

**SURVEY OF THE PELAGIC FISH RESOURCES OFF
NORTH WEST AFRICA**

**SENEGAL - THE GAMBIA – GUINEA BISSAU - GUINEA
22 June - 7 July 2011**

**Centre de Recherches Océanographiques de Dakar-Thiaroye
Dakar, Senegal**

**Institute of Marine Research
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Conakry, Guinea**

Bergen January 2012



THE EAF-NANSEN PROJECT

FAO started the implementation of the project "Strengthening the Knowledge Base for and Implementing an Ecosystem Approach to Marine Fisheries in Developing Countries (EAF-Nansen GCP/INT/003/NOR)" in December 2006 with funding from the Norwegian Agency for Development Cooperation (Norad). The EAF-Nansen project is a follow-up to earlier projects/programmes in a partnership involving FAO, Norad and the Institute of Marine Research (IMR), Bergen, Norway on assessment and management of marine fishery resources in developing countries. The project works in partnership with governments and also GEF-supported Large Marine Ecosystem (LME) projects and other projects that have the potential to contribute to some components of the EAF-Nansen project.

The EAF-Nansen project offers an opportunity to coastal countries in sub-Saharan Africa, working in partnership with the project, to receive technical support from FAO for the development of national and regional frameworks for the implementation of Ecosystem Approach to Fisheries management and to acquire additional knowledge on their marine ecosystems for their use in planning and monitoring. The project contributes to building the capacity of national fisheries management administrations in ecological risk assessment methods to identify critical management issues and in the preparation, operationalization and tracking the progress of implementation of fisheries management plans consistent with the ecosystem approach to fisheries.

LE PROJET EAF-NANSEN

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

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

CRUISE REPORTS 'DR FRIDTJOF NANSEN'

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by

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TABLE OF CONTENTS

CHAPTER 1	INTRODUCTION	1
1.1	OBJECTIVE OF THE CRUISE.....	1
1.2	PARTICIPATION.....	2
1.3	NARRATIVE.....	2
CHAPTER 2	METHODS.....	7
2.1	ENVIRONMENTAL DATA	7
2.2	BIOLOGICAL SAMPLING	7
2.3	ACOUSTIC SAMPLING.....	8
CHAPTER 3	SURVEY RESULTS	12
3.1	HYDROGRAPHY.....	12
3.1.1	<i>Cross shelf hydrographical profiles.....</i>	<i>12</i>
3.1.2	<i>Sea surface temperature.....</i>	<i>19</i>
3.2	PELAGIC FISH	21
3.2.1	<i>St. Louis - Cape Vert.....</i>	<i>26</i>
3.2.2	<i>Cape Vert - The Gambian border.....</i>	<i>26</i>
3.2.3	<i>The Gambian shelf.....</i>	<i>27</i>
3.2.4	<i>The Casamance shelf.....</i>	<i>28</i>
3.2.5	<i>The Guinea Bissau shelf.....</i>	<i>28</i>
3.2.6	<i>The Guinea shelf.....</i>	<i>29</i>
CHAPTER 4	OVERVIEW AND SUMMARY OF RESULTS	30

Annex I	Records of fishing stations
Annex II	Description of instruments and fishing gear
Annex III	Pooled length distributions by species
Annex IV	Estimated number and biomass by length-group and sectors

CHAPTER 1 INTRODUCTION

1.1 Objective of the cruise

The general objectives of the survey were to estimate biomass and map the distribution of small pelagic fish stocks off NW Africa (Senegal, the Gambia, Guinea Bissau and Guinea) by hydro-acoustic methods and describe the hydrographic conditions in the region over a period of 16 days, in June-July 2011. The agreed objectives were as follows:

- To map the distribution and estimate the biomass for the main small pelagic fish using hydro-acoustic methods. The species of interest were: sardinellas (*Sardinella aurita*) and (*Sardinella maderensis*), horse mackerel (*T. trecae*), false scad (*Decapterus rhonchus*), and anchovy (*Engraulis encrasicolus*).
- To identify and describe the size distribution of the target fish populations by midwater and bottom trawl sampling and process the catches by recording weight and number by species.
- Collect biological data of the main target species, especially *Sardinella aurita*, *S. maderensis* and *T. trecae*.
- To sample standard hydrographical transects for temperature, salinity and oxygen.
- To train local participants in acoustic survey methodology including fish identification and sampling, scrutinizing of echograms, hydrographic sampling and abundance estimation.

The time allocated for the survey was 16 days.

1.2 Participation

Participating scientists were:

Centre de Recherches Océanographiques de Dakar-Thiaroye (CRODT), Senegal:
Abdoulaye Sarre (Local cruise leader) and Ndiaga Thiam

Department of Fisheries (FD), The Gambia:
Ebou Mass Mbye

Centro de Investigacao Pesqueira Aplicada (CIPA), Guinea Bissau
M. Duarte Bucal and Amadeu Mendes de Almeida

Centre National des Sciences Halieutique de Boussoura (CNSHB), Guinea:
Amadou Bahand and Ousmane Tagbé Camara

Institute of Marine Research (IMR), Norway:
Reidar Toresen (Cruise leader), Magne Olsen, Jarle Kristiansen and Ole Sverre Fosheim

1.3 Narrative

The survey started on the 22/06-2011 from Dakar. The vessel departed at 16:30 GMT (GMT=Local time) and steamed north to St Louis at the border to Mauritania, where the surveying was started. The course track and fishing stations are shown in Figure 1a, Figure 1b, Figure 2a and Figure 2b, while Table 1 shows survey effort during the survey, including number of trawl stations and CTD casts.

During all surveys in the region a common survey design has been adapted with systematic parallel course tracks spaced 10 NM (nautical miles) apart, perpendicular to the coastline. During this survey, this strategy was followed in Senegal and The Gambia. In Guinea Bissau and in Guinea the transects were carried out by a somewhat larger distance. This was because of limited time available for the survey to cover the whole region with transects 10 NM apart. The distance between the transects in Guinea Bissau and Guinea varied between 15 and 22 NM. To cover the whole distribution area of pelagic fish, the shelf was covered from the 15 m isobath and offshore to the 500 m isobath. Trawling was done irregularly, either to identify echo registrations or to check 'blindly' if fish were mixed with the plankton in the upper layers of the water column. Pelagic trawl with floats was often used to catch fish close to the

surface. A smaller pelagic trawl or the bottom trawl with floats was used for sampling pelagic fish in shallow waters (depth less than 25 m).

Six cross shelf hydrographic profiles were carried out, at St. Louis 23/6, Cape Vert 25/6, off the Gambia 26/6, at Casamance 28/6, off Guinea Bissau at 30/6, off Guinea at 5/7.

All data collected during the survey were made available to the participants.

Table 1. Summary of survey effort by regions, including number of demersal (BT) and pelagic (PT) trawl hauls, CTD casts, and distance surveyed (log), disregarding the steaming from Cape Vert to St. Louis

(log).

Area	BT	PT	Total trawls	CTD casts	Log (NM)
St. Louis to Casamance	11	27	38	77	1057
Guinea Bissau and Guinea	8	17	25	36	1155

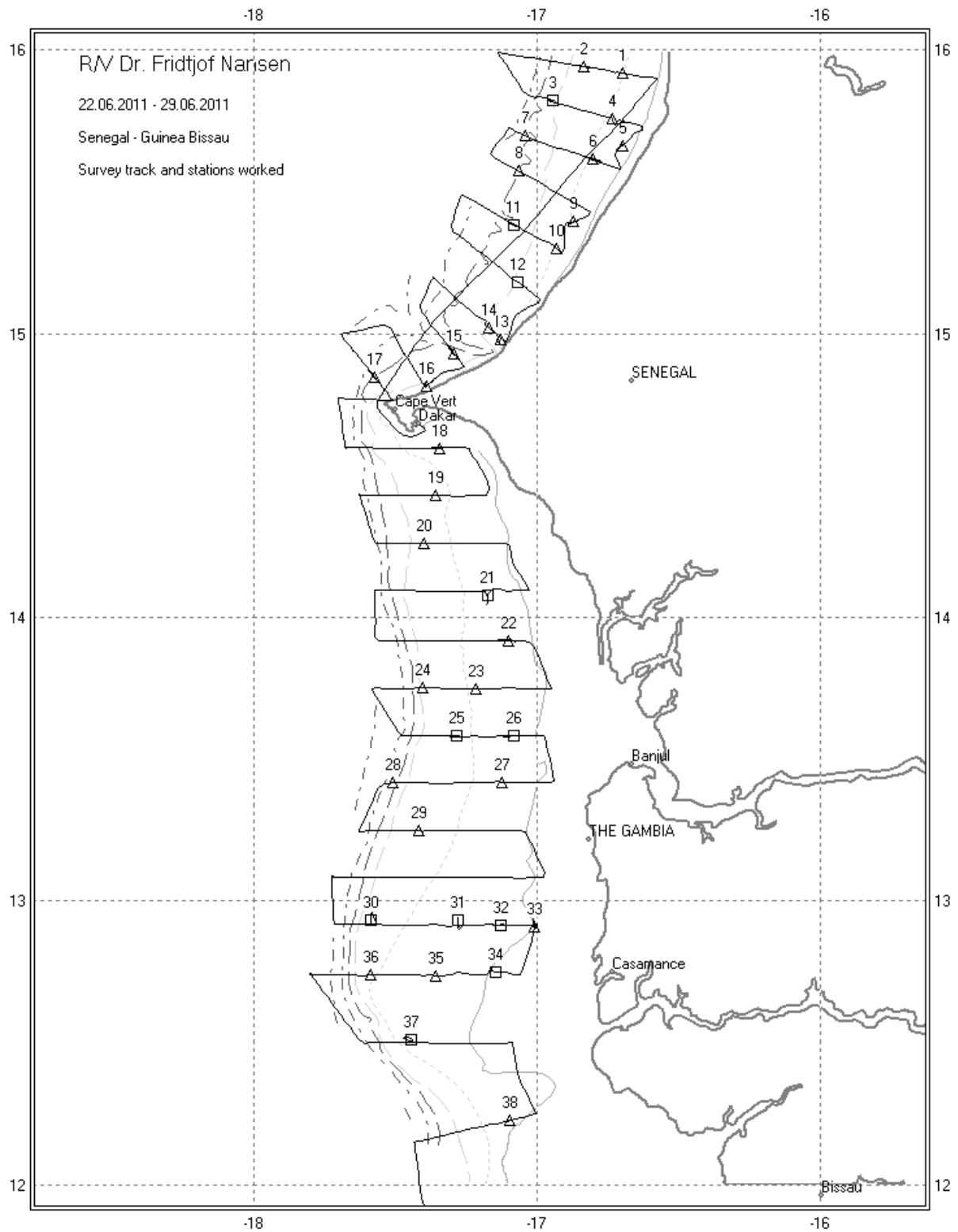


Figure 1a. Course tracks with fishing stations; Casamance to St. Louis.

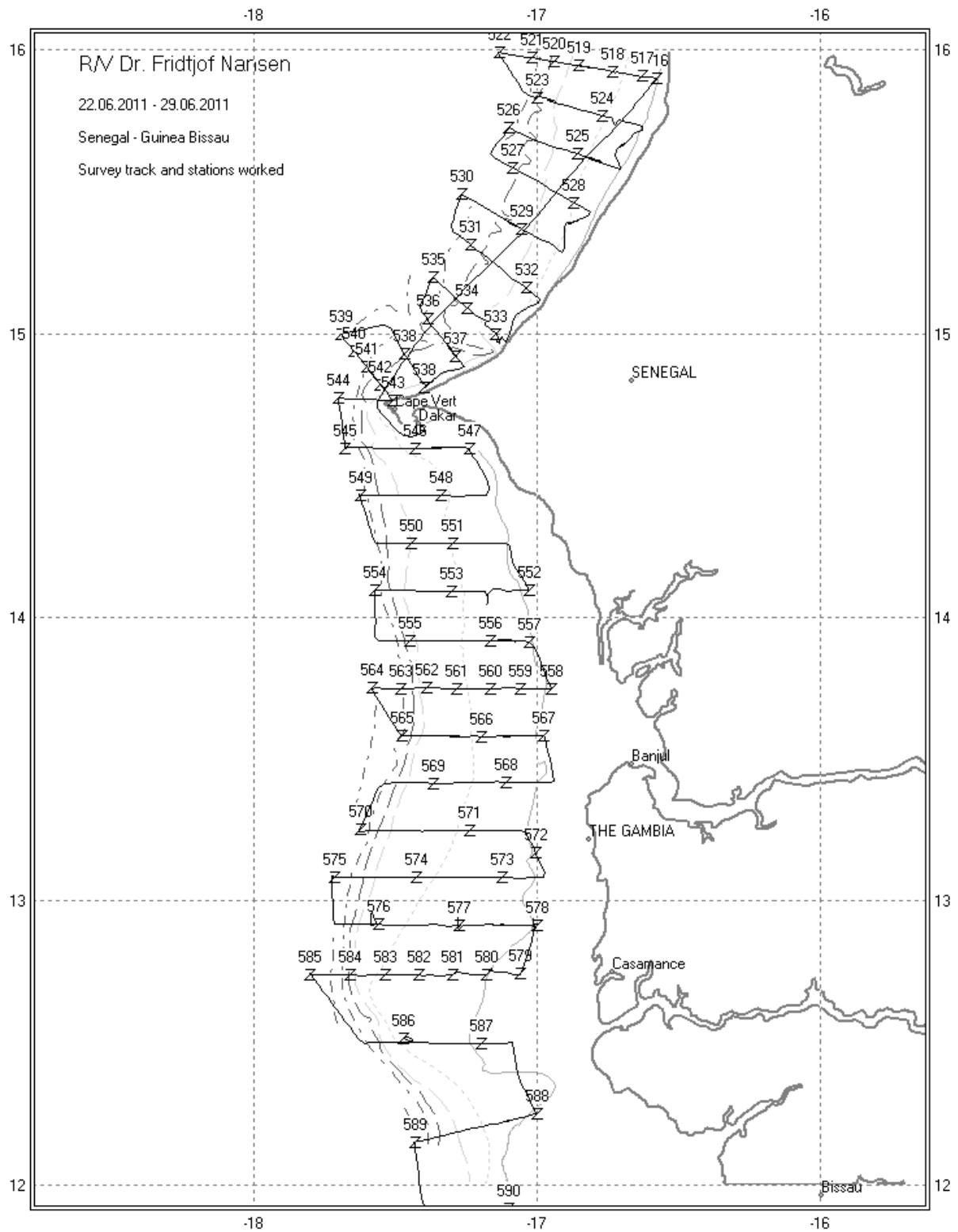


Figure 1b. Course tracks with hydrographic stations; Casamance to St. Louis.

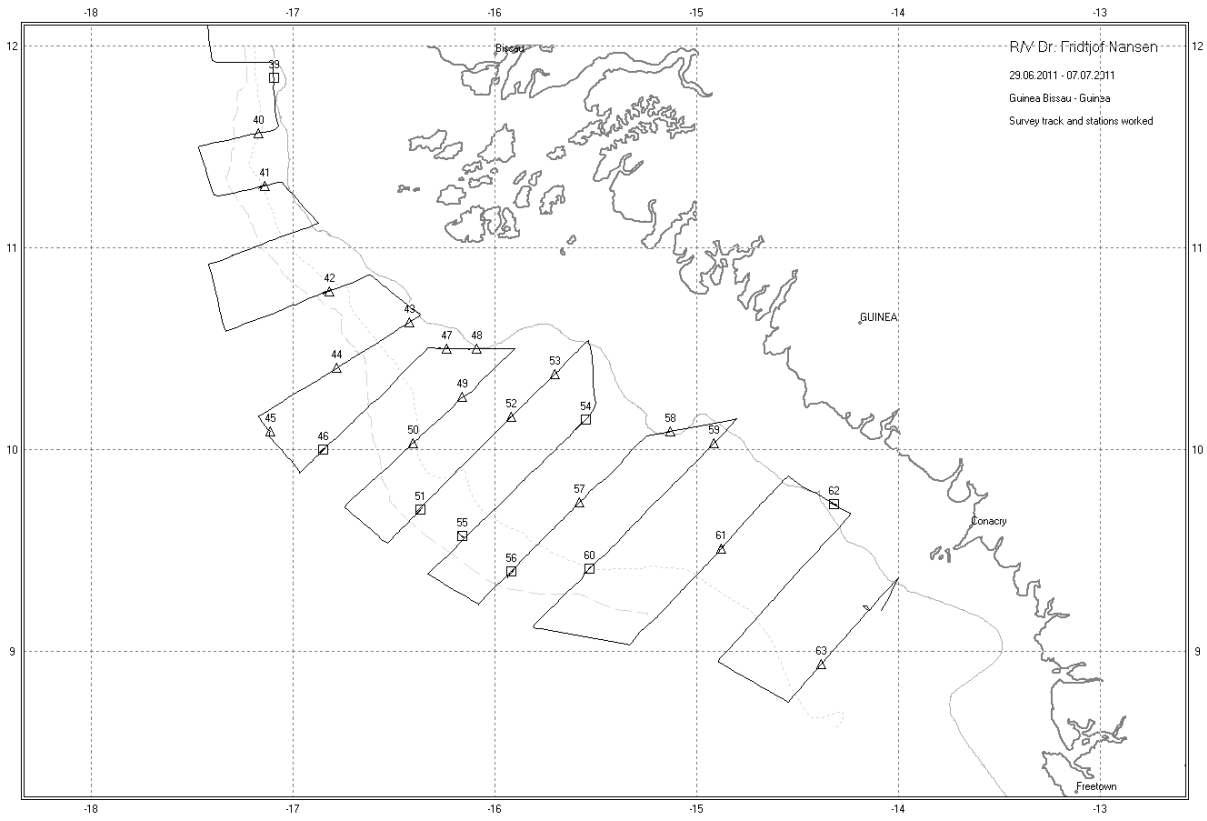


Figure 2a. Course tracks with fishing stations; Guinea Bissau and Guinea.

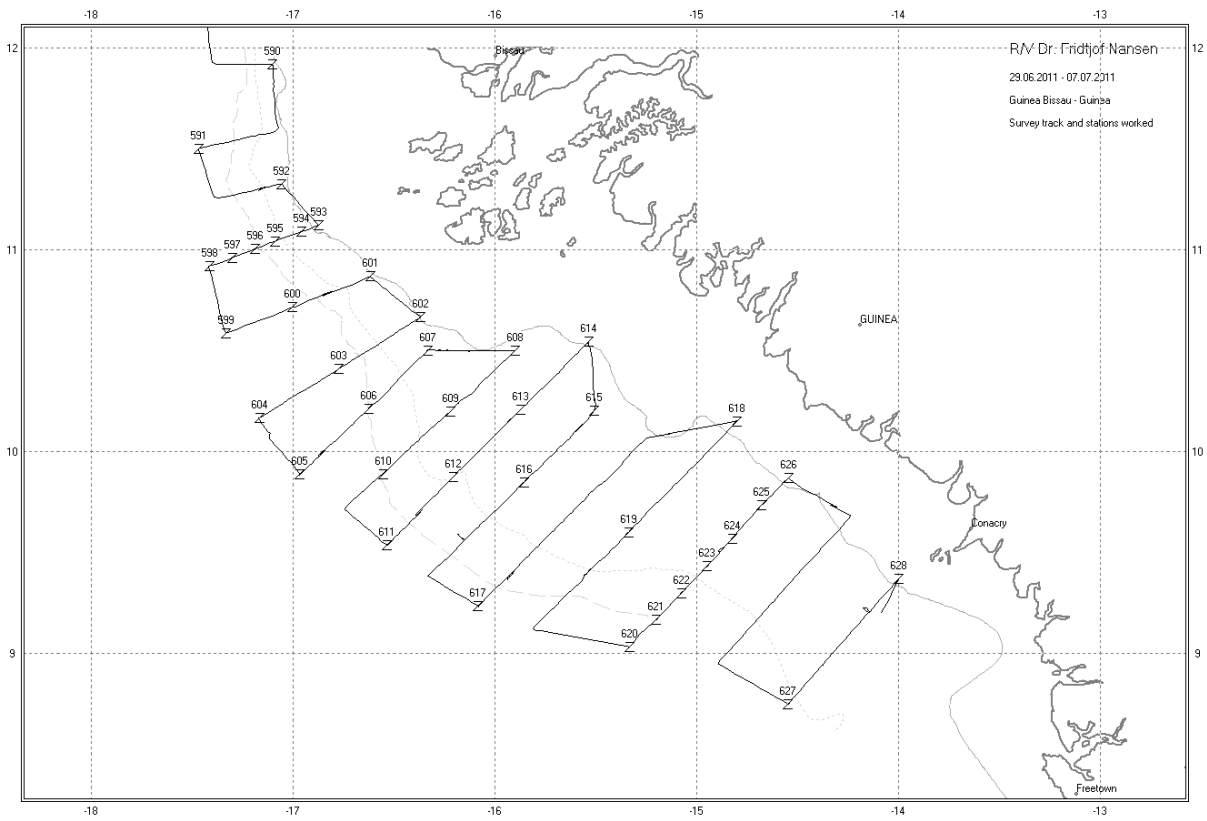


Figure 2b. Course tracks with hydrographic stations; Guinea Bissau and Guinea.

CHAPTER 2 METHODS

2.1 Environmental Data

A Seabird 911+ CTD probe was used to obtain vertical profiles of the temperature, salinity and oxygen. Real time logging was carried out using the PC based Seabird Seasave Software. CTD casts were conducted along the cruise track in fixed transects and regularly stations spread over the entire shelf. The casts were stopped a few meters above the bottom, and at a maximum of 1000 m depth.

2.2 Biological sampling

Biological sampling of the fish was carried out using trawls. A pelagic trawl was used, and to operate it closer to surface, floats was often used. The bottom trawl was used for verification of fish close to bottom, or with floats for sampling of pelagic fish in shallow waters (depth less than 25 m). Annex II gives a description of the instruments and the fishing gear used. All catches were sampled for composition by weight and numbers of each species caught. Species identification was based on the FAO Species Guides. Length frequency distributions, by total fish length in cm, of the selected target species were taken in all the stations where they were present. Individual weight measurements were taken regularly to estimate the condition factor in the length-weight relationship:

$$\bar{w} = \frac{cond}{100} \cdot L^3$$

The specific condition factors obtained from the samples and applied for this survey were: 0.96 for sardinellas and *Trachurus trecae*.

For the estimation of the biomass of carangids and associated species, an overall average length of 23 cm and a condition factor of 0.88 (to calculate the mean length of this length group) were applied. The target groups used for Senegal and The Gambia can be found in Table 1, while the complete records of fishing stations and catches are shown in Annex I.

Table 1. Allocation of acoustic densities to taxii. Note that for the groups of sardinella, horse mackerel, and sardine all encountered species are listed, while only examples are listed for the remaining groups.

