

## **SURVEYS OF THE FISH RESOURCES OF ANGOLA**

**Survey of the pelagic resources  
17 August – 16 September 2002**

**Institute of Marine Research  
IMR  
Bergen**

**Institute of Marine Research  
IIM  
Luanda**

**CRUISE REPORTS "DR. FRIDTJOF NANSEN"**

**SURVEYS OF THE FISH RESOURCES OF ANGOLA**

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by

**B.E. Axelsen, D. Zaera, and M. Ostrowski**

Institute of Marine Research  
P.O.Box 1870 Nordnes  
N-5817 Bergen, Norway

**F. Vaz-Velho, and N. Luyeye**

Instituto de Investigação Marinha  
Luanda, Angola

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## CHAPTER 1 INTRODUCTION

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### 1.1 Objectives

This survey is one of a series aimed at monitoring the pelagic fish resources of Angola, as agreed with the Instituto de Investigação Marinha (IIM), Luanda.

The main objectives of the survey were the following:

- To estimate the abundance and to map the distribution of the main commercially important pelagic and semi-pelagic fish species in Angolan waters, including the two sardinella species *Sardinella aurita* and *S. maderensis*, the Cunene horse mackerel *Trachurus trecae*, the Cape horse mackerel *Trachurus trachurus capensis*, the pilchard *Sardinops ocellata* and other pelagic species, mainly carangids.
- To study the biological condition of the main species, including length weight-relationships, reproductive stages and stomach fullness. The refined method for determination of gonad maturity stages in *T. trecae* developed during the 2001 survey was applied.
- To collect gonads, stomachs and otoliths from both horse mackerel species and to collect depth stratified samples of zoo- and phytoplankton in order to continue the studies of horse mackerel feeding biology, relating stomach contents to estimated zooplankton compositions and densities. The distribution and aggregation patterns of sardinella will be correlated with phytoplankton distributions and hydrographical and meteorological conditions.
- To map the general meteorological, hydrographical and biological conditions in the survey area by means of continuous recordings of weather data, CTD-casts (Temperature, Salinity and Oxygen), ADCP measurements (Acoustic Doppler Current Profiler) and plankton sampling along acoustical and hydrographical transect lines. Higher sampling efforts will be allocated in the Benguela front area and in the main horse mackerel and sardinella distribution areas.
- On-the-job training for the Angolan participants on the main survey routines, including using the NAN-SIS and Hydrobase software, scrutinizing acoustical data (BEI) and producing acoustical biomass estimates. Dr. Marek Ostrowski (IMR) will instruct in database management and analysis of hydrographical data.

The aim of the time series that this survey is part of is to map fluctuations in stock levels in the main pelagic species and to improve the understanding of these fluctuations in terms of the biology of the main species in relation to the environment.

## 1.2 Participation

The scientific staff consisted of:

From IIM, Luanda: Filomena VAZ-VELHO (28/8 – 16/9, team leader), N’Kosi LUYEYE (17/8 – 27/8, team leader), Agostinho Duarte (17/8 – 27/8), Domingos PEDRO (28/8 – 16/9), Francisco DE ALMEDA (17/8 – 16/9), Henriette LUTUBA-NSILULU (28/8 – 16/9), Gaspar Luís FAMOROSA (28/8 – 16/9), António BARRADAS (28/8 – 16/9), Kilanda FIDEL (17/8 – 27/8), Miguel ANDRE (17/8 – 27/8), Lia NETO (17/8 – 27/8) and Geraldina SALVADOR (17/8 – 16/9).

From IMR, Bergen: Bjørn Erik AXELSEN (Cruise leader), Diana ZAERA, Marek OSTROWSKI, Tore MØRK, and Jan Frode WILHELMSEN.

From NatMIRC<sup>1</sup>, Swakopmund: Jean-Paul Roux (28/8 – 16/9), and Benedictus DUNDEE (28/8 – 16/9).

From TPA<sup>2</sup>, Luanda: Manuel FERNANDO (17/8 – 16/9), Misael Filipe de ALMEIDA (17/8 – 27/8), Alexandre Vasconcelos SALCEDO (17/8 – 27/8), and João Vunge (28/8-16/9).

<sup>1</sup> National Marine Information and Research Centre

<sup>2</sup> Televisão Pública de Angola

## 1.3 Narrative

The vessel departed Luanda 17 August at 1800 local time and steamed north towards the Angolan-Zairian border (Congo River), arriving 18 August at 1200. The sampling trawls, including the mid-sized (15 m vertical opening) pelagic trawl fitted with the codend multisampler and the demersal trawl (5 m), were ready for deployment at arrival, but the smallest pelagic trawl (10 m) was torn during the last survey and there was no spare onboard the vessel. One of the net drums (small, twin

mounted) was out of order due to a broken axel. The demersal trawl was therefore used in all surface tows using large floats, like in previous surveys. The acoustic transducers (18, 38 and 120 kHz (split beam, EK500 1) and 200 kHz (single beam, EK500 2)) were calibrated 7 September in Baía dos Elefantes. The previous calibration was carried out 22.04.02 in False Bay, South Africa (“Dr. Fridtjof Nansen” BENEFIT Cruise Reports No 3/2002).

During the northward steaming, aggregations of mesopelagic fish were observed at about 200 m depth on the outer slope (800-1 000 m). The Congo River standard hydrographical section (9 standard stations, fixed during the 2001 pelagic survey) was therefore extended offshore with 3 additional stations to the 1 500 m isobath in order to check for possible offshore distributions of horse mackerel. The spacing between the stations was 6.25 – 6.50 nautical miles (NM).

Throughout the time series of the pelagic survey of Angola, different survey strategies have been applied regarding survey design, sampling intensity and degree of coverage. The choice of strategy has primarily depended on the available ship time and the prior knowledge of the spatial distribution of the target species.

This year, a systematic survey track with equally spaced transect lines (5 NM) perpendicular to the coast was followed. Although largely similar, this represents a modification from the survey design in 2001 with parallel longitudinal acoustic transect lines with 5 NM spacing. The main reason for this modification was the limited time available for this year’s survey due to *e.g.* a change of crews. By applying the design with lines that are perpendicular to the coast the steamed distance can be reduced by 20-30 % without loss of sampling intensity, gaining time required for targeted trawling, hydrographical sampling and *ad-hoc* experiments such as collection of zoo- and phytoplankton samples. Besides, in 2001 it was experienced that although the longitudinal design was largely applicable, there were certain areas where the angle of the coastline deviated too much from the latitudinal direction, giving a near parallel design locally. Although semi-parallel, the perpendicular design is often recommended, and will be followed consequently in future surveys.

The 2002 survey design, which is based on the experiences gained during the time series, represents the new standard for the time-series estimates. Detailed descriptions of all survey procedures, including exact positions for all acoustical and hydrographical transects, will be made available for future surveys on the internal web-browser onboard the “Dr. Fridtjof Nansen” and at IIM. A similar standard is under development for the swept area surveys, where the standard hydrographical sampling scheme will be identical to the acoustic time series. Hydrographical and biological sampling relating to particular fish distributions, or with reference to specific biological investigations will, however, necessarily change between surveys.



The acoustic transects generally cover a depth range of 20-500 m, but some lines extended to about 1 000 m depth to check for deeper distributions of horse mackerel. In certain areas in the central region surveying is stopped at about 50 m depth due to extreme steepness of the shelf. The shallowest part of the shelf between N'zeto and the Congo River is partly inaccessible for trawling due to oil platforms and wells, and was prior to 2001 not adequately covered. In 2001 and 2002 this section has been covered acoustically, but only small amounts of fish (sardinella) were recorded.

CTD sections that have been covered routinely over the past few years are included in the new, standardized survey grid. ADCP (Acoustic Doppler Current Profiler) recordings were logged continuously along the entire survey track. Additional CTD and ADCP stations were added on an *ad hoc* basis in areas where horse mackerel and sardinella were abundant. In these areas, zoo- and phytoplankton samples were obtained using *Hydrobios Multinet* plankton sampler and *Niskin* water samplers, respectively. The ship called on Luanda 26 August at 1200 for a change of crews and some of the scientific staff members. The survey was resumed 28 August at 1000. The vessel reached the end of the survey grid at the Cunene River outlet on 15 September at 0200 and docked in Walvis Bay 16 September at 1500.

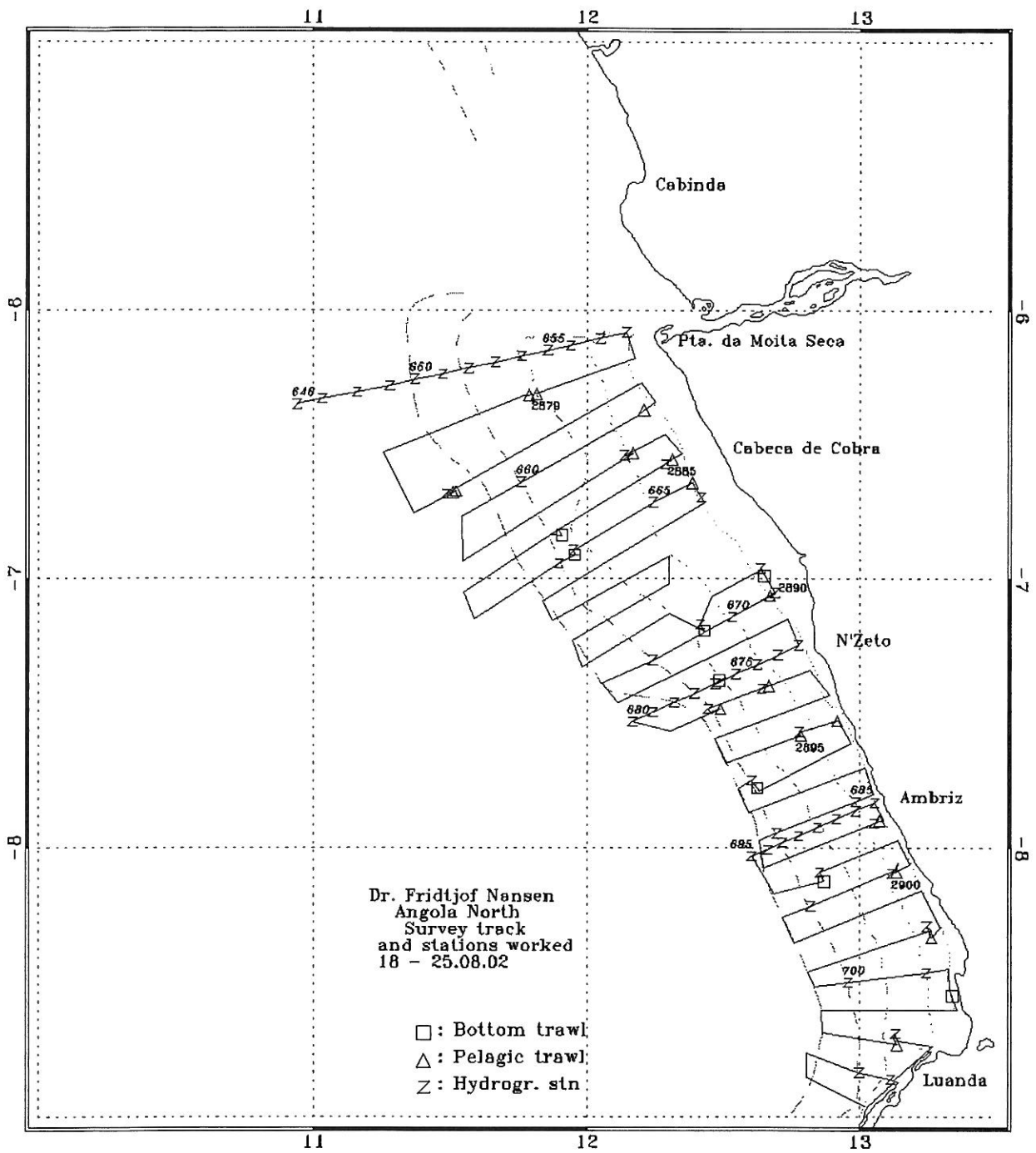
Following established practice, the surveyed area was divided into three regions: north of Pta. das Palmerinhas - Congo River (9°S): ANGOLA NORTH - was covered from 18 to 26 August. The region between 9°S and 13°S: ANGOLA CENTRAL - was surveyed from 28 August to 6 September. The region limited by Cunene River and the parallel 13°S: ANGOLA SOUTH - was covered from 7 to 15 September.

#### 1.4 Survey effort

Figures 1a-c show the cruise tracks with fishing and hydrographic stations for the northern, central and southern regions, respectively. Table 1 summarizes the survey effort by regions.

**Table 1.** Summary of survey effort by regions, including number of demersal (BT) and pelagic (PT) trawl hauls, CTD casts, water stations (2-4 phytoplankton samples per station), Multinet stations (2-5 zooplankton samples per station) and distance surveyed (Log), disregarding the steaming from Luanda to Congo River.

Area	BT	PT	Total trawls	CTD casts	Water stations	Multinet stations	Log (NM)
Pta. Palmerinhas - Congo River	8	17	25	59	55 (225)	0	1 519
Benguela - Pta. Palmerinhas	11	31	42	129	10 (20)	13 (44)	1 570
Cunene River - Benguela	13	30	43	87	0	5 (14)	1 154
Total	32	78	110	275	65 (245)	18 (58)	4 243



**Figure 1a.** Angola north. Course track with fishing, plankton and hydrographic stations, Pta. das Palmerinhas - Congo River. Depth contours at 20, 50, 100, 200 and 500 m.

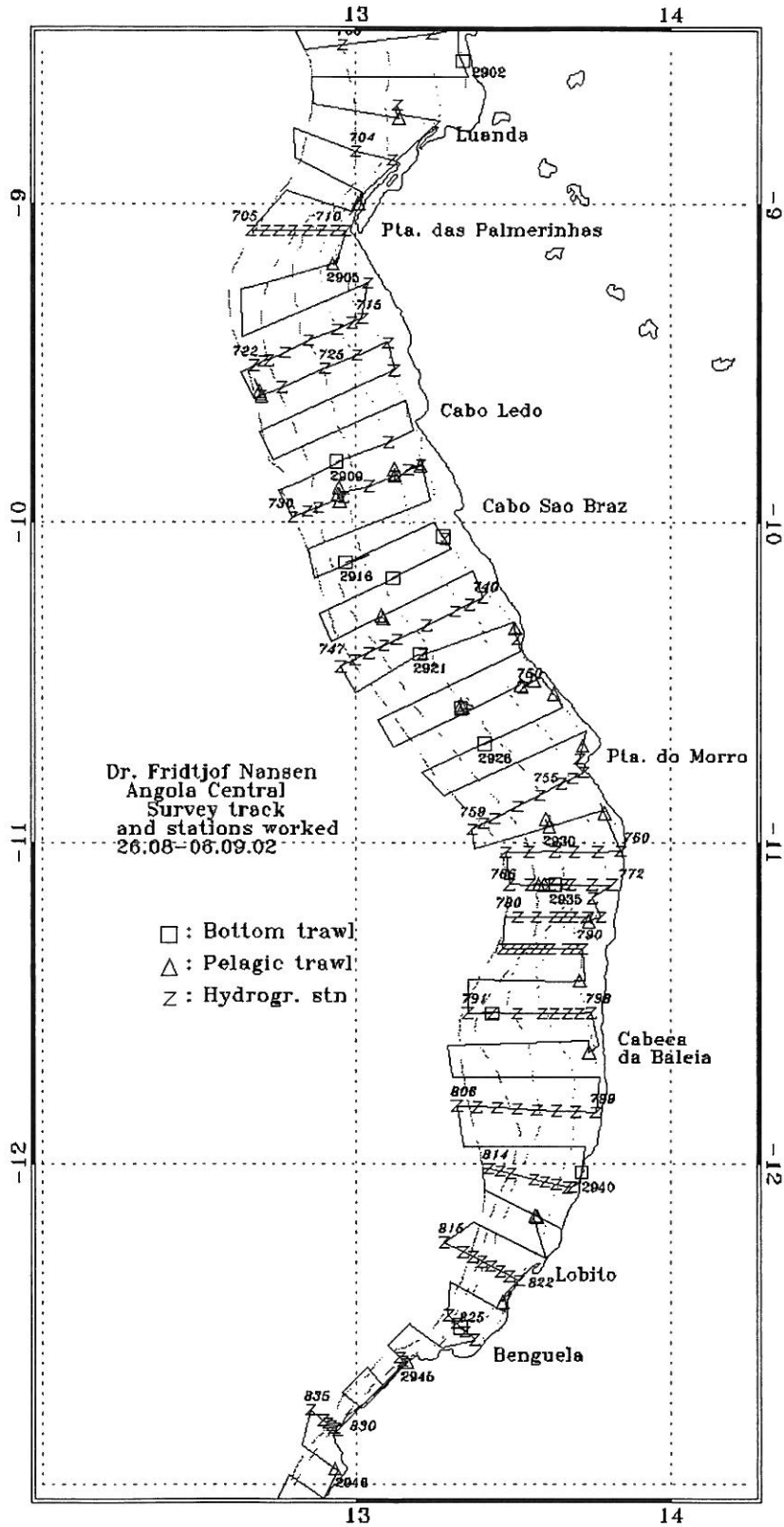
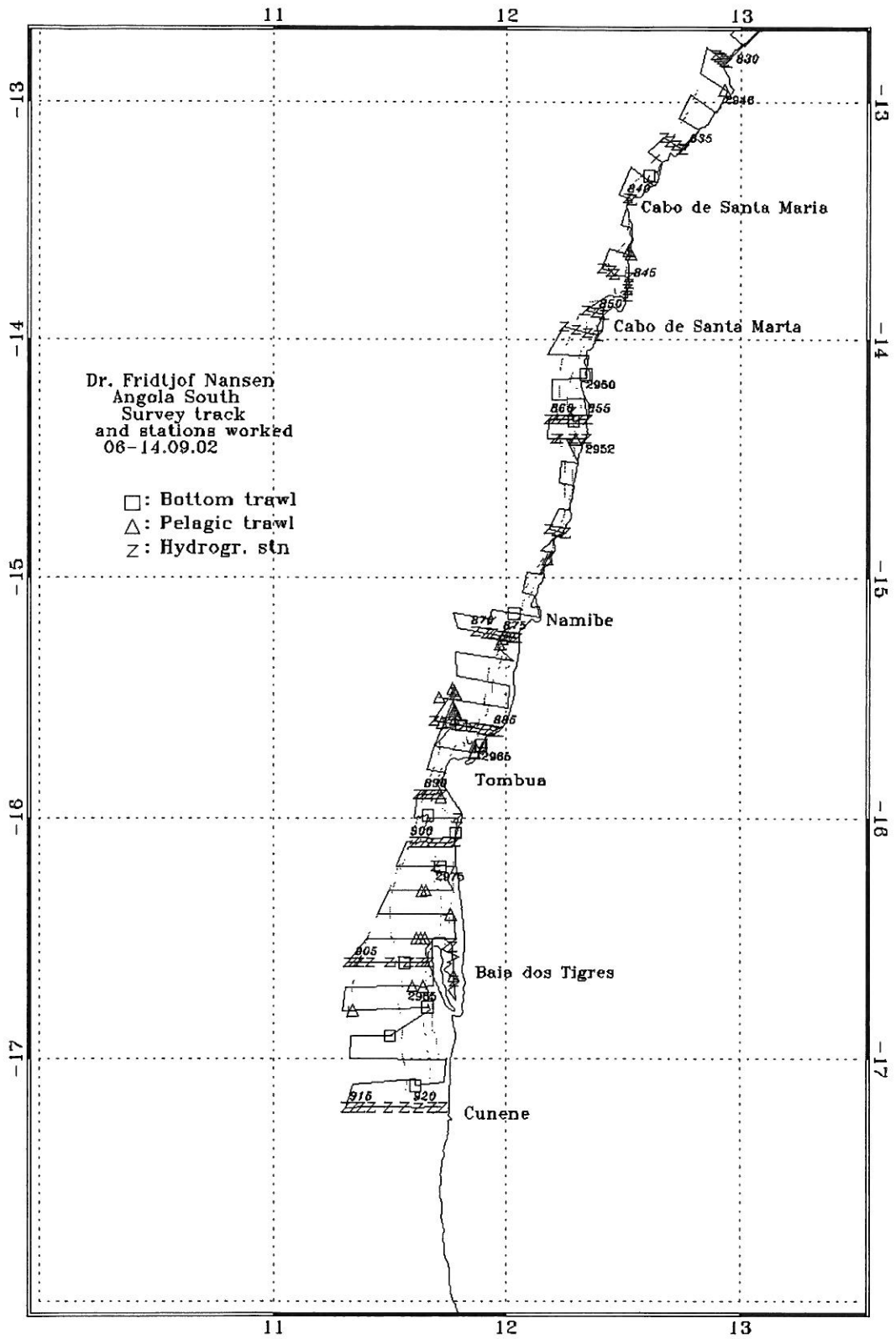


Figure 1b. Angola central. Course track with fishing, plankton and hydrographic stations, Benguela - Pta. das Palmerinhas. Depth contours at 20, 50, 100, 200 and 500 m



**Figure 1c.** Angola south: Cunene River-Benguela. Course track with fishing, plankton and hydrographic stations. Depth contours at 20, 50, 100 and 200 m.

## CHAPTER 2 METHODS

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### 2.1 Hydrographic sampling

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 transects at about 20 NM distance. The casts were stopped a few meters above the bottom, and at a maximum of 500 m depth. Two water samples, one near the surface and one near the bottom, were collected using Niskin bottles at stations corresponding to the standard profiles. The samples were analysed for dissolved oxygen using the Winkler method in order to calibrate the oxygen sensor. Salinity of water samples could not be measured, as the Guideline Portasal salinometer was out of order, but were sent to NatMIRC in Swakopmund, Namibia, for subsequent analysis there.

A total of 33 samples were accepted for oxygen calibration. A linear regression of the Winkler determinations on the CTD values produced the correction:

$$O_{2\text{corrected}} = 0.966 \cdot O_{2\text{recorded}} + 0.248 \quad (1)$$

Current measurements were carried out continuously using the hull-borne Acoustic Doppler Profiler (ADCP). The ADCP was set to ping every 8 seconds, the depth bins were set to 8 m and the number of bins was 40. Data were averaged at 300 seconds intervals and stored on an IBM compatible PC using Transect v. 2.70 software.

Meteorological data logged from the Aanderaa meteorological station included wind direction and speed, air temperature, incident solar intensity and sea surface temperature (SST). All data were averaged by unit distance sailed (1 NM).

### 2.2 Fish sampling

A brief description of the sampling trawls is provided in Annex I. All trawl catches were sampled for species composition by weights and numbers. Records of catch rates are given in Annex II.

Biological samples were obtained for sardinella and horse mackerel. Total length and body weight were determined to the nearest 1 cm and 1 g below, respectively. Sex and reproductive stages were determined by means of macroscopic examination, scoring each fish according to the five-point

classification scale first proposed by Holden and Raitt (1974), with the addition of the refined description for Cunene horse mackerel identified and presented in the 2001 cruise report (Table 2).

**Table 2.** The five points gonad maturity scale proposed for partial spawners by Holden and Raitt (1974). Additional information specific for Cunene horse mackerel (*Trachurus trecae*) as described by Dr. Isabel Afonso Dias during the 2001 survey are included.

Stage	Maturity status	Description
I	Immature	Ovary and testis lengths about 1/3rd of body cavity length. Ovaries pinkish, translucent; testis whitish. Ova not visible to the naked eye.  <b><i>Ovary and testis quite narrow and have a tubular shape.</i></b>
II	Maturing virgin and recovering spent	Ovary and testis about 1/2 length of body cavity length. Ovary pinkish, translucent; testis whitish, more or less symmetrical. Ova not visible to the naked eye.  <b><i>Ovary more opaque; small specks make gonad appear more granular. Testes develop lobules, hence loosing the tubular shape. Some recovering spent ovaries have conspicuous blood vessels.</i></b>
III	Ripening	Ovary and testis about 2/3rds length of body cavity length. Ovary pinkish-yellow colour with granular appearance, testis whitish to creamy. No transparent ova visible.  <b><i>Milt can be seen inside testes when cut. Ovaries granular due to the presence of opaque oocytes. First time spawners have very swollen gonads. Ovaries that have spawned once lose consistency, but maintain the external appearance typical for this stage.</i></b>
IV	Ripe	Ovary and testis from 2/3rds to full length of body cavity. Ovary orange-pink in colour with conspicuous superficial blood vessels. Large transparent, ripe ova visible. Testis whitish to creamy, soft.  <b><i>Ovaries jelly-like due to the presence of translucent oocytes. Gonads extrude oocytes or milt when gently pressed.</i></b>
V	Spent	Ovary and testis shrunken to about 1/2 length of body cavity. Walls loose. Ovary may contain remnants of disintegrating opaque and ripe ova, darkened or translucent. Testis bloodshot and slack.  <b><i>Testes may have sperm remaining in the seminal duct. Pinkish areas appear in the periphery of the testes. Ovaries bloodshot and slack.</i></b>

Stomach samples of sardinella and horse mackerel were collected for further analysis at IIM, Luanda. Feeding biology will be investigated in more detail at a later stage by relating the stomach contents to recorded availability of phytoplankton (sardinella) and horse mackerel (zooplankton). Gonads and otoliths were collected for *ad hoc* examination.

