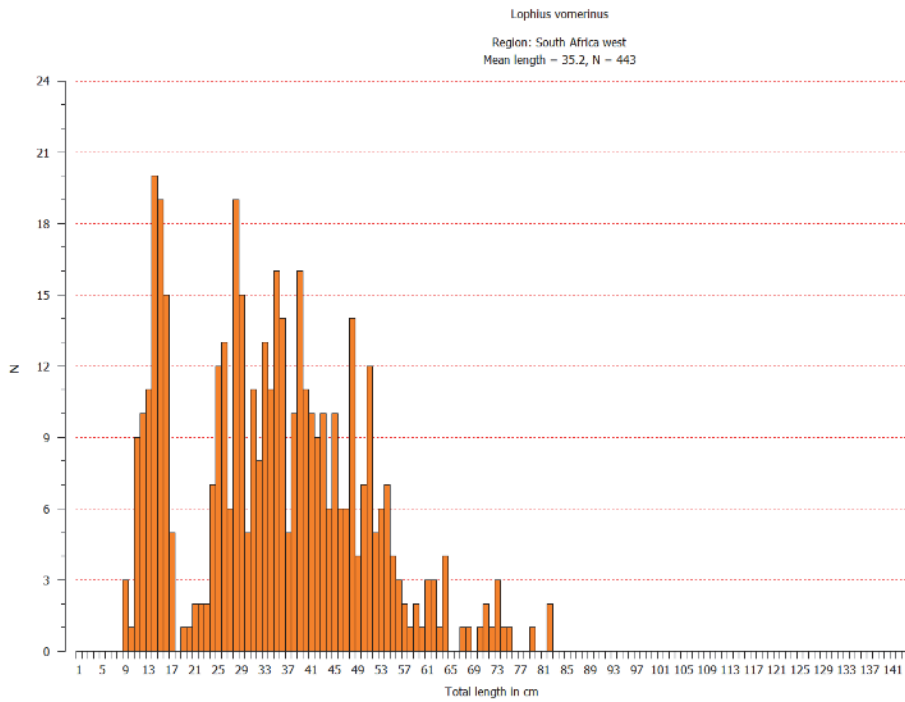


Figure VII.3. Length histogram of *Lophius vomerinus*

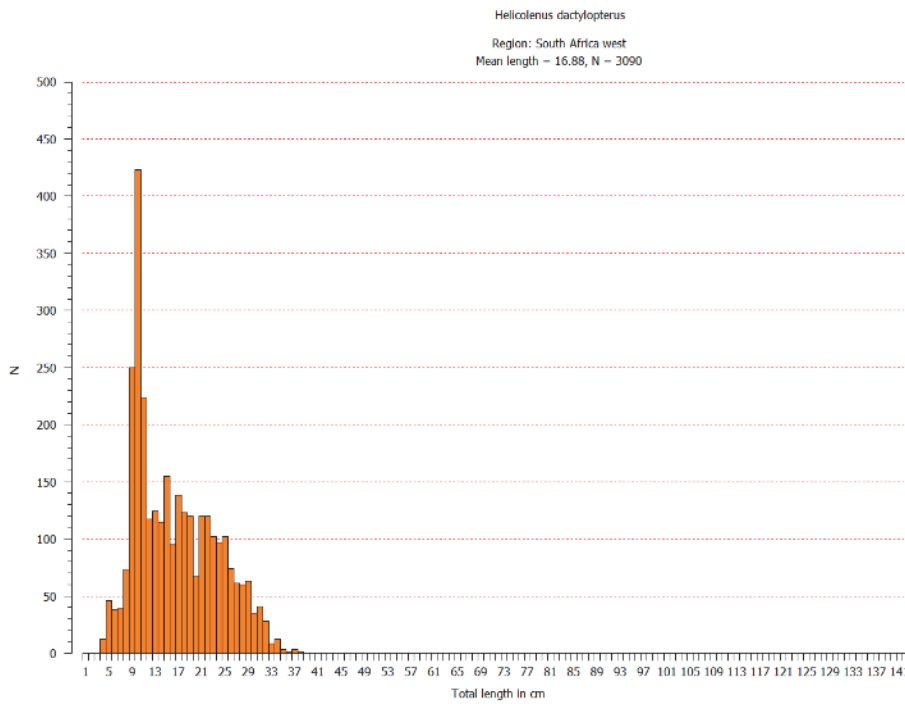


Figure VII.4. Length histogram of *Helicolenus dactylopterus*

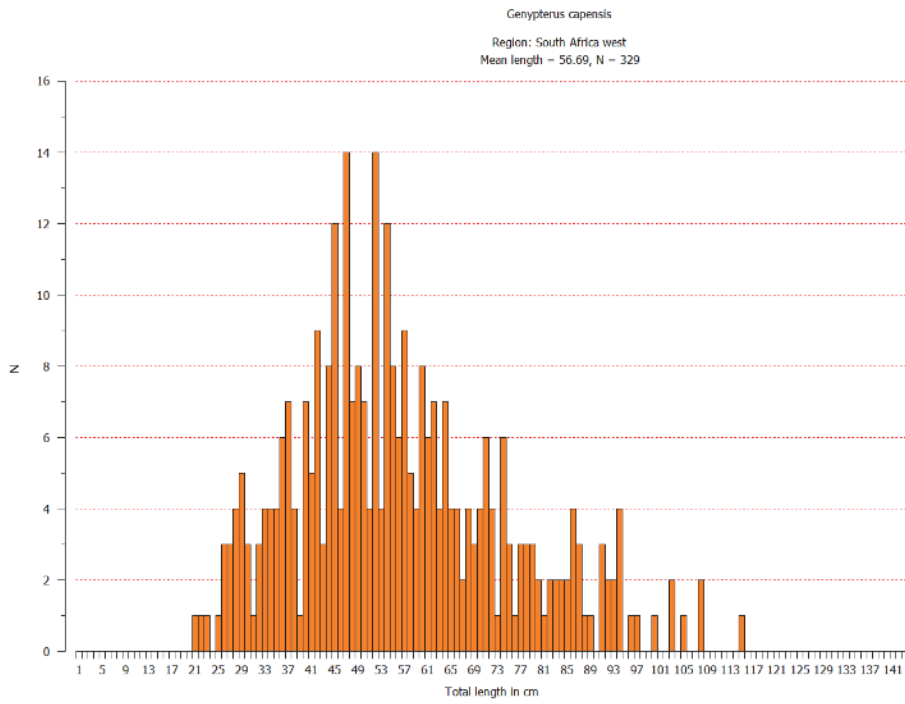


Figure VII.5. Length histogram of *Genypterus capensis*

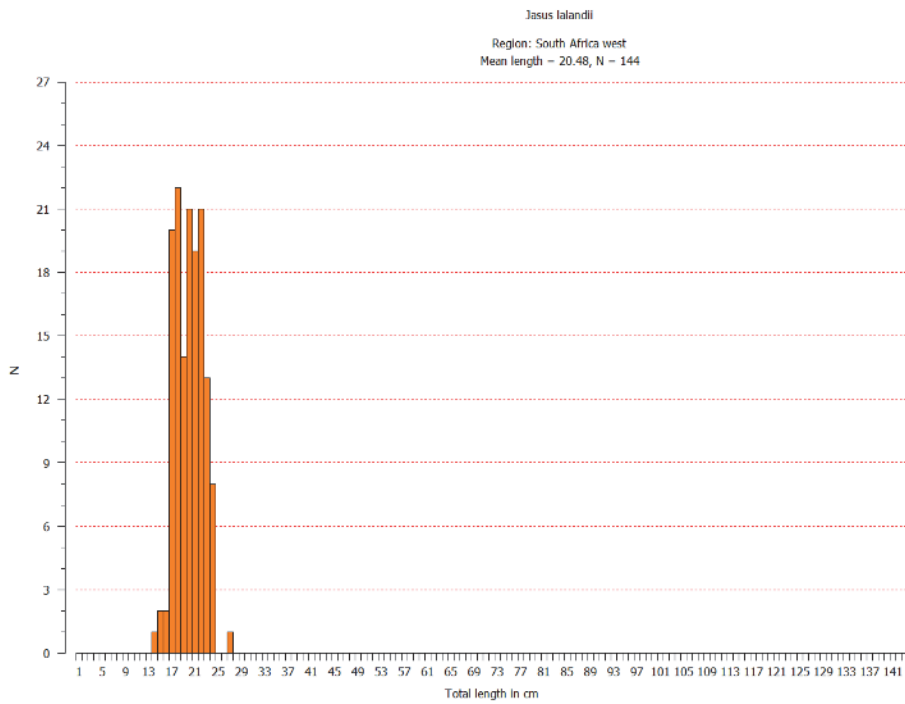


Figure VII.6. Length histogram of *Jasus lalandii*

ANNEX VIII. OVERVIEW OF SAMPLES AND INSTITUTIONS

Gear/equipment	Analyses	Samples	Preservation	Port of offloading	Type of transportation	Institution address	Contact person Leg 2.1 (e-mail, phone no)	Deadline for analysis
Niskin bottles on CTD		Nutrients	0.2 ml chloroform (keep cool)	Walvis Bay after leg 2.3		IMR		
WP2 (180 µm) from max 200 m 1/2 Split	Zooplankton biomass estimation	Aluminium trays	Dried and then frozen	Walvis Bay after leg 2.3		IMR	Stamatina Isari	
WP2 (180 µm) from max 200 m 1/2 Split	Zooplankton community identification	Bottles with ½ of bulk WP2 sample	4% formaldehyde	Walvis Bay	By road	NatMIRC	Richard Horaeb	September 2019
MultiNet (Midi, 1 x 405 µm), oblique tow from max 200 m 1/2 Split	Ichthyoplankton community identification	Bottles with ½ of bulk multinet sample	96% ethanol	Walvis Bay	By road	NatMIRC	Richard Horaeb/Josephine	September 2019
MultiNet (Midi, 1 x 405 µm), oblique tow from max 200 m 1/2 Split	Ichthyoplankton community identification	Bottles with ½ of bulk multinet sample	4% formaldehyde	Walvis Bay	By road	NatMIRC	Richard Horaeb/Josephine	September 2019