Group	Taxon	Species
Sardinella	<i>Sardinella</i> sp.	<i>S. aurita</i> <i>S. maderensis</i>
Horse mackerel	<i>Trachurus</i> sp.	<i>T. trecae</i> <i>T. trachurus</i>
Sardine	Sardinops	<i>S. pilchardus</i>
Pelagic species 1	Clupeiformes ₁	<i>Ilisha africana</i> <i>Engraulis encrasicolus</i>
Pelagic species 2	Carangidae ₂	<i>Trachinotus ovatus</i> <i>Selene dorsalis</i> <i>Chloroscombrus chrysurus</i> <i>Decapterus rhonchus</i> <i>Alectis alexandrinus</i>
Little tuny	Scombridae	<i>Euthynnus alletteratus</i> <i>Sarda sarda</i> <i>Scomber japonicus</i>
	Sphyraenidae	<i>Sphyraena guachancho</i>
	Others	<i>Trichiurus lepturus</i> <i>Zeus faber</i>
Other demersal species	Sparidae ₃	<i>Dentex angolensis</i> <i>D. macrophthalmus</i> <i>D. congoensis</i> <i>D. canariensis</i> <i>D. barnardi</i> <i>Pagellus bellottii</i> <i>Sparus caeruleostictus</i> <i>S. pagrus africanus</i>
Big-eye grunt	Other taxii	<i>Pseudupeneus prayensis</i> <i>Brachydeuterus auritus</i> <i>Arioma bondi</i> <i>Pomadasys incisus</i> <i>Galeoides decadactylus</i>
Mesopelagic species	Myctophidae ₃ Other mesopelagic fish	
Plankton	Calanoidae Euphausiidae Other plankton	<i>Calanus</i> sp. <i>Meganyctiphanes</i> sp.

₁: other than *Sardinops* sp.; ₂: other than *Trachurus* sp.; ₃: main taxon in group.

2.3 Acoustic sampling

A SIMRAD EK-60 Echosounder was used with the settings as shown in Annex II. The LSSS was used for analysis and allocation of the integrated s_A -values to the individual specified target groups by 5 NM intervals. The allocation of values to target groups was based on a combination of a visual scrutiny of the pattern as deduced from echo diagrams, the LSSS analysis, and the catch compositions.

In cases where the target category of fish contains more than one species (sardinellas and *Trachurus trecae*), the mean s_A -value allocated to the category is divided between the species in the same ratio as their contribution to the mean back scattering strength in the length frequency samples.

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

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

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

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

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

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

where

ρ_i = density of fish in length group i

s_A = mean integrator value

p_i = proportion of fish in length group i

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

target species, and

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

The integrator outputs were split in fish groups using a combination of pattern of traces as deduced from echo diagrams, the LSSS analysis and catch composition as described below. The following groups were used: 1) sardinellas, 2) horse mackerel, 3) carangids and associated species, and 4) demersal fish.

The above equations show that the conversion from s_A -values to number of fish is dependent on the length composition of the fish. It is therefore important to get representative length distributions from the stock in the whole distribution area.

When the size classes (of e.g. young fish and older fish) are well mixed, the various length distributions can be pooled together with equal importance. Otherwise, when the size classes are segregated, the total distribution area has to be post-stratified, according to the length distributions, and separate estimates are made for the regions containing fish with equal size.

For a region representing a distribution of a target-specie, the following basic data are needed for the estimation of abundance;

- 1) the average s_A -value for the region,
- 2) the surface (usually square nautical miles, NM^2), and
- 3) a representative length distribution of the fish in the region.

If the targeted fish is a mixture of more than one species, for example sardinellas, a representative distribution of the two, within the region, as shown in the trawl catches, are used. A length distribution representing the number of the two species for each catch will have to be calculated. Thereafter, these distributions have to be normalized to a unit number (usually 100) so they are equally weighted.

A systematic approach to a) divide the s_A -value between species in a category of fish (e.g. *Sardinella aurita* and *S. maderensis*) and b) produce pooled length distributions of a target species for use in the above equation and c) calculate the biomass estimates for a region, is obtained through the following procedure:

The samples of the species in the category (e.g. sardinellas) are respectively pooled together with equal importance (normalized).

The mean back scattering strength (ρ/s_A) of each length frequency distribution of the target species is calculated and summed. This is automatically done in the Excel spread-sheet made

available for acoustic abundance estimation onboard RV “Dr. Fridtjof Nansen”, provided the data are punched in this sheet.

The mean s_A -value allocated to the category of fish in the region is divided between the species in the same ratio as their relative contribution to the mean back scattering strength of the length groups in the sample representing the region

The pooled length distribution is used, together with the mean s_A -value, to calculate the density (numbers per square NM) by length groups and species, using the above formula. The total number by length group in the area is obtained by multiplying each density-number by the area.

The numbers are then converted to biomass using the estimated weight at length.

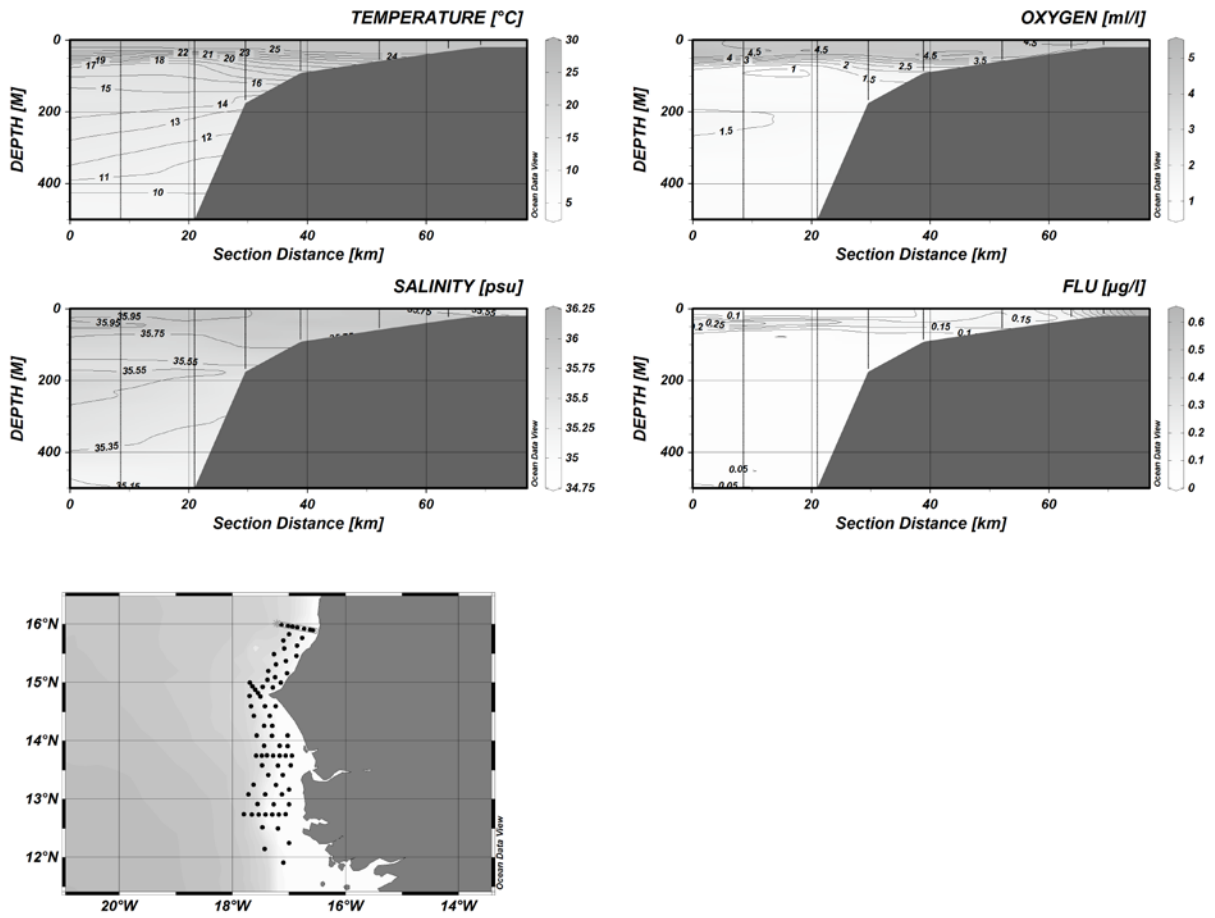
CHAPTER 3 SURVEY RESULTS

3.1 Hydrography

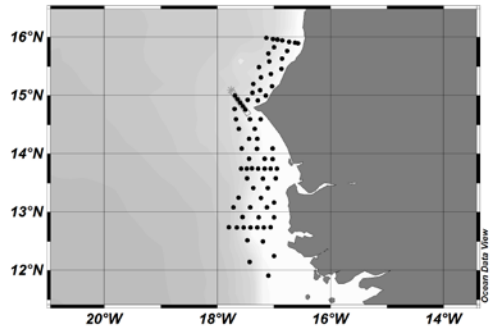
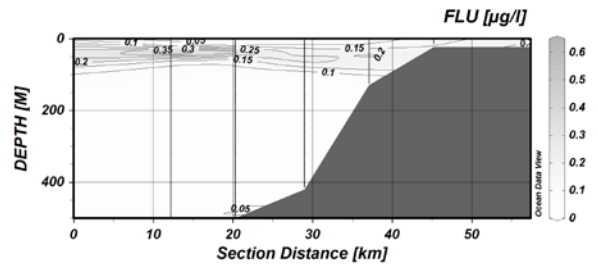
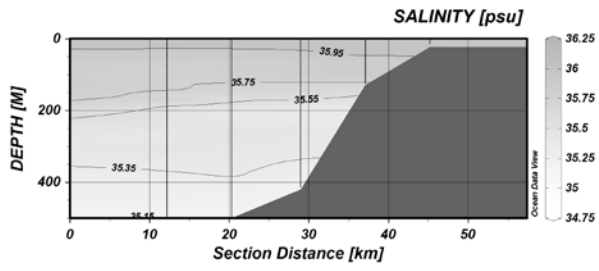
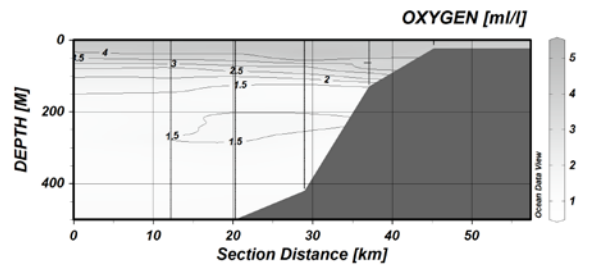
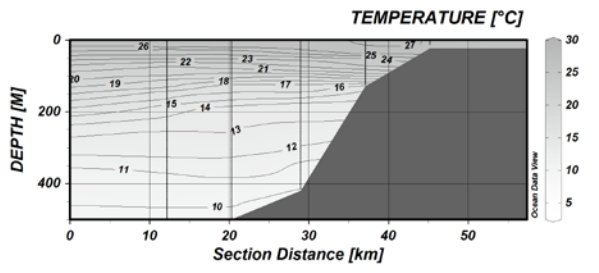
Hydrographical data was collected on fixed CTD stations to 500 m depth and from the Thermosalinograph and the Aanderaa weather station that continuously collect sea surface temperature, wind speed and direction, solar radiation, etc. during the survey.

3.1.1 Cross shelf hydrographical profiles

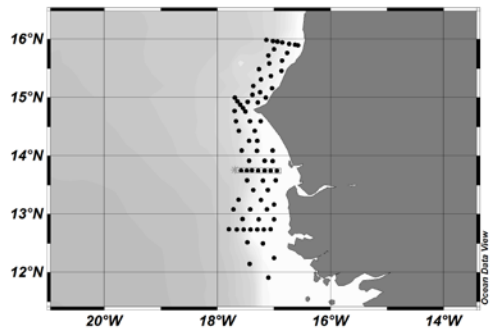
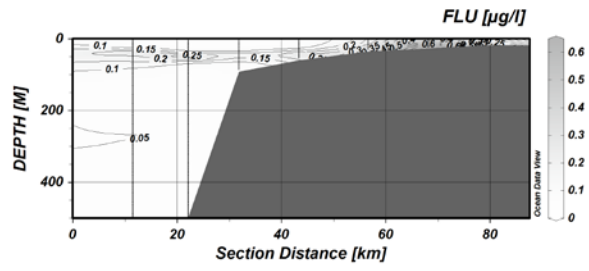
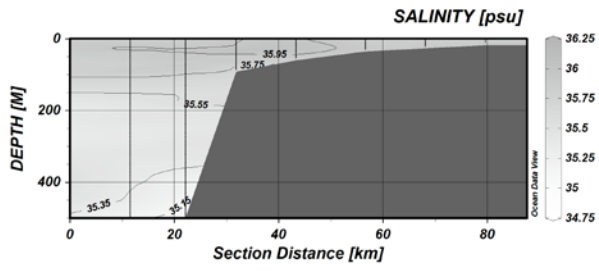
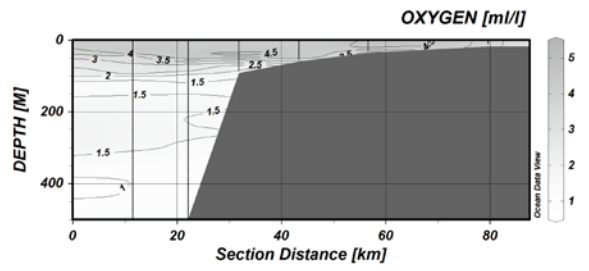
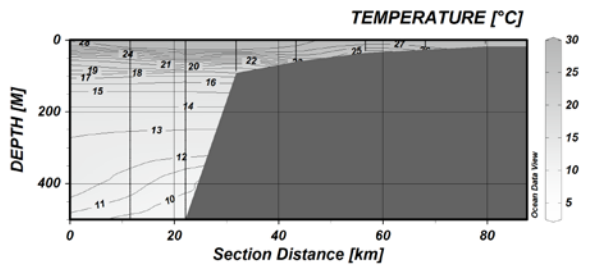
Figure 2 shows the distribution of temperature, salinity and oxygen from the six hydrographical transects collected during the survey. The surface water temperature off St Louis was around 25°C, with a thermocline at approximately 30 - 50 m depth. Further south along the shelf, the surface temperature increased to around 27 off Cape Vert, around 28 off The Gambia and around 29 off Guinea, with the thermocline at about the same depth as further north. The water masses in the survey area was well oxygenated with oxygen concentrations in the surface layer >4,5 ml O₂/l.



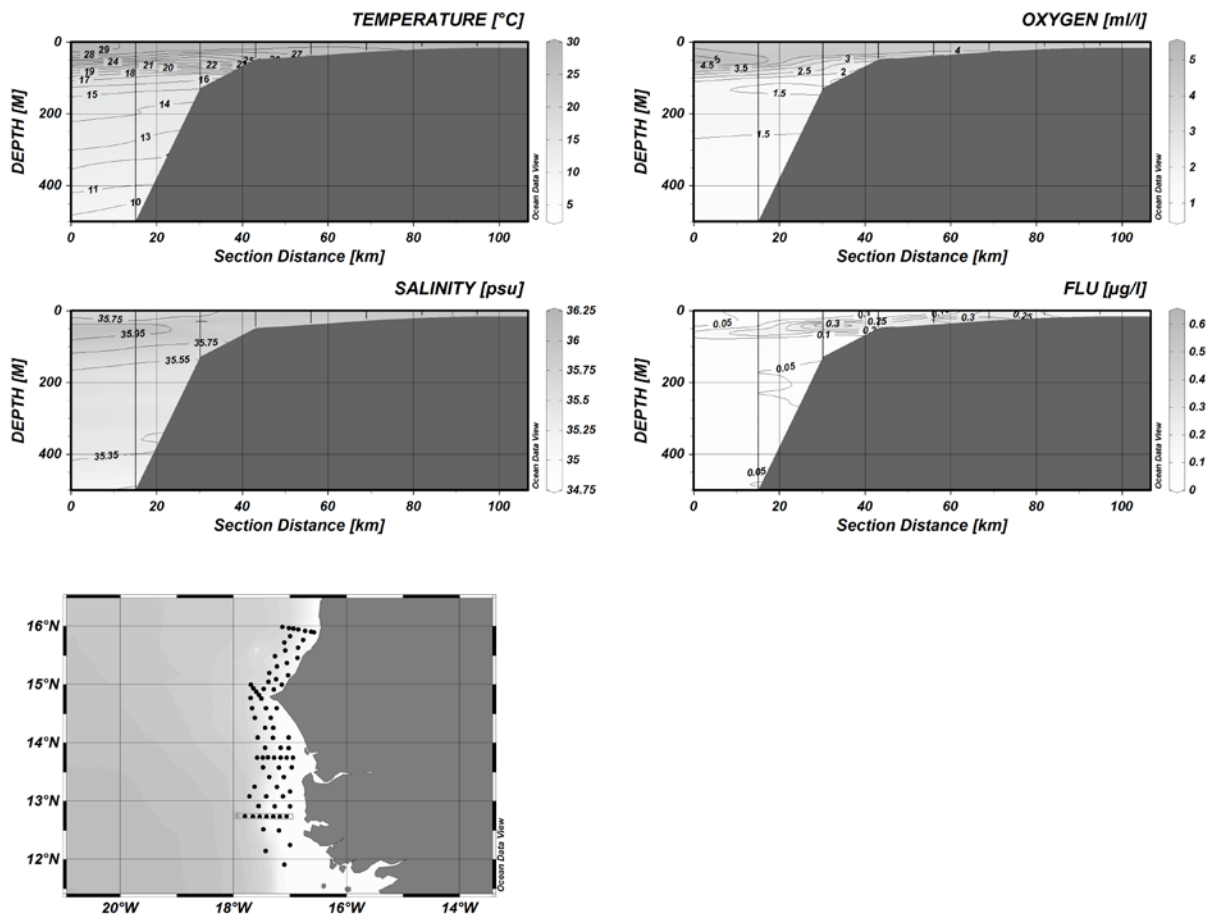
ST. LOUIS – SOUTH 23/6



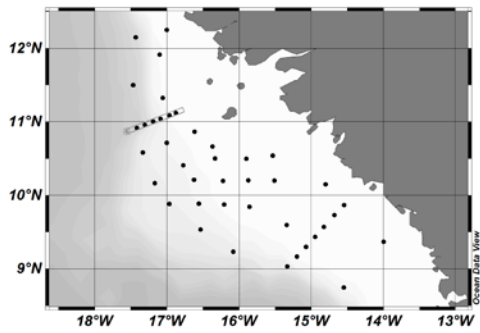
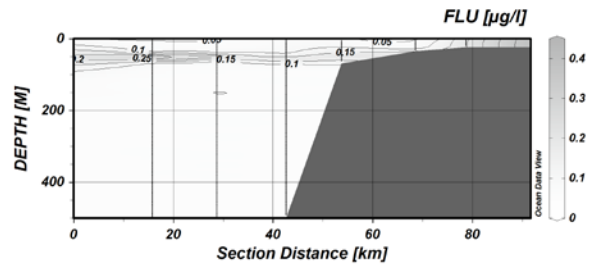
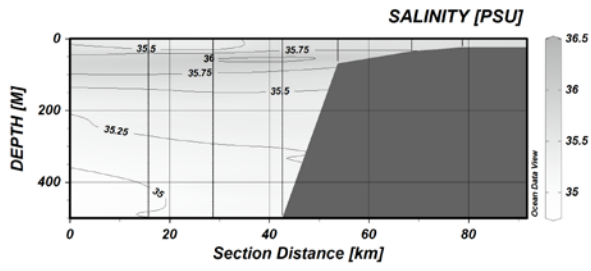
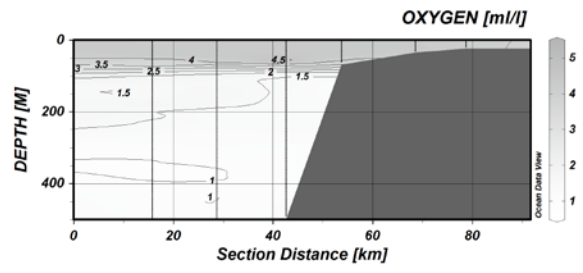
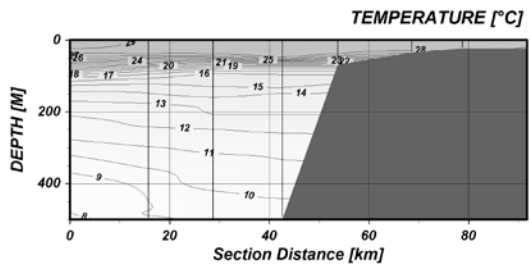
CAPE VERT 25/6



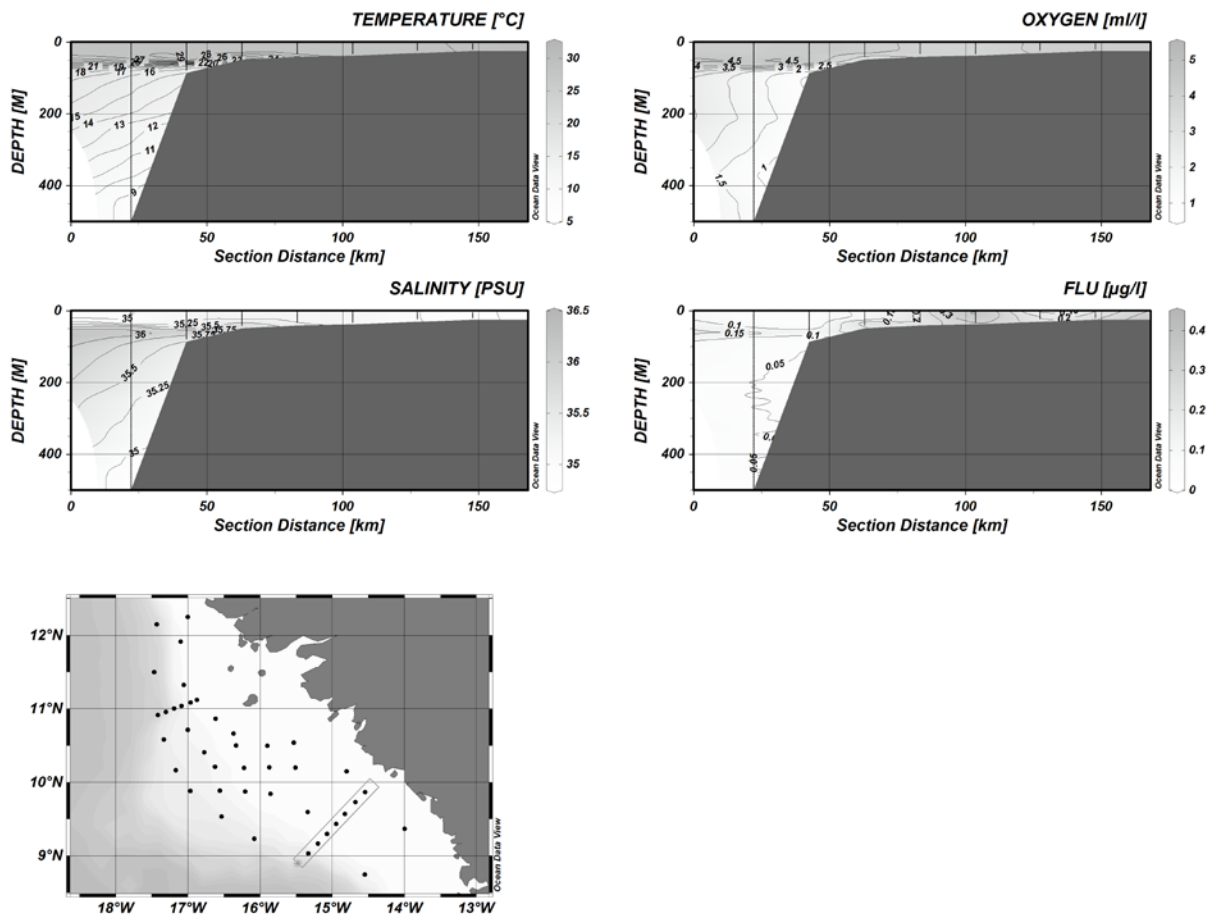
THE GAMBIA WEST 26/6



CASAMANCE 28/6



GUINEA BISSAU 30/6



GUINEA 5/7

Figure 3. Hydrographical profiles with distribution of temperature, salinity and oxygen off St. Louis – South, Cape Vert, The Gambia, Casamance, Guinea Bissau and Guinea.