## 2.3 Plankton sampling

### *Zooplankton*

The zooplankton communities in the main distribution area of horse mackerel and on selected localities within the sardinella core areas were sampled in order to map the prey availability. The sampling was conducted by means of Hydrobios Multinet, enabling up to five depth-specific samples in one deployment. Each net (405  $\mu\text{m}$ ) was fitted with a flow meter for estimation of sample volume. A Scanmar depth sensor gave real-time information of the depth. Nets were opened and closed remotely from the bridge of the vessel.

### *Phytoplankton*

Phytoplankton samples were collected using Niskin water samplers mounted in a circular array on the CTD probe.

## 2.4 Acoustic sampling

### *Acoustic equipment*

The acoustic recordings were conducted using two Simrad EK 500 echosounders (Bodholt *et al.*, 1989) running keel mounted transducers at nominal operating frequencies of 38, 120, 18 (EK500 1) and 200 kHz (EK500 2). The technical specifications and operational settings of the echosounders are given in Annex III. Acoustic raw-data were logged using the Sun-Unix based Bergen Echo Integrator (BEI) (Knudsen 1996).

There are very few locations along the Angolan coast that are favourable for transceiver calibration (essentially Baía dos Tigres and Baía dos Elephantes), and the survey was therefore started without *a priori* calibration. All transceivers were calibrated in Baía dos Elephantes 7 September. The  $S_V$  transducer gain at the 38 kHz transceiver was recorded at 27.18 dB, compared to 27.01 dB on the last calibration (False Bay, 22.04.02). Since the change in  $S_V$  gain was within a 0.2 dB range, which is relatively low compared to the expected experimental error level; no *ad hoc* re-computation of the data will be conducted. The TS transducer gain on the same transceiver was recorded at 27.26 dB, which is identical to the previous calibration.

### *Allocation of acoustic energy to target taxii*

The acoustic data were scrutinized using the post-processing module of the BEI software. Scatterers were displayed at 38 kHz, standardized to 5 NM echograms with 1 000 pings (horizontal) by 500 bins (vertical). The mean 5 NM area backscattering coefficients,  $s_A$  ( $\text{m}^2/\text{NM}^2$ ), were allocated to a predefined set of taxii on the basis established echogram features. Acoustic groups and respective taxii are listed in Table 3. Ground truthing and estimation of mean length and weight were

accomplished by means of targeted pelagic and demersal trawling.

**Table 3.** Allocation of acoustic densities to taxii. Note that for the groups sardinella, horse mackerel, big-eye grunt and pilchard all encountered species are listed, while for the remaining groups, listed species are only examples.

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 capensis</i>
Pilchard	<i>Sardinops</i>	<i>S. ocellata</i>
Big-eye grunt		<i>Brachydeuterus auritus</i>
Pelagic species 1	Clupeiformes <sub>1</sub>	<i>Ilisha africana</i>
		<i>Etrumeus whiteheadi</i>
		<i>Engraulis encrasicolus</i>
Pelagic species 2	Carangidae <sub>2</sub>	<i>Selene dorsalis</i>
		<i>Chloroscombrus chrysurus</i>
		<i>Decapterus rhonchus</i>
		<i>Seriola carpenteri</i>
	Scombridae	<i>Auxis thazard</i>
		<i>Sarda sarda</i>
		<i>Scomber japonicus</i>
	Sphyraenidae	<i>Sphyraena guachancho</i>
	Others	<i>Trichiurus lepturus</i>
		<i>Lepidopus caudatus</i>
Other demersal species	Sparidae <sub>3</sub>	<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>
		<i>Saurida brasiliensis</i>
		<i>Arioma bondi</i>
		<i>Pomadasys incisus</i>
		<i>Galeoides decadactylus</i>
	Mesopelagic species	Myctophidae <sub>3</sub>
Other mesopelagic fish		<i>Trachinocephalus myops</i>
Plankton	Calanoidae	<i>Calanus</i> sp.
	Euphausiidae	<i>Meganyctiphanes</i> sp.
	Other plankton	

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



### Estimation of biomass

The target strength (TS) function used to convert mean area backscattering coefficient  $s_A$  ( $m^2/NM^2$ ) to number of fish corresponds to:

$$TS = 20 \log L - 72 \text{ (dB)} \quad (2)$$

or

$$C_F = \frac{10^{7.2}}{4\pi} \cdot L^{-2} \quad (3)$$

where  $C_F$  is the conversion factor from acoustic density to fish biomass and  $L$  is the mean total fish length. This target strength function was originally established for North Sea herring, but has later been attributed to clupeids in general (Foote *et. al.*, 1986, Foote, 1987). No specific target strength relations presently are available for the species at hand, and equation (3) has therefore been applied consequently for all targeted species in this time series. The biomass was calculated by multiplying the number of fish by the expected length at weight, estimated by regressing the log-length (total) against total weight. Separate length-weight relationships were worked for each region (north, central, south), pooling all data within each region.

The boundaries of encountered fish aggregations (post strata) were determined by means of contouring within the inner and outer zero-value limits of the transect lines. The strata contours were digitised using a CalBoard III digitising board/Atlas Draw v. 2.03 PC based software. Distribution plots and aerial calculations on the strata were carried out using IDL 5.4. Substratification was used to isolate areas of similar densities, using the following pre-defined, standard categories: 1:  $s_A = 0-300$ ; 2:  $s_A = 300-1\ 000$ ; 3:  $s_A = 1\ 000-3\ 000$ ; 4:  $s_A > 3\ 000$ .

Mean 5-NM integrator values ( $s_A$ ) computed along the transect lines were re-averaged for each stratum. The short spacing between the lines (5 NM) makes it impossible to exclude all between-transect values without removing some on-line contributions, particularly for sardinella on the inner shelf. The potential bias (positive) of including between-line values is likely smaller than the bias (negative) that would have been introduced by excluding high on-line contributions and this bias is also counteracted by the shallow distribution pattern (partly above the integration limit) and vessel avoidance behaviour (Misund and Aglen, 1992) of sardinella. All estimates should consequently be considered as relative indices of abundance.

The overall length frequency distributions within strata were estimated by weighting the sample-distributions with the nearest valid 5 NM integrator value, or the average of two adjacent values. Target species of the same genus, i.e. *S. aurita*/ *S. maderensis* and *T. trecae*/ *T. trachurus capensis*,

are not acoustically distinguishable, and the  $s_A$  values were therefore split according to the relative distributions of the two species in each length group. The total number of fish in each length group was estimated as:

$$\rho_i = \frac{\langle s_A \rangle t_{i,j} \cdot u_i}{\sum_i \frac{u_i}{C_{Fi}}} \cdot A_s = \frac{10^{7.2} \cdot t_{i,j} \cdot u_i \cdot \langle s_A \rangle \cdot A_s}{4\pi \sum_i u_i \cdot (L_i + 0.5)^2} \quad (4)$$

where:

- $\rho_i$  = estimated number of fish in length group i
- $\langle s_A \rangle$  = mean recorded area backscattering coefficient ( $m^2/NM^2$ )
- $t_{ij}$  = proportion of species j in length group i
- $u_i$  = proportion of sampled fish in length group i
- $A_s$  = horizontal area of stratum s
- $C_{Fi}$  = conversion factor for length group i
- $L_i$  = length group i (nearest full cm below total length)
- $L_i+0.5$  = mean length in  $L_i$

## CHAPTER 3 OCEANOGRAPHIC CONDITIONS

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### 3.1 Sea surface temperature

#### *Data quality*

Sea surface temperature aboard of the R/V “Dr. F. Nansen” is measured by means of a sensor mounted at the intake of the cooling water to the engine. This is a hull-mounted sensor and therefore difficult to disassemble in order to perform a laboratory-based calibration. During this survey, we have adopted a simple linear regression to verify the accuracy of this sensor by comparing it with the precision temperature data from the sensor of the CTD probe. The method merged the data from the two sensors into a collocated data series. The CTD data used in the comparison were extracted at the 5 m depth from the CTD database. Next, a grid with the spacing 2 by 2 nautical miles was overlaid on the map covering the survey region. After that, both the SST and CTD datasets were overlaid onto this grid. Finally, the temperature values in those cells where data from both sensors were present were extracted and converted into the input series for the linear regression. A total 230 CTD stations were used in the comparison, yielding the following linear regression:

$$T_{\text{SST}} = 1.006 * T_{\text{CTD}} + 0.094$$

which gives us an indication that the temperature recorded by means of the SST sensor is at present 0.1°C warmer than the true (CTD-measured) values.

From the dataset recorded during the survey, there is about 20 hours of SST and wind data, which are missing. The loss occurred in the region off Ambriz and therefore no temperature contours from that region are available in Figure 2a.

#### *Distribution patterns*

The maps presenting the distribution of SST along the Angolan coast are depicted in Figures 2a-d. The main trend reflects the global decrease of temperature with latitude, from the high values of the tropics in the North to the low values in the subtropical region in the South. Between the Congo River at 06°S (Figure 2a) and Cunene River at 17°15'S (Figure 2d) the temperature dropped from 21° to 14°C. This decrease, however, was non-uniform. Sections along the coast with higher temperature were alternated with the colder regions. A summary of the SST variability along the 200 m depth contour is shown in Figure 3. The dominant distance between the neighbouring

temperature maximums varied between 3 and 4 degrees of latitude and appeared to be coupled to the alongshore variability of the main features of the submarine topography. In the northern and central region, the warmest regions occurred north of the two deep eastward indentations of the shelf, between Ambriz and Rio Onzo in the north (Figure 2a) and off Lobito in the south (Figure 2b), where at the shelf-break temperature was higher than 22°C. The coldest spots along the shelf-break were observed off Ponta das Palmerinhas, 9°S (Figure 2a), and along the northern edge of the underwater ridge of Quicombo Bank at 11°15'S (Figure 2b). In both these locations, the temperature dropped below 19°C at the shelf-break. The isolated spots of the 19°S water were frequently observed near the coast in the central region.

South of the city of Benguela (Figure 2c) the coastal topography abruptly changes. The shallow shelf platform disappears entirely being replaced by the steep continental slope, originating at the coastline. This type of topography prevails along much of the coastline between Ponta Salinas and Ponta Albina. In this region, the survey grid was generally limited to 5 NM offshore. The major alongshore temperature gradients were observed off Ponta Salinas in the north and Namibe in the south. Off Ponta Salinas, temperature dropped from 20° to 18 °C within 20 nautical miles along the coast. In the south, a wedge of warm oceanic water separated the region between Namibe and Ponta Albina. In the remaining area, from Cabo de Santa Maria to Namibe, the low coastal temperatures ( $16\text{ °C} < T < 18\text{ °C}$ ) dominated the distributions.

Figure 2d depicts the SST distribution in the southernmost extremity of the survey region from Ponta Albina to the Cunene River. The temperature in this region decreased further from 16 °C at Ponta Albina to 14 °C near the Cunene River. A special event was observed within the pocket of warmer water entrapped inshore along Praia Navio, (Figure 2d). The sea surface the region was covered with red-coloured patches manifesting high phytoplankton densities, which characterize red tides.

### **3.2 Wind conditions**

Calm wind conditions were observed in the northern and central survey region. In these areas, the wind direction varied throughout the day, predominantly between SW to E, but winds from the northern sectors were also observed. The top wind velocities in the northern and central regions rarely exceeded 8 knots (4.1 m/s). Figure 4(a-c) shows the map of wind velocities along the survey track for the northern, central and southern regions respectively. Southwards of the latitude 14°S, the wind direction becomes progressively concentrated around S and SW and the recorded velocities increased. To the south of Tombua (15°45' S), the survey fell under the strong south-to-

south-easterly trade wind with velocities reaching 30 knots (15.5 m/s). Summary statistics of the wind conditions in 2-degree latitudinal boxes along the Angolan coast are represented in Tables 4-5.

**Table 4.** Frequency of occurrence of wind for the principal directions for the 2-degree latitudinal sections along the Angolan coast, obtained from the data averaged over 1NM intervals along the survey track. The values are given as percentage of all observations.

Wind sector	Latitudinal range					
	6°-8°S	8°-10°S	10°-12°S	12°-14°S	14°-16°S	>16°S
N	1.5	1.3	3.0	1.7	0.0	0.0
NE	8.4	2.9	3.9	4.8	0.0	0.0
E	28.1	12.1	10.9	5.7	0.5	0.5
SE	27.8	26.3	18.3	5.9	2.3	5.9
S	17.2	28.8	33.9	27.7	53.0	66.2
SW	12.5	18.1	20.4	26.7	30.5	26.8
W	3.2	7.1	6.9	16.2	12.6	66.3
NW	1.3	3.3	2.8	11.3	1.1	26.9

**Table 5.** Average wind velocity for the principal wind directions for the 2-degree latitudinal sections along the Angolan coast, obtained from the data averaged over 1NM intervals along the survey track. The values are given in knots.

Wind sector	Latitudinal range					
	6°-8°S	8°-10°S	10°-12°S	12°-14°S	14°-16°S	>16°S
N	2.7	1.8	3.1	2.8	0.0	0.0
NE	4.8	4.3	3.0	3.9	0.0	4.1
E	5.9	4.1	5.5	4.0	2.1	27.0
SE	7.3	6.2	5.8	3.2	5.0	23.1
S	6.1	6.2	7.1	8.3	10.6	16.0
SW	7.1	7.0	6.6	7.9	10.1	16.4
W	4.7	6.2	4.2	5.9	5.5	0.0
NW	3.7	4.8	2.4	6.5	4.5	0.0

### 3.3 Vertical distributions

Vertical distributions of temperature, salinity and oxygen are depicted in Figures 5a to 5k. In the northern and central regions, the plots demonstrate a typical winter conditions, characterized by a shallow but well developed pycnocline, an offshore increase in temperature and low oxygen concentrations below the depths 15-20 m (Figure 5(a-f)). A notable departure from the well-developed vertical stratification was observed in the region of Quicombo Bank; in the sections collected between Ponta de Balela and Enseada do Baleia (Figure 5f-h). Note that in the same geographical location the sea surface temperature displayed a distinct minimum (Figure 2b). In addition, the ADCP current recordings (not shown here) displayed a distinct intensification in the offshore transport in the same location. On the contrary, the wind speed was very low during the event. By bringing all these observations, one must consider a tropical upwelling-favourable

scenario, in which the uplift of cold waters to the surface is caused by the divergence at the frontal zone between two counter rotating eddies, rather than by a wind event. While this type of upwelling is commonly observed off Ghana, thus far very little has been known about its extent and intensity off Angola. Most probably, in our observations off Ponta do Quicombo we have picked up its signal, but more detailed data analysis will be necessary to confirm its existence.

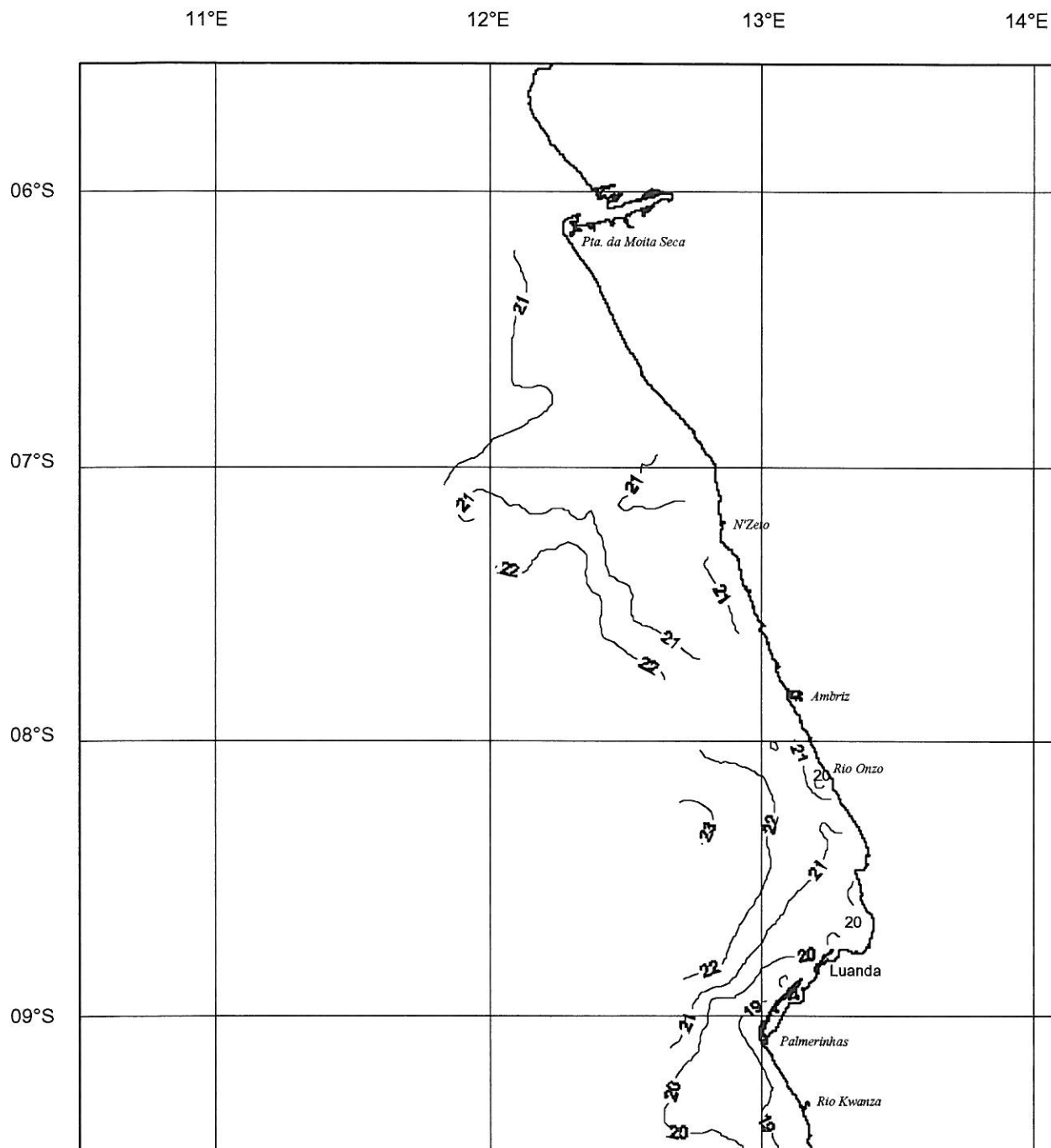
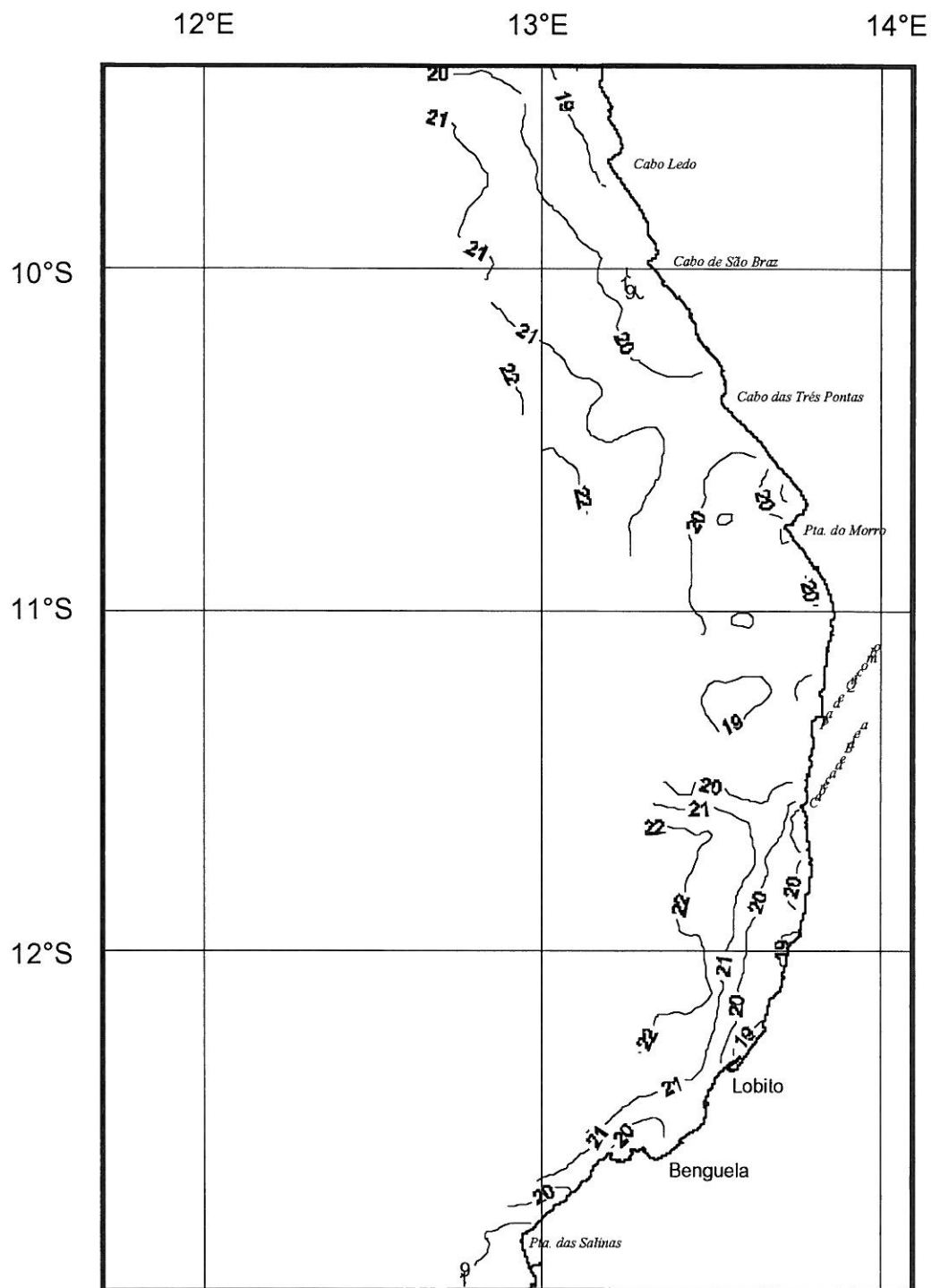


Figure 2a. Distribution of sea surface temperature in northern Angola.