	Ichthyoplankton community identification	Scintillation vials with sorted ichthyoplankton from ½ of bulk multinet sample	4% formaldehyde	Walvis Bay	By road	NatMIRC	Richard Horaeb/Josephine	September 2019
Manta trawl (375 µm): surface tow for 15 mins	Neuston community identification	Neuston community identification	70% ethanol	Walvis Bay		UWC	Mark Gibbons	

Gear/equipment	Analyses	Samples	Preservation	Port of offloading	Type of transportation	Institution address	Contact person Leg 2.1 (e-mail, phone no)	Deadline for analysis
	Species identification, Genetics	Scintillation vials with sorted ichthyoplankton from the bulk manta sample	96% ethanol			IMR	Stamatina Isari	
	Abundance and chemical composition of microplastics	Aluminium trays with sorted microplastics from the bulk manta sample	Photographed, dried and frozen			IMR	Bjørn Einar Grøsvik,	
Trawl samples	Species identification	Jellyfish whole individual	Dried + frozen	Walvis Bay	Plane	UWC	Mark Gibbons	
Trawl samples	Genetic analyses?	Jellyfish arm	96% Ethanol + frozen	Walvis Bay	Plane	UWC	Mark Gibbons	
Trawl samples	??	Jellyfish the rest	4% formaldehyde	Walvis Bay	Plane	UWC	Mark Gibbons	
Trawl samples	Genetic analyses (stock identity)	Finclips of priority species (Lophius, Genypterus, T. capensis and S.colias)	96% Ethanol	Walvis Bay		IMR Link to Romina's project	Geir/Maria	