3.1.2 Sea surface temperature

Figure 4 and 5 illustrates the sea surface temperature at 5 m depth, in Senegal and The Gambia and Guinea Bissau and Guinea resectively. The surface waters on the Guinea and Guinea Bissau shelf were dominated by water temperatures higher than 28°C. Northwards, the temperature gradually decreased and in the area off Dakar, the surface tempearature was measured at about 26°C. Off St. Louis the surface temperature was around 25°C.

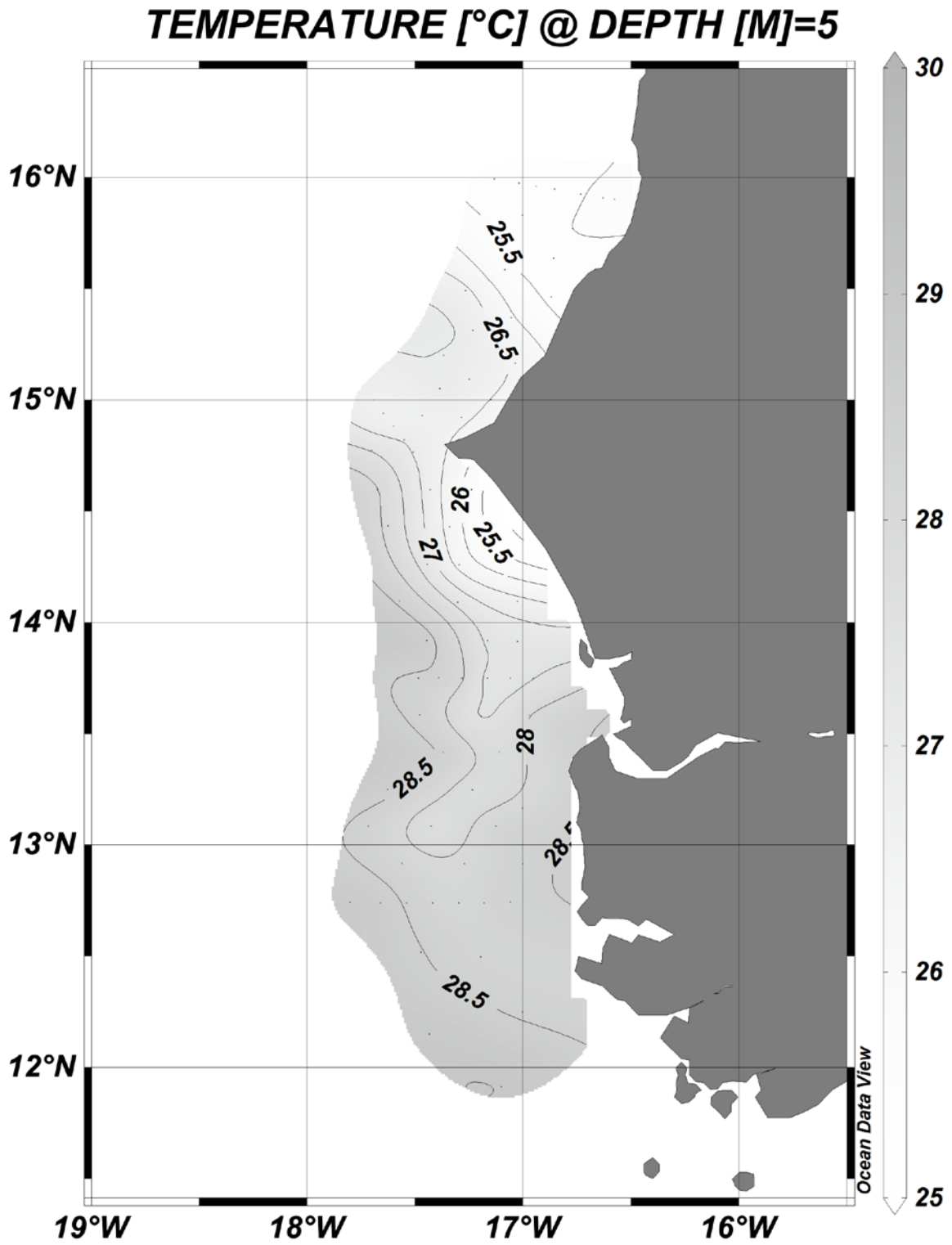


Figure 4. Sea surface temperature; Casamance to St. Louis.

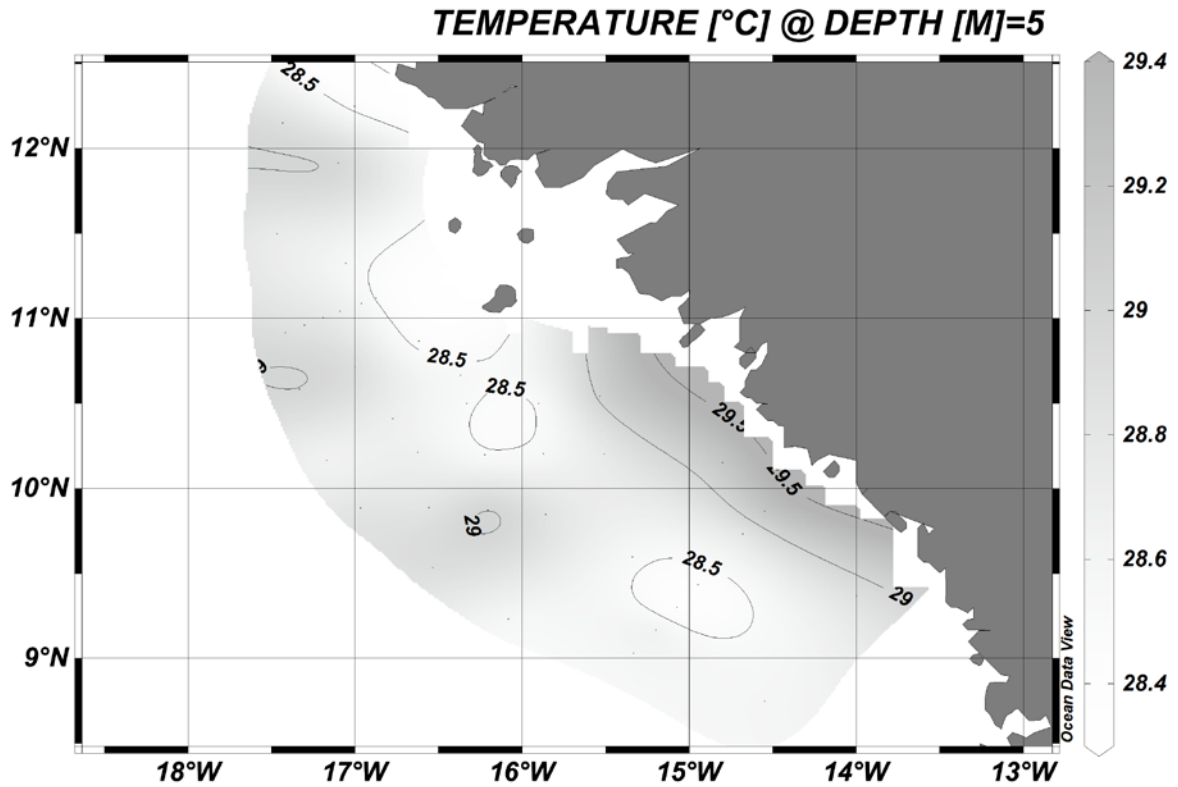


Figure 5. Sea surface temperature; Guinea Bissau and Guinea.

3.2 Pelagic fish

The main groups of pelagic fish encountered during the survey of Senegal and the Gambia illustrated with contoured acoustic densities are shown in Figure 6, Figure 7 and Figure 8, and the corresponding distributions in Guinea Bissau and Guinea are shown in Figure 9, Figure 10 and Figure 11.

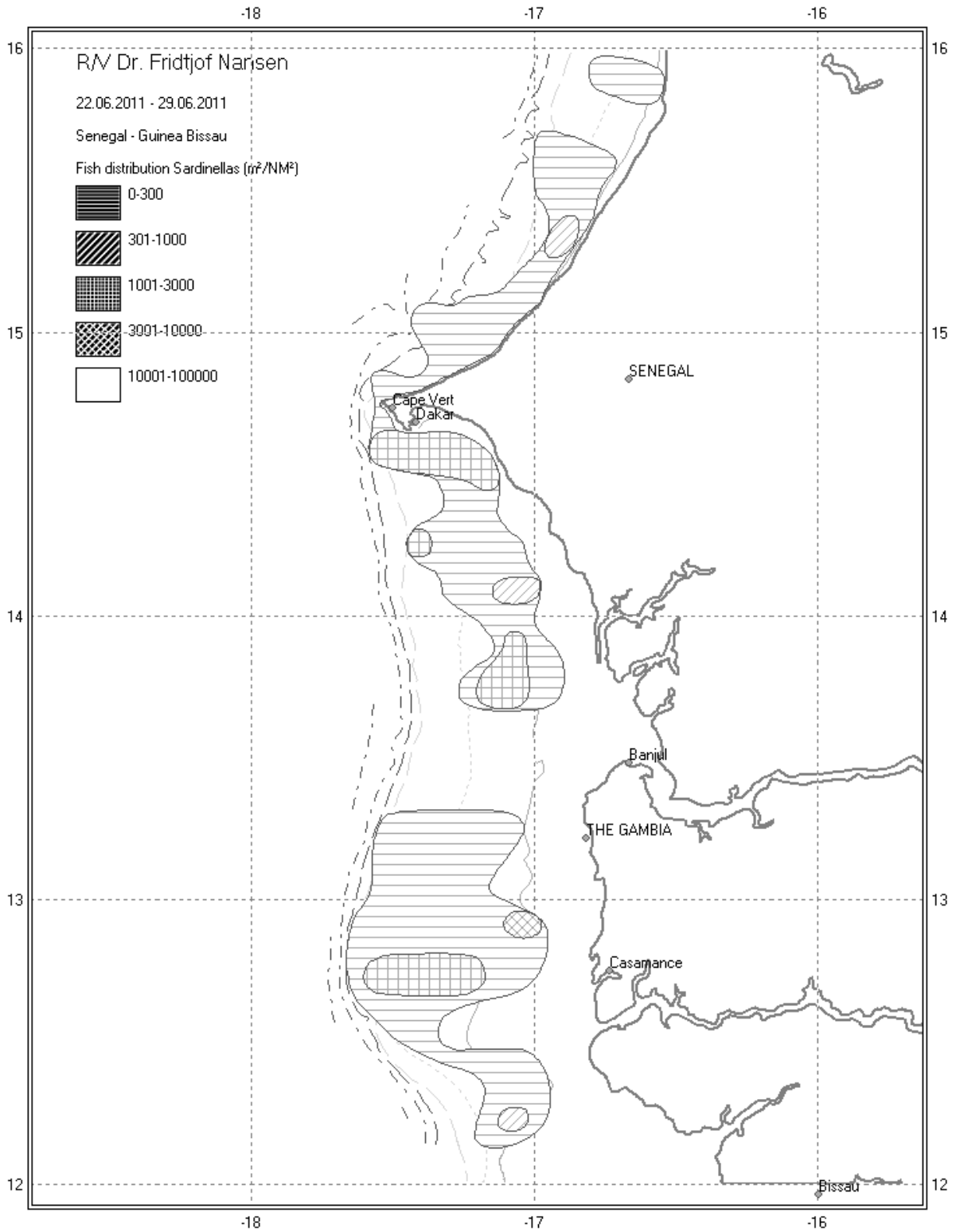


Figure 6. Distribution of sardinellas; Casamance to St. Louis.

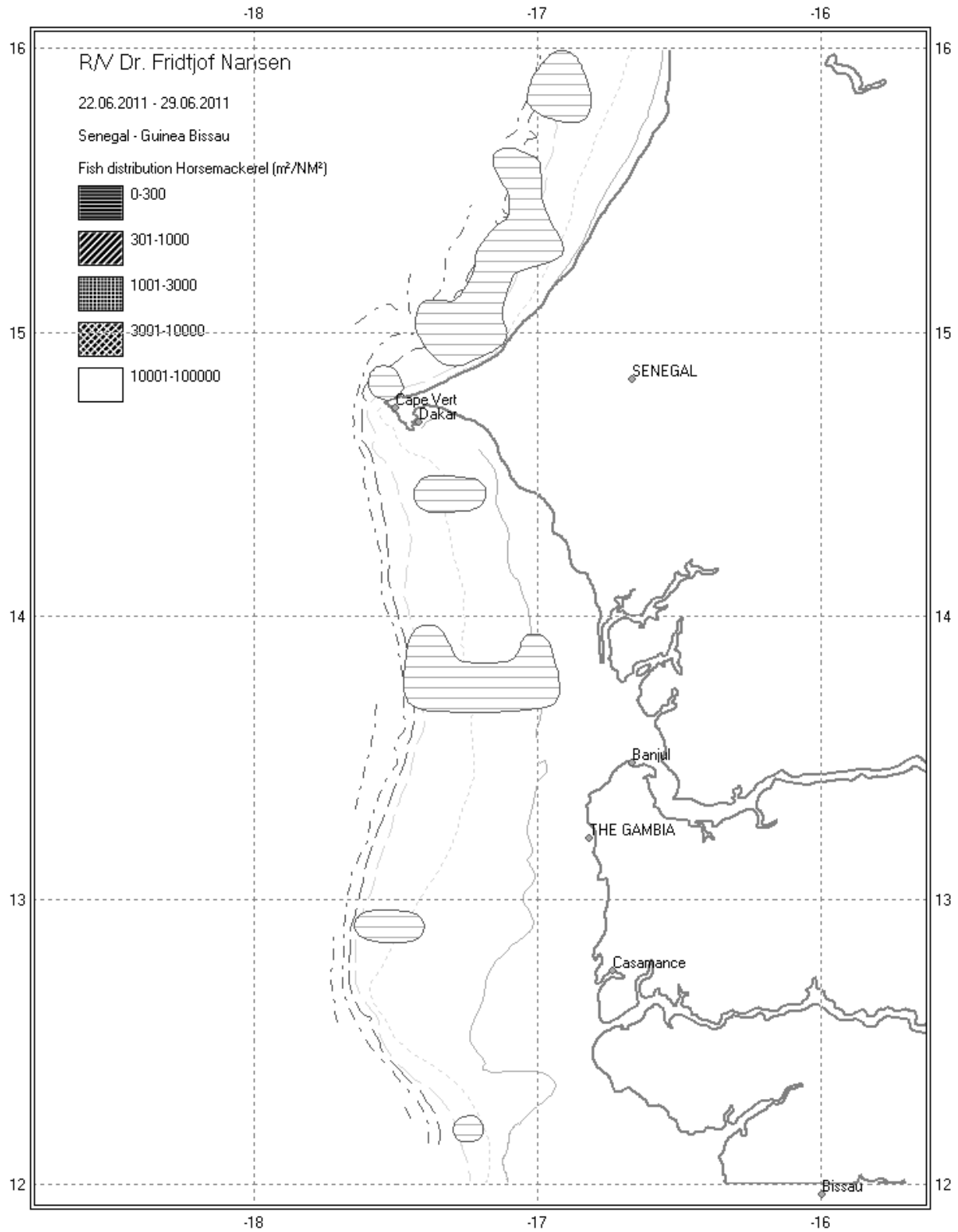


Figure 7. Distribution of *Trachurus trecae*; Casamance to St. Louis.

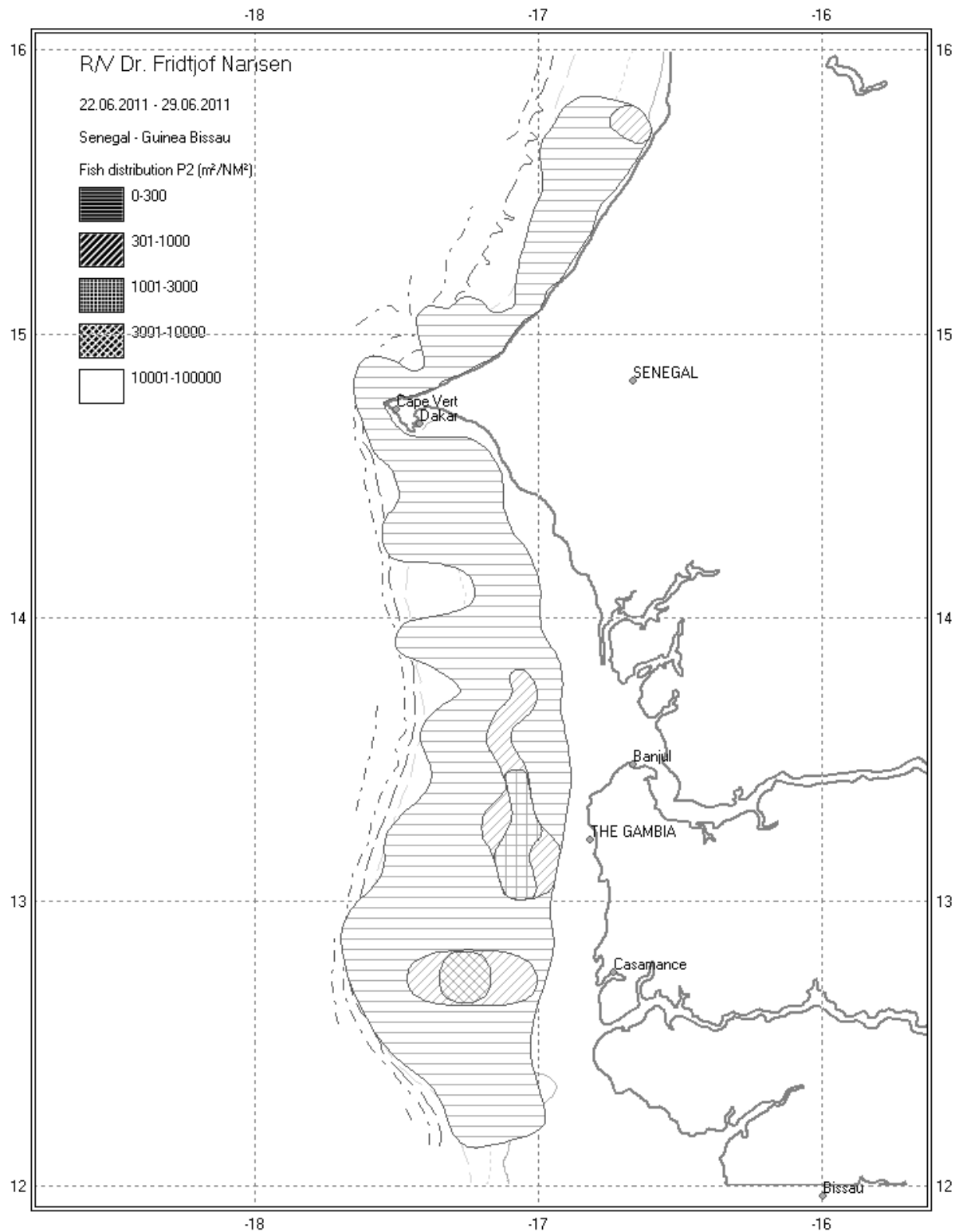


Figure 8. Distribution of carangids and associated species; Casamance to St. Louis

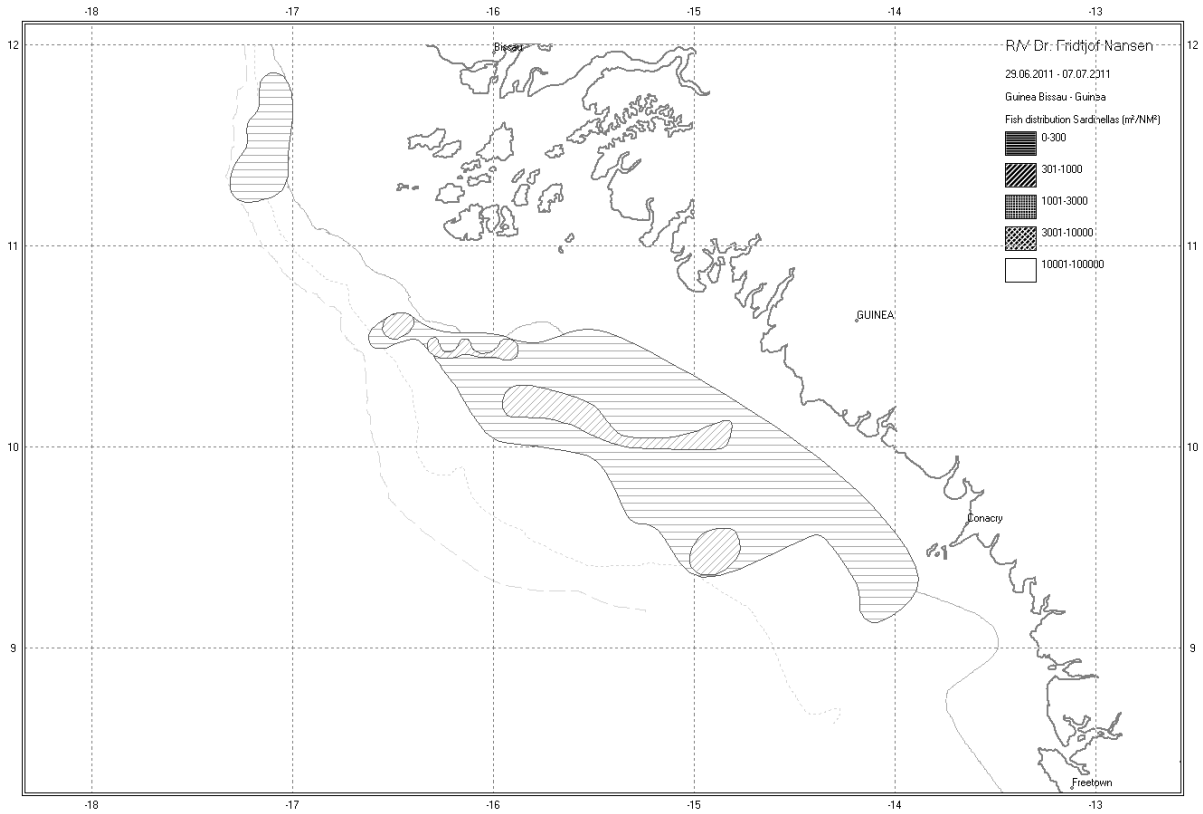


Figure 9. Distribution of sardinellas in Guinea and Guinea Bissau.