**Figure 2b.** Distribution of sea surface temperature in Central Angola.



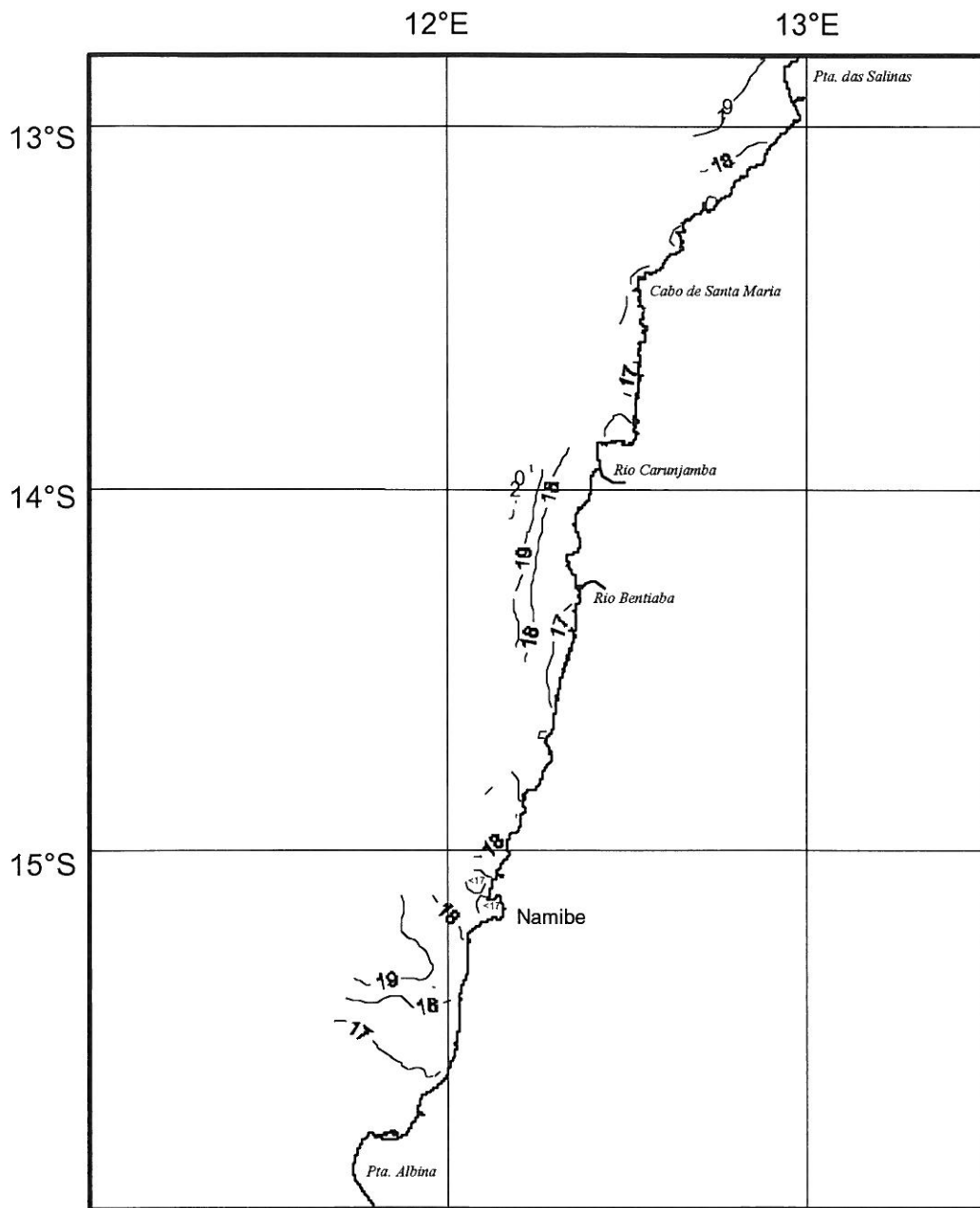
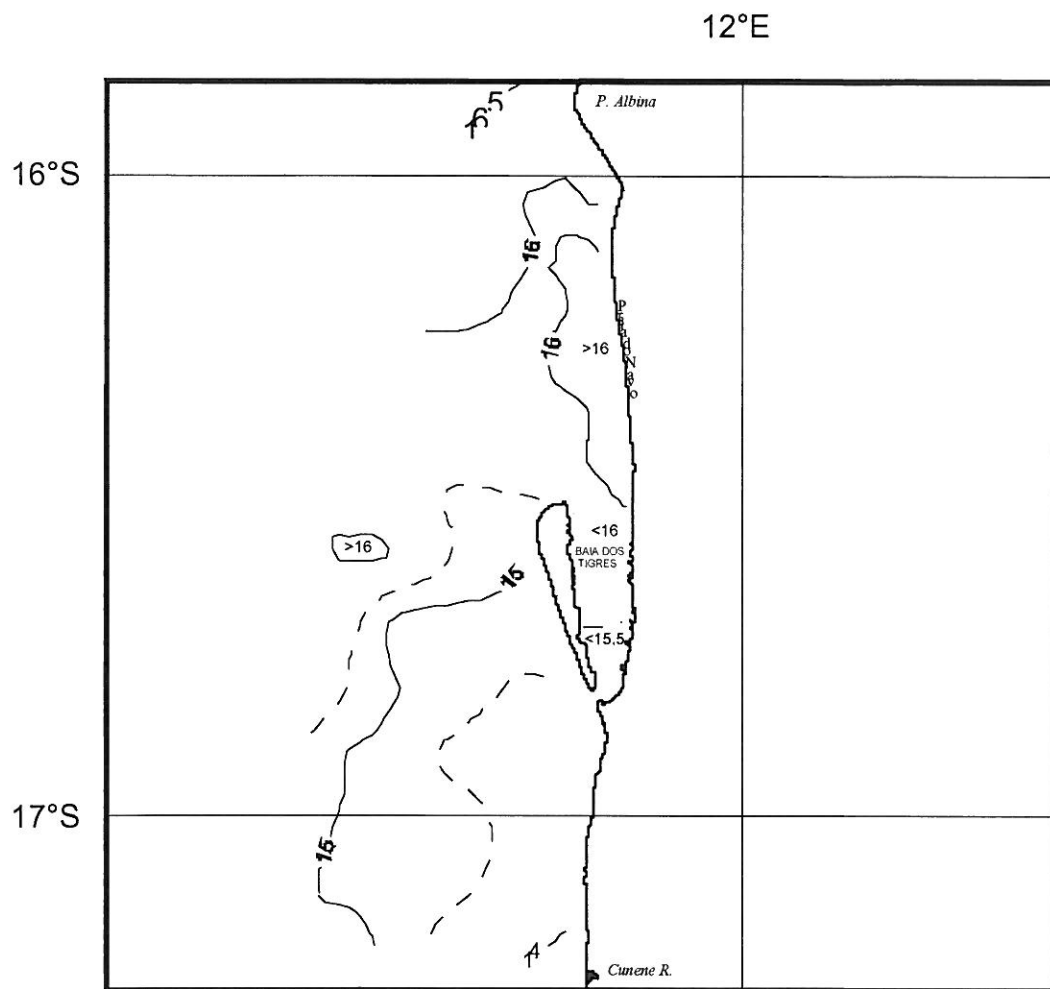
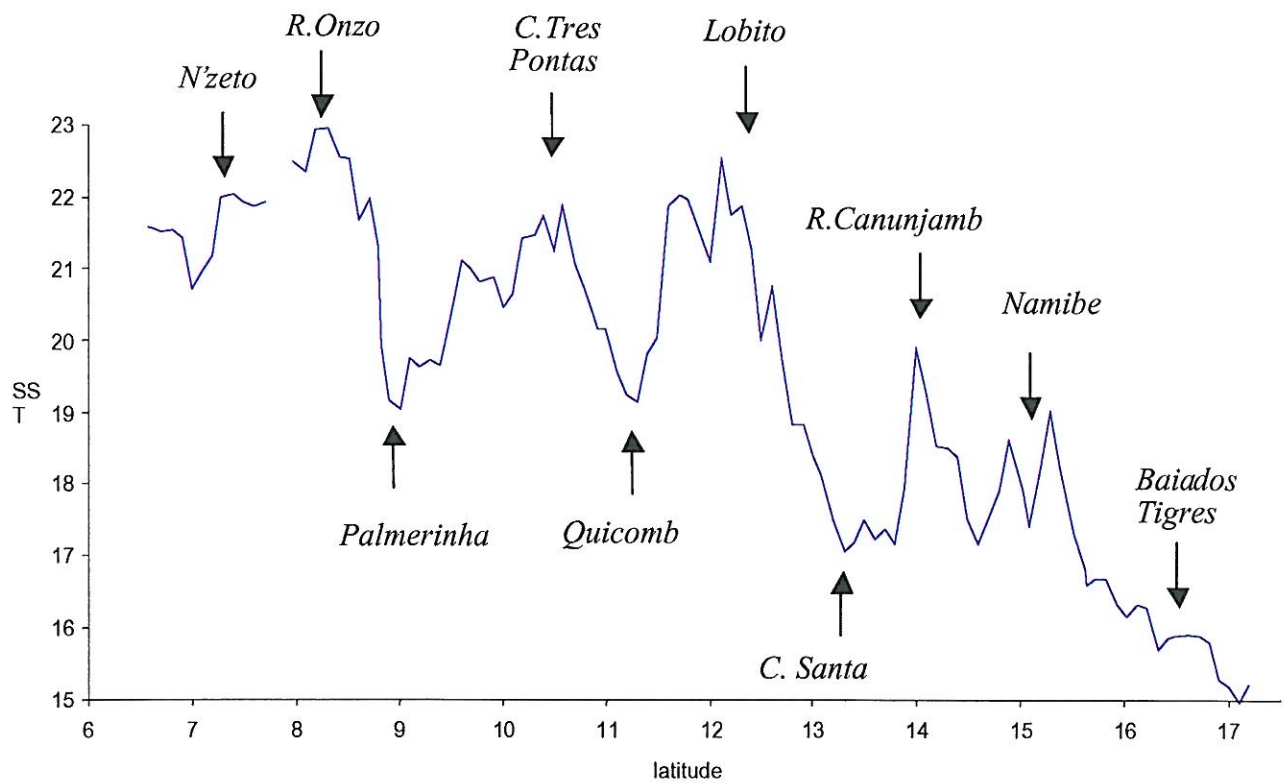


Figure 2c. Southern Angola. Distribution of sea surface temperature: Pta. Salinas to Ponta Albina.



**Figure 2d.** Southern Angola. Distribution of sea surface temperature: Ponta Albina to Cunene River.



**Figure 3.** Latitudinal distribution of sea surface temperature in the proximity of 200 m depth. The arrows indicate the locations of the coastal features depicted in Figures 2a-d

The observations made during current cruise indicate the presence of colder and less saline water masses on the Angolan shelf. However, the spatial distribution of temperature salinity and oxygen, as well as the vertical stratification followed more or less the pattern observed during winter on previous surveys with the R/V “Dr. Fridtjof Nansen”.

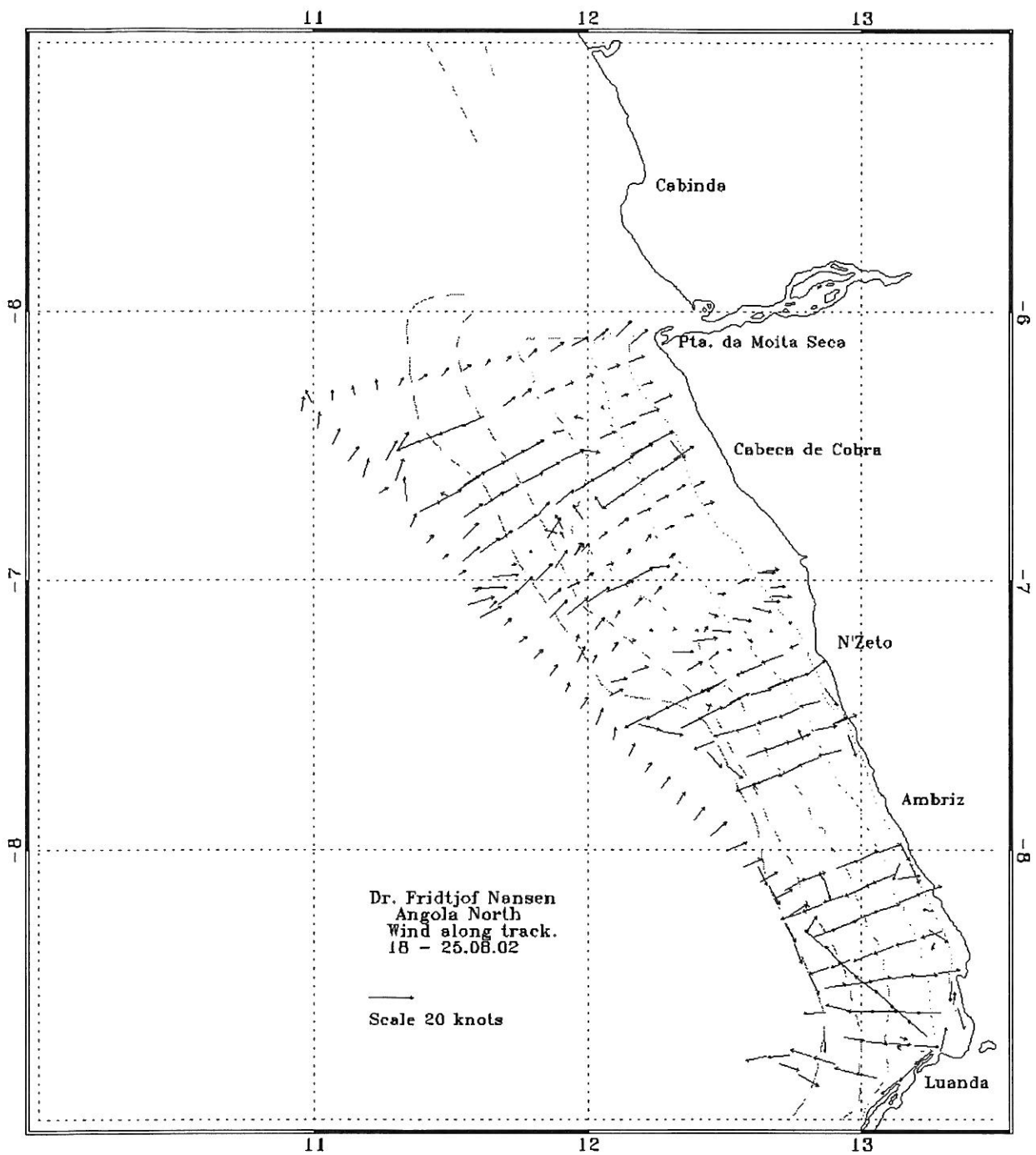


Figure 4a. Angola north: Pta. das Palmerinhas - Congo River. Distribution of wind velocities along the survey track.

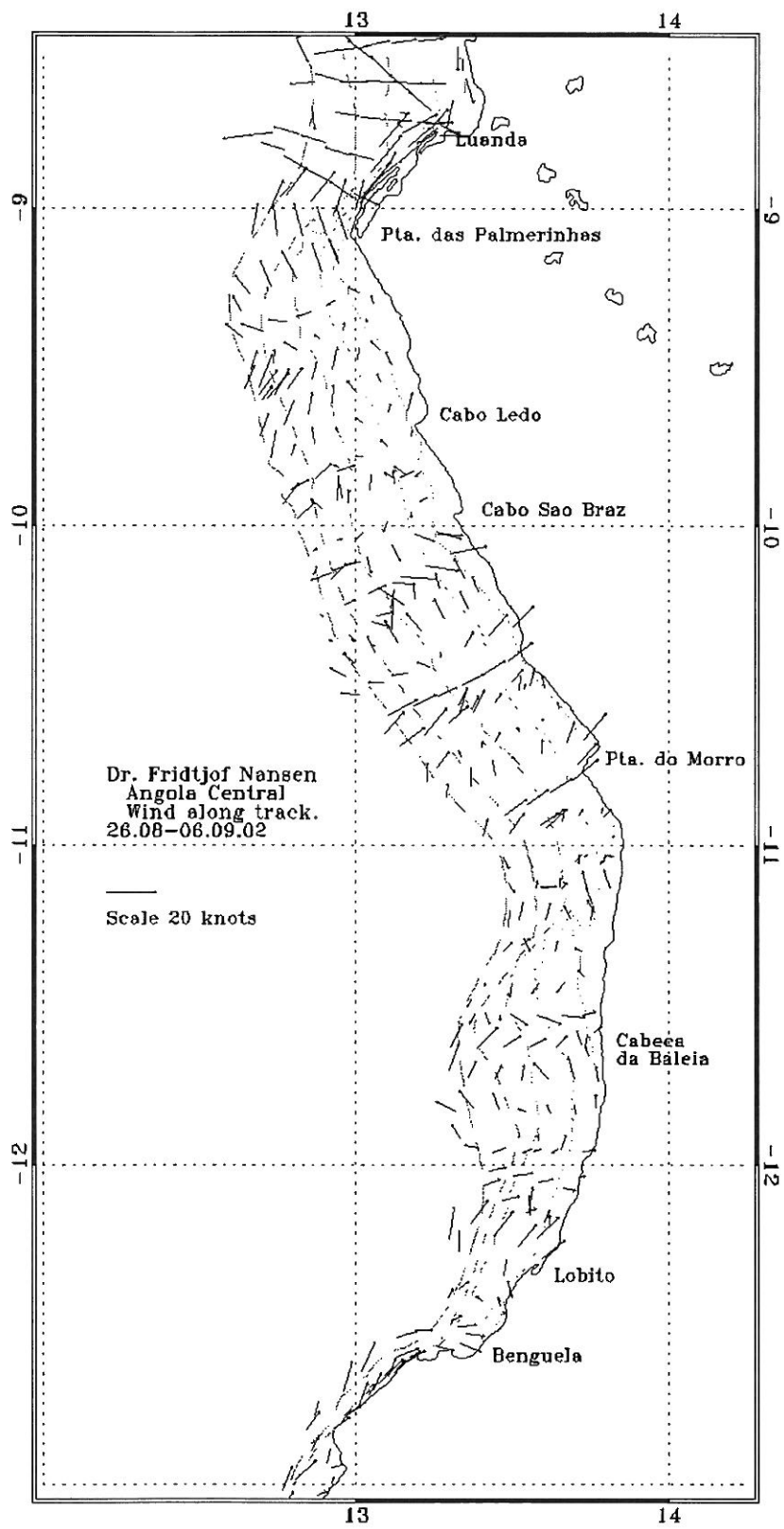
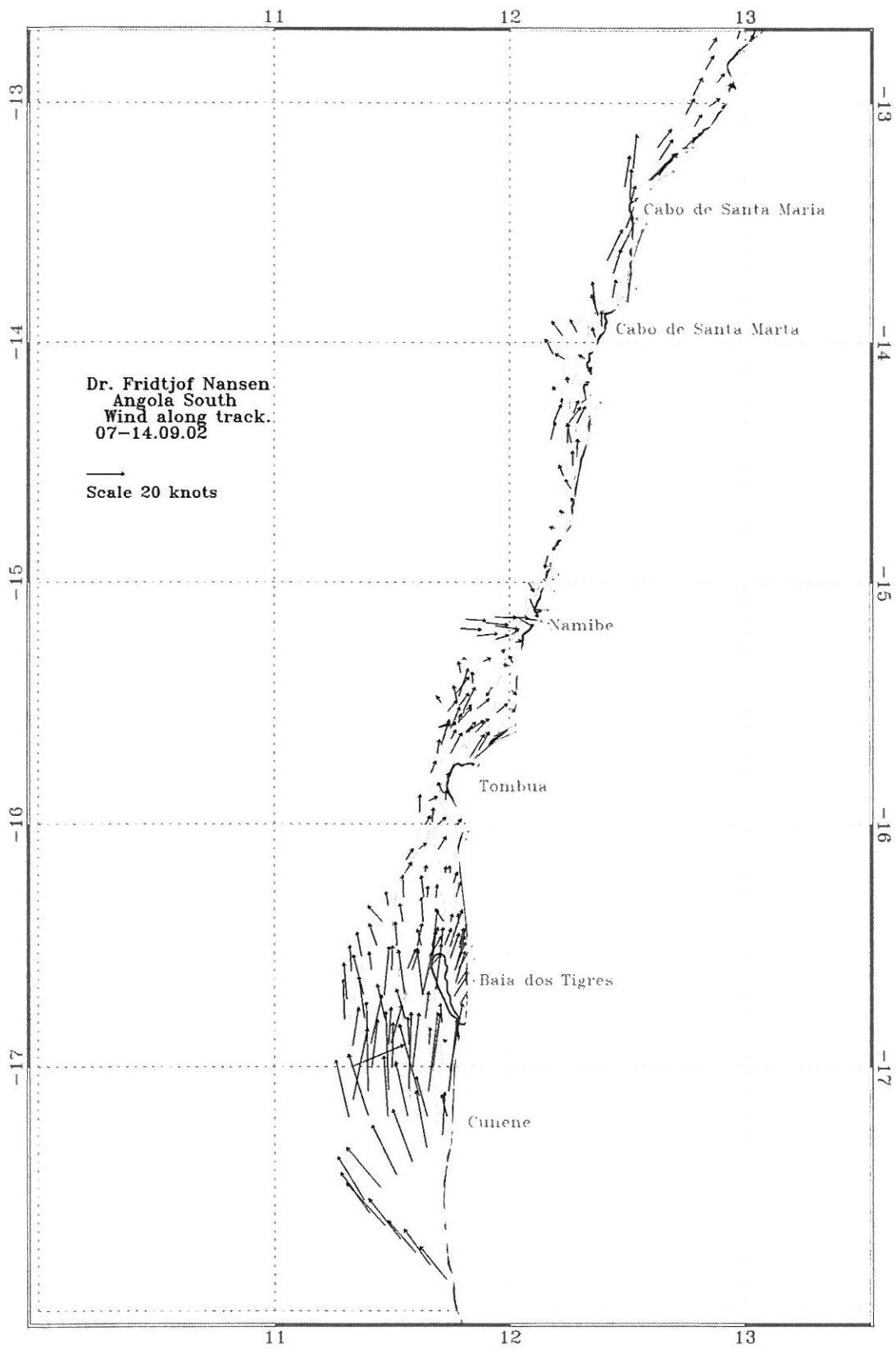


Figure 4b. Angola central: Benguela - Pta. das Palmerinhas. Distribution of wind velocities along the survey track.



**Figure 4c.** Angola south: Cunene - Benguela. Distribution of wind velocities along the survey track.

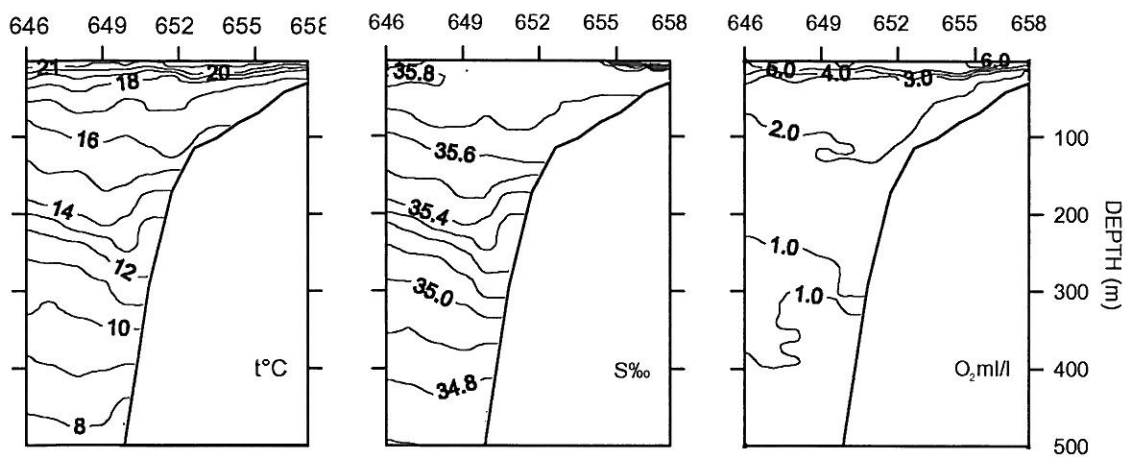


Figure 5a. Vertical sections of temperature salinity and oxygen off Moita Seca.

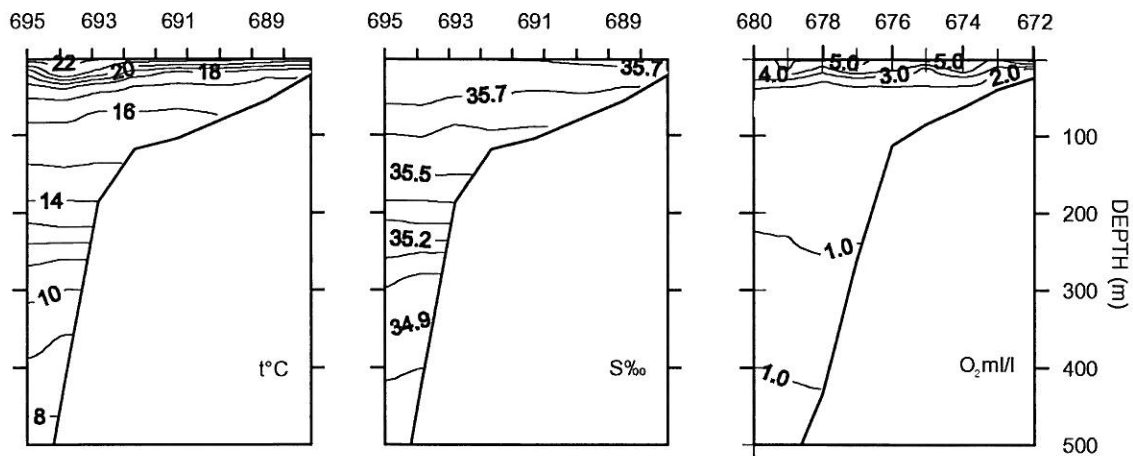


Figure 5b. Vertical sections of temperature salinity and oxygen off Ambriz.