Gear/equipment	Analyses	Samples	Preservation	Port of offloading	Type of transportation	Institution address	Contact person Leg 2.1 (e-mail, phone no)	Deadline for analysis
Trawl samples	Morphometric analyses/parasites/otoliths/ Stomachs (Hakes, Lophius, Genypterus, T. capensis and S.colias)	Whole specimens (same as those sampled for genetics)	Frozen	Walvis Bay	By road	NatMIRC	Paul/Sarah/Beata Theopolina/Latoya (NatMIRC for Trachurus and Scomber)	
Trawl samples	Taxonomy	Whole fish, for species that cannot be identified	Frozen	Walvis Bay	By road	NatMIRC	Johnny/Malasia	
Trawl samples	Benthic epifauna	Whole specimen	Ethanol or formalin	Walvis Bay	Plane	DAFF	Lara Aktinson	
Trawl sediment pipe	chemical analyses /granulometric analyses	Trawl cylinder sediment	Frozen / 4% formaldehyde	Walvis Bay	Plane	SANBI	Kerry Sink	

ANNEX IX. OVERVIEW OF DATA COLLECTED AND AVAILABILITY TO PARTNER COUNTRIES

2019402		After the survey, to local cruise leader Ester Nangolo	At the post survey meeting, to local cruise leader	Upon request	Not collected/stored	Analyzed by partner country	Analyzed by Sci.Plan
Data types	Data						
Track log	continuous 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					
Chemistry	Nutrients		x				
Chemistry	pH			x			x
Chemistry	Total alkalinity			x			x

2019402		After the survey, to local cruise leader Ester Nangolo	At the post survey meeting, to local cruise leader	Upon request	Not collected/stored	Analyzed by partner country	Analyzed by Sci.Plan
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		