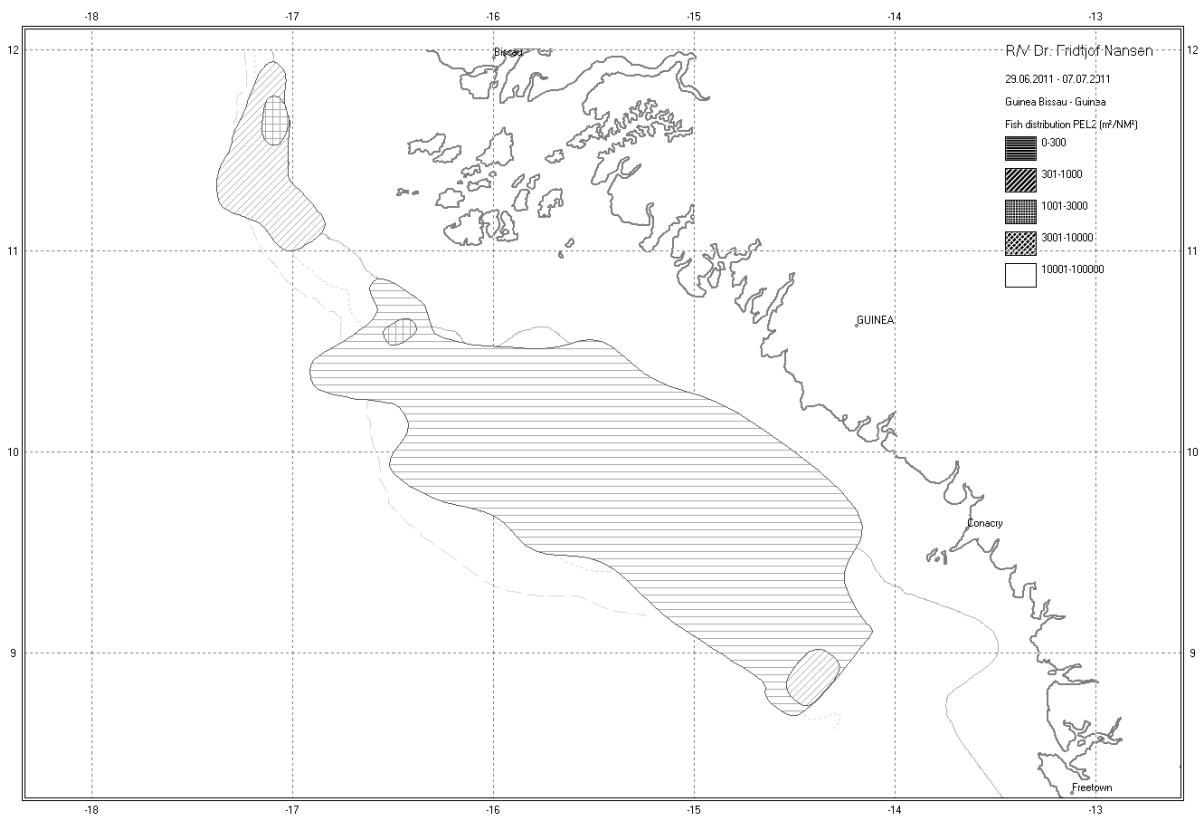


Figure 10. Distribution of carangids and associated species in Guinea and Guinea Bissau.

3.2.1 St. Louis - Cape Vert

Sardinellas were found in two areas north of Cape Vert. One close to St Louis, and the other from about 15°40'N to Cape Vert. *S. aurita* dominated by about 78% of the estimate in this subregion, Figure 6. The modal length of *S. aurita* in the area was 29 cm while the length distribution of *S. maderensis* had two modal peaks, 14 and 30 cm. Few juvenile sardinella was found in the area. The biomass estimate of *S. aurita* was 30 thousand tonnes while *S. maderensis* was estimated at 8 thousand tonnes, Table 3.

Trachurus trecae were only found in smaller low density areas, one small area about 20 NM south of St. Louis, one larger area in the middle, and a smaller area north of Cape Vert, Figure 7. The biomass of *Trachurus trecae* was estimated at 12 thousand tonnes. *Trachurus trecae* in the region had one modal peak at 11 cm.

One low density area of Carangids and associated pelagic fish species was found between St. Louis and Cape Vert. The area of distribution covered the whole shelf south of St. Louis to Cape Vert, Figure 8. The distribution was relatively wide, from 20 m depth and offshore to approximately 50 m depth. The dominant species in the catches were *Trachinotus ovatus*, *Chloroscombrus chrysurus*, *Pomadasys peroteti* and *Trichiurus lepturus* and the biomass was estimated to be 22 thousand tonnes.

Table 3. St. Louis to Cape Vert. Biomass estimates of pelagic fish, thousand tonnes.

<i>S. maderensis</i>	<i>S. aurita</i>	<i>Trachurus trecae</i>	Carangids etc.
8	30	12	22

3.2.2 Cape Vert - The Gambian border

A larger area with medium densities of sardinella was found between Cape Vert and the Gambian border, Figure 6. The distribution was continuous and the sardinellas were found inshore. The distribution continued from inshore of 15 m bottom depth to between 50 and 100 m depth offshore. Table 4 shows the biomass estimates of the two sardinella species, *S. maderensis* was estimated at 217 thousand tonnes while 29 thousand tonnes of *S. aurita* was found.

Pooled length compositions of samples from *S. maderensis* showed modal peaks at 18 and 24 cm. *S. aurita* had modal peaks at 15 and 29 cm. Estimated number and biomass by length-groups are found in Annex IV.

The distribution of *Trachurus trecae* was limited to a small area some 20 NM south of Dakar. There was also some low density areas at the border to The Gambia, Figure 7. The total biomass was estimated at 12 thousand tonnes. The *Trachurus trecae* had four modal peaks in the area, at 10 cm, at 24 cm, at 28 cm and at 30 cm.

As in the other regions south of Cape Vert, carangids and associated pelagic species were distributed over most of the shelf from less than 20 m depth and offshore to between 50 and 100 m depth. The dominating species in the area were *Chloroscombrus chrysurus* and *Decapterus rhonchus*, Figure 8. The biomass of carangids and associated pelagic fish was estimated at about 65 thousand tonnes, Table 4.

Table 4. Cape Vert to The Gambia border. Biomass estimates of pelagic fish, thousand tonnes.

<i>S. maderensis</i>	<i>S. aurita</i>	<i>Trachurus trecae</i>	Carangids etc.
217	29	12	65

3.2.3 The Gambian shelf

The main distribution of sardinellas found in the Senegalese waters south of Cape Vert did not continue into the Gambian waters. A low density distribution area of *S. aurita* was found in southern parts of the Gambian waters Figure 8. The distribution was mainly confined inside of the 50 m isobath. The estimate was merely 6 thousand tonnes of *S. aurita*. The modal length was 18 cm. The estimated numbers and biomass by length-groups can be found in Annex IV.

No *Trachurus trachurus* was found in The Gambian waters and therefore no estimate could be carried out Figure 7.

Carangids and associated species were found in low to medium density widely distributed over the whole Gambian shelf, Figure 8.. The catches of this group were dominated by *Chloroscombrus chrysurus* and *Decapterus rhonchus*. The biomass was estimated at 95 thousand tonnes.

Table 5. The Gambia. Biomass estimates of pelagic fish, thousand tonnes.

<i>S. maderensis</i>	<i>S. aurita</i>	<i>Trachurus trecae</i>	Carangids etc.
-	6	-	95

3.2.4 The Casamance shelf

Sardinella were found in medium and high density over the shelf, but mainly from the 50 m depth, continuing inshore of 20 m depth. The main concentrations were found at about 12°45'N, Figure 6. The region was dominated by *S. Maderensis* by 56%. Two modal peaks of *Sardinella aurita* were found in the area, one at 16 cm, and one at 22 cm (total length) while the modal size of *S. maderensis* was 28 cm. Estimated number and biomass by length-groups can be found in Annex IV. The total biomass of sardinellas in the area was estimated to be 210 thousand tonnes, Table 6. Of this 92 thousand tonnes were *S. aurita*, while 118 thousand tonnes were *S. maderensis*.

Only a few registrations of *Trachurus trecae* were made in the Casamance area, Figure 8, and the estimate was merely about 500 tonnes. These had a modal length of 10 cm.

Other pelagic fish (P2) were found covering large parts of the shelf, similar to what is experienced most years. In general both carangids other than horse mackerel, scombrids, hairtails and barracudas were found in the area. The most frequently found species in the catches were *Chloroscombrus chrysurus*, *Trichiurus lepturus*, *Decapterus punctatus*, and *Trachinotus ovatus*. The species were well mixed with the sardinellas where their distribution overlapped, Figure 8. The estimated biomass of this group of fish was 187 thousand tonnes.

Table 6. Casamance. Biomass estimates of pelagic fish, thousand tonnes.

<i>S. maderensis</i>	<i>S. aurita</i>	Horse mackerel	Carangids etc.
118	92	+	187

3.2.5 The Guinea Bissau shelf

The main distribution of sardinellas found in the Casamance area continued into the northern parts of the Guinea Bissau waters. The distribution was mainly confined inside of the 50 m isobath. Another smaller area of distribution was found further south on the shelf, Figure 9. Both species of sardinella was found in the area and like in the Casamance, with a dominance of *S. maderensis*. The total estimate of sardinellas in the Guinea Bissau waters during the survey was 46 thousand tonnes, Table 5. This comprised of 23 thousand tonnes of *S. maderensis* and 23 thousand tonnes of *S. aurita*. The modal length of *S. maderensis* was 27 cm while *S. aurita* had two modal lengths, at 14 cm and at 23 cm. The estimated numbers and biomass by length-groups can be found in Annex IV.

Trachurus trecae was found in a very small area on the shelf between 40 and 100 m depth. The densities were very low with an estimated biomass of only 1.2 thousand tonnes, Table 5. The size distribution of horse mackerel in the area consisted of two modal peaks, one at 9 cm and the other at 15 cm.

Carangids and associated species were found in low to medium density widely distributed over the whole shelf of Guinea Bissau, Figure 10. The catches of this group were also here dominated by *Chloroscombrus chrysurus* and *Decapterus rhonchus*. The biomass was estimated at 182 thousand tonnes.

Table 7. Guinea Bissau. Biomass estimates of pelagic fish, thousand tonnes.

<i>S. maderensis</i>	<i>S. aurita</i>	<i>Trachurus trecae</i>	Carangids etc.
23	23	1	182

3.2.6 The Guinea shelf

The distribution of sardinella had a quite wide distribution on the shelf of Guinea, Figure 9. Both species of sardinella was found in the area with a dominance of *S. maderensis*. The total estimate of sardinellas in the Guinean waters during the survey was 220 thousand tonnes, Table 5. This comprised of 134 thousand tonnes of *S. maderensis* and 86 thousand tonnes of *S. aurita*. The modal lengths of *S. maderensis* was 21 and 25 cm while *S. aurita* had modal lengths of 15 cm and 23 cm. The estimated numbers and biomass by length-groups can be found in Annex IV.

Trachurus trecae was found in a very small area on the shelf between 40 and 100 m depth. The densities were very low with an estimated biomass of only 151 tonnes, Table 5. The size distribution of horse mackerel in the area consisted of a modal peak of 11 cm.

Carangids and associated species were found in low to medium density widely distributed over the whole Guinean shelf, Figure 10. The catches of this group were dominated by *Chloroscombrus chrysurus*, and *Decapterus rhonchus*. The biomass was estimated at 97 thousand tonnes.

Table 8. Guinea. Biomass estimates of pelagic fish, thousand tonnes.

<i>S. maderensis</i>	<i>S. aurita</i>	<i>Trachurus trecae</i>	Carangids etc.
134	86	+	97

CHAPTER 4 OVERVIEW AND SUMMARY OF RESULTS

The survey was conducted successfully from 22nd June to 7th July, covering a course track of 2 212 NM. A total of 63 fishing stations and 113 CTD casts were carried out.

The hydrographical data showed a stable surface layer at approximately 30-50 m depth for the whole shelf. Warm surface waters characterized the surface water in Guinea, Guinea Bissau, the Casamance area and in The Gambia, but decreased north of Cape Vert. The shelf was well oxygenated in the whole survey area.

Sardinellas were found in three large areas, and in a few smaller patches between Guinea and St Louis. The total biomass was estimated to be 766 thousand tonnes, and 35% of this was *S. aurita*. The major part of the stock, 69% of *S. aurita*, and 59% of *S. maderensis* respectively, were concentrated between Casamance and St. Louis, Figure 6. The division of biomass between length groups and species are dependent on representative trawl samples of the two species. Since sardinella show strong trawl avoidance some care should be taken when interpreting the results.

Trachurus trecae were found in some smaller areas between Gambia and Cape Vert, and a somewhat larger area further north, Figure 7. Almost no horsemackerel were found in Guinea Bissau or in Guinea. The total estimate of *Trachurus trecae* was 26 thousand tonnes, of this 92% was found north of The Gambia. No separate estimate was made for *Decapterus rhonchus*.

The distribution of 'P2's', other carangids and associated species, were distributed over most of the shelf in low densities, Figure 8 and Figure 10. The main species in the catches of this group consisted of *Chloroscombrus chrysurus*, *Decapterus rhonchus* and *Selene dorsalis*. The total biomass was estimated at 648 thousand tonnes.

An overview of the acoustic estimates of biomass of the main groups of pelagic fish is shown in Table 9, and the geographical distribution and abundance of main species can be found in Figure 11 and Figure 12. The total biomass of sardinellas was thus 766 thousand tonnes, *Trachurus trecae* 26 thousand tonnes and of carangids and associated species 648 thousand tonnes.

Table 9. Summary of biomass estimates of pelagic fish, Senegal and the Gambia. thousand tonnes.

	<i>S. maderensis</i>	<i>S. aurita</i>	Horse mackerel	Carangids etc.
St. Louis-Cape Vert	8	30	12	22
Cape Vert - the Gambia	217	29	12	65
The Gambia	-	6	-	95
Casamance	118	92	0,5	187
Guinea Bissau	23	23	1	182
Guinea	134	86	+	97
Total	500	266	26	648

Table 10 lists biomass estimates of sardinellas and carangids (including *Trachurus trecae*) and associated species from the “Dr. Fridtjof Nansen” surveys of the shelf region. Large-scale latitudinal movements of pelagic fish between West Sahara and Guinea are well known, and in the summer the sardinellas should be concentrated in Senegal for spawning. The present coverage of the area is different from previous once as the shelves off Guinea and Guinea Bissau also was covered. This gives additional information about pelagic fish in the region and may explain some of the variation in abundance of pelagic fish in the different countries because substantial amounts of sardinella were also found here. The estimate of sardinellas in Guinea Bissau and in Guinea of 220 thousand tonnes can be compared with the estimate of 388 thousand tonnes of sardinella estimated in a survey in these countries in May-June 2007. The estimates of sardinellas and horse mackerel of 500 and 393 thousand tonnes in Senegal and the Gambia during this survey is somewhat low when compared to earlier estimates of these at this time of the year in this area.

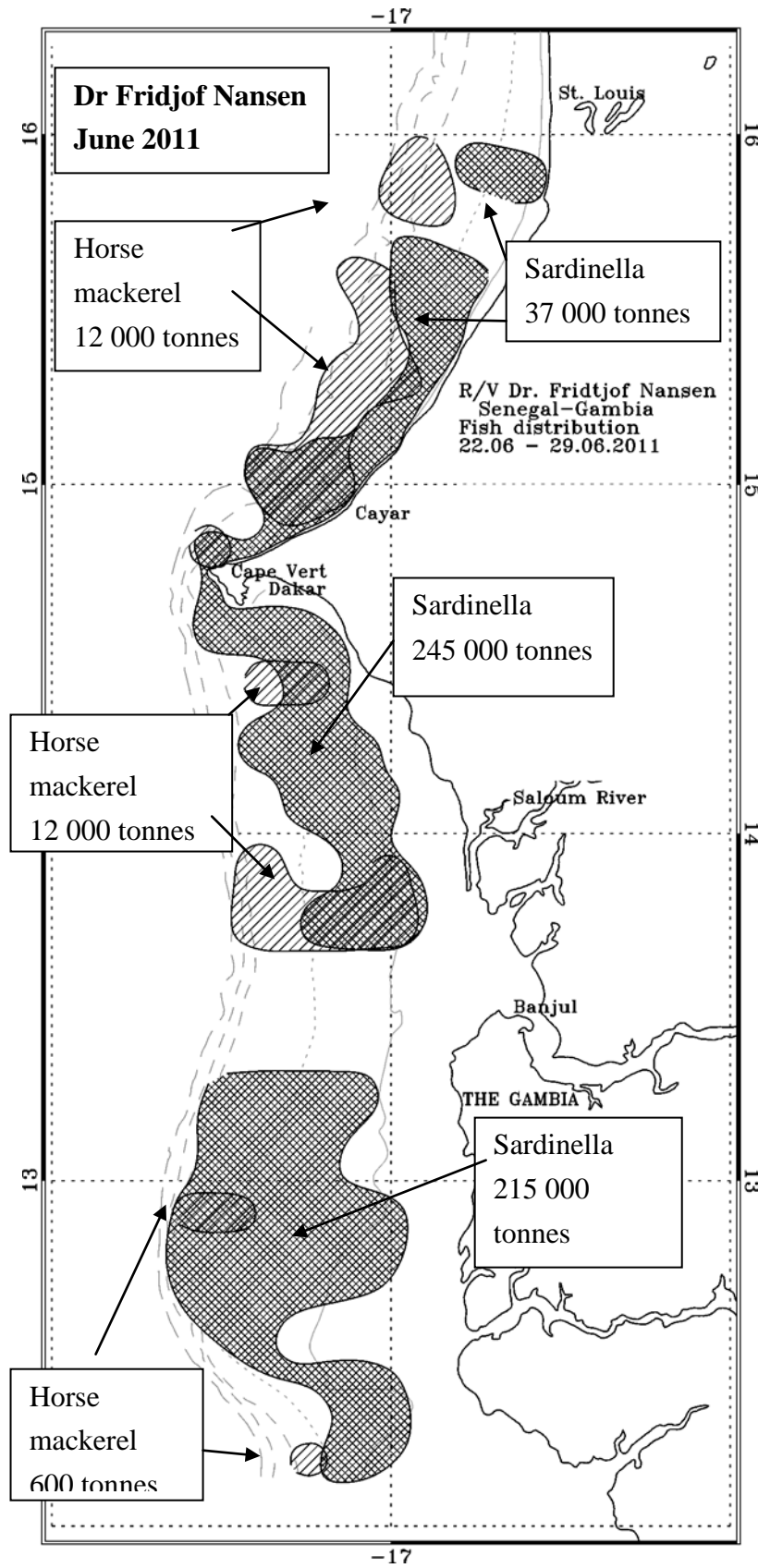


Figure 11. Major pelagic fish concentrations with estimated biomass (tonnes), Senegal and The Gambia.

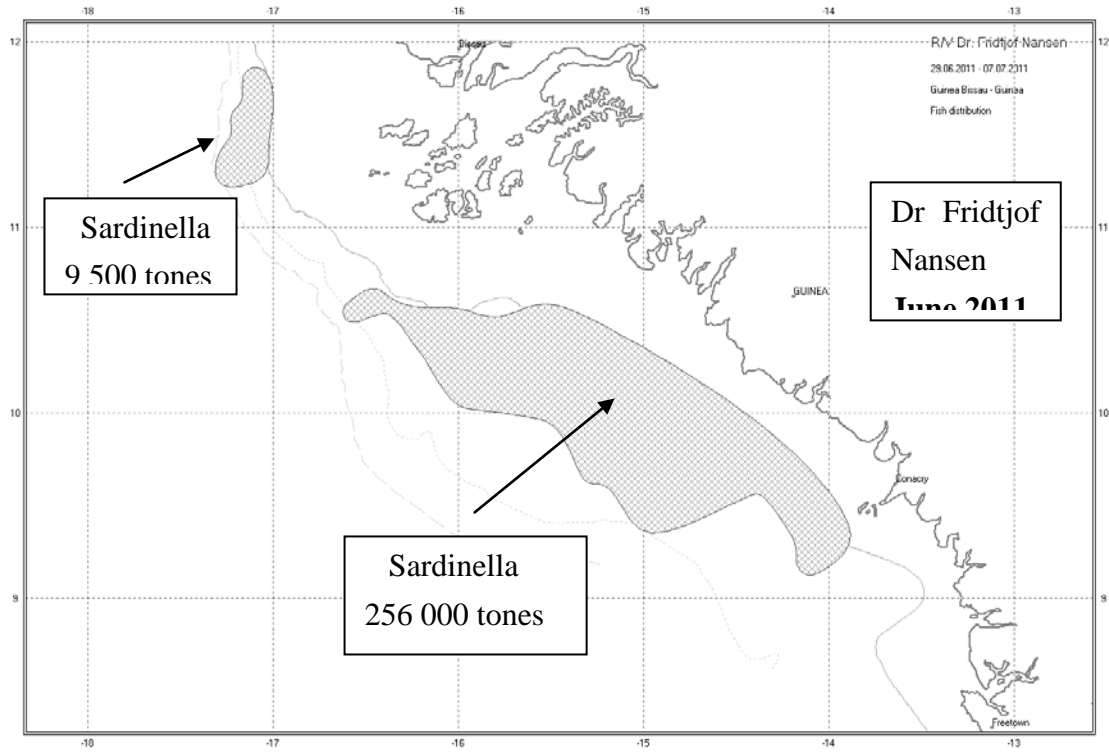


Figure 12. Major pelagic fish concentrations with estimated biomass (tonnes), Guinea Bissau and Guinea.