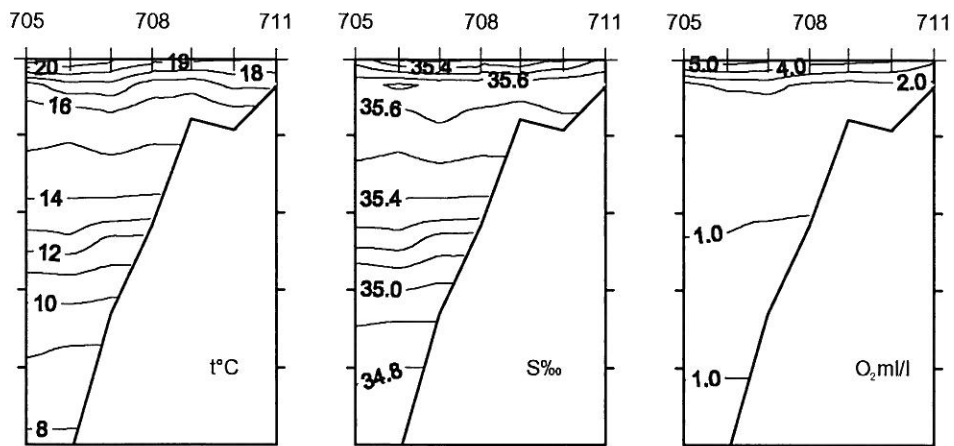


Figure 5c. Vertical sections of temperature salinity and oxygen off Palmerinhas.

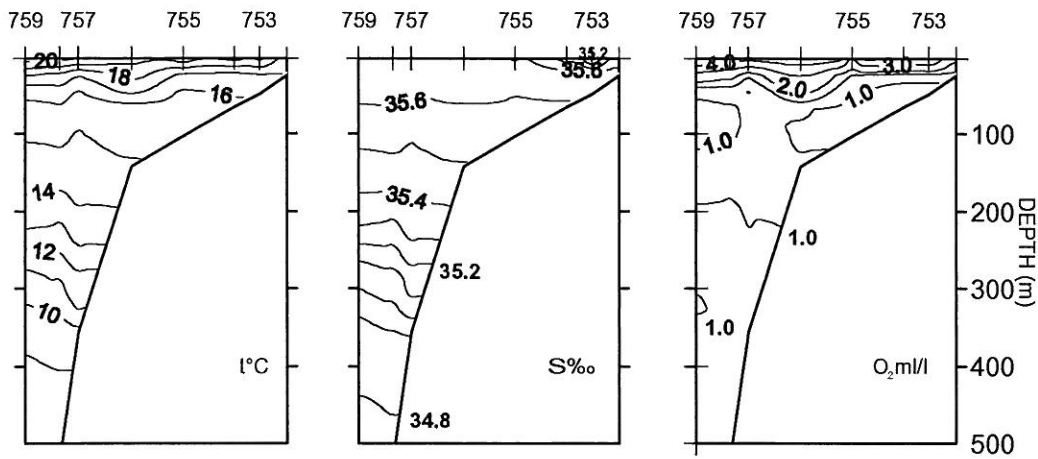


Figure 5d. Vertical sections of temperature salinity and oxygen off Pta. do Morro.

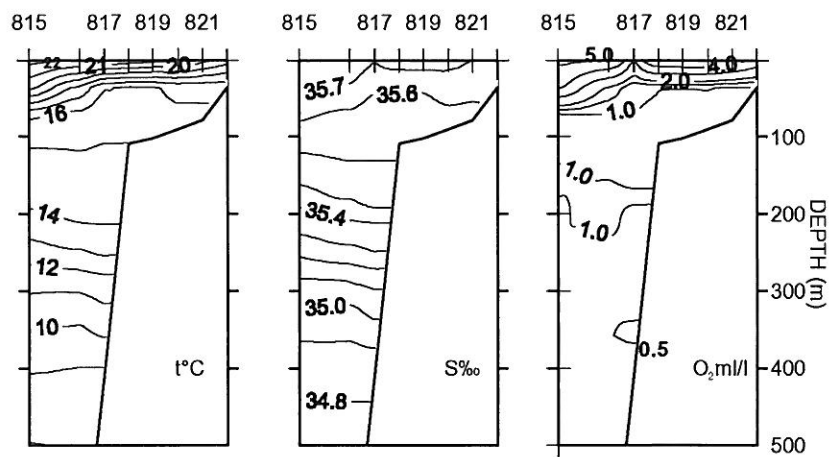
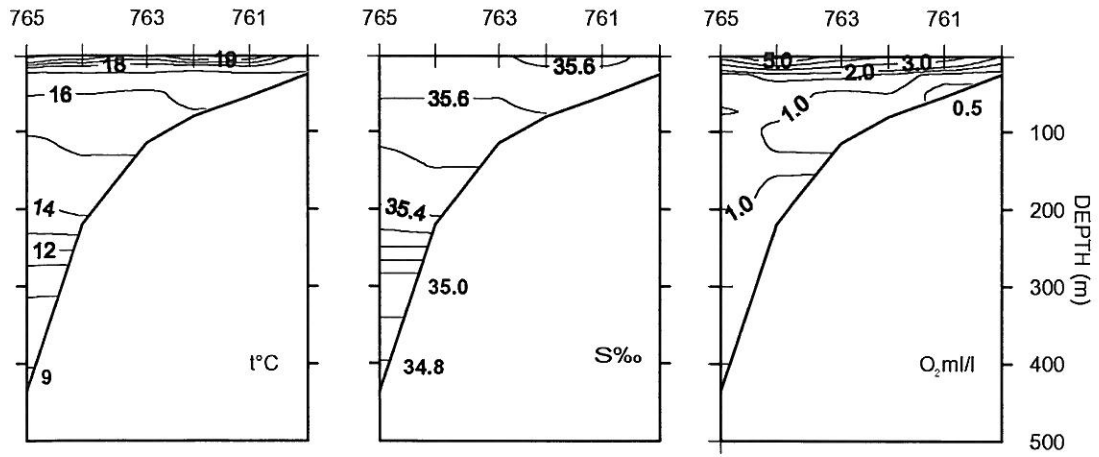
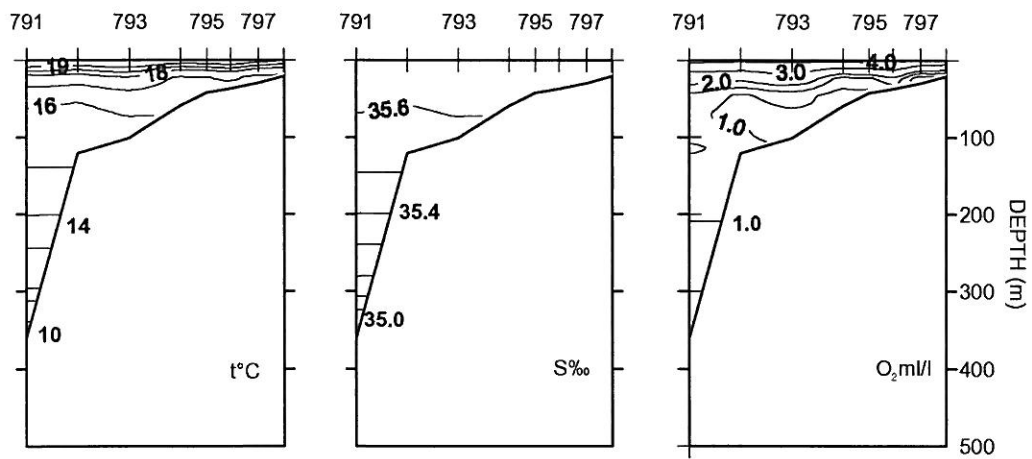


Figure 5e. Vertical sections of temperature salinity and oxygen off Lobito.

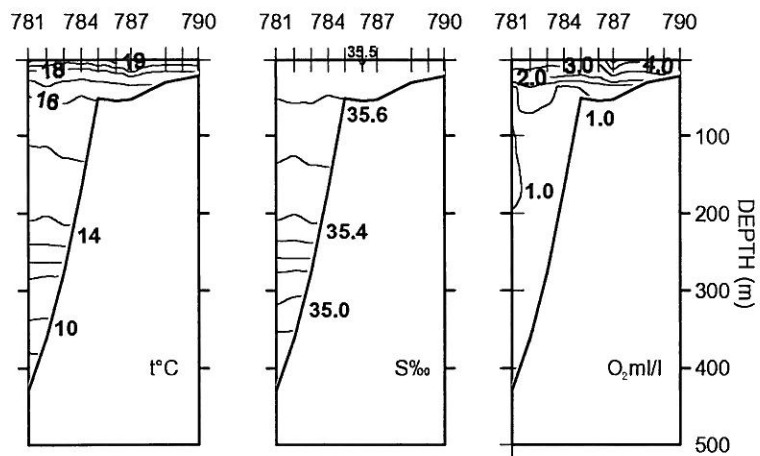




**Figure 5f.** Vertical sections of temperature salinity and oxygen off Ponta do Balela.



**Figure 5g.** Vertical sections of temperature salinity and oxygen off Enseada do Baleia



**Figure 5h.** Vertical sections of temperature salinity and oxygen off Ponta do Quicombo

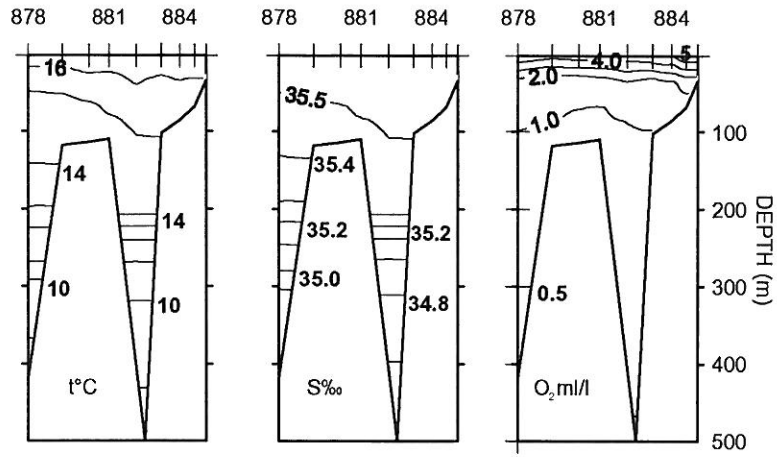


Figure 5i. Vertical sections of temperature salinity and oxygen off Flamingos.

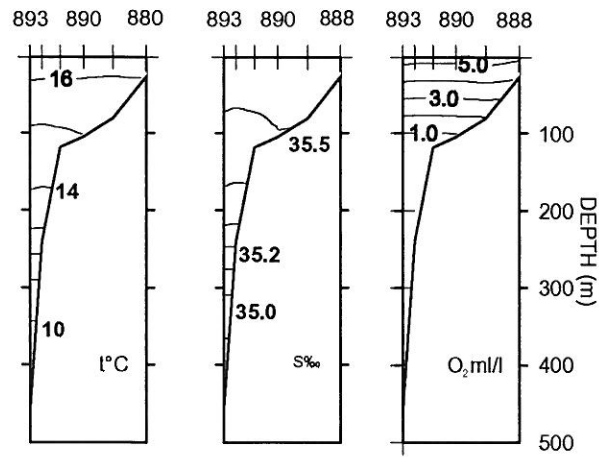


Figure 5j. Vertical sections of temperature salinity and oxygen off Pta. Albina.

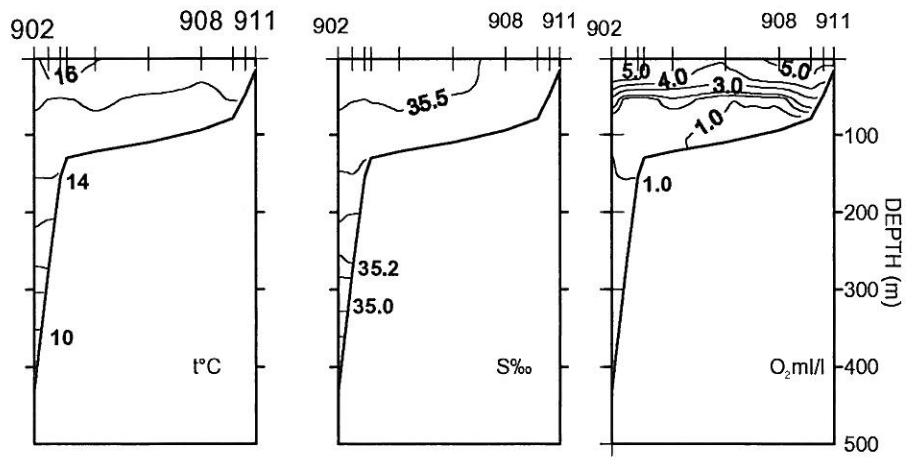


Figure 5k. Vertical sections of temperature salinity and oxygen off Baía dos Tigres.

## CHAPTER 4 DISTRIBUTION, SIZE COMPOSITION AND BIOMASS ESTIMATES

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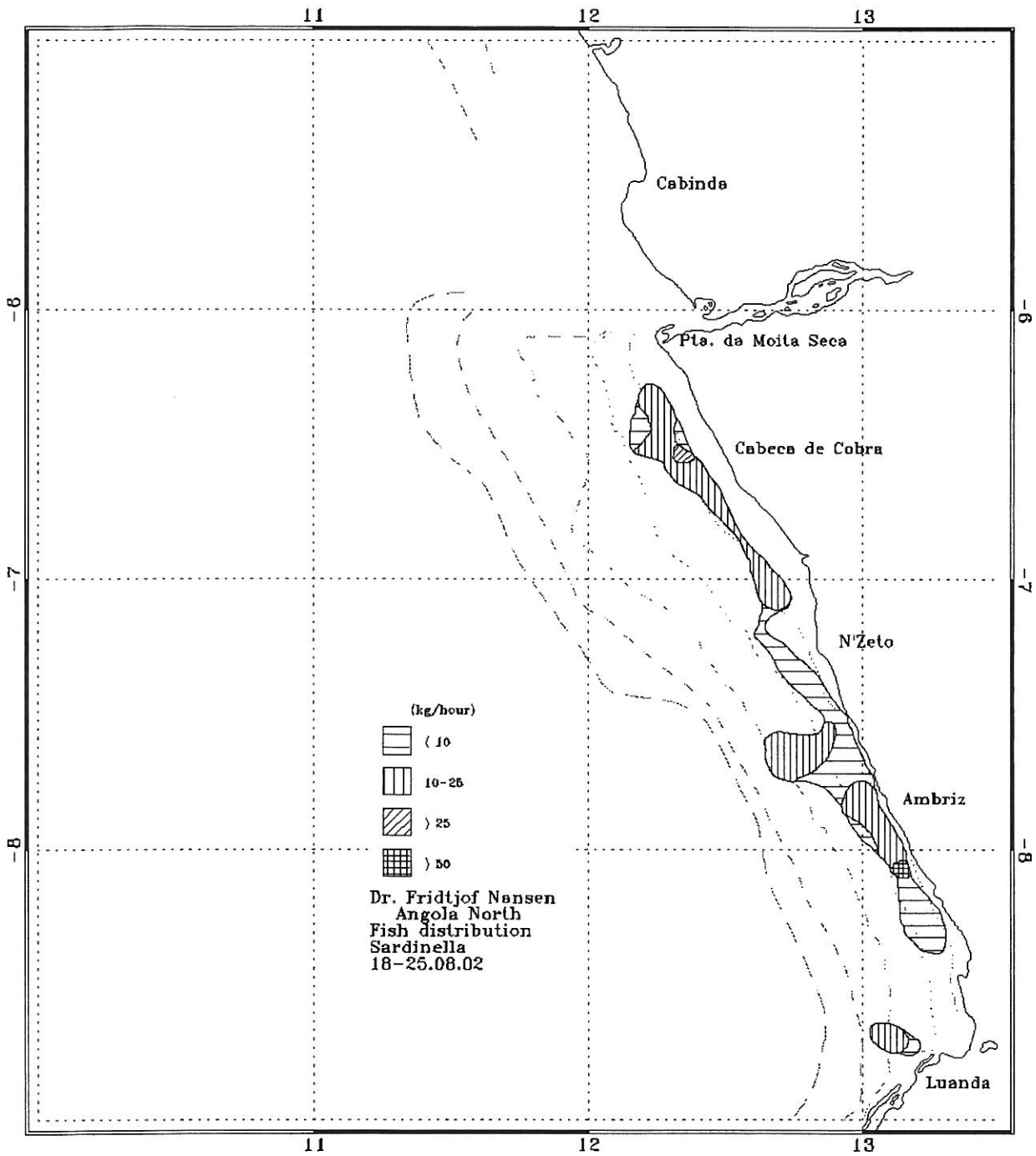
### 4.1 Pta. das Palmerinhas - Congo River

#### *Sardinella*

Both *Sardinella maderensis* and *S. aurita* were found in three different areas in the northern region, mainly inshore (Figure 6). In the northernmost of these (Cabeça de Cobra), only *S. aurita* was found. In the central part (N'zeto) both species were mixed, while the southern distribution area consisted only of *S. maderensis*. Last year, the distribution pattern was patchy, covering a smaller total area. Like last year, acoustic densities in this region were generally low, with high-density spots inshore. The sardinella was usually schooling near the surface during daytime, often visible from very long distances (several kilometres). Contrasting last year, when the sardinella usually formed loose aggregations at night, dense schools or shoals were frequently formed at night during this year's survey. During dense schooling the sardinella, like usually, was very hard to sample. Most samples this year are therefore, like in previous years, obtained from loose aggregations at nighttime.

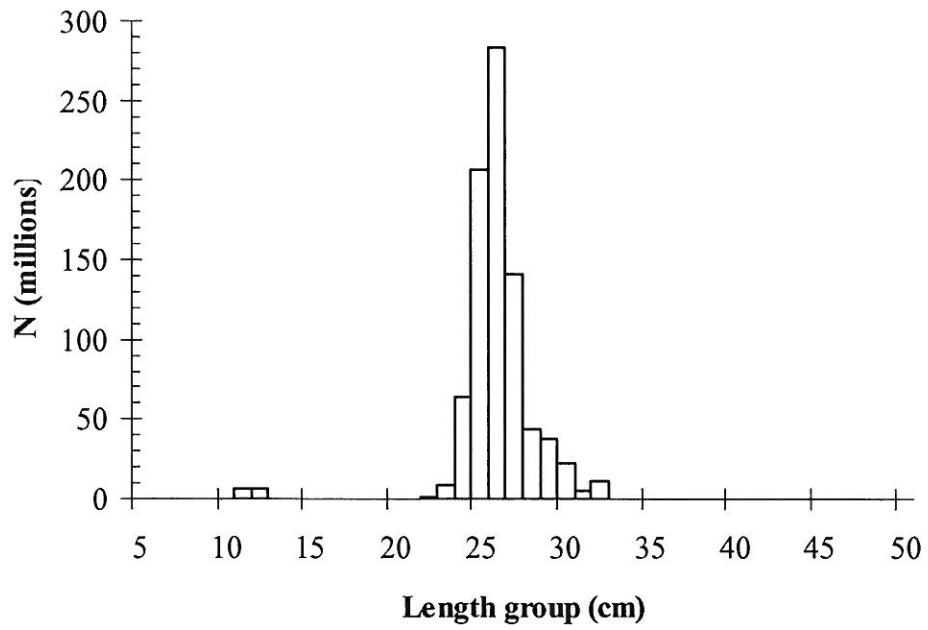
Figure 7 shows the length frequency distribution of *S. maderensis* and *S. aurita*. The *S. maderensis* ranged from 23 cm to 33 cm total length (TL), with a clear modal length around 26 cm TL. The *S. aurita* ranged from 14 to 34 cm TL with no apparent modal lengths.

The biomass of sardinella was estimated at 177 000 tons, which is very close to last year's estimate (173 000 tons). Of this, about 140 000 tons was *S. maderensis*, compared to 88 000 tons last year, while 37 000 tons was *S. aurita* (estimated at 86 000 tons last year). The splitting between species is, however, very sensitive to sampling intensity in the overlapping zone, while the total estimate should be more robust. Figure 8 shows the cumulative distribution of the biomass for both species. For *S. maderensis*, the bulk of the biomass (90 %) consisted of individuals < 29 cm TL, while most of the *S. aurita* was < 31 cm TL (35 cm last year).



**Figure 6.** Northern Angola. Distribution of *Sardinella* spp.: Pta. das Palmerinhas - Congo River. Depth contours as in Figure 1a.

a) *Sardinella maderensis*



b) *Sardinella aurita*

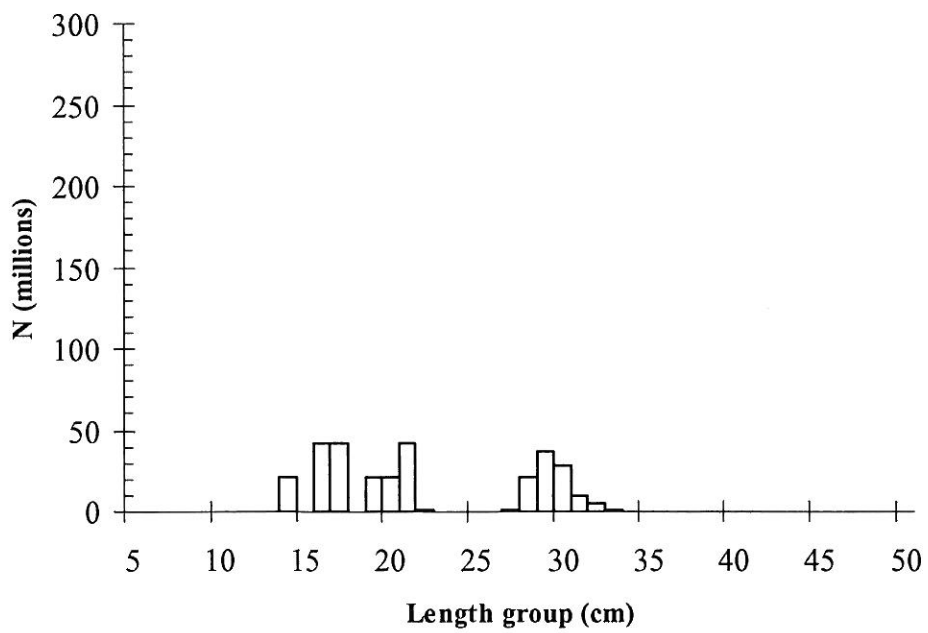
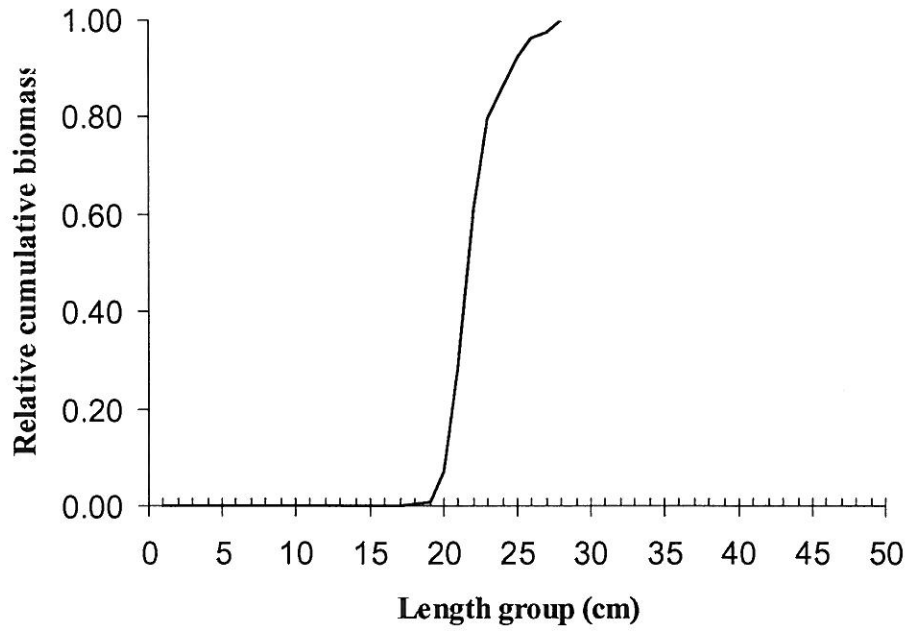
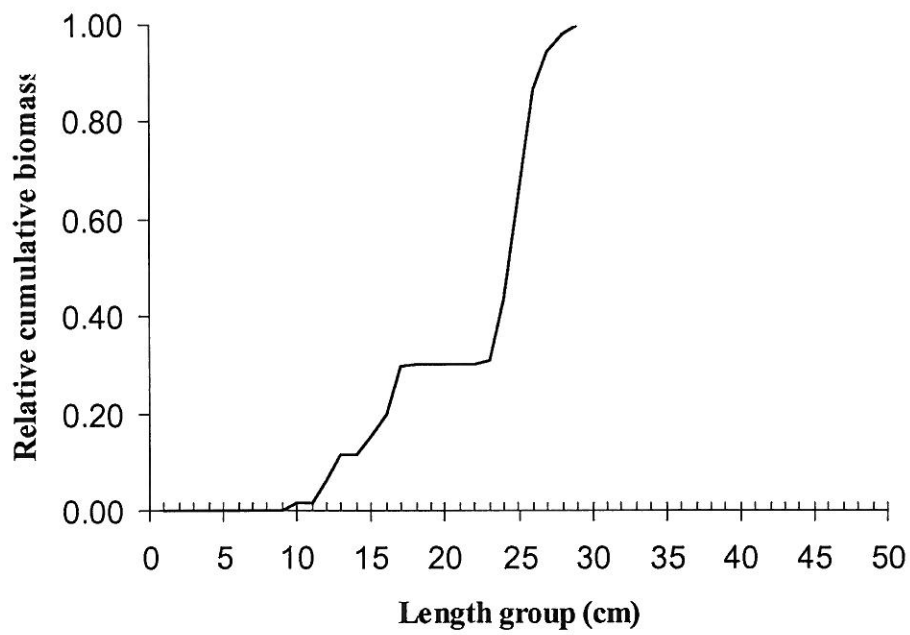