Table 10. Biomass estimates from previous 'Dr Fridtjof Nansen' surveys of Senegal - The Gambia shelf in thousand tonnes. The results of the survey in June-July 2011 includes the estimate of 266 thousand tonnes of sardinellas and 280 thousand tonnes of carangids including horse mackerel in Guinea Bissau and Guinea.

Survey:	Sardinellas	Carangids etc.*
AprMay-81	210	570
Sept -81	360	**
FebMar-82	40	90
NovDec-86	330	170
FebMar-92	1 530	690
NovDec-95	760	220
NovDec-96	230	530
NovDec-97	300	250
NovDec-98	390	340
NovDec-99	1 390	470
NovDec-00	300	540
JunJul-01	410	230
NovDec-01	430	480
JunJul-02	600	430
NovDec-02	910	260
JunJul-03	670	610
NovDec-03	597	319
NovDec-04	819	289
NovDec-05	828	231
MayJun-07***	388	
JunJul-11****	766	674

* *Trachurus trecae* and other carangids

** Not available

***Guinea Bissau and Guinea only

****Includes Guinea Bissau and Guinea

References

Toresen, R., Gjørseter, H., and Barros, P. 1998. The acoustic method as used in the abundance estimation of capelin (*Mallotus villosus* Müller) and herring (*Clupea harengus* Linné) in the Barents Sea. Fisheries Research 34 (1998) 27-37.

MacLennan, D. N. and Simmons E. J. (1992). Fisheries Acoustics. Chapman and Hall.325p.

Annex I Records of fishing stations

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 1
 DATE :23/06/2011 GEAR TYPE: PT NO: 1 POSITION:Lat N 15°55.03
 start stop duration Lon W 16°41.69
 TIME :05:29:52 05:59:26 29.6 (min) Purpose : 1
 LOG : 1781.10 1782.62 1.5 Region : 1300
 FDEPTH: 10 10 Gear cond.: 0
 BDEPTH: 48 56 Validity : 0
 Towing dir: 0° Wire out : 80 m Speed : 3.1 kn
 Sorted : 0 Total catch: 53.48 Catch/hour: 108.55

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachinotus ovatus	35.32	154	32.54	
Sardinella maderensis	24.15	101	22.25	6
Selene dorsalis	22.02	164	20.29	7
Chloroscombrus chrysurus	11.57	77	10.66	5
Decapterus rhonchus	4.32	22	3.98	2
Sphyraena guachancho	2.70	10	2.49	
Sardinella aurita	2.56	10	2.36	1
Engraulis encrasicolus	2.19	986	2.02	3
Trichiurus lepturus	1.83	30	1.68	
Brachydeuterus auritus	1.04	8	0.95	
Trachurus trecae	0.37	138	0.34	4
JELLYFISH	0.20	12	0.19	
Alloteuthis africana	0.06	73	0.06	
Sardina pilchardus	0.02	2	0.02	
Bregmaceros sp.	0.01	4	0.01	
Saurida brasiliensis	0.00	8	0.00	
Leptocephalus	0.00	4	0.00	
Acanthusus sp. juvenile	0.00	2	0.00	
Total	108.37		99.83	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 2
 DATE :23/06/2011 GEAR TYPE: PT NO: 1 POSITION:Lat N 15°56.56
 start stop duration Lon W 16°49.96
 TIME :07:34:39 08:00:28 25.8 (min) Purpose : 1
 LOG : 1791.95 1793.28 1.3 Region : 1300
 FDEPTH: 64 70 Gear cond.: 0
 BDEPTH: 88 84 Validity : 0
 Towing dir: 0° Wire out : 150 m Speed : 3.1 kn
 Sorted : 0 Total catch: 5.21 Catch/hour: 12.11

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	9.30	70	76.78	
Stromateus fiatola	1.74	2	14.40	
Sardinella maderensis	0.53	2	4.41	
Sardinella aurita	0.53	2	4.41	
Total	12.11		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 3
 DATE :23/06/2011 GEAR TYPE: BT NO: 21 POSITION:Lat N 15°49.24
 start stop duration Lon W 16°56.69
 TIME :13:57:38 14:11:54 14.3 (min) Purpose : 1
 LOG : 1832.52 1833.25 0.7 Region : 1300
 FDEPTH: 104 111 Gear cond.: 0
 BDEPTH: 104 111 Validity : 0
 Towing dir: 0° Wire out : 270 m Speed : 3.1 kn
 Sorted : 38 Total catch: 845.41 Catch/hour: 3554.63

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	3309.88	360433	93.11	8
Engraulis encrasicolus	180.63	66412	5.08	10
Scomber japonicus	41.37	1211	1.16	9
Sphoeroides pachgaster	10.68	50	0.30	
Saurida brasiliensis	7.06	706	0.20	
Todaropsis eblanae	2.61	76	0.07	
Antigonia capros	1.01	101	0.03	
Merluccius polli	1.01	101	0.03	
Dentex maroccanus	0.21	4	0.01	
Illex coindetii	0.17	38	0.00	
Total	3554.63		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 4
 DATE :23/06/2011 GEAR TYPE: PT NO: 4 POSITION:Lat N 15°45.57
 start stop duration Lon W 16°44.14
 TIME :16:15:56 16:45:41 29.7 (min) Purpose : 1
 LOG : 1847.63 1848.99 1.4 Region : 1300
 FDEPTH: 0 0 Gear cond.: 0
 BDEPTH: 43 39 Validity : 0
 Towing dir: 0° Wire out : 90 m Speed : 2.8 kn
 Sorted : 0 Total catch: 5.37 Catch/hour: 10.83

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachinotus ovatus	4.44	14	40.97	
Euthynnus alletteratus	3.33	4	30.73	
Lagocephalus laevigatus	1.37	2	12.66	
J E L Y F I S H	1.23	4	11.36	
Trichiurus lepturus	0.34	2	3.17	
Trachurus trecae	0.12	12	1.12	11
Total	10.83		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 5
 DATE :23/06/2011 GEAR TYPE: PT NO: 4 POSITION:Lat N 15°39.84
 start stop duration Lon W 16°41.80
 TIME :18:37:27 18:39:43 2.2 (min) Purpose : 1
 LOG : 1864.88 1864.98 0.1 Region : 1300
 FDEPTH: 10 10 Gear cond.: 0
 BDEPTH: 26 25 Validity : 0
 Towing dir: 0° Wire out : 90 m Speed : 3.9 kn
 Sorted : 0 Total catch: 28.73 Catch/hour: 798.06

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	306.94	1056	38.46	
Pomadourys jubelini	168.06	500	21.06	
Galeoides decadactylus	76.67	194	9.61	
Drepane africana	59.72	222	7.48	
Chloroscombrus chrysurus	43.61	278	5.46	12
Alectis alexandrinus	25.28	28	3.17	
J E L Y F I S H	22.50	83	2.82	
Pteroscion peli	18.61	444	2.33	
Pseudotolithus senegalensis	16.11	111	2.02	
Sphyraena guachancho	12.50	28	1.57	
Eucinostomus melanopterus	10.28	83	1.29	
Arius parkii	10.28	28	1.29	
Trachinotus ovatus	8.89	28	1.11	
Pentanemus quinquarius	6.94	83	0.87	
Ilisha africana	5.56	167	0.70	13
Brachydeuterus auritus	3.33	28	0.42	
Selene dorsalis	2.78	417	0.35	
Total	798.06		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 6
 DATE :23/06/2011 GEAR TYPE: PT NO: 4 POSITION:Lat N 15°37.05
 start stop duration Lon W 16°48.25
 TIME :20:36:37 21:06:26 29.8 (min) Purpose : 1
 LOG : 1881.26 1882.79 1.5 Region : 1300
 FDEPTH: 5 5 Gear cond.: 0
 BDEPTH: 44 36 Validity : 0
 Towing dir: 0° Wire out : 92 m Speed : 3.1 kn
 Sorted : 0 Total catch: 209.46 Catch/hour: 421.59

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Ilisha africana	149.00	1459	35.34	14
Sardinella maderensis	70.10	268	16.63	16
Trichiurus lepturus	66.92	203	15.87	
Chloroscombrus chrysurus	56.72	380	13.45	19
Brachydeuterus auritus	42.63	324	10.11	
Decapterus rhonchus	14.51	50	3.44	17
Sardinella aurita	10.57	42	2.51	15
Sphyraena guachancho	7.75	64	1.84	18
Trachinotus ovatus	1.83	8	0.43	
Arius heudelotii	1.27	6	0.30	
Penaeus notialis	0.28	28	0.07	
Total	421.59		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 7
 DATE :23/06/2011 GEAR TYPE: PT NO: 1 POSITION:Lat N 15°41.85
 start stop duration Lon W 17°2.37
 TIME :23:20:14 23:50:12 30.0 (min) Purpose : 1
 LOG : 1899.89 1901.51 1.6 Region : 1300
 FDEPTH: 36 42 Gear cond.: 0
 BDEPTH: 403 464 Validity : 0
 Towing dir: 0° Wire out : 80 m Speed : 3.2 kn
 Sorted : 0 Total catch: 2.65 Catch/hour: 5.31

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
JELLYFISH	4.99	3324	93.96	
MYCTOPHIDAE	0.22	184	4.15	
ONYCHOTEUTHIDAE	0.10	24	1.89	
Total	5.31		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 8
 DATE :24/06/2011 GEAR TYPE: PT NO: 1 POSITION:Lat N 15°34.44
 start stop duration Lon W 17°3.86
 TIME :02:34:48 03:05:41 30.9 (min) Purpose : 1
 LOG : 1918.00 1919.80 1.8 Region : 1300
 FDEPTH: 30 23 Gear cond.: 0
 BDEPTH: 191 140 Validity : 0
 Towing dir: 0° Wire out : 80 m Speed : 3.5 kn
 Sorted : 33 Total catch: 183.72 Catch/hour: 356.97

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	350.91	30218	98.30	20
Trichiurus lepturus	4.27	6	1.20	
Sphyraena guachancho	1.71	4	0.48	
Scomber japonicus	0.08	2	0.02	
Selene dorsalis	0.00	2	0.00	
Total	356.97		100.00	

R/V Dr. Fridtjof Nansen		SURVEY:2011407		STATION: 9		R/V Dr. Fridtjof Nansen		SURVEY:2011407		STATION: 13	
DATE	: 24/06/2011	GEAR TYPE: PT NO:	4	POSITION:Lat	N 15°23.68	DATE	: 24/06/2011	GEAR TYPE: PT NO:	4	POSITION:Lat	N 14°58.89
TIME	: 06:50:03	start	07:20:04	duration	30.0 (min)	TIME	: 19:54:39	start	20:18:45	duration	24.1 (min)
LOG	: 1944.12	stop	1945.52		1.4	LOG	: 2032.87	stop	2033.83		1.0
FDEPTH:	5	Region	: 1300	Purpose	: 1	FDEPTH:	10	Region	: 1300	Purpose	: 1
BDEPTH:	40	Gear cond.:	0	Validity	: 0	BDEPTH:	46	Gear cond.:	0	Validity	: 0
Towing dir:	0°	Speed	: 2.8 kn	Wire out	: 80 m	Towing dir:	0°	Speed	: 2.4 kn	Wire out	: 98 m
Sorted	: 0	Catch/hour:	10.67	Total catch:	5.34	Sorted	: 6	Catch/hour:	6.05	Total catch:	15.06
SPECIES		CATCH/HOUR		% OF TOT. C		SPECIES		CATCH/HOUR		% OF TOT. C	
		weight	numbers					weight	numbers		
Trachinotus ovatus		4.94	16	46.25		Sardinella maderensis		7.84	32	52.07	26
Decapterus rhonchus		2.86	138	26.78	21	Chloroscombrus chrysurus		6.97	42	46.28	27
Sardinella maderensis		1.82	4	17.04		Sardinella aurita		0.12	7	0.83	28
Selene dorsalis		1.06	2	9.93		Sphoeroides marmoratus		0.07	2	0.50	
						Fistularia tabacaria		0.07	22	0.50	
Total		10.67		100.00		Sepiella ornata		0.02	2	0.17	
						Total		15.11		100.33	

R/V Dr. Fridtjof Nansen		SURVEY:2011407		STATION: 10		R/V Dr. Fridtjof Nansen		SURVEY:2011407		STATION: 14	
DATE	: 24/06/2011	GEAR TYPE: PT NO:	1	POSITION:Lat	N 15°18.06	DATE	: 24/06/2011	GEAR TYPE: PT NO:	4	POSITION:Lat	N 15°1.28
TIME	: 08:33:22	start	09:03:58	duration	30.6 (min)	TIME	: 21:12:25	start	21:44:14	duration	31.8 (min)
LOG	: 1954.43	stop	1955.99		1.6	LOG	: 2038.47	stop	2039.99		1.5
FDEPTH:	35	Region	: 1300	Purpose	: 1	FDEPTH:	10	Region	: 1300	Purpose	: 1
BDEPTH:	50	Gear cond.:	0	Validity	: 0	BDEPTH:	97	Gear cond.:	0	Validity	: 0
Towing dir:	0°	Speed	: 3.0 kn	Wire out	: 77 m	Towing dir:	0°	Speed	: 2.9 kn	Wire out	: 90 m
Sorted	: 0	Catch/hour:	2.43	Total catch:	1.24	Sorted	: 0	Catch/hour:	38.79	Total catch:	73.12
SPECIES		CATCH/HOUR		% OF TOT. C		SPECIES		CATCH/HOUR		% OF TOT. C	
		weight	numbers					weight	numbers		
Sardinella maderensis		2.43	8	100.00	22	Engraulis sp.		38.34	17678	52.44	
Total		2.43		100.00		Sardinella aurita		21.38	271	29.23	29

R/V Dr. Fridtjof Nansen		SURVEY:2011407		STATION: 11		R/V Dr. Fridtjof Nansen		SURVEY:2011407		STATION: 15	
DATE	: 24/06/2011	GEAR TYPE: BT NO:	21	POSITION:Lat	N 15°23.07	DATE	: 25/06/2011	GEAR TYPE: PT NO:	1	POSITION:Lat	N 14°55.68
TIME	: 10:59:13	start	11:29:22	duration	30.2 (min)	TIME	: 02:50:29	start	03:35:41	duration	45.2 (min)
LOG	: 1970.12	stop	1971.56		1.4	LOG	: 2076.09	stop	2078.49		2.4
FDEPTH:	131	Region	: 1300	Purpose	: 1	FDEPTH:	50	Region	: 1300	Purpose	: 1
BDEPTH:	131	Gear cond.:	0	Validity	: 0	BDEPTH:	114	Gear cond.:	0	Validity	: 0
Towing dir:	0°	Speed	: 2.9 kn	Wire out	: 328 m	Towing dir:	0°	Speed	: 3.2 kn	Wire out	: 110 m
Sorted	: 66	Catch/hour:	1092.12	Total catch:	548.97	Sorted	: 44	Catch/hour:	217.71	Total catch:	289.00
SPECIES		CATCH/HOUR		% OF TOT. C		SPECIES		CATCH/HOUR		% OF TOT. C	
		weight	numbers					weight	numbers		
Trachurus trecae		635.81	1894	58.22	23	Sardinella aurita		231.97	9462	80.27	32
Trichiurus lepturus		329.74	406	30.19		Trachurus trecae		36.84	3794	12.75	33
Illex coindetii		72.20	2789	6.61		MYCTOPHIDAE		10.95	3633	3.79	
SALPS		46.50	30995	4.26		Scomber japonicus		6.64	126	2.30	31
Octopus vulgaris		2.73	2	0.25		Saurida brasiliensis		1.86	226	0.64	
Synodus saurus		2.20	16	0.20		Engraulis encrasicolus		0.40	226	0.14	
Ariomma bondi		1.69	34	0.15		Illex coindetii		0.27	46	0.09	
Serranus africanus		0.51	237	0.05		Trichiurus lepturus		0.07	7	0.02	
Munidopsis sp.		0.51	541	0.05		Selene dorsalis		0.01	13	0.00	
Saurida brasiliensis		0.17	16	0.02		Total		289.00		100.00	
Antigonia capros		0.03	34	0.00							
Engraulis encrasicolus		0.03	34	0.00							
Total		1092.12		100.00							

R/V Dr. Fridtjof Nansen		SURVEY:2011407		STATION: 12		R/V Dr. Fridtjof Nansen		SURVEY:2011407		STATION: 16	
DATE	: 24/06/2011	GEAR TYPE: BT NO:	21	POSITION:Lat	N 15°11.00	DATE	: 25/06/2011	GEAR TYPE: PT NO:	1	POSITION:Lat	N 14°48.92
TIME	: 16:14:14	start	16:44:16	duration	30.0 (min)	TIME	: 05:45:01	start	06:15:16	duration	30.3 (min)
LOG	: 2008.52	stop	2010.13		1.6	LOG	: 2095.47	stop	2097.06		1.6
FDEPTH:	96	Region	: 1300	Purpose	: 1	FDEPTH:	10	Region	: 1300	Purpose	: 1
BDEPTH:	96	Gear cond.:	0	Validity	: 0	BDEPTH:	67	Gear cond.:	0	Validity	: 0
Towing dir:	0°	Speed	: 3.2 kn	Wire out	: 260 m	Towing dir:	0°	Speed	: 3.2 kn	Wire out	: 0 m
Sorted	: 159	Catch/hour:	317.62	Total catch:	159.02	Sorted	: 15	Catch/hour:	15.05	Total catch:	29.85
SPECIES		CATCH/HOUR		% OF TOT. C		SPECIES		CATCH/HOUR		% OF TOT. C	
		weight	numbers					weight	numbers		
Mustelus mustelus		167.18	32	52.63		Sardinella aurita		12.30	520	41.20	34
Epinephelus guaza ?		24.37	2	7.67		Scomber japonicus		10.27	99	34.42	
Trachurus trecae		23.07	2328	7.26	25	Euthynnus alletteratus		5.99	44	20.07	
Decapterus rhonchus		20.87	72	6.57	24	Sphyræna guachancho		0.91	2	3.06	
Pontinus helena		15.98	34	5.03		Brachydeuterus auritus		0.22	2	0.73	
Raja miraletus		7.49	8	2.36		Trachurus trecae		0.16	2	0.53	
Brachydeuterus auritus		7.29	44	2.30		Total		29.85		100.00	
Pseudupeneus prayensis		5.83	32	1.84							
Pseudolithus senegalensis		5.81	10	1.83							
Alectis alexandrinus		5.75	2	1.81							
Sphyræna guachancho		5.29	12	1.67							
Trigla lyra		3.93	32	1.24							
Stromateus fiatola		3.28	4	1.03							
Octopus vulgaris		2.84	2	0.89							
Scyliorhinus stellaris		2.64	2	0.83							
Selene dorsalis		1.84	58	0.58							
Chaetodon hoefleri		1.60	10	0.50							
Scorpaena angolensis		1.56	10	0.49							
Umbrina canariensis		1.36	6	0.43							
Dentex canariensis		1.24	6	0.39							
Trichiurus lepturus		1.06	10	0.33							
Eucinostomus melanopterus		0.98	22	0.31							
Illex coindetii		0.98	449	0.31							
Pentheroscion mbizi		0.64	2	0.20							
Priacanthus arenatus		0.62	2	0.19							
Ethmalosa fimbriata		0.60	2	0.19							
Fistularia petimba		0.54	2	0.17							
Engraulis encrasicolus		0.52	252	0.16							
Grammolites gruvellii		0.52	8	0.16							
Saurida brasiliensis		0.42	80	0.13							
Boops boops		0.40	2	0.13							
Scorpaena scrofa		0.38	4	0.12							
Lagocephalus laevigatus		0.22	4	0.07							
Sardinella maderensis		0.18	12	0.06							
Gobius sp		0.16	106	0.05							
Scomber japonicus		0.14	4	0.04							
Zeus faber		0.10	2	0.03							
Citharus linguatula		0.06	2	0.02							
Total		317.72		100.03							

R/V Dr. Fridtjof Nansen		SURVEY:2011407		STATION: 17		R/V Dr. Fridtjof Nansen		SURVEY:2011407		STATION: 18	
DATE	: 25/06/2011	GEAR TYPE: PT NO:	1	POSITION:Lat	N 14°50.82	DATE	: 25/06/2011	GEAR TYPE: PT NO:	1	POSITION:Lat	N 14°50.82
TIME	: 12:30:30	start	12:59:05	duration	28.6 (min)	TIME	: 12:30:30	start	12:59:05	duration	28.6 (min)
LOG	: 2139.57	stop	2141.27		1.7	LOG	: 2139.57	stop	2141.27		1.7
FDEPTH:	30	Region	: 1300	Purpose	: 1	FDEPTH:	30	Region	: 1300	Purpose	: 1
BDEPTH:	201	Gear cond.:	0	Validity	: 0	BDEPTH:	30	Gear cond.:	0	Validity	: 0
Towing dir:	0°	Speed	: 3.6 kn	Wire out	: 80 m	Towing dir:	0°	Speed	: 3.6 kn	Wire out	: 80 m
Sorted	: 10	Catch/hour:	9.95	Total catch:	20.88	Sorted	: 10	Catch/hour:	9.95	Total catch:	20.88
SPECIES		CATCH/HOUR		% OF TOT. C		SPECIES		CATCH/HOUR		% OF TOT. C	
		weight	numbers					weight	numbers		
SALPS		20.78	13851	99.52	0	SALPS		0.06	6	0.29	
Todaropsis eblanae		0.02	6	0.09		Selene dorsalis		0.01	6	0.06	
Selene dorsalis		0.01	6	0.06		Acanthusus sp. juvenile		0.01	2	0.05	
Total		20.88		100.01		Total		20.88		100.01	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 18
 DATE :25/06/2011 GEAR TYPE: PT NO: 4 POSITION:Lat N 14°35.82
 start stop duration Lon W 17°20.70
 TIME :19:52:40 20:13:02 20.4 (min) Purpose : 1
 LOG : 2192.84 2193.94 1.1 Region : 1300
 FDEPTH: 10 10 Gear cond.: 0
 BDEPTH: 35 35 Validity : 0
 Towing dir: 0° Wire out : 80 m Speed : 3.2 kn
 Sorted : 4 Total catch: 574.74 Catch/hour: 1692.07

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella aurita	786.95	5538	46.51	35
Chloroscombrus chrysurus	466.34	5220	27.56	38
Sardinella maderensis	355.05	1828	20.98	36
Selene dorsalis	49.81	291	2.94	
Brachydeuterus auritus	12.98	185	0.77	
Decapterus rhonchus	8.48	53	0.50	37
Selar crumenophthalmus	5.56	26	0.33	
Galeoides decadactylus	3.71	26	0.22	
Scomber japonicus	3.18	26	0.19	
Total	1692.07		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 19
 DATE :25/06/2011 GEAR TYPE: PT NO: 4 POSITION:Lat N 14°25.78
 start stop duration Lon W 17°21.33
 TIME :23:51:26 00:21:59 30.6 (min) Purpose : 1
 LOG : 2224.04 2225.61 1.6 Region : 1300
 FDEPTH: 10 10 Gear cond.: 0
 BDEPTH: 63 71 Validity : 0
 Towing dir: 0° Wire out : 80 m Speed : 3.1 kn
 Sorted : 29 Total catch: 29.48 Catch/hour: 57.88

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	35.93	367	62.08	
Sardinella aurita	9.99	228	17.27	39
Trachurus trecae	5.71	200	9.87	41
Scomber japonicus	3.12	39	5.39	40
Sardinella maderensis	2.00	12	3.46	42
Selene dorsalis	0.98	8	1.70	
Illex coindetii	0.10	161	0.17	
Saurida brasiliensis	0.04	27	0.07	
Total	57.88		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 20
 DATE :26/06/2011 GEAR TYPE: PT NO: 1 POSITION:Lat N 14°15.62
 start stop duration Lon W 17°23.75
 TIME :05:02:35 05:32:02 29.5 (min) Purpose : 1
 LOG : 2262.22 2263.94 1.7 Region : 1300
 FDEPTH: 30 30 Gear cond.: 0
 BDEPTH: 77 93 Validity : 0
 Towing dir: 0° Wire out : 80 m Speed : 3.5 kn
 Sorted : 58 Total catch: 58.31 Catch/hour: 118.80

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella aurita	87.61	1088	73.74	45
Scomber japonicus	26.89	242	22.64	43
Chloroscombrus chrysurus	2.67	29	2.25	
Trachurus trecae	0.94	132	0.79	44
Sardinella maderensis	0.37	2	0.31	
Selene dorsalis	0.33	2	0.27	
Total	118.80		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 21
 DATE :26/06/2011 GEAR TYPE: BT NO: 21 POSITION:Lat N 14°4.74
 start stop duration Lon W 17°10.30
 TIME :10:14:11 10:44:27 30.3 (min) Purpose : 1
 LOG : 2304.61 2306.24 1.6 Region : 1300
 FDEPTH: 35 36 Gear cond.: 0
 BDEPTH: 35 36 Validity : 0
 Towing dir: 0° Wire out : 100 m Speed : 3.2 kn
 Sorted : 65 Total catch: 260.95 Catch/hour: 517.24

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	320.22	3835	61.91	46
Pseudupeneus prayensis	48.26	385	9.33	
Scarus hoefleri	33.54	54	6.48	
Pagrus caeruleostictus	28.10	196	5.43	
Balistes capriscus	23.01	54	4.45	
Plectorhinchus mediterraneus	18.11	63	3.50	
Epinephelus aeneus	15.96	10	3.08	
Balistes punctatus	12.67	18	2.45	
Stephanolepis sp.	4.64	28	0.90	
Fistularia tabacaria	4.55	63	0.88	
Umbrina canariensis	4.01	28	0.78	
Aluterus heudelotii	2.14	4	0.41	
Priacanthus arenatus	0.89	8	0.17	
Serranus scriba	0.80	8	0.16	
Xyrichtys novacula	0.36	8	0.07	
Total	517.24		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 22
 DATE :26/06/2011 GEAR TYPE: PT NO: 4 POSITION:Lat N 13°55.05
 start stop duration Lon W 17°6.02
 TIME :20:21:53 20:52:02 30.2 (min) Purpose : 1
 LOG : 2374.19 2375.80 1.6 Region : 1320
 FDEPTH: 5 5 Gear cond.: 0
 BDEPTH: 32 34 Validity : 0
 Towing dir: 0° Wire out : 80 m Speed : 3.2 kn
 Sorted : 91 Total catch: 1552.23 Catch/hour: 3087.99

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	1576.59	263	51.06	
Chloroscombrus chrysurus	816.74	11037	26.45	59
Sardinella maderensis	103.49	812	3.35	48
Sardinella aurita	91.31	1082	2.96	47
Sphyræna guachancho	91.31	237	2.96	49
Decapterus rhonchus	65.95	406	2.14	51
Galeoides decadactylus	62.90	237	2.04	
Pomadasyd jubelini	52.42	237	1.70	
Sarda sarda	48.70	68	1.58	
Eucinostomus melanopterus	48.02	575	1.56	
Arius heudelotii	47.35	34	1.53	
Alectis alexandrinus	24.69	101	0.80	
Trachurus trecae	17.59	135	0.57	50
Umbrina canariensis	15.90	101	0.51	
Selene dorsalis	11.50	135	0.37	
Dentex canariensis	8.12	34	0.26	
Pagellus bellottii	3.72	34	0.12	
Penaeus notialis	1.69	34	0.05	
Total	3087.99		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 23
 DATE :27/06/2011 GEAR TYPE: PT NO: 1 POSITION:Lat N 13°44.96
 start stop duration Lon W 17°12.83
 TIME :01:19:24 01:49:15 29.8 (min) Purpose : 1
 LOG : 2409.54 2411.21 1.7 Region : 1320
 FDEPTH: 10 10 Gear cond.: 0
 BDEPTH: 42 48 Validity : 0
 Towing dir: 0° Wire out : 90 m Speed : 3.4 kn
 Sorted : 29 Total catch: 86.85 Catch/hour: 174.63

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella aurita	85.66	820	49.05	53
Chloroscombrus chrysurus	39.33	356	22.52	
Sardinella maderensis	21.96	145	12.57	52
Decapterus rhonchus	17.67	121	10.12	54
Trachurus trecae	5.19	36	2.97	55
Selene dorsalis	2.77	12	1.59	
Sphyræna guachancho	1.63	6	0.93	
Scomber japonicus	0.42	6	0.24	
Total	174.63		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 24
 DATE :27/06/2011 GEAR TYPE: PT NO: 1 POSITION:Lat N 13°45.06
 start stop duration Lon W 17°24.09
 TIME :03:28:25 03:59:46 31.4 (min) Purpose : 1
 LOG : 2420.84 2422.59 1.8 Region : 1320
 FDEPTH: 30 30 Gear cond.: 0
 BDEPTH: 96 119 Validity : 0
 Towing dir: 0° Wire out : 80 m Speed : 3.3 kn
 Sorted : 31 Total catch: 314.00 Catch/hour: 600.77

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	504.15	44713	83.92	58
Engraulis encrasicolus	77.87	8323	12.96	56
Scomber japonicus	13.39	191	2.23	57
Illex coindetii	5.36	19	0.89	
Total	600.77		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 25
 DATE :27/06/2011 GEAR TYPE: BT NO: 21 POSITION:Lat N 13°34.92
 start stop duration Lon W 17°16.95
 TIME :09:03:41 09:38:48 35.1 (min) Purpose : 1
 LOG : 2457.17 2459.03 1.9 Region : 1400
 FDEPTH: 65 72 Gear cond.: 0
 BDEPTH: 65 72 Validity : 0
 Towing dir: 0° Wire out : 180 m Speed : 3.2 kn
 Sorted : 0 Total catch: 66.29 Catch/hour: 113.28

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Decapterus rhonchus	71.52	304	63.13	64
Umbrina canariensis	10.92	77	9.64	
Pagellus bellottii	9.43	104	8.33	
Lagocephalus laevigatus	4.15	32	3.67	
Pseudupeneus prayensis	3.23	21	2.85	
Selene dorsalis	3.11	9	2.75	62
Cepola macrophthalma	2.58	3	2.28	
Priacanthus arenatus	1.83	10	1.61	
Fistularia petimba	1.59	24	1.40	
Chloroscombrus chrysurus	1.11	24	0.98	63
Alloteuthis africana	0.94	171	0.83	
Echelus myrus	0.62	2	0.54	
Scorpaena scrofa	0.43	5	0.38	
Sardinella maderensis	0.41	2	0.36	60
Sardinella aurita	0.36	10	0.32	61
J E L Y F I S H	0.32	2	0.29	
Citharichthys stampflii	0.31	2	0.27	
peneus notialis	0.19	5	0.17	
Loligo vulgaris	0.10	2	0.09	
Scomber japonicus	0.10	2	0.09	
Trachurus trecae	0.03	2	0.03	65
Total	113.28		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 26
 DATE :27/06/2011 GEAR TYPE: BT NO: 21 POSITION:Lat N 13°34.87
 start stop duration Lon W 17°4.96
 TIME :11:47:11 12:17:58 30.8 (min) Purpose : 1
 LOG : 2476.19 2477.89 1.7 Region : 1400
 FDEPTH: 32 35 Gear cond.: 0
 BDEPTH: 32 35 Validity : 0
 Towing dir: 0° Wire out : 130 m Speed : 3.3 kn
 Sorted : 75 Total catch: 943.72 Catch/hour: 1839.61

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	1355.70	14957	73.70	
Balistes caprisicus	176.90	322	9.62	
Pseudupeneus prayensis	96.17	1158	5.23	
Pomadasy incisus	60.15	31	3.27	
Decapterus rhonchus	59.50	257	3.23	66
Plectorhinchus mediterraneus	34.42	64	1.87	
Epinephelus aeneus	15.20	8	0.83	
Fistularia petimba	7.72	322	0.42	
Drepane africana	7.27	12	0.40	
Sardinella maderensis	6.73	33	0.37	
Octopus vulgaris	5.56	4	0.30	
Alectis alexandrinus	4.05	4	0.22	
Arius heudelotii	2.61	2	0.14	
Pagellus bellottii	2.25	33	0.12	
Mugil curema	2.25	33	0.12	
CONGER SP	1.17	4	0.06	
Acanthurus monroviae	0.80	2	0.04	
Arius parkii	0.58	2	0.03	
Syacium micrurum	0.55	2	0.03	
Total	1839.59		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 27
 DATE :27/06/2011 GEAR TYPE: PT NO: 4 POSITION:Lat N 13°25.14
 start stop duration Lon W 17°7.44
 TIME :16:05:03 16:32:39 27.6 (min) Purpose : 1
 LOG : 2507.75 2509.12 1.4 Region : 1400
 FDEPTH: 0 10 Gear cond.: 0
 BDEPTH: 38 40 Validity : 0
 Towing dir: 0° Wire out : 90 m Speed : 3.0 kn
 Sorted : 30 Total catch: 285.17 Catch/hour: 619.93

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	617.39	5935	99.59	
Trachinotus ovatus	2.54	11	0.41	
Total	619.93		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 28
 DATE :27/06/2011 GEAR TYPE: PT NO: 1 POSITION:Lat N 13°25.00
 start stop duration Lon W 17°30.40
 TIME :19:26:47 19:57:58 31.2 (min) Purpose : 1
 LOG : 2533.84 2535.71 1.9 Region : 1400
 FDEPTH: 35 36 Gear cond.: 0
 BDEPTH: 234 508 Validity : 0
 Towing dir: 0° Wire out : 84 m Speed : 3.6 kn
 Sorted : 0 Total catch: 35.00 Catch/hour: 67.33

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
SALPS	67.33	5611	100.00	
Total	67.33		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 29
 DATE :27/06/2011 GEAR TYPE: PT NO: 4 POSITION:Lat N 13°14.80
 start stop duration Lon W 17°24.90
 TIME :23:07:06 23:37:28 30.4 (min) Purpose : 1
 LOG : 2560.02 2561.34 1.3 Region : 1400
 FDEPTH: 10 10 Gear cond.: 0
 BDEPTH: 71 66 Validity : 0
 Towing dir: 0° Wire out : 90 m Speed : 2.6 kn
 Sorted : 43 Total catch: 42.60 Catch/hour: 84.13

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella aurita	48.78	723	57.98	69
Scomber japonicus	33.38	352	39.67	68
Euthynnus alletteratus	0.89	6	1.06	
Selene dorsalis	0.55	4	0.66	
Trachurus trecae	0.20	22	0.23	67
Decapterus punctatus	0.18	2	0.21	
Saurida brasiliensis	0.16	12	0.19	
Total	84.13		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 30
 DATE :28/06/2011 GEAR TYPE: BT NO: 21 POSITION:Lat N 12°56.07
 start stop duration Lon W 17°35.22
 TIME :11:34:03 12:00:10 26.1 (min) Purpose : 1
 LOG : 2659.35 2660.66 1.3 Region : 1330
 FDEPTH: 74 76 Gear cond.: 0
 BDEPTH: 74 76 Validity : 0
 Towing dir: 0° Wire out : 220 m Speed : 3.0 kn
 Sorted : 76 Total catch: 76.43 Catch/hour: 175.57

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pomadasy peroteti	40.54	99	23.09	
Boops boops	37.44	8237	21.33	
Trachurus trecae	24.23	3832	13.80	70
Pagellus bellottii	12.11	96	6.90	
Fistularia petimba	10.41	140	5.93	
Pseudupeneus prayensis	8.18	388	4.66	
Dactylopterus volitans	7.92	25	4.51	
Umbrina canariensis	7.53	18	4.29	
Epinephelus aeneus	5.15	5	2.93	
Sardinella aurita	3.86	140	2.20	71
Torpedo marmorata	2.94	5	1.67	
Decapterus rhonchus	2.55	9	1.45	
Balistes caprisicus	2.30	2	1.31	
Pagrus caeruleostictus	1.95	5	1.11	
Alectis alexandrinus	1.79	2	1.02	
Plectorhinchus mediterraneus	1.10	2	0.63	
Erythrocles monodi	0.96	308	0.55	
Syacium micrurum	0.94	7	0.54	
Cynoglossus monodi	0.85	7	0.48	
Chaetodon hoefleri	0.83	7	0.47	
Sepia officinalis	0.55	5	0.31	
Anthias anthias	0.34	165	0.20	
Scorpaena scrofa	0.30	9	0.17	
Trigla lyra	0.30	2	0.17	
Grammolites gruvelli	0.28	7	0.16	
Chromis sp.	0.21	2	0.12	
Lagocephalus laevisgatus	0.14	2	0.08	
Illex coindetii	0.14	119	0.08	
Total	175.84		100.16	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 31
 DATE :28/06/2011 GEAR TYPE: BT NO: 21 POSITION:Lat N 12°56.05
 start stop duration Lon W 17°16.63
 TIME :14:53:40 15:25:10 31.5 (min) Purpose : 1
 LOG : 2684.92 2686.57 1.7 Region : 1330
 FDEPTH: 37 36 Gear cond.: 0
 BDEPTH: 37 36 Validity : 0
 Towing dir: 0° Wire out : 120 m Speed : 3.2 kn
 Sorted : 71 Total catch: 255.62 Catch/hour: 486.74

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	207.93	1089	42.72	
Pseudupeneus prayensis	100.25	1040	20.60	
Priacanthus arenatus	44.56	124	9.15	
Pagrus caeruleostictus	32.68	124	6.71	
Alectis alexandrinus	21.71	13	4.46	
Decapterus rhonchus	21.54	668	4.42	72
Balistes punctatus	12.30	8	2.53	
Acanthurus monroviae	10.82	17	2.22	
Boops boops	8.74	5990	1.80	
Pomadasy incisus	7.10	50	1.46	
Sardinella maderensis	5.37	25	1.10	
Epinephelus aeneus	5.31	8	1.09	
Fistularia petimba	2.72	57	0.56	
Bodianus speciosus	2.27	2	0.47	
Sepia officinalis	2.15	8	0.44	
Psettodes belcheri	0.91	2	0.19	
Total	486.36		99.92	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 32
 DATE :28/06/2011 GEAR TYPE: BT NO: 21 POSITION:Lat N 12°54.99
 start stop duration Lon W 17°7.53
 TIME :16:44:29 17:13:30 29.0 (min) Purpose : 1
 LOG : 2697.49 2699.02 1.5 Region : 1330
 FDEPTH: 24 27 Gear cond.: 0
 BDEPTH: 24 27 Validity : 0
 Towing dir: 0° Wire out : 92 m Speed : 3.2 kn
 Sorted : 18 Total catch: 17.60 Catch/hour: 36.39

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Cymbium pepo	15.67	2	43.07	
Alectis alexandrinus	5.33	8	14.66	
Sepia officinalis	3.27	12	8.98	
Balistes caprisicus	2.13	2	5.85	
Dactylopterus volitans	1.63	2	4.49	
Lagocephalus laevisgatus	1.57	4	4.32	
Fistularia petimba	1.30	25	3.58	
Decapterus rhonchus	1.26	4	3.47	
Bodianus speciosus	1.14	4	3.13	
Pagrus caeruleostictus	1.03	8	2.84	
Illex coindetii	0.79	550	2.16	
Stephanolepis hispidus	0.39	2	1.08	
Perulibatrachus elminensis	0.31	2	0.85	
Perulibatrachus rossignoli	0.31	2	0.85	
Callinectes sp.	0.14	2	0.40	
Pseudupeneus prayensis	0.11	6	0.31	
Total	36.40		100.02	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 33
 DATE :28/06/2011 GEAR TYPE: PT NO: 4 POSITION:Lat N 12°54.69
 start stop duration Purpose : 1
 TIME :18:40:44 19:10:13 29.5 (min) Region : 1330
 LOG : 2710.17 2711.66 1.5 Gear cond.: 0
 FDEPTH: 0 0 Validity : 0
 BDEPTH: 20 21 Speed : 3.0 kn
 Towing dir: 0° Wire out : 80 m Catch/hour: 319.20
 Sorted : 63 Total catch: 156.78

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	127.76	1303	40.02	
Sardinella maderensis	114.52	678	35.88	73
Decapterus rhonchus	40.62	193	12.72	75
Sarda sarda	10.93	16	3.43	
Sardinella aurita	8.20	67	2.57	74
Liza falcipinnis	6.35	20	1.99	
Scomberomorus tritor	4.44	6	1.39	
Calappa rubroguttata	1.28	2	0.40	
Lagocephalus laevigatus	1.28	2	0.40	
Selene dorsalis	1.26	6	0.40	
Trachinotus ovatus	0.81	6	0.26	
Eucinostomus melanopterus	0.81	6	0.26	
Caranx senegalus	0.61	2	0.19	
Portunus validus	0.31	6	0.10	
Total	319.20		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 37
 DATE :29/06/2011 GEAR TYPE: BT NO: 21 POSITION:Lat N 12°30.63
 start stop duration Purpose : 1
 TIME :08:07:08 08:38:21 31.2 (min) Region : 1330
 LOG : 2800.42 2802.07 1.6 Gear cond.: 0
 FDEPTH: 41 45 Validity : 0
 BDEPTH: 41 45 Speed : 3.2 kn
 Towing dir: 0° Wire out : 120 m Catch/hour: 114.33
 Sorted : 11 Total catch: 59.49

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Decapterus rhonchus	33.67	100	29.45	84
Pseudupeneus prayensis	16.57	100	14.49	
Fistularia petimba	10.95	177	9.58	
Caranx crysos	9.32	12	8.15	
Sardinella maderensis	7.82	33	6.84	83
Alloteuthis africana	7.46	6421	6.52	
Alectis alexandrinus	5.46	10	4.77	
Selene dorsalis	5.25	25	4.59	
Seriola carpenteri	5.07	10	4.44	
Eucinostomus melanopterus	4.94	44	4.32	
Chloroscombrus chrysurus	3.11	13	2.72	
Lagocephalus laevigatus	2.38	10	2.08	
Arius parkii	1.13	2	0.99	
Psettodes belcheri	0.69	2	0.61	
Scorpaena angolensis	0.29	2	0.25	
Pagellus bellottii	0.21	2	0.18	
Total	114.33		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 34
 DATE :28/06/2011 GEAR TYPE: BT NO: 21 POSITION:Lat N 12°45.09
 start stop duration Purpose : 1
 TIME :21:28:35 21:49:24 20.8 (min) Region : 1330
 LOG : 2729.79 2730.79 1.0 Gear cond.: 0
 FDEPTH: 10 10 Validity : 0
 BDEPTH: 20 20 Speed : 2.9 kn
 Towing dir: 0° Wire out : 60 m Catch/hour: 412.31
 Sorted : 28 Total catch: 143.07

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	253.60	1628	61.51	
Decapterus rhonchus	149.86	764	36.35	76
Trichiurus lepturus	2.56	3	0.62	
Galeoides decadactylus	2.07	3	0.50	
Arius parkii	1.93	6	0.47	
Fistularia petimba	1.21	6	0.29	
Penaeus notialis	1.07	3	0.26	
Total	412.31		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 38
 DATE :29/06/2011 GEAR TYPE: PT NO: 4 POSITION:Lat N 12°13.59
 start stop duration Purpose : 1
 TIME :14:11:36 14:41:28 29.9 (min) Region : 1330
 LOG : 2850.93 2852.67 1.7 Gear cond.: 0
 FDEPTH: 10 10 Validity : 0
 BDEPTH: 28 31 Speed : 3.5 kn
 Towing dir: 0° Wire out : 90 m Catch/hour: 204.50
 Sorted : 69 Total catch: 101.78

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sphyraena guachancho	86.20	163	42.15	
Chloroscombrus chrysurus	55.61	229	27.19	
Trichiurus lepturus	13.81	30	6.76	
Ilisha africana	9.14	100	4.47	
Scomber japonicus	8.74	8	4.27	
Arius laticutatus	8.64	2	4.23	
Galeoides decadactylus	5.38	6	2.63	
Trachinotus ovatus	4.37	6	2.14	
Elops lacerta	3.77	4	1.84	
Brachydeuterus auritus	3.72	32	1.82	
Alectis alexandrinus	1.46	2	0.71	
Selene dorsalis	1.46	8	0.71	
Decapterus punctatus	1.31	2	0.64	
Stromateus fiatola	1.00	2	0.49	
Total	204.60		100.05	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 35
 DATE :28/06/2011 GEAR TYPE: PT NO: 4 POSITION:Lat N 12°44.26
 start stop duration Purpose : 1
 TIME :23:43:17 00:13:02 29.7 (min) Region : 1330
 LOG : 2743.91 2745.40 1.5 Gear cond.: 0
 FDEPTH: 5 5 Validity : 0
 BDEPTH: 36 37 Speed : 3.0 kn
 Towing dir: 0° Wire out : 80 m Catch/hour: 26.33
 Sorted : 13 Total catch: 13.05