Figure 7. Total length distribution of *Sardinella maderensis* (a) and *S. aurita* (b): Pta. das Palmerinhas - Congo River.

a) *Sardinella maderensis*



b) *Sardinella aurita*



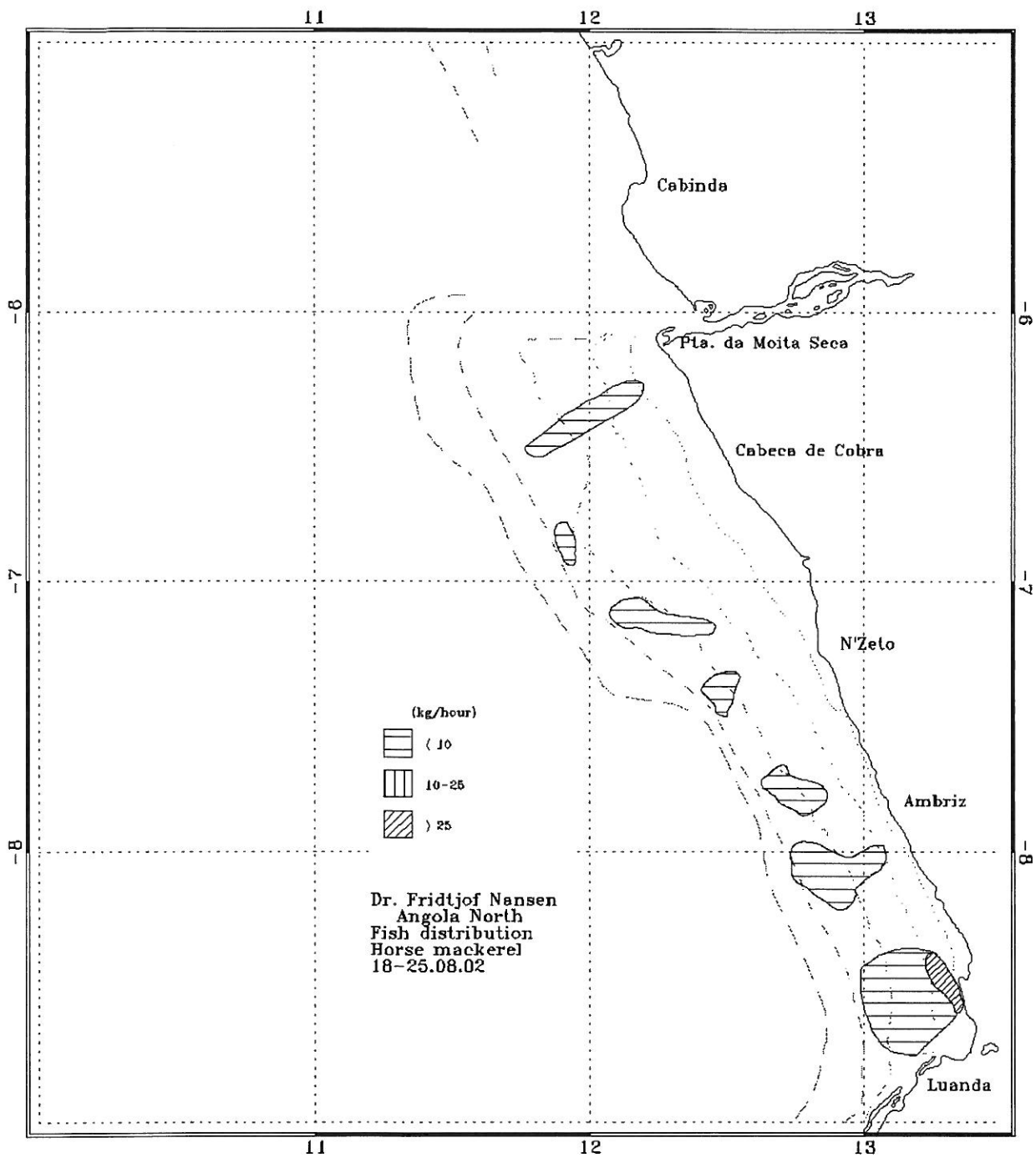
**Figure 8.** Relative cumulative biomass *Sardinella maderensis* (a) and *S. aurita* (b): Pta. das Palmerinhas - Congo River.

### *Cunene horse mackerel*

Like in previous years, only *T. trecae* was found in this region. The horse mackerel was located in seven relatively small low-density areas (Figure 9).

Figure 10 shows the length frequency distribution of horse mackerel for the region. The size distribution was polymodal, with the primary mode around 14 cm TL and secondary modes at about 18 and 28 cm TL.

The estimated biomass of *T. trecae* was 3 000 tons (63 000 tons last year). Most of the biomass (90 %) was comprised of fish < 33 cm TL (Figure 11).



**Figure 9.** Northern Angola. Distribution of Cunene horse mackerel (*Trachurus trecae*): Pta das Palmerinhas - Congo River. Depth contours as in Figure 1a.



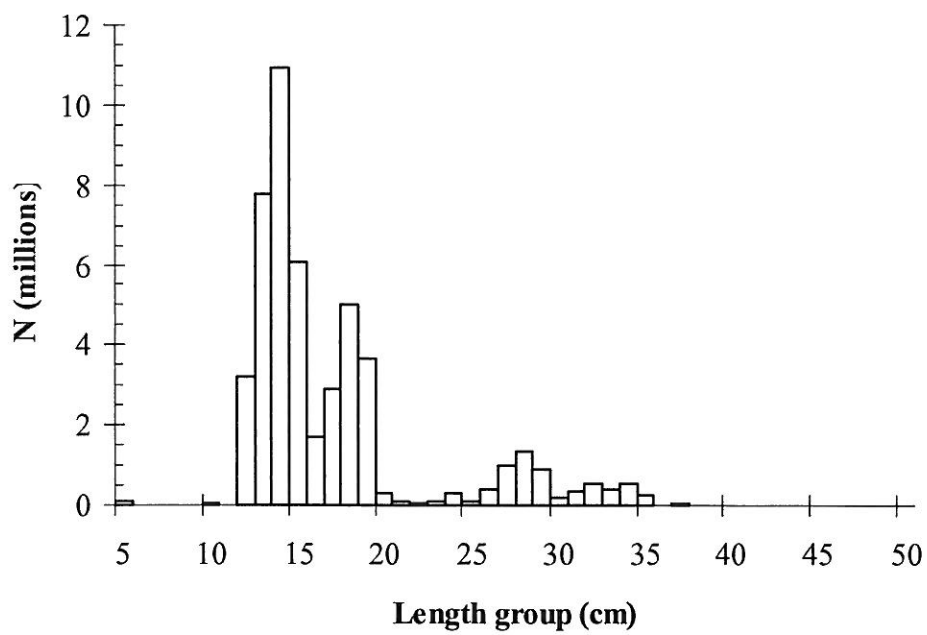


Figure 10. Total length distribution of Cunene horse mackerel (*Trachurus trecae*), Pta. das Palmerinhas - Congo River.

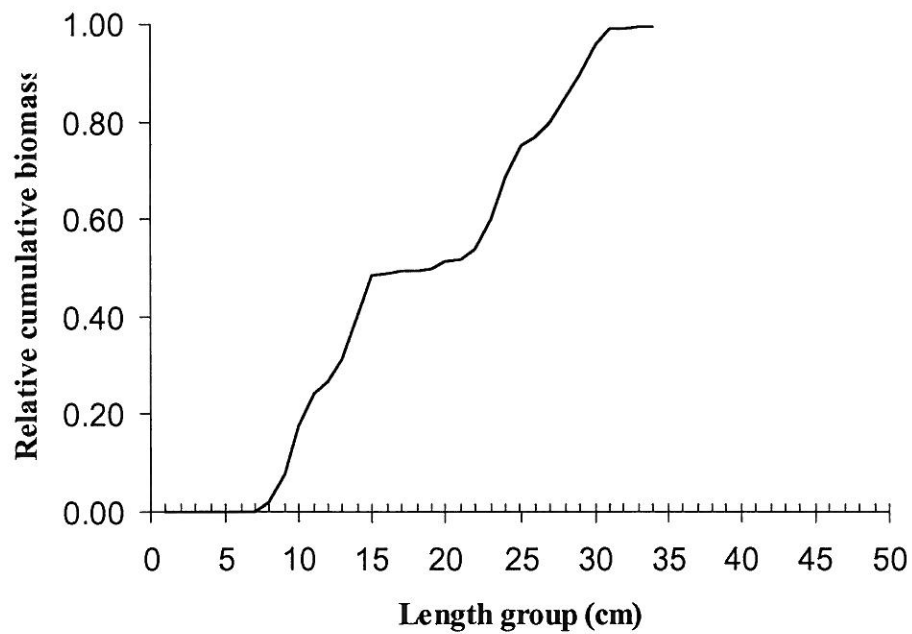


Figure 11. Cumulative percentage biomass by length group, *Trachurus trecae*: Pta. das Palmerinhas - Congo River.

### *Other pelagic species*

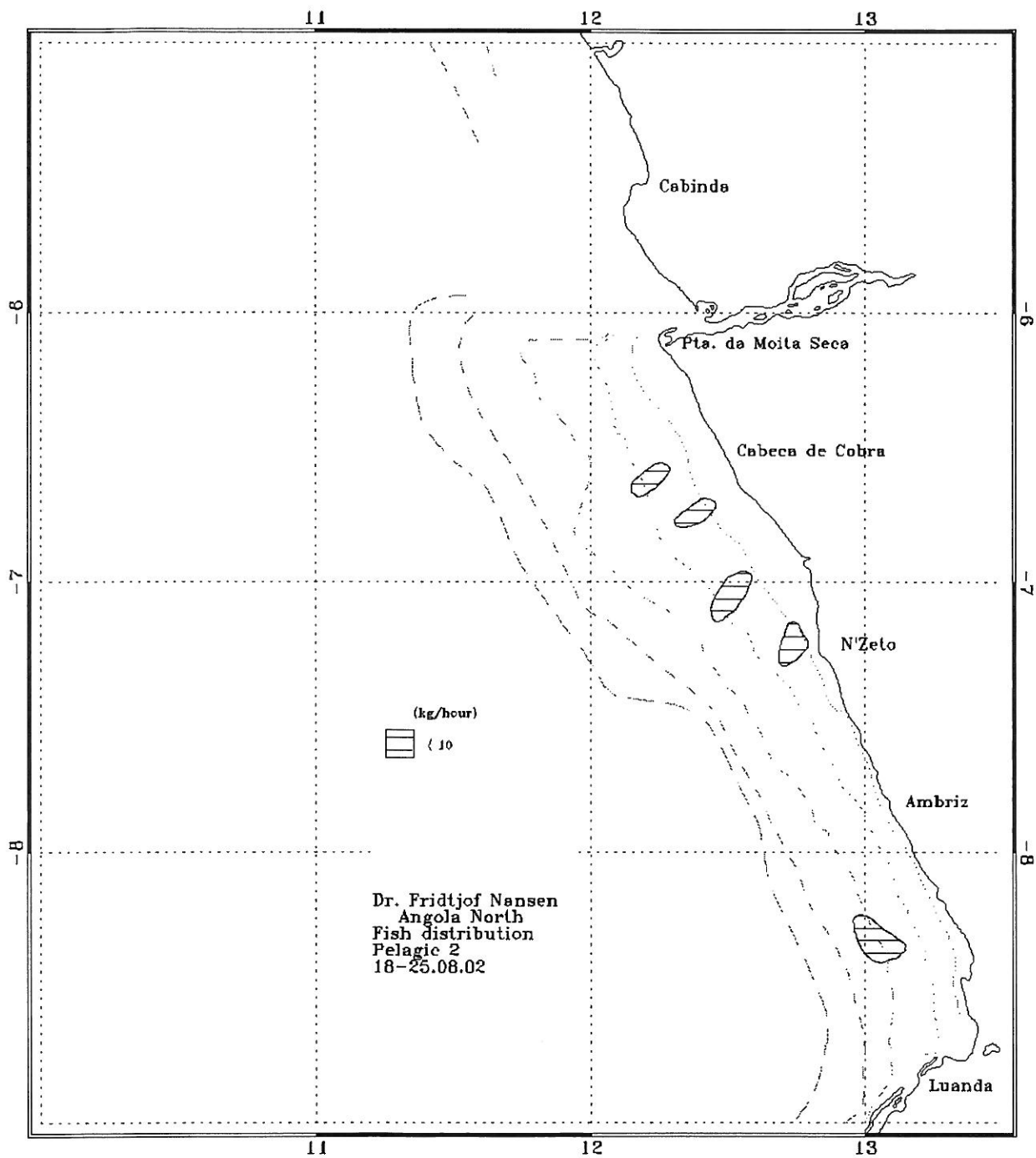
#### *Group 1*

No fish in pelagic species group 1 were encountered in the region.

#### *Group 2*

This category, which includes members of the family Carangidae (other than *Trachurus* sp.), Scombridae, Sphyraenidae and *Trichiurus lepturus*, was found in five areas throughout the region, all with low densities (Figure 12). The hairtails (*Trichiurus lepturus*) was the dominant species group, followed by carangids, barracudas and scombrids (Table 6). One of the most common carangid species, *Chloroscombrus chrysurus*, was absent from the catches.

The biomass estimate, based on an average length of 30 cm TL and a condition factor equal to 0.01, was 45 000 tons, compared to 68 000 tons last year.



**Figure 13.** Northern Angola. Distribution of other pelagic species 2: Pta das Palmerinhas - Congo River. Depth contours as in Figure 1a.

**Table 6.** Catch rates (kg/h) of the main groups of pelagic fish, Pta das Palmerinhas - Congo River.

Station	<i>Ilisha</i> sp.	Carangids	Barracudas	Scombrids	Hairtail	Other
2879					3.0	1.1
2884					1.1	13.9
2885			5.4			608.3
2886			0.5		1.6	271.1
2888		0.1	27.6	25.6		136.6
2889		16.9				297.9
2890		25.9	3.8			200.5
2891		13.0	2.6	9.2	1.2	379.6
2892		66.7		4.7	3.5	423.5
2894		52.4			269.5	42.1
2895		36.0			720.0	178.2
2896		2.6	14.2			87.9
2897				9.1	12.1	110.8
2898		7.3		5.8	3.8	1 389.6
2899				2.7	7.8	387.9
2900				72.5		4 371.9
2901			85.5		676.8	29 237.6
2902			10.4		9.7	3 328.0
2903		0.03		10.3		445.0
MEAN		8.8	6.0	5.6	68.4	1 688.9
SE		4.0	3.1	3.7	3.8	
% Catch		0.5	0.3	0.3	4.0	

## 4.2 Benguela – Pta. das Palmerinhas

### *Sardinella*

*Sardinella* was found throughout the region, primarily on the inner part of the continental shelf. The distribution was continuous, except north of Cabo Ledo (Figure 13). High density areas were found south off Cabo São Braz and Pta. do Morro. *S. maderensis* dominated the two species also in this area. *S. aurita* was caught in one of the hauls only.

The length distribution for sardinella is presented in Figure 14(a-b) for *S. maderensis* and *S. aurita*, respectively. The size distributions of *S. maderensis* showed a dominating distributional mode at 25-35 cm TL, peaking at 28 cm. A juvenile cohort with modal length around 8 cm TL was recorded south of Cabo São Braz (10°S) in shallow waters. *S. aurita* ranged from 28-31 cm TL. Individuals <32 cm TL comprised most of the total biomass (90 %) in *S. maderensis* (Figure 15).

The biomass for sardinella was estimated at a total of 257 000 tons, 191 000 tons for *S. maderensis* and 66 000 tons for *S. aurita*, compared to a total of 179 000 tons last year.

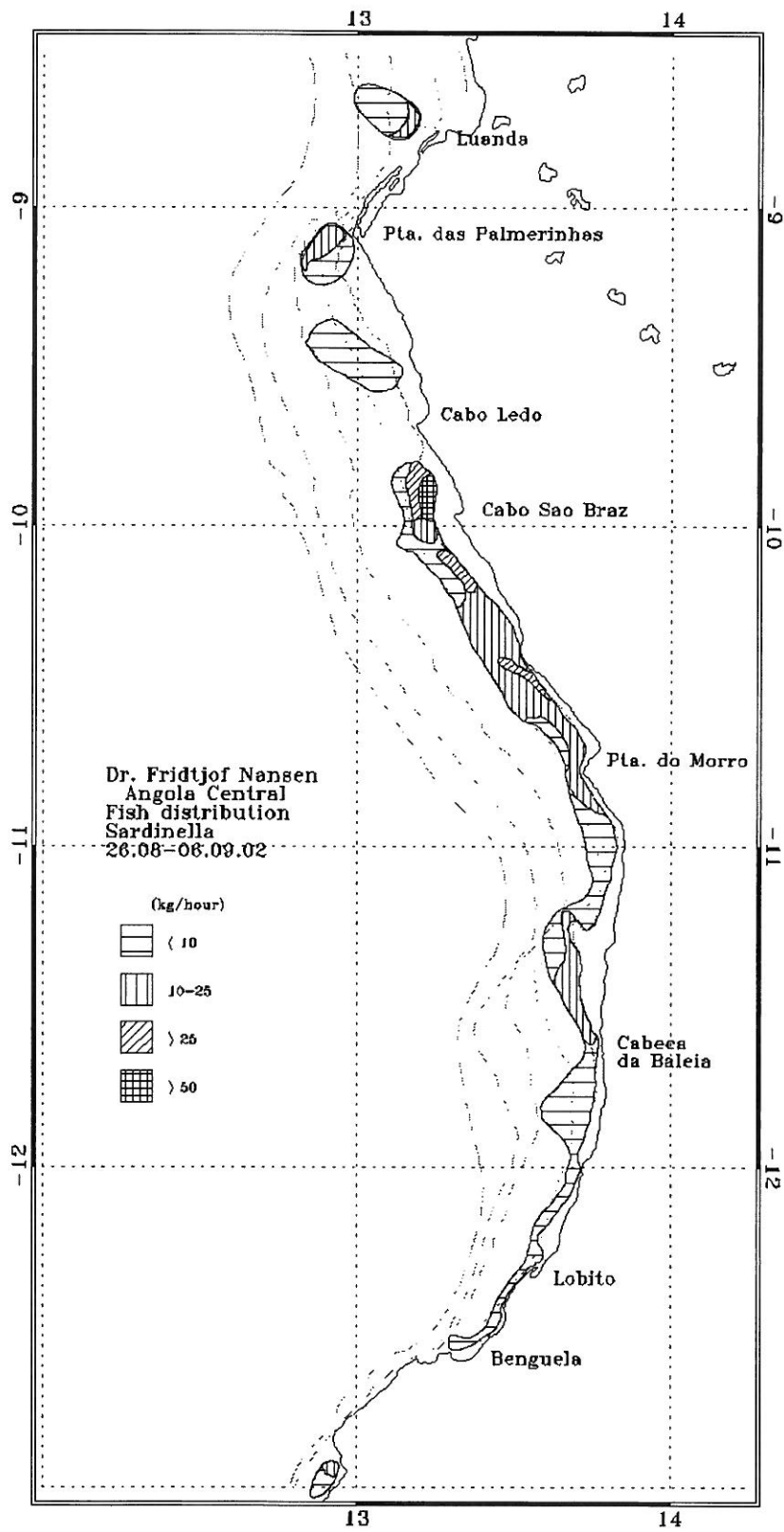
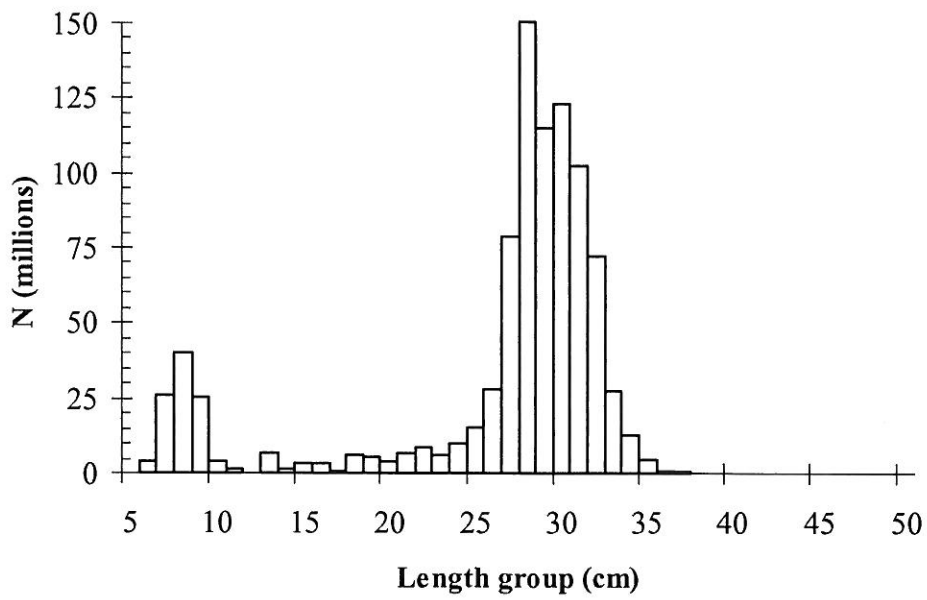
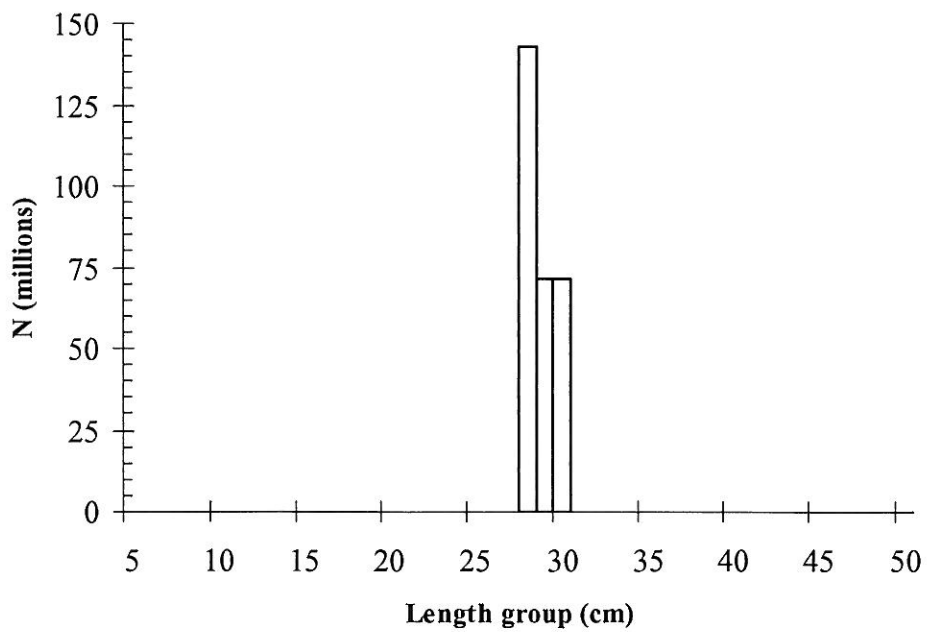


Figure 13. Central Angola. Distribution of *Sardinella* spp.: Benguela – Pta. das Palmerinhas. Depth contours as in Figure 1b.