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Selar crumenophthalmus	5.55	28	21.07	
Decapterus rhonchus	4.38	22	16.63	77
Sardinella aurita	2.89	20	10.96	79
Caranx senegalus	2.74	2	10.42	
Scomberomorus tritor	2.56	2	9.73	
Arius heudelotii	1.82	2	6.90	
Sardinella maderensis	1.69	6	6.44	78
Echeneis naucrates	1.03	4	3.91	
Saurida brasiliensis	0.91	113	3.45	
Boops boops	0.87	496	3.30	
Illex coindetii	0.87	178	3.30	
Eucinostomus melanopterus	0.79	2	2.99	
Bristle worms yellow	0.24	14	0.92	
Total	26.33		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 39
 DATE :29/06/2011 GEAR TYPE: BT NO: 21 POSITION:Lat N 11°50.34
 start stop duration Purpose : 1
 TIME :20:55:39 21:25:51 30.2 (min) Region : 2100
 LOG : 2907.82 2909.44 1.6 Gear cond.: 0
 FDEPTH: 0 0 Validity : 0
 BDEPTH: 21 20 Speed : 3.2 kn
 Towing dir: 0° Wire out : 80 m Catch/hour: 327.12
 Sorted : 76 Total catch: 164.65

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Hemicaranx bicolor	151.09	1101	46.19	
Chloroscombrus chrysurus	52.39	93	16.02	
Elops lacerta	44.70	111	13.67	
Rhizoprionodon acutus	21.02	32	6.43	
Sardinella maderensis	14.17	121	4.33	85
Ilisha africana	13.69	242	4.18	
Stromateus fiatola	10.37	54	3.17	
Arius heudelotii	5.28	14	1.62	
Trichiurus lepturus	4.79	54	1.46	
Trachinotus ovatus	3.36	22	1.03	
Psettodes belcheri	1.75	6	0.53	
Brachydeuterus auritus	1.25	14	0.38	
Trachinotus mookalee	0.85	4	0.26	
Mugil curema	0.58	6	0.18	
Selene dorsalis	0.54	9	0.16	
Liza falcipinnis	0.50	6	0.15	
Penaeus notialis	0.44	4	0.13	
Fistularia petimba	0.28	4	0.09	
Sepiella ornata	0.04	4	0.01	
Alectis alexandrinus	0.02	4	0.01	
EUPHASIDAE *	0.02	89	0.01	
BELONIDAE	0.00	183	0.00	
Total	327.12		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 36
 DATE :29/06/2011 GEAR TYPE: PT NO: 4 POSITION:Lat N 12°44.34
 start stop duration Purpose : 1
 TIME :01:56:34 02:26:29 29.9 (min) Region : 1330
 LOG : 2757.40 2759.02 1.6 Gear cond.: 0
 FDEPTH: 0 10 Validity : 0
 BDEPTH: 51 55 Speed : 3.3 kn
 Towing dir: 0° Wire out : 90 m Catch/hour: 209.58
 Sorted : 30 Total catch: 104.48

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella aurita	149.20	1888	71.19	81
Sardinella maderensis	25.49	126	12.16	80
Scomber japonicus	13.90	154	6.63	82
Chloroscombrus chrysurus	5.20	28	2.48	
Sarda sarda	4.28	8	2.04	
Arius laticutatus	4.07	8	1.94	
Caranx crysos	4.00	8	1.91	
Trichiurus lepturus	2.46	8	1.17	
Decapterus punctatus	0.70	8	0.34	
Selene dorsalis	0.28	211	0.13	
Total	209.58		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 40
 DATE :29/06/2011 GEAR TYPE: PT NO: 4 POSITION:Lat N 11°34.05
 start stop duration Lon W 17°10.34
 TIME :23:41:04 00:14:29 33.4 (min) Purpose : 1
 LOG : 2928.75 2930.67 1.9 Region : 2100
 FDEPTH: 10 10 Gear cond.: 0
 BDEPTH: 55 61 Validity : 0
 Towing dir: 0° Wire out : 90 m Speed : 3.4 kn
 Sorted : 0 Total catch: 22.68 Catch/hour: 40.72

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Ilisha africana	9.68	147	23.77	
Trichiurus lepturus	7.27	75	17.86	
Sphyræna guachancho	7.11	25	17.46	
Euthynnus alletteratus	3.81	5	9.35	
Selene dorsalis	3.36	20	8.25	
Brachydeuterus auritus	2.53	115	6.22	
Sardinella maderensis	1.87	11	4.59	86
Saurida brasiliensis	1.76	282	4.32	
Selar crumenophthalmus	0.74	4	1.81	
Echeneis naucrates	0.72	7	1.76	
Engraulis encrasicolus	0.65	754	1.59	
Illex coindetii	0.63	670	1.54	
Trachinotus ovatus	0.43	2	1.06	
Decapterus rhonchus	0.11	9	0.26	87
Hemiramphus brasiliensis	0.07	2	0.18	
Total		40.72	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 41
 DATE :30/06/2011 GEAR TYPE: PT NO: 4 POSITION:Lat N 11°18.32
 start stop duration Lon W 17°8.29
 TIME :05:56:39 06:26:37 30.0 (min) Purpose : 1
 LOG : 2978.54 2980.11 1.6 Region : 2100
 FDEPTH: 10 10 Gear cond.: 0
 BDEPTH: 47 52 Validity : 0
 Towing dir: 0° Wire out : 90 m Speed : 3.1 kn
 Sorted : 0 Total catch: 4.38 Catch/hour: 8.77

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	7.35	36	83.79	88
Sarda sarda	0.94	2	10.73	
Sphyræna guachancho	0.48	2	5.48	
Decapterus rhonchus	0.00	4	0.02	
Total		8.77	100.02	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 42
 DATE :30/06/2011 GEAR TYPE: PT NO: 4 POSITION:Lat N 10°47.04
 start stop duration Lon W 16°49.28
 TIME :20:10:48 20:40:53 30.1 (min) Purpose : 1
 LOG : 3093.94 3095.54 1.6 Region : 2100
 FDEPTH: 10 10 Gear cond.: 0
 BDEPTH: 79 92 Validity : 0
 Towing dir: 0° Wire out : 90 m Speed : 3.2 kn
 Sorted : 0 Total catch: 2.77 Catch/hour: 5.53

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Saurida brasiliensis	5.39	1161	97.47	
RACHYCENTRIDAE	0.12	2	2.17	
Selene dorsalis	0.02	20	0.36	
Total		5.53	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 43
 DATE :01/07/2011 GEAR TYPE: PT NO: 4 POSITION:Lat N 10°37.76
 start stop duration Lon W 16°25.46
 TIME :01:12:41 01:44:02 31.4 (min) Purpose : 1
 LOG : 3134.40 3136.32 1.9 Region : 2100
 FDEPTH: 0 0 Gear cond.: 0
 BDEPTH: 34 39 Validity : 0
 Towing dir: 0° Wire out : 80 m Speed : 3.7 kn
 Sorted : 0 Total catch: 78.15 Catch/hour: 149.57

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	50.53	655	33.78	
Acanthocybium solandri	48.71	2	32.57	
Decapterus rhonchus	16.78	513	11.22	91
Sardinella aurita	16.44	718	10.99	89
Decapterus punctatus	4.36	176	2.92	
Trichiurus lepturus	2.43	8	1.63	
Sphyræna guachancho	2.43	21	1.63	
Echeneis naucrates	2.37	2	1.59	
Arius heudelotii	2.05	2	1.37	
Sardinella maderensis	2.05	17	1.37	90
Lagocephalus laevigatus	0.50	8	0.33	
Priacanthus aeneus	0.46	4	0.31	
Saurida brasiliensis	0.21	44	0.14	
Engraulis encrasicolus	0.10	13	0.06	
Hemicaranx bicolor	0.10	2	0.06	
Sepia officinalis	0.04	2	0.03	
Illex coindetii	0.02	23	0.01	
Total		149.57	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 44
 DATE :01/07/2011 GEAR TYPE: PT NO: 4 POSITION:Lat N 10°24.15
 start stop duration Lon W 16°47.04
 TIME :04:34:52 05:06:00 31.1 (min) Purpose : 1
 LOG : 3159.73 3161.42 1.7 Region : 2100
 FDEPTH: 10 10 Gear cond.: 0
 BDEPTH: 182 193 Validity : 0
 Towing dir: 0° Wire out : 90 m Speed : 3.3 kn
 Sorted : 0 Total catch: 1.46 Catch/hour: 2.81

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	2.00	6	71.23	
Scomber japonicus	0.46	241	16.44	
Trachurus trecae	0.27	31	9.59	92
Illex coindetii	0.04	13	1.37	
Caranx crysos	0.04	21	1.37	
Stephanolepis hispidus	0.00	17	0.07	
Selene dorsalis	0.00	15	0.07	
Total		2.82	100.14	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 45
 DATE :01/07/2011 GEAR TYPE: PT NO: 4 POSITION:Lat N 10°5.34
 start stop duration Lon W 17°6.81
 TIME :08:44:31 09:14:27 29.9 (min) Purpose : 1
 LOG : 3192.42 3194.07 1.7 Region : 2100
 FDEPTH: 0 0 Gear cond.: 0
 BDEPTH: 458 479 Validity : 0
 Towing dir: 0° Wire out : 90 m Speed : 3.3 kn
 Sorted : 0 Total catch: 0.02 Catch/hour: 0.04

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Decapterus rhonchus	0.03	38	0.00	
Hemicaranx bicolor	0.00	2	0.00	
Psenes sp.	0.00	2	0.00	
Caranx crysos	0.01	6	0.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 46
 DATE :01/07/2011 GEAR TYPE: BT NO: 21 POSITION:Lat N 9°59.90
 start stop duration Lon W 16°50.97
 TIME :13:00:49 13:30:58 30.1 (min) Purpose : 1
 LOG : 3220.55 3222.10 1.6 Region : 2100
 FDEPTH: 326 362 Gear cond.: 0
 BDEPTH: 326 362 Validity : 0
 Towing dir: 0° Wire out : 880 m Speed : 3.1 kn
 Sorted : 28 Total catch: 168.71 Catch/hour: 335.85

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chlorophthalmus atlanticus	130.79	3010	38.94	
Merluccius polli	49.69	227	14.79	
Pterothrissus belloci	40.73	131	12.13	
Illex coindetii	35.24	287	10.49	
Saurida brasiliensis	23.77	11001	7.08	
Synagrops microlepis	22.34	932	6.65	
Ariomma bondi	8.96	251	2.67	
CHIROSTYLIDAE	8.36	717	2.49	
Lophiodes kempfi	5.02	12	1.49	
Malacocephalus laevis	2.87	24	0.85	
Parapanaeus longirostris	1.43	143	0.43	
Zenion hololepis	1.07	60	0.32	
Plesionika martia	1.07	251	0.32	
Nezumia sp.	0.96	36	0.28	
Ariomma melanum	0.96	36	0.28	
Bembrops heterurus	0.72	12	0.21	
Parasudis fraser-bruenneri	0.72	12	0.21	
Epigonus telescopus	0.60	36	0.18	
Illex coindetii	0.45	12	0.14	
Sea cucumber	0.27	12	0.08	0
Synchiropus phaeton	0.12	12	0.04	
Chlorophthalmus sp.	0.09	12	0.03	
Monolene microstoma	0.04	12	0.01	
Syacium micrurum	0.01	12	0.00	
Total		336.27	100.12	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 47
 DATE :01/07/2011 GEAR TYPE: PT NO: 4 POSITION:Lat N 10°30.07
 start stop duration Lon W 16°14.43
 TIME :20:22:09 20:52:23 30.2 (min) Purpose : 1
 LOG : 3274.45 3275.98 1.5 Region : 2100
 FDEPTH: 10 10 Gear cond.: 0
 BDEPTH: 33 32 Validity : 0
 Towing dir: 0° Wire out : 90 m Speed : 3.0 kn
 Sorted : 65 Total catch: 842.84 Catch/hour: 1672.30

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	1176.59	14119	70.36	
Sardinella maderensis	203.81	1095	12.19	93
Caranx crysos	134.05	190	8.02	
Arius heudelotii	77.14	24	4.61	
Decapterus rhonchus	34.29	643	2.05	95
Sphyræna guachancho	27.62	190	1.65	
Sardinella aurita	9.05	310	0.54	94
Trichiurus lepturus	6.67	24	0.40	
Trachinotus ovatus	2.62	24	0.16	
Pontinus sp.	0.48	48	0.03	
Total		1672.30	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 48
 DATE :01/07/2011 GEAR TYPE: PT NO: 4 POSITION:Lat N 10°30.01
 start stop duration Purpose : 1
 TIME :23:05:49 23:35:56 30.1 (min) Region : 2100
 LOG : 3290.35 3292.32 2.0 Gear cond.: 0
 FDEPTH: 5 5 Validity : 0
 BDEPTH: 27 33 Speed : 3.9 kn
 Towing dir: 0° Wire out : 90 m Catch/hour: 3000.00
 Sorted : 60 Total catch: 1506.50

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella aurita, juvenile	2163.62	75573	72.12	96
Chloroscombrus chrysurus	579.97	7916	19.33	
Sphyraena guachancho	151.34	747	5.04	
Decapterus rhonchus	77.66	946	2.59	97
Sardinella aurita	21.91	149	0.73	100
Decapterus punctatus	2.99	100	0.10	
Lagocephalus laevis	2.49	50	0.08	
Total	2999.98		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 49
 DATE :02/07/2011 GEAR TYPE: PT NO: 4 POSITION:Lat N 10°15.56
 start stop duration Purpose : 1
 TIME :04:31:56 05:02:38 30.7 (min) Region : 2200
 LOG : 3328.53 3330.04 1.5 Gear cond.: 0
 FDEPTH: 10 10 Validity : 0
 BDEPTH: 39 38 Speed : 2.9 kn
 Towing dir: 0° Wire out : 80 m Catch/hour: 265.71
 Sorted : 35 Total catch: 136.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	150.63	856	56.69	98
Arius heudelotii	72.09	31	27.13	
Sardinella aurita	29.13	258	10.96	99
Sphyraena guachancho	7.09	12	2.67	
Selar crumenophthalmus	4.98	18	1.88	
Trichiurus lepturus	1.02	2	0.38	
Callinectes pallidus	0.35	70	0.13	
Decapterus punctatus	0.35	12	0.13	
Hemicaranx bicolor	0.06	18	0.02	
Stephanolepis hispidus	0.01	12	0.00	
Total	265.72		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 50
 DATE :02/07/2011 GEAR TYPE: PT NO: 1 POSITION:Lat N 10°1.84
 start stop duration Purpose : 1
 TIME :08:05:19 08:37:57 32.6 (min) Region : 2200
 LOG : 3348.60 3350.22 1.6 Gear cond.: 0
 FDEPTH: 34 40 Validity : 0
 BDEPTH: 54 57 Speed : 3.0 kn
 Towing dir: 0° Wire out : 95 m Catch/hour: 93.38
 Sorted : 0 Total catch: 50.80

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
J E L L Y F I S H	93.38	219	100.00	
Total	93.38		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 51
 DATE :02/07/2011 GEAR TYPE: BT NO: 21 POSITION:Lat N 9°42.09
 start stop duration Purpose : 1
 TIME :16:13:59 16:44:15 30.3 (min) Region : 2200
 LOG : 3408.87 3410.26 1.4 Gear cond.: 0
 FDEPTH: 163 187 Validity : 0
 BDEPTH: 163 187 Speed : 2.7 kn
 Towing dir: 0° Wire out : 410 m Catch/hour: 165.00
 Sorted : 22 Total catch: 83.24

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Antigonia capros	112.59	1990	68.24	
Illex coindetii	29.02	301	17.59	
Ariomma bondi	17.92	412	10.86	
Zeus faber	3.96	4	2.40	
Trigla lyra	1.51	16	0.91	
Total	165.00		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 52
 DATE :02/07/2011 GEAR TYPE: PT NO: 4 POSITION:Lat N 10°9.70
 start stop duration Purpose : 1
 TIME :21:30:10 22:00:08 30.0 (min) Region : 2200
 LOG : 3452.06 3453.42 1.4 Gear cond.: 0
 FDEPTH: 5 5 Validity : 0
 BDEPTH: 33 36 Speed : 2.7 kn
 Towing dir: 0° Wire out : 90 m Catch/hour: 1952.34
 Sorted : 61 Total catch: 975.52

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	1693.93	23728	86.76	
Decapterus punctatus	100.23	1185	5.13	102
Sardinella maderensis	86.14	640	4.41	103
Sardinella aurita	39.39	448	2.02	101
Sphyraena guachancho	23.06	128	1.18	
Sphyraena sphyraena	9.61	64	0.49	
Total	1952.34		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 53
 DATE :03/07/2011 GEAR TYPE: PT NO: 4 POSITION:Lat N 10°22.40
 start stop duration Purpose : 1
 TIME :01:00:10 01:31:17 31.1 (min) Region : 2200
 LOG : 3473.88 3475.14 1.3 Gear cond.: 0
 FDEPTH: 0 0 Validity : 0
 BDEPTH: 25 25 Speed : 2.4 kn
 Towing dir: 0° Wire out : 90 m Catch/hour: 48.72
 Sorted : 0 Total catch: 25.28

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Decapterus punctatus	16.86	517	34.61	
Engraulis encrasicolus	12.80	5439	26.27	105
Decapterus rhonchus	5.24	60	10.76	106
Arius heudelotii	3.45	2	7.08	
Sardinella aurita	2.62	102	5.38	107
Scomberomorus tritor	2.29	4	4.71	
Sardinella maderensis	1.62	46	3.32	104
Rhizoprionodon acutus	1.41	2	2.89	
Priacanthus arenatus	0.58	6	1.19	
Sphyraena guachancho	0.48	2	0.99	
Echeneis naucrates	0.35	2	0.71	
Caranx crysos	0.27	4	0.55	
Bodianus speciosus	0.17	2	0.36	
Callinectes pallidus	0.08	8	0.16	
Brachydeuterus auritus	0.08	6	0.16	
Sepia officinalis	0.08	6	0.16	
Pseudopenaeus prayensis	0.08	10	0.16	
Spherooides pachgaster	0.08	6	0.16	
Pagellus bellottii	0.04	4	0.08	
Serranus scriba	0.04	2	0.08	
Ophichthus bennettii	0.04	2	0.08	
Trachinocephalus myops	0.04	2	0.08	
Penaeus kerathurus	0.02	4	0.04	
Parapenaeus longirostris	0.02	15	0.04	
Total	48.72		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 54
 DATE :03/07/2011 GEAR TYPE: BT NO: 21 POSITION:Lat N 10°8.93
 start stop duration Purpose : 1
 TIME :08:12:53 08:42:42 29.8 (min) Region : 2200
 LOG : 3524.05 3525.19 1.1 Gear cond.: 0
 FDEPTH: 27 27 Validity : 0
 BDEPTH: 27 27 Speed : 2.3 kn
 Towing dir: 0° Wire out : 120 m Catch/hour: 11.15
 Sorted : 2 Total catch: 5.54

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	11.11	201	99.64	108
Decapterus punctatus	0.04	2	0.36	
Total	11.15		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 55
 DATE :03/07/2011 GEAR TYPE: BT NO: 21 POSITION:Lat N 9°34.26
 start stop duration Purpose : 1
 TIME :14:53:29 15:17:12 23.7 (min) Region : 2200
 LOG : 3575.20 3576.40 1.2 Gear cond.: 0
 FDEPTH: 144 146 Validity : 0
 BDEPTH: 144 146 Speed : 3.0 kn
 Towing dir: 0° Wire out : 380 m Catch/hour: 7274.29
 Sorted : 57 Total catch: 2875.77

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Ariomma bondi	3313.66	291779	45.55	
Antigonia capros	1846.54	43381	25.38	
Trachurus trercae	1182.55	120784	16.26	109
Saurida brasiliensis	798.06	160624	10.97	
Illex coindetii	40.47	506	0.56	
Zeus faber	32.88	126	0.45	
Mustelus mustelus	20.36	3	0.28	
Scomber japonicus	16.44	506	0.23	
Priacanthus arenatus	8.85	126	0.12	
Trachinocephalus myops	8.85	126	0.12	
Raja straeleni	3.24	3	0.04	
Squatina oculata	2.38	3	0.03	
Total	7274.29		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 56
 DATE :03/07/2011 GEAR TYPE: BT NO: 21 POSITION:Lat N 9°23.67
 start stop duration Purpose : 1
 TIME :22:20:02 22:50:12 30.2 (min) Region : 2200
 LOG : 3628.29 3629.93 1.6 Gear cond.: 0
 FDEPTH: 156 180 Validity : 0
 BDEPTH: 156 180 Speed : 3.3 kn
 Towing dir: 0° Wire out : 378 m Catch/hour: 447.33
 Sorted : 25 Total catch: 224.86

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Antigonia sp capros	247.08	5156	55.23	
Synodus saurus	60.70	752	13.57	
Pontinus accraensis	34.38	555	7.68	
Scorpaena scrofa	31.15	143	6.96	
Lepidotrigla carolae	25.60	1074	5.72	
Illex coindetii	16.11	161	3.60	
Peristedion cataphractum	14.32	627	3.20	
Chelidonichthys gabonensis	3.40	36	0.76	
Todaropsis eblanae	2.33	18	0.52	
DERICHTHYDAE	2.33	125	0.52	
Pterothrissus belloci	2.15	18	0.48	
RAJIDAE	2.09	2	0.47	
Brotula barbata	1.65	2	0.37	
Lepidotrigla cadmani	1.61	36	0.36	
Sepia officinalis	1.25	18	0.28	
Ophidiidae 'spot nose'	0.54	72	0.12	
Syacium micrurum	0.54	36	0.12	
Solenocera africana	0.05	54	0.01	
Selene dorsalis	0.04	18	0.01	
Total	447.32		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 57
 DATE :04/07/2011 GEAR TYPE: PT NO: 4 POSITION:Lat N 9°44.25 Lon W 15°34.88
 start stop duration
 TIME :03:07:45 03:38:37 30.9 (min) Purpose : 1
 LOG : 3661.28 3662.70 1.4 Region : 2200
 FDEPTH: 0 0 Gear cond.: 0
 BDEPTH: 40 41 Validity : 0
 Towing dir: 0° Wire out : 90 m Speed : 2.8 km
 Sorted : 0 Total catch: 13.67 Catch/hour: 26.58

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	22.55	319	84.86	
Scomberomorus tritor	3.64	2	13.68	
Decapterus punctatus	0.21	4	0.80	
Sardinella aurita	0.17	6	0.66	110
Total	26.58		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 58
 DATE :04/07/2011 GEAR TYPE: PT NO: 4 POSITION:Lat N 10°5.43 Lon W 15°7.81
 start stop duration
 TIME :07:57:19 08:26:10 28.9 (min) Purpose : 1
 LOG : 3697.42 3698.58 1.2 Region : 2200
 FDEPTH: 0 0 Gear cond.: 0
 BDEPTH: 27 24 Validity : 0
 Towing dir: 0° Wire out : 90 m Speed : 2.4 km
 Sorted : 0 Total catch: 1.65 Catch/hour: 3.43