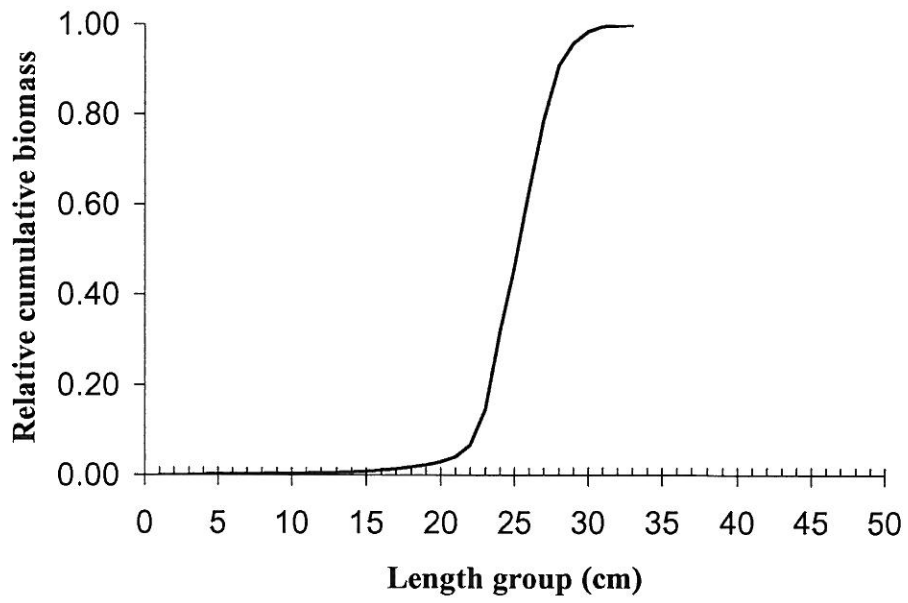


a) *Sardinella maderensis*

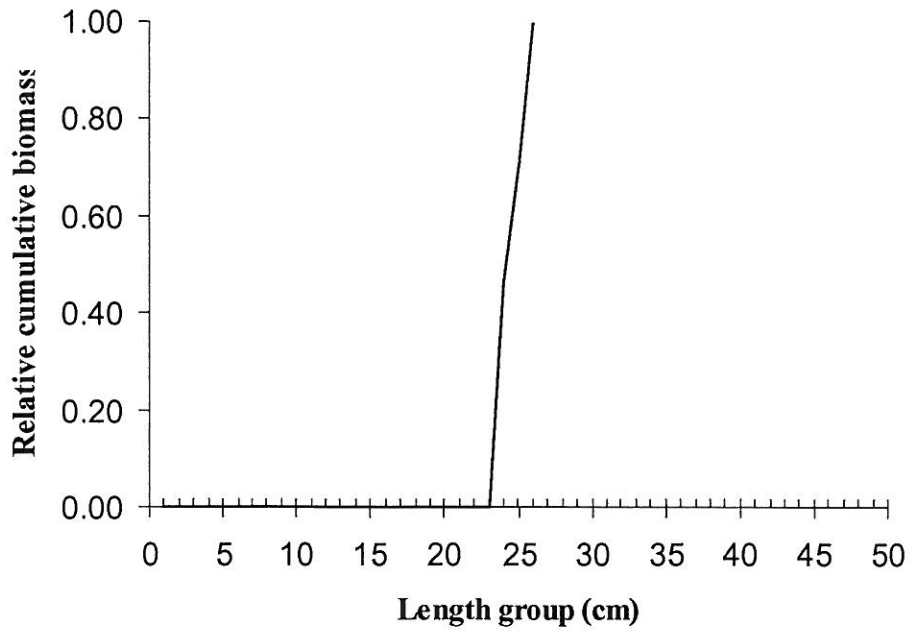


b) *Sardinella aurita*

**Figure 14.** Total length distribution of *Sardinella maderensis* (a) and *S. aurita* (b). Benguela - Pta. das Palmerinhas.



a) *Sardinella maderensis*



a) *Sardinella aurita*

**Figure 15.** Relative cumulative biomass *Sardinella maderensis* (a) and *S. aurita* (b), Benguela - Pta. das Palmerinhas.

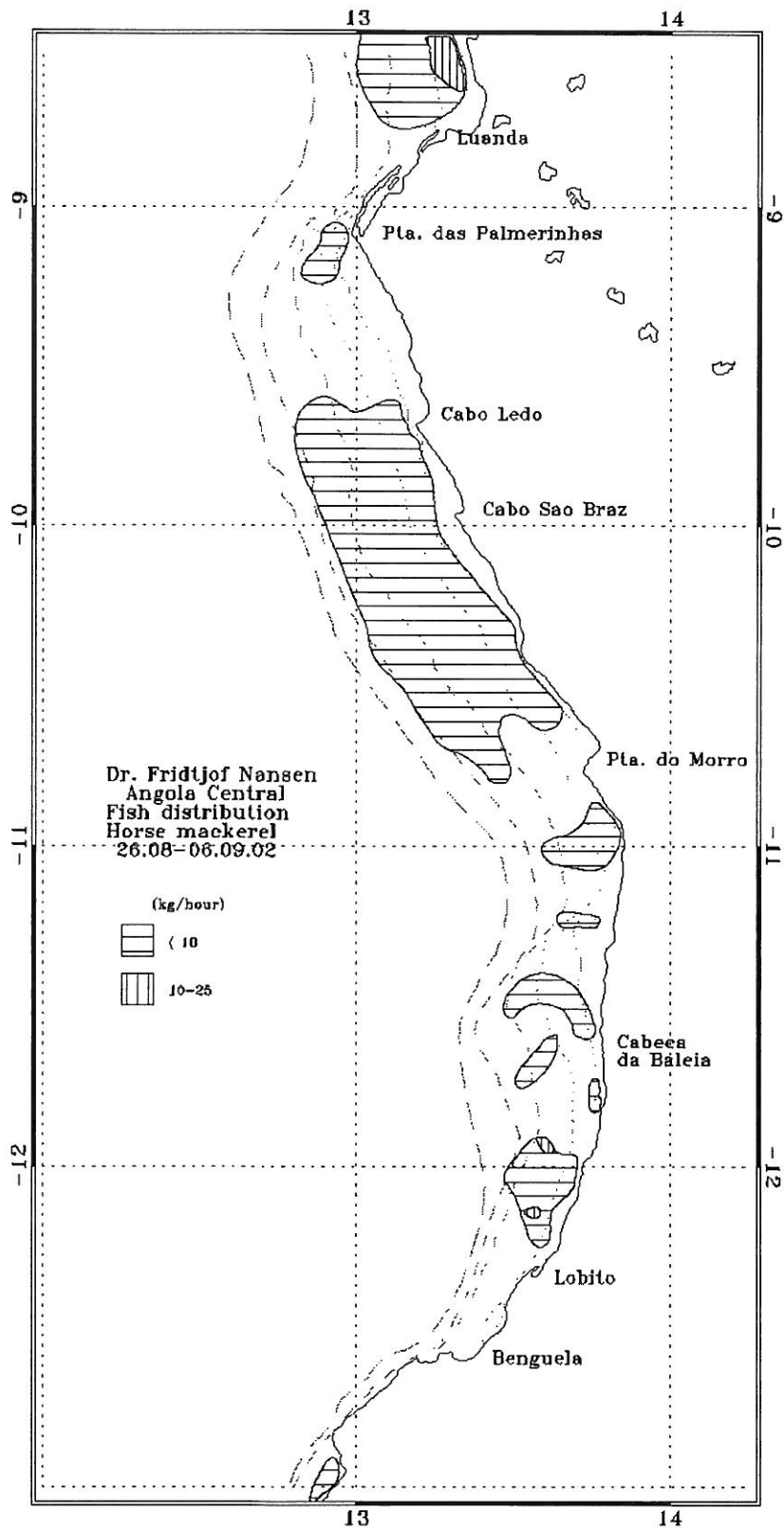


### *Horse mackerel*

Only *T. trecae* was encountered in this region. The distribution was patchy, with relatively low densities. A small area with medium densities was found inshore north of Lobito (Figure 16).

Figure 17 shows the total length distribution of this species. The total length ranged from 10 to 42 cm TL, with two modes around 16 and 25 cm TL.

The biomass of Cunene horse mackerel was estimated at 22 000 tons. This is the lowest estimate in this area during the time series. The bulk of the biomass (~90 %) consisted of individuals <38 cm TL (Figure 18), but due to the high number of juveniles in the estimate, this corresponds to 97% of the population in numbers. Equivalently, 90 % of the population in numbers were <33 cm TL.



**Figure 16.** Central Angola. Distribution of horse mackerel (*Trachurus trecae*): Benguela – Pta. das Palmerinhas. Depth contours as in Figure 1b.

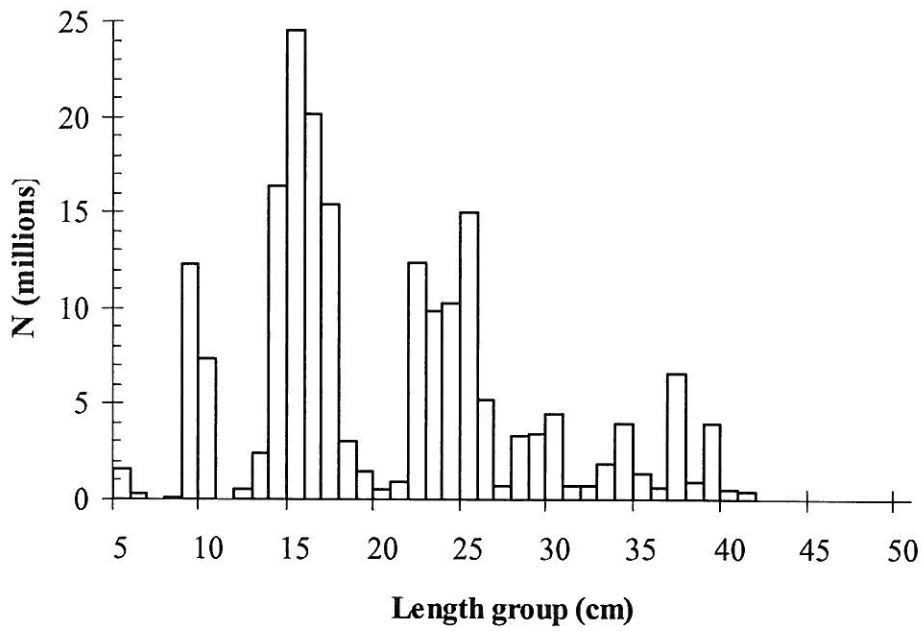


Figure 17. Total length distribution of horse mackerel (*Trachurus trecae*): Benguela – Pta. das Palmerinhas.

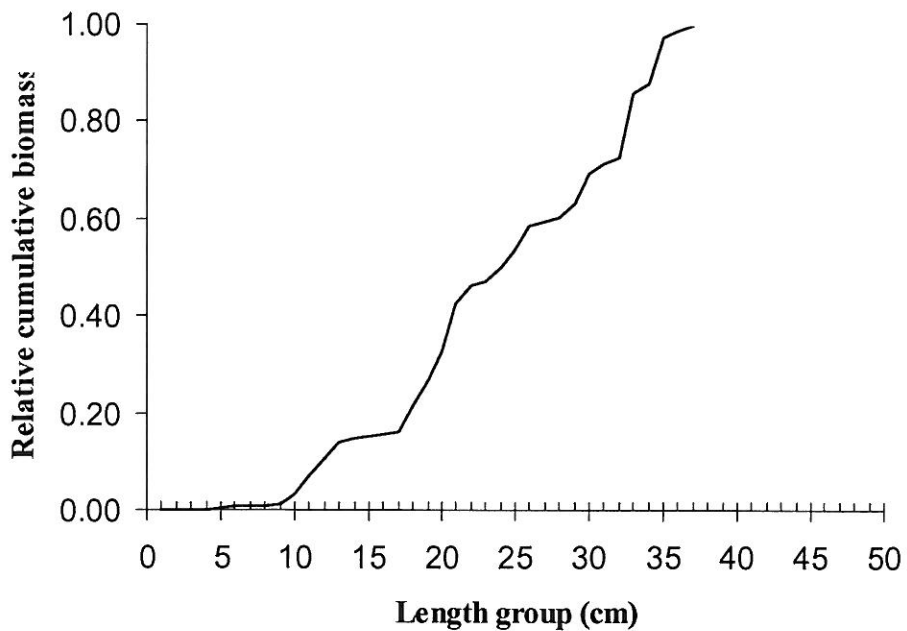


Figure 18. Relative cumulative biomass of horse mackerel (*Trachurus trecae*): Benguela – Pta. das Palmerinhas.

### *Other pelagic species*

An overview of the main groups of other pelagic fish in the central region is given in Table 7.

#### *Group 1*

No fish in pelagic species, group 1, were encountered in the region.

#### *Group 2*

Pelagic fish type 2 was encountered in low-density aggregations ranging from south of Lobito to Pta. das Palmerinhas (Figure 19). The most common species was hairtail (*Trichiurus lepturus*). Other species included *Sarda sarda* and *Scomber japonicus*.

The biomass estimate, based on an average length of 30 cm TL and a condition factor equal to 0.01, was 46 000 tons, compared to 35 000 tons last year.

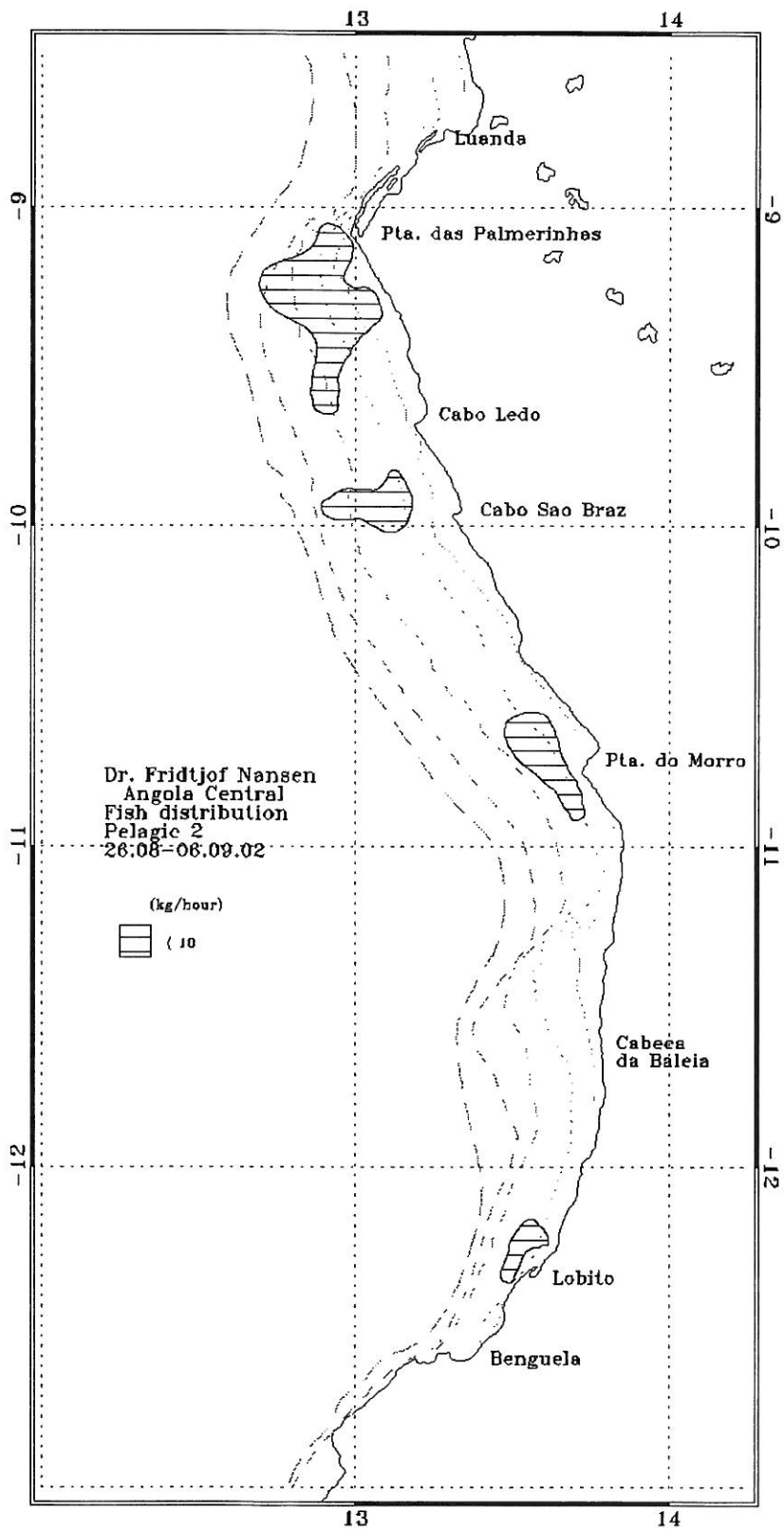


Figure 19. Central Angola. Distribution of other pelagic species, group 2: Benguela – Pta. das Palmerinhas. Depth contours as in Figure 1b

**Table 7.** Catch rates (kg/h) of the main groups of pelagic fish, Benguela – Pta. das Palmerinhas.

Station	<i>Ilisha</i> sp.	Carangids	Barracudas	Scombrids	Hairtail	Other
2904		0.02		24.7	4.2	3.8
2905		2.2	1.2		5.9	244.5
2908		0.1			15.7	175.1
2909					55.2	431.3
2910		0.03			14.1	9.8
2912					4.2	13.0
2913					7.6	14.3
2914					1.2	3.4
2915			2.9	2.0	1.5	252.2
2916					1.2	190.2
2917					5.6	5 923.8
2920					1.2	0.0
2921				23.0	190.8	165.4
2922		1.3				283.4
2924					22.6	22.8
2925					7.3	239.6
2927		7.3			6.0	3 216.8
2928					108.9	239.0
2929		3.6				559.2
2930					25.0	11.2
2931					9.0	134.7
2932		1.6			2.1	55.4
2933					13.8	2.4
2934					1.4	158.3
2935					280.7	621.9
2936			0.6		4.1	294.1
2938				105.2		1 581.1
2940		45.1	23.8		21.2	395.0
2943			0.4	6.1		41.9
2944					65.6	4 887.2
2946					2.4	69.9
2947					45.3	602.5
MEAN		1.4	0.6	3.6	21.0	495.2
SE		1.5	0.5	1.1	6.1	
% Catch		0.2	0.1	0.7	4.2	

### 4.3. Cunene - Benguela

#### *Sardinella*

No sardinella was recorded in this region.

#### *Horse mackerel*

Like in previous years, both species of horse mackerel were found in the southern region. The fish presented a patchy distribution between north of Cabo Santa María and Cunene (17°15'S) (Figure 20). The density varied throughout the area, with the highest recordings between Cunene and south of Tombua, including Baía dos Tigres.

Figure 21 shows the size distributions of horse mackerels. Juveniles (6-15 cm TL) dominated in both species, with modal peak around 11 cm TL. For *T. trecae* an additional mode could be seen around 20 cm TL. The presence of *T. capensis* in this region is related to the intrusion of colder water from the Benguela current that usually reaches its northernmost extension in this area during this time of the year.

The estimated biomass for horse mackerels in the southern region was 250 000 tons, 64 000 tons for *T. trecae* and 187 000 tons for *T. trachurus capensis*, compared to a total of 335 000 tons last year. The biomass of fish inside Baía dos Tigres (9 000 tons: 5 000 tons of *T. trecae* and 4 000 tons for *T. trachurus capensis*) was estimated separately.

Figure 22 shows that most of the biomass for both species, consisted of individuals under 24 cm TL.

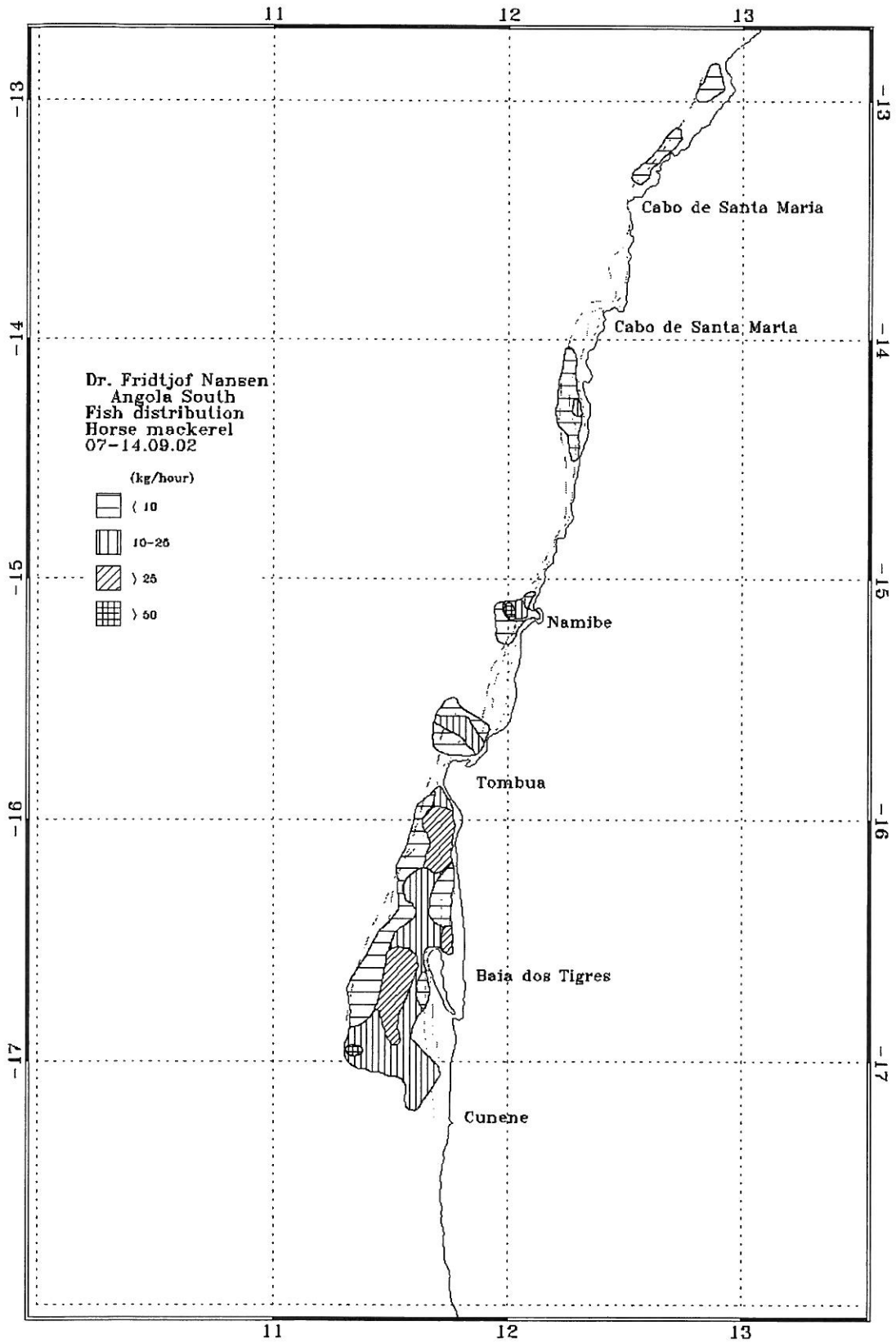
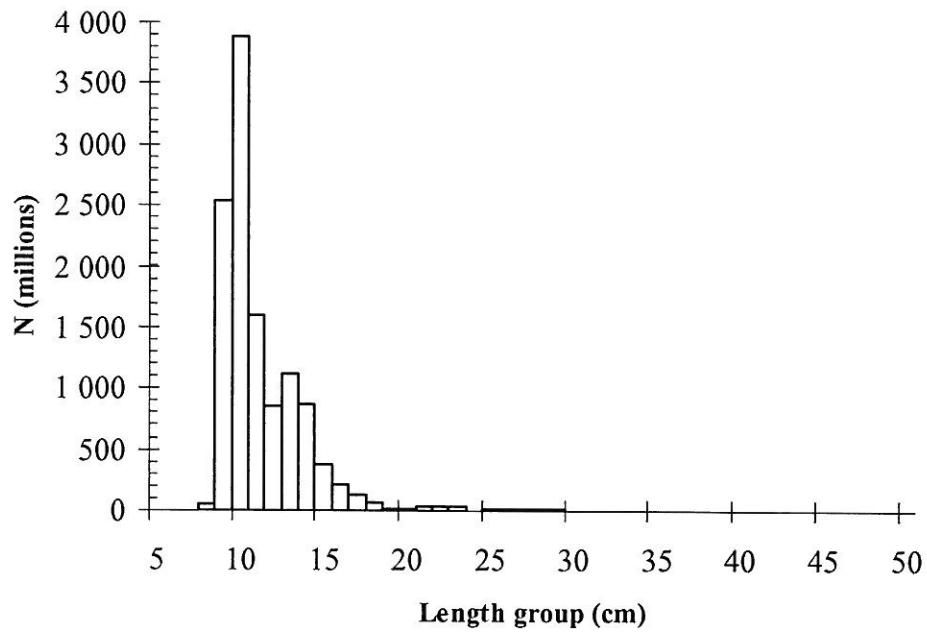
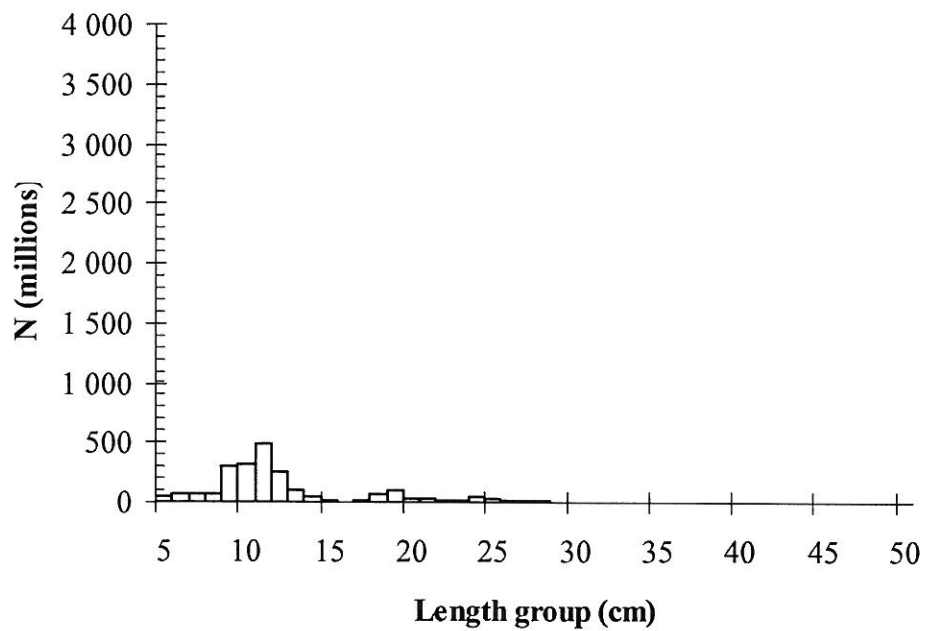


Figure 20. Southern Angola. Distribution of horse mackerel: Cunene - Benguela Depth contours as in Figure 1c.



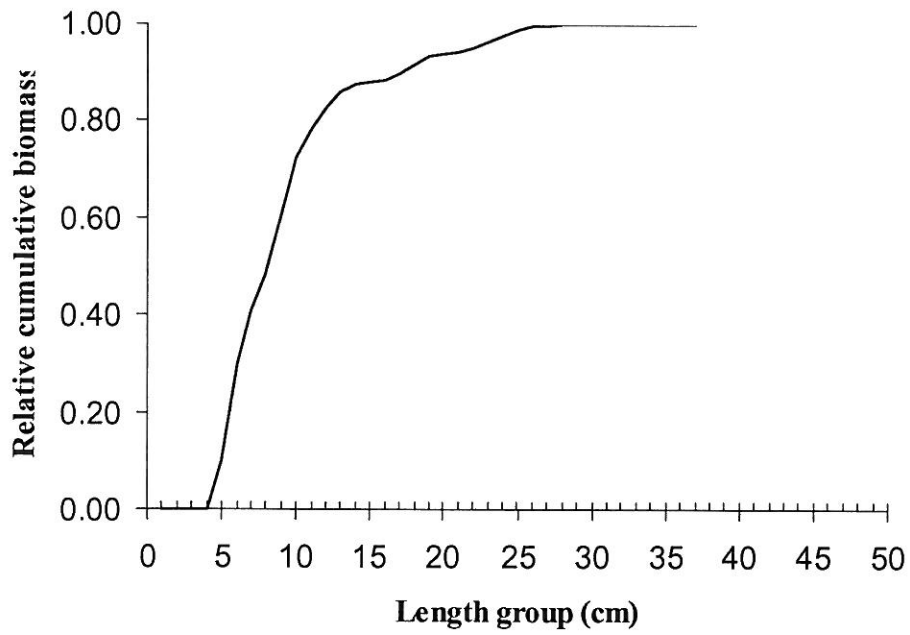


a) *Trachurus trachurus capensis*

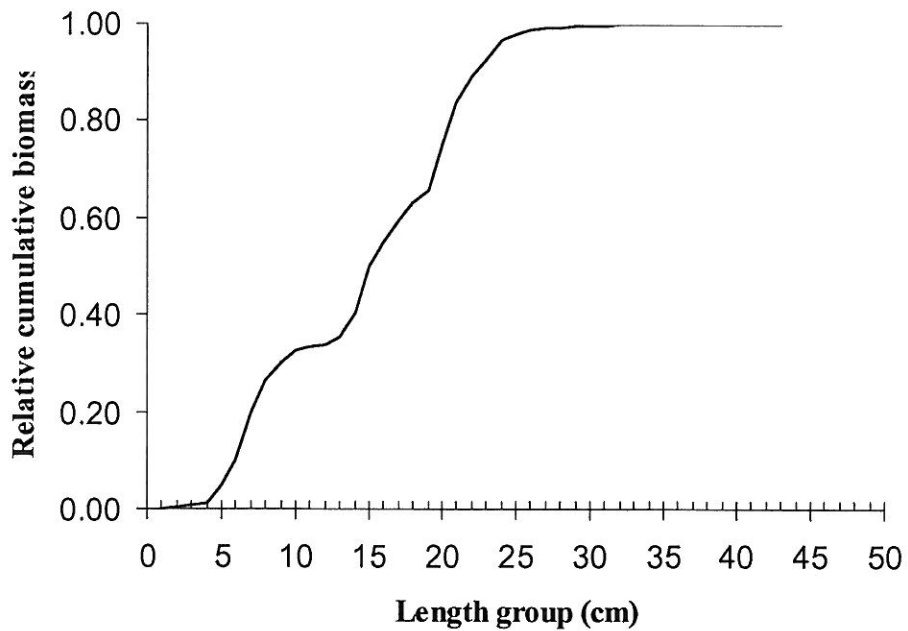


b) *Trachurus trecae*

Figure 21. Total length distribution of *Trachurus trachurus capensis* (a) and *T. trecae* (b): Benguela-Tombua.



a) *Trachurus trachurus capensis*



b) *Trachurus trecae*

**Figure 22.** Relative cumulative biomass of *T. trachurus capensis* (a) and *T. trecae* (b): Benguela-Tombua.

### *Other pelagic species*

An overview of the main groups of other pelagic fish in the southern region is given in Table 8.

#### *Group 1*

Pelagic fish group 1, was found in three aggregations, extending from Baía dos Tigres (16°50'S) to Cunene River (Figure 23). The acoustic densities ranged from low to high. Round herring (*Etrumeus whiteheadi*) dominated the catches.

Based on an average length of 30 cm TL and a condition factor equal to 0.01, the biomass estimate was estimated at 36 000 tons, compared to 130 000 tons last year.

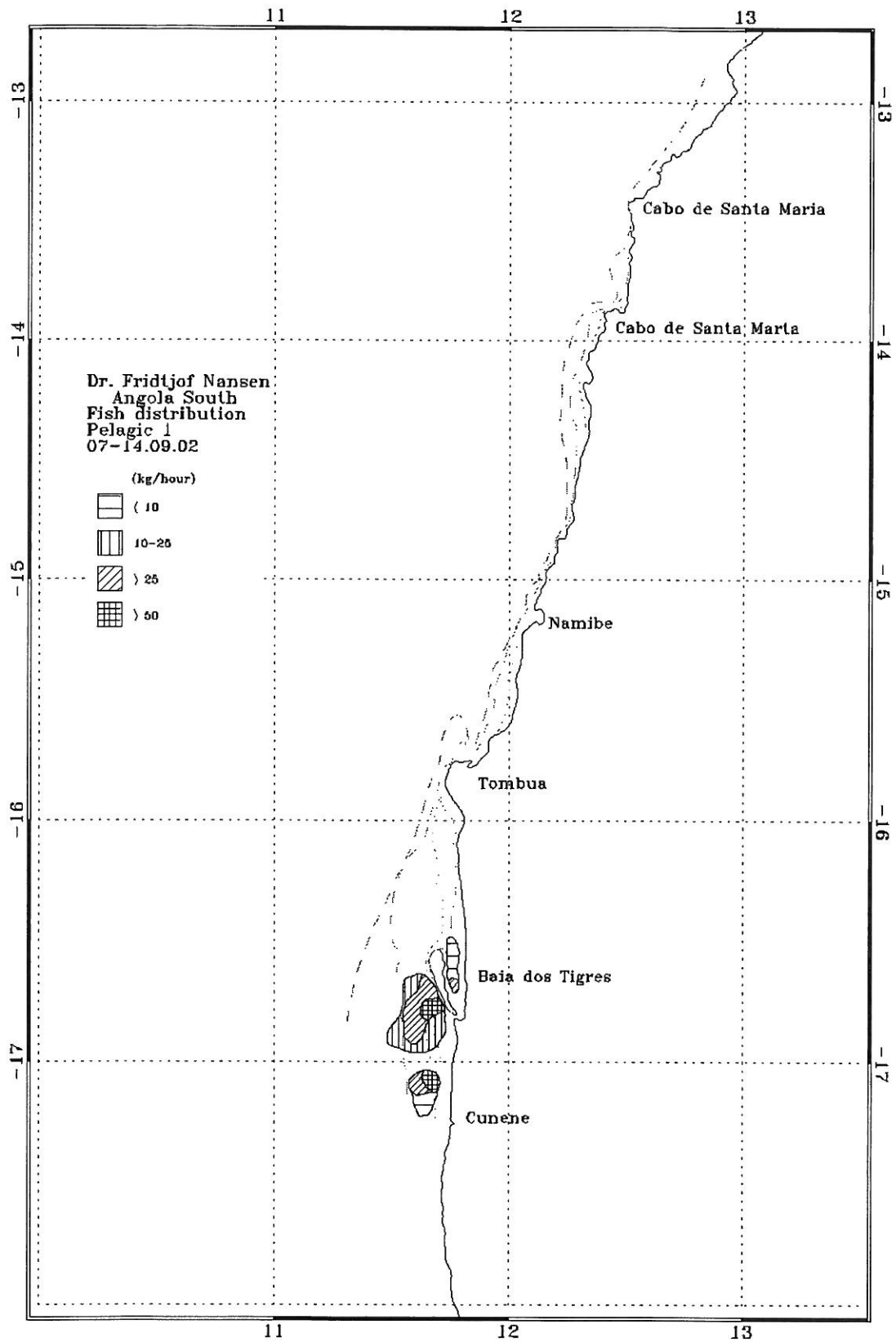
#### *Group 2*

Pelagic fish group 2, was found only north of Namibe (15°30'S) The acoustic density was low

Based on an average length of 30 cm TL, and a condition factor equal to 0.01, the biomass estimate was estimated at 3 000 tons, compared to 8 000 tons last year.

**Table 8.** Catch rates (kg/h) of the main groups of pelagic fish. Cunene River – Benguela.

Station	<i>Engraulis</i> sp.	<i>Etrumeus</i> sp.	Hairtail	Other
2947			45.3	602.5
2948			7.8	77.9
2949			7.9	83.7
2950				
2951			5.5	2 108.6
2952			5.9	118.2
2953			0.2	123.3
2954				1 544.7
2955				50.3
2956				3.6
2957			4.0	32.6
2958		1.0	11.9	95.2
2959				
2960				
2961				
2962		14.2	0.2	5 072.0
2963		21.1	6.4	666.0
2964		9.3	7.6	526.3
2965		0.3	0.3	179.5
2966			0.2	146.9
2967			0.5	47.0
2968			7.2	305.6
2869				
2970				7.4
2971				45.2
2972			5.7	6 967.8
2973				3 952.4
2974				36 100.8
2975		43.9		12 936.6
2976		0.1		76.6
2977				7.9
2978		0.4		450.4
2979				
2980				1 423.8
2981		1.9		16.2
2982		148.9		15 279.0
2983	580.0			20.6
2984				
2985				185.6
2986		0.4		0.0
2987	3 863.4			62 802.8
2988		5 346.1		26 522.9
2989			35.3	2 177.7
MEAN	103.3	129.9	3.5	4 203.7
SE	89.4	1.5	3.3	
% Catch	2.4	3.0	0.1	

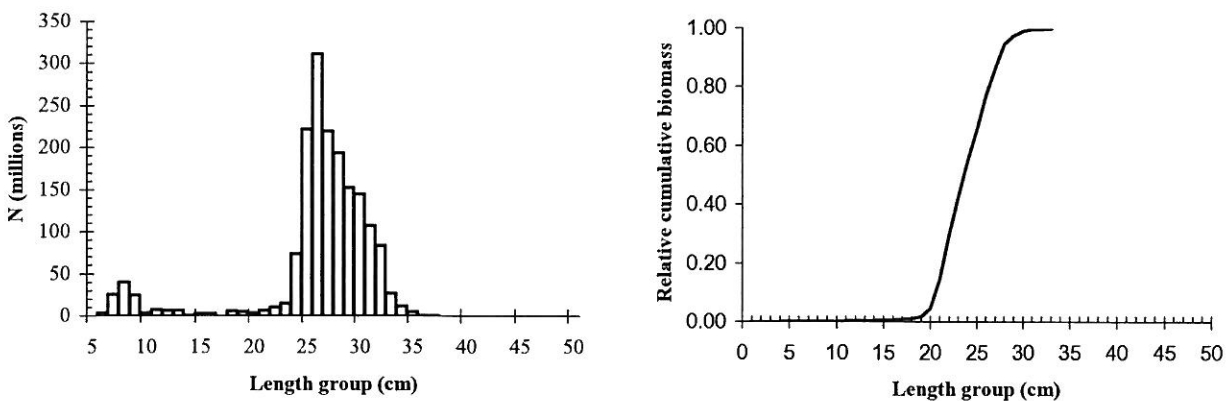


**Figure 23.** Southern Angola. Distribution of other pelagic species group 1: Cunene River – Benguela. Depth contours as in Figure 1c.

## CHAPTER 5 SUMMARY OF SURVEY RESULTS

### 5.1 Sardinella

The total biomass estimate for sardinellas (342 000 tons) is at the same level as last year (434 000 tons). Figure 24 shows the overall length frequency distribution of *S. maderensis* recorded during the survey. It shows that most of the biomass (98%) is  $\geq 24$  cm total length. However, the population of juvenile fish may be underestimated as a result of the inshore distribution of fish and the presence of juveniles north of the Congo River.



**Figure 24.** Overall length distribution (a) and relative cumulative biomass (b) of *S. maderensis*.

It should be noted that sardinella biomass estimates are particularly susceptible to bias due to the behaviour of the fish. This is especially so regarding the horizontal and vertical migratory patterns, and gear and vessel avoidance by this species can affect the recorded densities. Therefore, care should be taken when interpreting the results. Their behavioural patterns largely depend on the prevailing environmental conditions, such as intrusion of freshwater from the Congo River and other rivers into coastal waters. Also, inter-annual variation in the environment may affect estimates differently between years.

Table 9 shows the time-series of biomass estimates for sardinellas. Except for last year, there has been a gradual decrease in biomass over the last 5 years. Therefore, last year's increase should be re-evaluated during the coming years before drawing any conclusions on the stock level. The strong

reduction of *S. aurita* during the last decade continued this year (102 000 tons, or 24% of the total biomass). However, it should be noted that the proportion allocated to each species is determined by the relative catch rates, and very few samples of *S. aurita* were obtained during the present survey. But this will not affect the total biomass estimate.

**Table 9.** Biomass estimates of sardinellas by regions and surveys (1 000 tons).

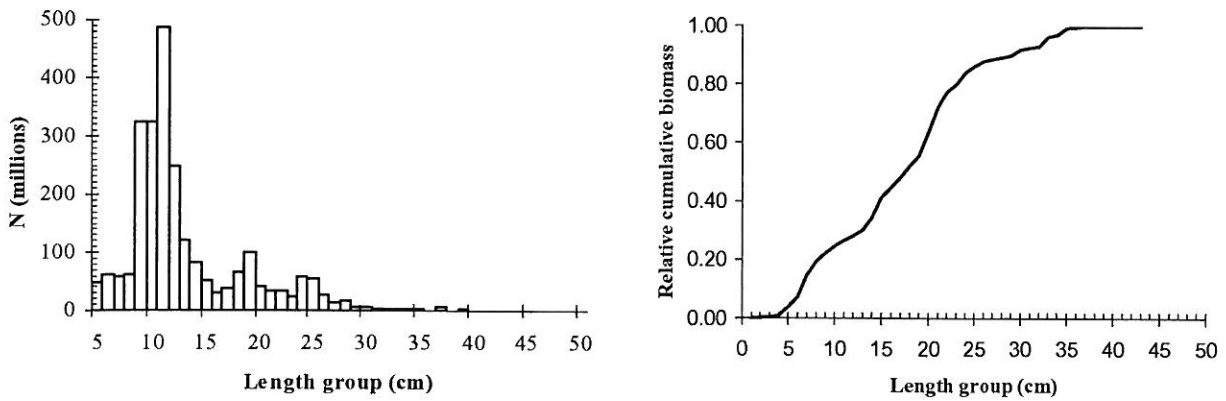
Survey	Cunene-Benguela	Benguela - Pta Palmerinhas	Pta Palm.-Cabinda	Benguela-Cabinda	Cunene-Cabinda
1/85	25	220	80	300	325
2/85	110	190	180	370	480
3/85	0	70	190	260	260
4/85	0	200	110	310	310
1/86	10	140	110	250	260
2/86	10	130	130	260	270
1/89	40	200	60	260	300
2/89	20	40	130	170	190
3/89	40	100	60	160	200
1/91	?	180	120	300	300
2/91	?	68	154	222	222
1/92	?	119	161	280	280
1/94	*	410	100	510	
2/94	*	245	290	535	
1/95	*	140	24	164	
2/95	?	277	297	574	574
1/96	49	175	70	245	294
2/96	0	130	233	363	363
1/97	0	195	300†	495	495
1/98	75	389	79†	468	543
3/98	0	233	159†	392	392
2/99	0	228	135†	363	363
2/2000	0	179	174†	353	353
2/2001	0	257	177†	434	434

\* not surveyed

† surveyed from Congo River- Pta das Palmerinhas

## 5.2 Cunene horse mackerel

The total biomass estimate for *T. trecae* (163 000 tons) increased from last year (89 000 tons). It is evident from Figure 25 that juveniles (<21 cm TL) comprise the majority of the stock, both by weight (45%) and particularly by number (89%).



**Figure 25.** Overall length distribution (a) and relative cumulative biomass (b) of *T. trecae*.

Table 10 shows that the biomass estimate for *T. trecae* is still one of the lowest in the time-series.



**Table 10.** Biomass estimates of Cunene horse mackerel by regions and surveys (1 000 tons)

Survey	Cunene- Benguela	Benguela - Pta Palmerinhas	Pta Palm.- Cabinda	Benguela- Cabinda	Cunene- Cabinda
1/85	30	195	40	235	265
3/85	50	90	40	130	180
4/85/86	100	125	20	145	245
1/89	35	55	40	95	130
3/89	170	40	35	75	245
1/91	100	80	20	100	200
2/91	100	70	30	100	200
1/92	98	86	80	166	264
1/94	*	238	1	239	
2/94	*	130	120	250	
1/95	*	?	84	84	
2/95	70	160	110	270	340
1/96	286	214	6	220	506
2/96	140	157	63	220	360
1/97	234	55	138†	193	427
1/98	163	58	18†	76	239
3/98	118	112	37†	149	267
2/99	124	129	68†	197	321
2/2000	92	178	63†	241	333
2/2001	64	22	3†	25	89

\* not surveyed

† surveyed from Congo River- Pta das Palmerinhas

### 5.3 Conclusions

The present biomass of sardinellas is relatively high. However, the increase observed this year needs to be validated over the next 2-3 years before any sound conclusions can be made on the biomass of the stock. It should be emphasized that the biomass estimates of sardinellas may only be considered as relative indices rather than absolute estimates. Therefore, it is extremely important that urgent steps are taken to evaluate present survey methods in order to improve the accuracy of the estimates.

The present biomass of *T. trecae* is the lowest ever recorded, and the population consists almost entirely of juvenile fish. Therefore, in order to ensure recovery of the adult stock, it is imperative to take precautionary measures to prevent exploitation of the juvenile stock. Furthermore, to improve recruitment necessary to rebuild the stock, it is vital that the adult population is also protected from fishing.

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## ANNEX I FISHING GEAR

The vessel has different sized four-panel 'Åkrahamn' pelagic trawls and one 'Gisund super bottom trawl'. The opening for the trawl used (intermediate sized) was 15-18 m, and it with codend Multisampler for obtaining depth-specific samples.

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 inner net with a 10 mm net mesh. The vertical opening is about 5.0 m. The distance between the wing tips is about 18 m during towing. The sweeps are 40 m long. The trawl doors are 'Thyborøen' combi, 8 m<sup>2</sup> and weigh 2000 kg. The door spreading is about 45 m when using restraining rope.

The SCANMAR system was used on 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.