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Scomberomorus tritor	2.31	2	67.27	
Chloroscombrus chrysurus	0.58	8	16.97	
Sardinella maderensis	0.29	10	8.48	111
Priacanthus arenatus	0.21	2	6.06	
Sepiella ornata	0.04	4	1.21	
Total	3.43		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 59
 DATE :04/07/2011 GEAR TYPE: PT NO: 4 POSITION:Lat N 10°1.93 Lon W 14°54.87
 start stop duration
 TIME :12:23:26 12:54:10 30.7 (min) Purpose : 1
 LOG : 3729.86 3731.92 2.1 Region : 2200
 FDEPTH: 0 10 Gear cond.: 0
 BDEPTH: 45 37 Validity : 0
 Towing dir: 0° Wire out : 90 m Speed : 4.0 km
 Sorted : 0 Total catch: 1.00 Catch/hour: 1.95

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Echeneis naucrates	1.95	8	100.00	
Total	1.95		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 60
 DATE :04/07/2011 GEAR TYPE: BT NO: 21 POSITION:Lat N 9°24.65 Lon W 15°31.98
 start stop duration
 TIME :19:57:24 20:27:44 30.3 (min) Purpose : 1
 LOG : 3789.23 3790.69 1.5 Region : 2200
 FDEPTH: 59 63 Gear cond.: 0
 BDEPTH: 59 63 Validity : 0
 Towing dir: 0° Wire out : 174 m Speed : 2.9 km
 Sorted : 0 Total catch: 39.46 Catch/hour: 78.09

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Bothus podas africanus	24.93	524	31.93	
Trachinus armatus	20.78	315	26.61	
Raja miraletus	6.85	24	8.77	
Rhinobatos cemiculus	6.47	10	8.29	
Synodus saurus	5.22	32	6.69	

Dicologlossa hexophthalma	4.29	51	5.50
Lagocephalus lagocephalus	2.34	2	2.99
Sepia officinalis	1.82	14	2.33
Illex coindetii	1.37	10	1.75
Dactylopterus volitans	1.23	2	1.57
Mustelus mustelus	1.11	2	1.42
Grammolites gruvelli	0.55	10	0.71
Syacium micrurum	0.49	4	0.63
Conger conger	0.38	2	0.48
Octopus vulgaris	0.26	2	0.33
Total	78.09		100.00

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 61
 DATE :05/07/2011 GEAR TYPE: PT NO: 4 POSITION:Lat N 9°30.39 Lon W 14°52.86
 start stop duration
 TIME :08:09:28 08:39:28 30.0 (min) Purpose : 1
 LOG : 3883.70 3885.10 1.3 Region : 2200
 FDEPTH: 10 10 Gear cond.: 0
 BDEPTH: 39 40 Validity : 0
 Towing dir: 0° Wire out : 110 m Speed : 1.2 km
 Sorted : 59 Total catch: 9841.00 Catch/hour: 19682.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella aurita	19682.00	165708	100.00	112
Total	19682.00		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 62
 DATE :05/07/2011 GEAR TYPE: BT NO: 21 POSITION:Lat N 9°43.74 Lon W 14°19.15
 start stop duration
 TIME :15:28:38 15:46:33 17.9 (min) Purpose : 1
 LOG : 3933.73 3934.55 0.8 Region : 2200
 FDEPTH: 26 22 Gear cond.: 0
 BDEPTH: 26 22 Validity : 0
 Towing dir: 0° Wire out : 110 m Speed : 2.7 km
 Sorted : 0 Total catch: 6.47 Catch/hour: 21.68

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	21.21	295	97.84	113
Chloroscombrus chrysurus	0.47	7	2.16	
Total	21.68		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2011407 STATION: 63
 DATE :06/07/2011 GEAR TYPE: PT NO: 4 POSITION:Lat N 8°56.16 Lon W 14°23.01
 start stop duration
 TIME :04:04:33 04:36:46 32.2 (min) Purpose : 1
 LOG : 4039.67 4041.34 1.7 Region : 2200
 FDEPTH: 10 10 Gear cond.: 0
 BDEPTH: 45 48 Validity : 0
 Towing dir: 0° Wire out : 90 m Speed : 3.1 km
 Sorted : 0 Total catch: 0.38 Catch/hour: 0.71

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Decapterus punctatus	0.71	9	0.00	

Annex II Description of instruments and fishing gear

The Simrad EK-60, 38kHz scientific echosounder was used for abundance estimation during the survey, in addition data from the 18 kHz, 120 kHz and 200 kHz transducers were recorded for possible future multifrequency target identification. The LSSS recorded the hydroacoustic data and was used to scrutinize the acoustic records, and to allocate integrator data to fish species. All raw data were stored to disk and brought back to IMR for storing.

The details of the settings of the echosounders are as follows:

Settings	Tranceiver 1	Tranceiver 2	Tranceiver 3	Tranceiver 4
Frequency:				
Transducer:				
Tranceiver menu:				
Mode				
Transducer Type				
Transd. Sequence				
Transd Depth				
Absorption Coeff.				
Pulse Length				
Bandwidth				
Max. Power				
2-way Beam Angle				
Gain				
SA correction				
Angle Sens. Along				
Angle Sens. Athw.				
3 dB Beamw. Along				
3 dB Beamw. Athw.				
Alongship Offset				
Athw. ship Offset				
TS Detection menu				
Min. Value				
Min. Echo Length				
Max. Echo Length				
Max. Gain Comp.				
Max. Phase Dev.				

Calibration

A calibration of the acoustic equipment was conducted 23rd July 2010.

Fishing gear

The vessel has three different sized four-panel 'Åkrahamn' pelagic trawls and one 'Gisund super bottom trawl'. The two smallest pelagic trawls and the demersal trawl were used during the survey. The smallest pelagic trawl has 10-12 m vertical opening under normal operation, whereas the intermediate sized trawl has 15-18 m opening.

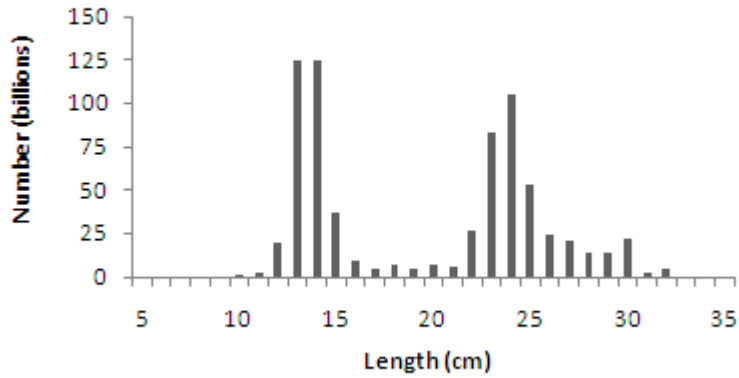
The bottom trawl has a 31 m headline and a 47 m footrope fitted with a 12" rubber bobbins gear. The codend has 20 mm meshes, and has an inner net with 10 mm mesh size. The vertical opening is about 5.5 m. The distance between the wing tips is about 18 m during towing. The sweeps are 40 m long. The trawl doors are 'Thyborøen' combi, 8 m² and weigh 2000 kg. The door spreading is about 50 m when using restraining rope. Trawling was conducted for species identification only and no restraining rope was therefore used during the survey.

The SCANBAS 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 distance and a height sensor is fitted on the bottom trawl to measure the trawl opening and provide information on clearance and bottom contact.

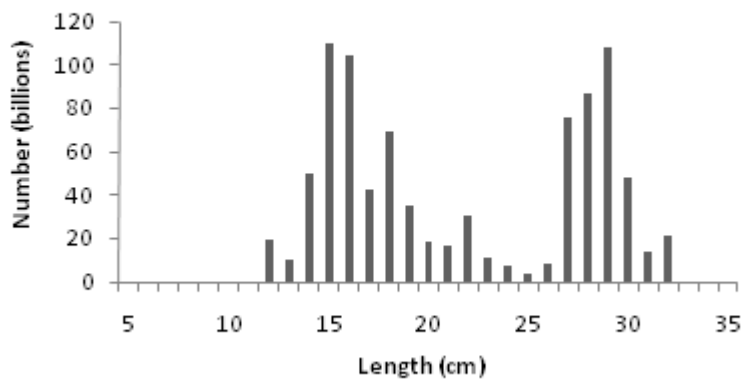
The pelagic trawls are equipped with a trawl eye that provides information about the trawl opening and the distance of the footrope to the bottom. A pressure sensor is used to show the depth on the headline.

Annex III Pooled length distributions by species

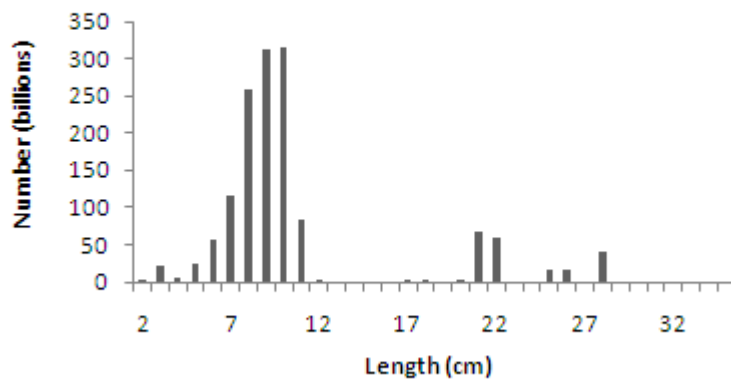
Sardinella maderensis, Senegal and The Gambia



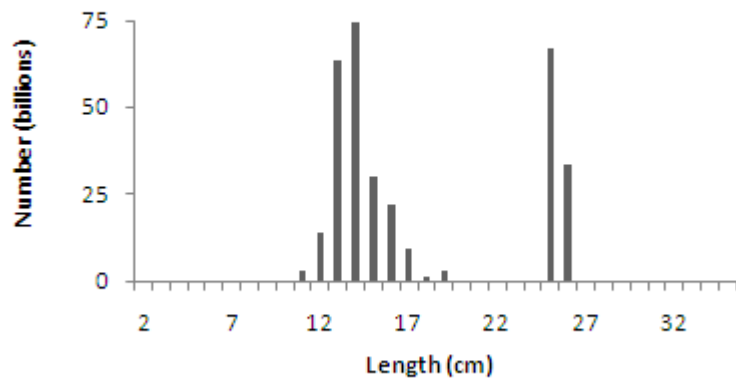
Sardinella aurita, Senegal and The Gambia



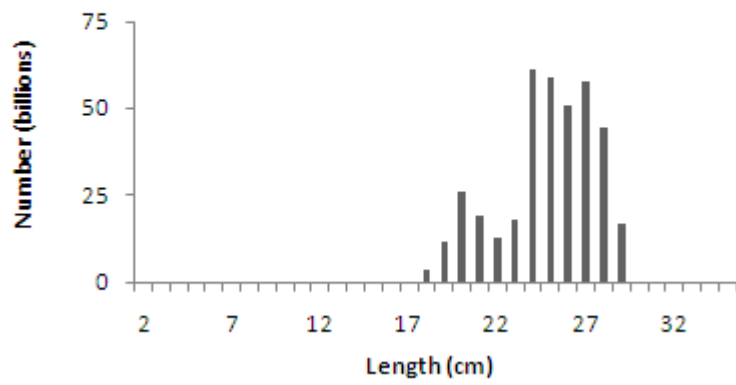
Trachurus trecae, Senegal and The Gambia



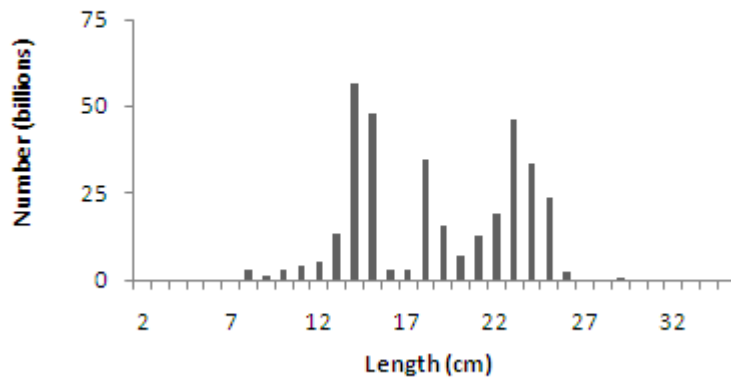
Sardinelle aurita, Guinea Bissau



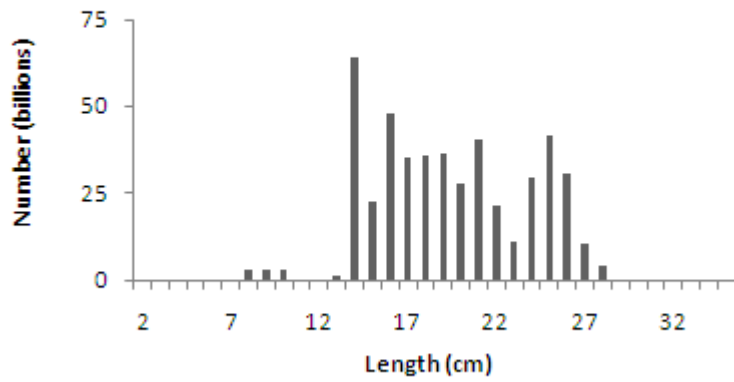
Sardinelle maderensis Guinea Bissau



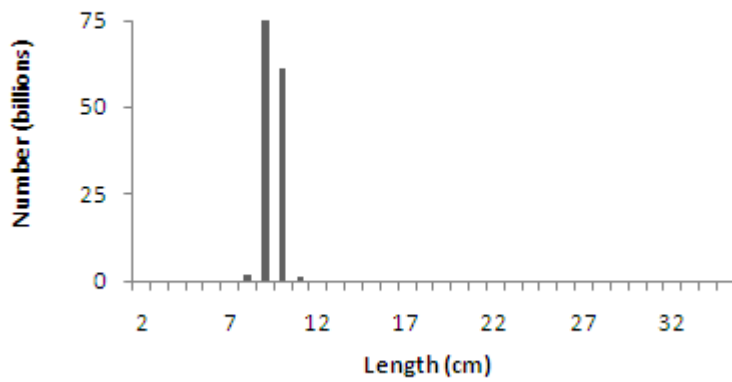
Sardinella aurita Guinea



Sardinella maderensis Guinea



Trachurus trecae Guinea



Annex IV Estimated number and biomass by length-group and sectors

Senegal and The Gambia, June 2011

Sardinella aurita

Length cm	N (thousands)					Biomass (tonnes)				
	St.Louis- Dakar	Dakar- Gambia	The Gambia	Casa- mance	TOTAL	St.Louis- Dakar	Dakar- Gambia	The Gambia	Casa- mance	TOTAL
5										
6										
7										
8										
9										
10										
11										
12		15 443	8 978		24 421		290	168		458
13		46 330		13 185	59 515		1 094		347	1 441
14		86 482	8 978	105 481	200 941		2 531	263	3 436	6 230
15		206 939	9 770	326 170	542 879		7 398	349	12 979	20 726
16		126 634	15 315	314 390	456 339		5 461	660	15 091	21 212
17		49 418	6 337	127 744	183 500		2 543	326	7 316	10 184
18		21 621	31 422	43 770	96 813		1 314	1 910	2 961	6 185
19	629	3 089	13 466	43 770	60 955	45	220	959	3 468	4 691
20		3 089	5 545	47 229	55 862		255	459	4 348	5 062
21			6 337	29 180	35 517			605	3 099	3 703
22	629		1 584	150 008	152 221	69		173	18 258	18 500
23				63 872	63 872				8 858	8 858
24	629	1 063		32 639	34 330	89	150		5 129	5 368
25		531		22 912	23 443		85		4 060	4 144
26	2 045	4 250		9 727	16 022	365	759		1 934	3 059
27	25 795	6 907			32 702	5 150	1 379			6 529
28	29 334	7 438		4 863	41 636	6 519	1 653		1 203	9 375
29	36 766	9 032			45 798	9 061	2 226			11 287
30	16 515	1 063			17 578	4 498	289			4 788
31	4 561	2 125			6 687	1 369	638			2 006
32	7 157	531			7 688	2 358	175			2 534
33										
34										
35										
36										
37										
38										
39										
40										
TOTAL	124 062	591 985	107 732	1 334 940	2 158 719	29 524	28 460	5 872	92 485	156 341

Senegal and The Gambia, June 2011

Sardinella maderensis

Length cm	N (thousands)					Biomass (tonnes)				
	St.Louis- Dakar	Dakar- Gambia	The Gambia	Casa- mance	TOTAL	St.Louis- Dakar	Dakar- Gambia	The Gambia	Casa- mance	TOTAL
5										
6										
7										
8										
9										
10	558				558	5				5
11	706				706	9				9
12	6 781				6 781	110				110
13	42 949				42 949	880				880
14	43 311				43 311	1 100				1 100
15	12 824				12 824	398				398
16	3 235				3 235	121				121
17	721	13 665			14 386	32	703			735
18		39 225			39 225		2 384			2 384
19		27 330			27 330	6	1 945			1 951
20		40 995			40 995		3 391			3 391
21		29 928			29 928		2 855			2 855
22		145 242			145 242	9	15 882			15 891
23		462 320		4 863	467 184		57 599		674	58 274
24		570 698		19 453	590 151	12	80 570		3 057	83 639
25		259 715		42 365	302 081		41 342		7 506	48 848
26		41 409		99 321	140 730	48	7 398		19 750	27 196
27	629	13 665		97 916	112 210	791	2 728		21 759	25 279
28	1 258			63 872	65 131	1 106			15 799	16 906
29	629			72 194	72 823	1 335			19 804	21 139
30	3 146			79 111	82 257	1 339			23 985	25 324
31	786				786	386				386
32	629			13 185	13 814	492			4 836	5 329
33										
34										
35										
36										
37										
38										
39										
40										
TOTAL	118 163	1 644 193		492 281	2 254 637	8 180	216 798		117 172	342 151

Senegal and the Gambia, June 2011

Trachurus trecae

Length cm	N (thousands)					Biomass (tonnes)				
	St. Louis- C. Vert	C. Vert- Gambia	The Gambia	Casa- mance	TOTAL	St. Louis- C. Vert	C. Vert- Gambia	The Gambia	Casa- mance	TOTAL
1										
2	2344					0				
3	32812					14				
5	9375					8				8
6	39047					62				62
7	43492			549		115			1	116
8	28187	3541		10975		114	9		29	152
9	149213	9148		41705	200 066	880	37		169	1 086
10	363570	40471		37315	441 356	2992	239		220	3 451
11	480431	24946		13719	519 096	5339	205		113	5 657
12	119776	4069		2195	126 040	1749	45		24	1 818
13	1695	2123		1097	4 916	32	31		16	79
14										
15										
16										
17										
18	1449				1 449	75				75
19	2144				2 144	130				130
20										
21	1449				1 449	120				120
22										
23		28100			28 100		2 681			2 681
24		24587			24 587		2 689			2 689
25										
26										
27		7025			7 025		1 118			1 118
28		7025			7 025		1 255			1 255
29										
30		17562			17 562		3 903			3 903
31										
32										
TOTAL	1 239 829	168 598		107 554	1 380 815	11 616	12 212		572	24 400

GuineaBissau, June 2011

Sardinella aurita

Length cm	N (thousands)		Biomass (tonnes)	
	GuineaBissau	TOTAL	GuineaBissau	TOTAL
5				
6				
7				
8				
9				
10				
11	2 569	2 569	38	38
12	13 597	13 597	255	255
13	62 494	62 494	1 476	1 476
14	73 680	73 680	2 156	2 156
15	29 787	29 787	1 065	1 065
16	21 470	21 470	926	926
17	9 256	9 256	476	476
18	1 284	1 284	78	78
19	2 569	2 569	183	183
20				
21				
22				
23				
24				
25	65 761	65 761	10 468	10 468
26	32 880	32 880	5 874	5 874
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				
TOTAL	315 347	315 347	22 995	22 995

GuineaBissau, June 2011

Sardinella maderensis

Length cm	N (thousands)		Biomass (tonnes)	
	GuineaBissau	TOTAL	GuineaBissau	TOTAL
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18	741	741	45	45
19	2 737	2 737	195	195
20	5 187	5 187	429	429
21	3 962	3 962	378	378
22	2 593	2 593	284	284
23	4 362	4 362	543	543
24	23 939	23 939	3 380	3 380
25	27 264	27 264	4 340	4 340
26	25 525	25 525	4 560	4 560
27	30 702	30 702	6 130	6 130
28	8 892	8 892	1 976	1 976
29	3 334	3 334	822	822
30				
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				
TOTAL	139 237	139 237	23 081	23 081

GuineaBissau, June 2011

Trachurus trecae

Length cm	N (thousands)		Biomass (tonnes)	
	GuineaBissau	TOTAL	GuineaBissau	TOTAL
1				
2				
3	10635		4	
5	63812		56	56
6				
7	10635		28	28
8	21271		86	86
9	31906	31 906	188	188
10				
11				
12				
13				
14	10635	10 635	251	251
15	21271	21 271	623	623
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				
TOTAL	159 530	63 812	1 232	1 232

Guinea, June 2011

Sardinella aurita

Length cm	N (thousands)	Biomass (tonnes)
	Guinea	Guinea
5		
6		
7		
8	8 583	51
9	4 292	35
10	8 583	95
11	12 875	188
12	17 166	322
13	42 916	1 014
14	187 398	5 485
15	157 357	5 625
16	8 583	370
17	9 719	500
18	113 629	6 907
19	51 341	3 655
20	22 917	1 895
21	42 355	4 041
22	63 090	6 899
23	153 293	19 098
24	110 280	15 569
25	78 087	12 430
26	6 744	1 205
27		
28		
29	1 739	429
30		
31		
32		
33		
34		
35		
36		
37		
38		
39		
40		
TOTAL	1 100 946	85 813

Guinea, June 2011

Sardinella maderensis

Length cm	N (thousands)	Biomass (tonnes)
	Guinea	Guinea
5		
6		
7		
8	8 583	51
9	8 583	71
10	8 583	95
11		
12		
13	4 292	101
14	211 145	6 180
15	74 673	2 670
16	157 342	6 785
17	116 253	5 981
18	118 411	7 197
19	120 457	8 574
20	90 826	7 512
21	132 971	12 687
22	71 440	7 812
23	36 020	4 488
24	96 584	13 636
25	136 662	21 754
26	101 792	18 185
27	34 314	6 851
28	13 726	3 050
29		
30		
31		
32		
33		
34		
35		
36		
37		
38		
39		
40		
TOTAL	1 542 656	133 679

Guinea June 2011

Trachurus

trecae

	N (thousands)	Biomass (tonnes)
Length cm	Guinea	Guinea
1		
2		
3		
5		
6		
7		
8		
9	222	1
10	8877	73
11	6769	75
12	111	2
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
TOTAL	15 978	151