# ANNEX II Records of fishing stations

PROJECT STATION:2879  
 DATE:19/ 8/02 GEAR TYPE: PT No: 1 POSITION:Lat S 619  
 start stop duration Long E 1149  
 TIME :00:23:12 00:40:15 17 (min) Purpose code: 1  
 LOG : 717.76 718.81 1.03 Area code : 3  
 FDEPTH: 50 50 GearCond.code:  
 BDEPTH: 103 108 Validity code: 3  
 Towing dir: 250ø Wire out: 200 m Speed: 40 kn\*10  
 Sorted: 1 Kg Total catch: 1.18 CATCH/HOUR: 4.16

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	3.07	4	73.80	
Trachurus trecae	0.85	32	20.43	6255
Saurida brasiliensis	0.25	201	6.01	
<b>Total</b>	<b>4.17</b>		<b>100.24</b>	

PROJECT STATION:2880  
 DATE:19/ 8/02 GEAR TYPE: PT No: 1 POSITION:Lat S 619  
 start stop duration Long E 1147  
 TIME :00:50:09 01:06:19 16 (min) Purpose code: 1  
 LOG : 719.43 720.64 1.19 Area code : 3  
 FDEPTH: 20 20 GearCond.code:  
 BDEPTH: 111 113 Validity code: 3  
 Towing dir: 250ø Wire out: 150 m Speed: 45 kn\*10  
 Sorted: Kg Total catch: CATCH/HOUR:

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
N O C A T C H	0.00			
<b>Total</b>				

PROJECT STATION:2881  
 DATE:19/ 8/02 GEAR TYPE: PT No: 1 POSITION:Lat S 640  
 start stop duration Long E 1131  
 TIME :07:32:39 07:46:57 14 (min) Purpose code: 1  
 LOG : 783.59 784.31 0.70 Area code : 3  
 FDEPTH: 200 200 GearCond.code:  
 BDEPTH: 693 713 Validity code: 3  
 Towing dir: 240ø Wire out: 500 m Speed: 30 kn\*10  
 Sorted: 1 Kg Total catch: 1.04 CATCH/HOUR: 4.46

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Diaphus dumerilli	4.24	3210	95.07	
Chaetodipterus lippel	0.13	94	2.91	
Priacanthus arenatus	0.04	9	0.90	
Saurida brasiliensis	0.04	4	0.90	
<b>Total</b>	<b>4.45</b>		<b>99.78</b>	

PROJECT STATION:2882  
 DATE:19/ 8/02 GEAR TYPE: PT No: 1 POSITION:Lat S 641  
 start stop duration Long E 1130  
 TIME :07:47:39 08:07:45 20 (min) Purpose code: 1  
 LOG : 784.34 785.43 1.07 Area code : 3  
 FDEPTH: 200 200 GearCond.code:  
 BDEPTH: 714 747 Validity code: 3  
 Towing dir: 240ø Wire out: 510 m Speed: 30 kn\*10  
 Sorted: 2 Kg Total catch: 1.55 CATCH/HOUR: 4.65

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Diaphus dumerilli	4.50	1740	96.77	
Loligo vulgaris	0.06	3	1.29	
Saurida sp.	0.03	9	0.65	
Chaetodipterus lippel	0.03	9	0.65	
Pellonula leonensis	0.03	9	0.65	
<b>Total</b>	<b>4.65</b>		<b>100.01</b>	

PROJECT STATION:2883  
 DATE:19/ 8/02 GEAR TYPE: PT No: 7 POSITION:Lat S 622  
 start stop duration Long E 1212  
 TIME :14:35:45 15:08:39 33 (min) Purpose code: 1  
 LOG : 844.66 846.69 1.99 Area code : 3  
 FDEPTH: 10 10 GearCond.code:  
 BDEPTH: 30 36 Validity code: 3  
 Towing dir: 225ø Wire out: 150 m Speed: 35 kn\*10  
 Sorted: 24 Kg Total catch: 24.11 CATCH/HOUR: 43.84

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
J E L L Y F I S H	43.64	7864	99.54	
Sepia officinalis hierredda	0.16	5	0.36	
Todaropsis eblanae - juvenile	0.02	7	0.05	
Trachurus trecae, juvenile	0.02	22	0.05	
<b>Total</b>	<b>43.84</b>		<b>100.00</b>	

PROJECT STATION:2884  
 DATE:20/ 8/02 GEAR TYPE: PT No: 1 POSITION:Lat S 632  
 start stop duration Long E 1210  
 TIME :00:52:51 01:18:21 26 (min) Purpose code: 1  
 LOG : 947.32 948.73 1.40 Area code : 3  
 FDEPTH: 10 10 GearCond.code:  
 BDEPTH: 50 53 Validity code: 3  
 Towing dir: 240ø Wire out: 150 m Speed: 35 kn\*10  
 Sorted: 6 Kg Total catch: 6.54 CATCH/HOUR: 15.09

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
J E L L Y F I S H	11.68	1032	77.40	
Sepia orbignyana	2.15	2	14.25	
Trichiurus lepturus	1.15	2	7.62	
Selene dorsalis, juveniles	0.05	7	0.33	
Alloteuthis africana	0.05	16	0.33	
Trachurus trecae, juvenile	0.02	28	0.13	
<b>Total</b>	<b>15.10</b>		<b>100.06</b>	

PROJECT STATION:2885  
 DATE:20/ 8/02 GEAR TYPE: PT No: 7 POSITION:Lat S 633  
 start stop duration Long E 1219  
 TIME :04:04:46 04:28:20 24 (min) Purpose code: 1  
 LOG : 972.01 973.41 1.35 Area code : 3  
 FDEPTH: 10 10 GearCond.code:  
 BDEPTH: 28 32 Validity code: 3  
 Towing dir: 236ø Wire out: 140 m Speed: 35 kn\*10  
 Sorted: 49 Kg Total catch: 245.50 CATCH/HOUR: 613.75

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	312.50	1365	50.92	6257
Brachydeuterus auritus	126.75	905	20.65	6256
Saurida brasiliensis	77.25	23890	12.59	
Sardinella aurita	76.63	255	12.49	6258
Rhizoprionodon acutus	6.50	3	1.06	
Stromateus fiatola	6.30	15	1.03	
Sphyræna sphyraena	5.48	28	0.89	
Trachurus trecae	1.38	5	0.22	
Decapterus punctatus	0.33	3	0.05	
Boops boops	0.30	3	0.05	
Trachurus trecae, juvenile	0.15	30	0.02	
Sepia officinalis hierredda	0.15	3	0.02	
Pagellus bellottii	0.05	10	0.01	
Dentex macrophthalmus Juv.	0.05	10	0.01	
<b>Total</b>	<b>613.82</b>		<b>100.01</b>	

PROJECT STATION:2886  
 DATE:20/ 8/02 GEAR TYPE: BT No:14 POSITION:Lat S 650  
 start stop duration Long E 1155  
 TIME :08:49:42 09:18:58 29 (min) Purpose code: 1  
 LOG :1011.10 1012.57 1.46 Area code : 3  
 FDEPTH: 120 124 GearCond.code:  
 BDEPTH: 120 124 Validity code: 3  
 Towing dir: 320ø Wire out: 340 m Speed: 30 kn\*10  
 Sorted: 74 Kg Total catch: 132.07 CATCH/HOUR: 273.25

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae, juvenile	80.90	2806	29.61	6259
Dentex angolensis	65.69	267	24.04	6260
Dentex congoensis	43.86	474	16.05	6261
Umbrina canariensis	25.97	72	9.50	
Illex coindetii	18.85	935	6.90	
Squalus megalops	6.21	2	2.27	
Dentex barnardi	5.38	4	1.97	
Branchiostegus semifasciatus	5.32	4	1.95	
Rhizoprionodon acutus	4.55	2	1.67	
Zeus faber	2.46	8	0.90	
Brotula barbata	2.44	2	0.89	
Raja miraletus	2.36	4	0.86	
Trigla lyra	1.90	14	0.70	
Anthias anthias	1.63	12	0.60	
Trichiurus lepturus	1.63	2	0.60	
Omastrophes pteropus	1.12	54	0.41	
Trachurus trecae	0.93	2	0.34	
Ariomma bondi	0.89	12	0.33	
Sphyræna sphyraena	0.52	2	0.19	
Chaetodon hoefleri	0.43	2	0.16	
Citharus linguatula	0.19	4	0.07	
Arnoglossus imperialis	0.02	2	0.01	
<b>Total</b>	<b>273.25</b>		<b>100.02</b>	

PROJECT STATION:2887  
 DATE:20/ 8/02 GEAR TYPE: BT No:14 POSITION:Lat S 655  
 start stop duration Long E 1157  
 TIME :15:56:56 16:10:01 13 (min) Purpose code: 1  
 LOG :1075.43 1075.89 0.38 Area code : 3  
 FDEPTH: 108 107 GearCond.code: 8  
 BDEPTH: 108 107 Validity code: 4  
 Towing dir: 57ø Wire out: 340 m Speed: 30 kn\*10  
 Sorted: 39 Kg Total catch: 39.45 CATCH/HOUR: 182.08

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex congoensis	69.23	545	38.02	6263
Dentex angolensis	38.54	162	21.17	6262
Dentex barnardi	22.15	51	12.16	
Epinephelus aeneus	21.00	9	11.53	
Rhizoprionodon acutus	20.54	5	11.28	
Raja miraletus	4.62	9	2.54	
Chelidomichthys capensis	2.77	14	1.52	
Anthias anthias	2.08	32	1.14	
HOLSA04	0.97	5	0.53	
Pagellus bellottii	0.18	5	0.10	
<b>Total</b>	<b>182.08</b>		<b>99.99</b>	

PROJECT STATION:2888  
 DATE:20/ 8/02 GEAR TYPE: PT No: 7 POSITION:Lat S 639  
 start stop duration Long E 1223  
 TIME :20:20:27 20:50:47 30 (min) Purpose code: 1  
 LOG :1110.40 1111.94 1.55 Area code : 3  
 FDEPTH: 0 0 GearCond.code:  
 BDEPTH: 20 19 Validity code: 3  
 Towing dir: 152ø Wire out: 130 m Speed: 30 kn\*10  
 Sorted: 47 Kg Total catch: 94.99 CATCH/HOUR: 189.98

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Alectis alexandrinus	75.20	100	39.58	
Sardinella maderensis	43.90	194	23.11	6264
Sphyræna sphyraena	27.64	8	14.55	
Sarda sarda	25.60	42	13.48	
Sardinella aurita	9.54	28	5.02	6265
Rhizoprionodon acutus	5.28	2	2.78	
Brachydeuterus auritus	2.68	22	1.41	
Decapterus rhonchus	0.14	2	0.07	
<b>Total</b>	<b>189.98</b>		<b>100.00</b>	

PROJECT STATION:2889  
 DATE:21/ 8/02 GEAR TYPE: BT No: 8 POSITION:Lat S 712  
 start stop duration Long E 1226  
 TIME :11:56:35 12:21:51 25 (min) Purpose code: 1  
 LOG :1261.65 1262.98 1.32 Area code : 3  
 FDEPTH: 86 85 GearCond.code:  
 BDEPTH: 86 85 Validity code: 3  
 Towing dir: 331ø Wire out: 290 m Speed: 30 kn\*10  
 Sorted: 5 Kg Total catch: 131.20 CATCH/HOUR: 314.88

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex congocensis	211.44	6898	67.15	
Pagellus bellottii	17.76	200	5.64	
Sepia orbignyana	17.04	24	5.41	
Decapterus rhonchus	16.92	17	5.37	
Squatina oculata	10.20	8	3.24	
Epinephelus aeneus	8.64	5	2.74	
Alloteuthis africana	6.84	1930	2.17	
Pistularia petimba	5.76	14	1.83	
Raja sp.	4.92	2	1.56	
Zeus faber	4.20	18	1.33	
Dentex canariensis	3.00	10	0.95	
Chaetodon robustus	2.76	17	0.88	
Octopus vulgaris	2.71	2	0.86	
Chelidonichthys capensis	1.44	18	0.46	
Dentex angolensis	1.08	58	0.34	
Trachurus trecae, juvenile	0.10	12	0.03	
Ariomma bondi	0.05	2	0.02	
Selene dorsalis	0.02	2	0.01	
Total	314.88		99.99	

PROJECT STATION:2890  
 DATE:21/ 8/02 GEAR TYPE: BT No: 8 POSITION:Lat S 659  
 start stop duration Long E 1239  
 TIME :15:04:13 15:34:03 30 (min) Purpose code: 1  
 LOG :1285.60 1287.10 1.49 Area code : 3  
 FDEPTH: 20 20 GearCond.code:  
 BDEPTH: 20 20 Validity code: 3  
 Towing dir: 320ø Wire out: 130 m Speed: 30 kn\*10  
 Sorted: 84 Kg Total catch: 115.14 CATCH/HOUR: 230.28

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagellus bellottii	94.60	492	41.08	
Pomadourys incisus	58.10	254	25.23	
Decapterus rhonchus	25.90	148	11.25	6266
Caranx crysos	13.60	20	5.91	
Pagrus caeruleostictus	7.20	12	3.13	
Dentex gibbosus	6.40	18	2.78	
Stromateus fiatola	6.04	10	2.62	
Zeus faber	3.90	6	1.69	
Sphyræna sphyraena	3.80	14	1.65	
Sepia officinalis hierredda	3.64	4	1.58	
Squatina oculata	3.20	2	1.39	
Scomberomorus tritor	1.40	2	0.61	
Raja miraletus	1.10	2	0.48	
Plectorhynchus mediterraneus	0.70	2	0.30	
Uranoscopus polli	0.70	2	0.30	
Total	230.28		100.00	

PROJECT STATION:2891  
 DATE:21/ 8/02 GEAR TYPE: PT No: 7 POSITION:Lat S 704  
 start stop duration Long E 1240  
 TIME :18:03:51 18:47:15 43 (min) Purpose code: 1  
 LOG :1302.29 1304.71 2.40 Area code : 3  
 FDEPTH: 5 5 GearCond.code:  
 BDEPTH: 23 31 Validity code: 3  
 Towing dir: 240ø Wire out: 130 m Speed: 30 kn\*10  
 Sorted: 79 Kg Total catch: 290.88 CATCH/HOUR: 405.88

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	270.00	1024	66.52	6268
Trachurus trecae	99.07	426	24.41	6267
Decapterus rhonchus	13.05	107	3.22	6270
Scomber japonicus	9.28	35	2.29	
Stromateus fiatola	5.65	7	1.39	
Sardinella aurita	2.86	11	0.70	6269
Sphyræna sphyraena	2.65	4	0.65	
Trichiurus lepturus	1.23	3	0.30	
Decapterus punctatus	0.91	13	0.22	
Eocps boops	0.85	43	0.21	
Pagellus bellottii	0.33	3	0.08	
Total	405.88		99.99	

PROJECT STATION:2892  
 DATE:22/ 8/02 GEAR TYPE: BT No: 8 POSITION:Lat S 723  
 start stop duration Long E 1229  
 TIME :08:03:13 08:33:59 31 (min) Purpose code: 1  
 LOG :1419.57 1421.17 1.59 Area code : 3  
 FDEPTH: 108 101 GearCond.code:  
 BDEPTH: 108 101 Validity code: 3  
 Towing dir: 60ø Wire out: 330 m Speed: 30 kn\*10  
 Sorted: 40 Kg Total catch: 257.69 CATCH/HOUR: 498.75

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Umbrina canariensis	241.35	424	48.39	6275
Atractoscion aequidens	77.23	14	15.48	
Seriola carpenteri	66.77	10	13.39	
Dentex angolensis	56.13	244	11.25	6272
Trachurus trecae	16.35	45	3.28	6271
Sepia officinalis hierredda	12.00	17	2.41	
Dentex congocensis	7.45	106	1.49	6273
Sarda sarda	4.74	2	0.95	
Trichiurus lepturus	3.52	4	0.71	
Zeus faber	3.46	10	0.69	
Sparus pagrus africanus *	2.83	2	0.57	
Dentex barnardi	2.38	8	0.48	
Lagocephalus laevigatus	1.61	4	0.32	
Illex coindetii	1.34	134	0.27	
Pagrus caeruleostictus	0.85	2	0.17	
Trigla lyra	0.48	6	0.10	
Chaetodon hoefleri	0.10	2	0.02	
Total	498.59		99.97	

PROJECT STATION:2893  
 DATE:22/ 8/02 GEAR TYPE: PT No: 4 POSITION:Lat S 729  
 start stop duration Long E 1229  
 TIME :15:00:49 15:33:49 33 (min) Purpose code: 1  
 LOG :1468.44 1470.79 2.25 Area code : 3  
 FDEPTH: 0 0 GearCond.code:  
 BDEPTH: 118 215 Validity code: 3  
 Towing dir: 240ø Wire out: 200 m Speed: 48 kn\*10  
 Sorted: 42 Kg Total catch: 42.58 CATCH/HOUR: 77.42

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
J E L Y F I S H	68.36	342	88.30	
Sardinella maderensis	8.91	33	11.51	6274
Lagocephalus laevigatus	0.09	33	0.12	
Pistularia petimba	0.02	2	0.03	
Trachurus trecae, juvenile	0.02	33	0.03	
Selene dorsalis, juveniles	0.02	13	0.03	
Total	77.42		100.02	

PROJECT STATION:2894  
 DATE:22/ 8/02 GEAR TYPE: PT No: 1 POSITION:Lat S 724  
 start stop duration Long E 1240  
 TIME :19:13:25 19:43:12 30 (min) Purpose code: 1  
 LOG :1488.40 1489.94 1.52 Area code : 3  
 FDEPTH: 0 0 GearCond.code:  
 BDEPTH: 69 73 Validity code: 3  
 Towing dir: 252ø Wire out: 130 m Speed: 32 kn\*10  
 Sorted: 52 Kg Total catch: 182.06 CATCH/HOUR: 364.12

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	269.50	684	74.01	
Decapterus rhonchus	51.40	42	14.12	
Trachinotus ovatus	37.80	80	10.38	
Scomberomorus tritor	3.84	2	1.05	
Selene dorsalis	1.04	2	0.29	
Illex coindetii	0.26	40	0.07	
Bregmaceros nectabanus	0.24	338	0.07	
Sepia officinalis hierredda	0.04	2	0.01	
Total	364.12		100.00	

PROJECT STATION:2895  
 DATE:23/ 8/02 GEAR TYPE: PT No: 1 POSITION:Lat S 735  
 start stop duration Long E 1247  
 TIME :04:22:40 04:27:56 5 (min) Purpose code: 1  
 LOG :1567.51 1567.84 0.32 Area code : 3  
 FDEPTH: 40 40 GearCond.code:  
 BDEPTH: 72 72 Validity code: 3  
 Towing dir: 335ø Wire out: 180 m Speed: 40 kn\*10  
 Sorted: 30 Kg Total catch: 77.85 CATCH/HOUR: 934.20

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	720.00	888	77.07	
Bregmaceros nectabanus	178.20	199044	19.08	
Decapterus rhonchus	36.00	24	3.85	
Total	934.20		100.00	

PROJECT STATION:2896  
 DATE:23/ 8/02 GEAR TYPE: PT No: 7 POSITION:Lat S 732  
 start stop duration Long E 1255  
 TIME :06:12:17 06:42:10 30 (min) Purpose code: 1  
 LOG :1578.87 1580.55 1.67 Area code : 3  
 FDEPTH: 5 5 GearCond.code:  
 BDEPTH: 29 35 Validity code: 3  
 Towing dir: 249ø Wire out: 130 m Speed: 32 kn\*10  
 Sorted: 31 Kg Total catch: 52.35 CATCH/HOUR: 104.70

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Caranx crysos	30.60	30	29.23	
Sardinella maderensis	23.00	60	21.99	6276
Sardinella aurita	20.50	80	19.58	6295
Sphyræna sphyraena	14.20	28	13.56	
Stromateus fiatola	10.30	16	9.84	
Scomberomorus tritor	3.50	2	3.34	
Decapterus rhonchus	2.60	4	2.48	
Total	104.70		100.00	

PROJECT STATION:2897  
 DATE:23/ 8/02 GEAR TYPE: BT No: 8 POSITION:Lat S 747  
 start stop duration Long E 1237  
 TIME :10:43:17 11:14:14 31 (min) Purpose code: 1  
 LOG :1616.67 1618.26 1.60 Area code : 3  
 FDEPTH: 152 161 GearCond.code:  
 BDEPTH: 152 161 Validity code: 3  
 Towing dir: 320ø Wire out: 470 m Speed: 30 kn\*10  
 Sorted: 45 Kg Total catch: 68.25 CATCH/HOUR: 132.10

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex angolensis	60.00	215	45.42	
Illex coindetii	17.52	486	13.26	
Trichiurus lepturus	12.19	12	9.23	
Zenopsis conchifer	10.94	14	8.28	
Sarda sarda	9.10	6	6.89	
Zeus faber	8.61	37	6.52	
Miracorvina angolensis	4.45	8	3.37	
Dentex macrophthalmus	3.48	15	2.63	
Pterothrissus belloci	1.74	21	1.32	
Umbrina canariensis	1.65	4	1.25	
Raja straeleni	1.35	2	1.02	
Dentex barnardi	0.97	2	0.73	
Citharus linguatula	0.08	4	0.06	
Trachurus trecae, juvenile	0.02	2	0.02	
Total	132.10		100.00	

PROJECT STATION: 2898  
 DATE: 23/ 8/02 GEAR TYPE: PT No: 7 POSITION: Lat S 754 Long E 1304  
 start stop duration  
 TIME :23:20:19 23:35:36 15 (min) Purpose code: 1  
 LOG :1726.32 1727.20 0.88 Area code : 3  
 FDEPTH: 5 5 GearCond.code:  
 BDEPTH: 30 37 Validity code: 3  
 Towing dir: 240° Wire cut: 140 m Speed: 35 kn\*10  
 Sorted: 95 Kg Total catch: 351.66 CATCH/HOUR: 1406.64

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	678.96	17060	48.27	6277
Sardinella maderensis	562.96	3552	40.02	6278
Sardinella aurita	138.72	512	9.86	6279
Trachurus trecae	9.00	216	0.64	6280
Selene dorsalis	7.32	104	0.52	
Scomber japonicus	5.88	16	0.42	
Trichiurus lepturus	3.80	16	0.27	
Total	1406.64		100.00	

PROJECT STATION: 2899  
 DATE: 24/ 8/02 GEAR TYPE: BT No: 8 POSITION: Lat S 807 Long E 1252  
 start stop duration  
 TIME :08:06:55 08:37:36 31 (min) Purpose code: 1  
 LOG :1791.77 1793.34 1.57 Area code : 3  
 FDEPTH: 117 118 GearCond.code:  
 BDEPTH: 117 118 Validity code: 3  
 Towing dir: 340° Wire cut: 360 m Speed: 30 kn\*10  
 Sorted: 64 Kg Total catch: 205.89 CATCH/HOUR: 398.50

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Umbrina canariensis	119.23	317	29.92	6284
Trachurus trecae, juvenile	101.71	3627	25.52	6285
Dentex angolensis	74.90	339	18.80	6281
Dentex macrophthalmus	43.65	124	10.95	6282
Dentex congosensis	25.06	190	6.29	6283
Trichiurus lepturus	7.84	8	1.97	
Zeus faber	4.94	15	1.24	
Atractoscion aequidens	3.48	2	0.87	
Branchiostegus semifasciatus	3.39	4	0.95	
Dentex barnardi	2.81	8	0.71	
Octopus vulgaris	2.79	4	0.70	
Sarda sarda	1.76	2	0.44	
Scomber japonicus	0.95	4	0.24	
Raja miraletus	0.93	2	0.23	
Trachurus trecae	0.83	2	0.21	
Illex coindetii	0.81	56	0.20	
Sparus pagrus africanus *	0.79	2	0.20	
Sepia officinalis hierredda	0.54	4	0.14	
Chaetodon hoefleri	0.50	4	0.13	
Brachydeuterus auritus	0.48	8	0.12	
Trigla lyra	0.33	2	0.08	
Boops boops	0.19	6	0.05	
Loligo vulgaris	0.19	10	0.05	
Bodianus speciosus	0.19	6	0.05	
Spicara alta	0.19	10	0.05	
Total	398.48		100.01	

PROJECT STATION: 2900  
 DATE: 24/ 8/02 GEAR TYPE: PT No: 4 POSITION: Lat S 806 Long E 1308  
 start stop duration  
 TIME :12:49:38 13:16:44 27 (min) Purpose code: 1  
 LOG :1829.05 1831.24 2.13 Area code : 3  
 FDEPTH: 5 5 GearCond.code:  
 BDEPTH: 44 36 Validity code: 3  
 Towing dir: 350° Wire cut: 250 m Speed: 50 kn\*10  
 Sorted: 149 Kg Total catch: 2000.00 CATCH/HOUR: 4444.44

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	3963.56	21984	89.18	6286
Sardinella aurita	408.38	1944	9.19	6287
Scomber japonicus	72.51	229	1.63	
Total	4444.45		100.00	

PROJECT STATION: 2901  
 DATE: 24/ 8/02 GEAR TYPE: PT No: 1 POSITION: Lat S 820 Long E 1316  
 start stop duration  
 TIME :22:24:57 22:38:44 14 (min) Purpose code: 1  
 LOG :1913.92 1914.88 0.95 Area code : 3  
 FDEPTH: 0 0 GearCond.code:  
 BDEPTH: 36 37 Validity code: 3  
 Towing dir: 340° Wire cut: 150 m Speed: 30 kn\*10  
 Sorted: 97 Kg Total catch: 7000.00 CATCH/HOUR: 30000.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	27342.68	766076	91.14	6288
Trachurus trecae	1082.87	22273	3.61	6290
Trichiurus lepturus	676.80	35529	2.26	
Sardinella aurita	657.43	9664	2.19	6289
Brachydeuterus auritus	154.71	1710	0.52	
Sphyræna sphyraena	85.50	4	0.29	
Total	29999.99		100.01	

PROJECT STATION: 2902  
 DATE: 25/ 8/02 GEAR TYPE: BT No: 8 POSITION: Lat S 833 Long E 1320  
 start stop duration  
 TIME :07:49:20 07:59:12 10 (min) Purpose code: 1  
 LOG :1988.43 1988.94 0.50 Area code : 3  
 FDEPTH: 21 21 GearCond.code:  
 BDEPTH: 21 21 Validity code: 3  
 Towing dir: 337° Wire cut: 100 m Speed: 30 kn\*10  
 Sorted: 103 Kg Total catch: 558.00 CATCH/HOUR: 3348.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	2364.00	71616	70.61	6292
Trachurus trecae, juvenile	892.80	26520	26.67	6291
Pomadasyus jubelini	24.00	48	0.72	
Sphyræna sphyraena	10.44	66	0.31	
Trichiurus lepturus	9.72	258	0.29	
Stromateus fiatola	9.60	18	0.29	
Sardinella maderensis	9.48	264	0.28	
Trachurus trecae	7.20	30	0.22	
Atractoscion aequidens	4.98	18	0.15	
Galeoides decadactylus	4.98	18	0.15	
Sepia officinalis hierredda	4.80	18	0.14	
Arius parkii	3.96	6	0.12	
Sardinella aurita	1.14	36	0.03	
Pomadasyus incisus	1.08	6	0.03	
Total	3348.18		100.01	

PROJECT STATION: 2903  
 DATE: 25/ 8/02 GEAR TYPE: PT No: 4 POSITION: Lat S 844 Long E 1308  
 start stop duration  
 TIME :14:24:21 14:46:01 22 (min) Purpose code: 1  
 LOG :2048.84 2050.46 1.60 Area code : 3  
 FDEPTH: 5 5 GearCond.code:  
 BDEPTH: 91 96 Validity code: 3  
 Towing dir: 329° Wire cut: 250 m Speed: 47 kn\*10  
 Sorted: 166 Kg Total catch: 166.94 CATCH/HOUR: 455.29

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	279.55	630	61.40	6294
Sardinella maderensis	159.41	518	35.01	6293
Sarda sarda	10.36	5	2.28	
Sardinella aurita	3.00	5	0.66	
Schedophilus pamarco	2.18	8	0.48	
Sepiella ornata	0.27	3	0.06	
Sepiella ornata	0.22	6	0.05	
Sepia bertheloti	0.14	5	0.03	
Lagocephalus laevigatus	0.11	8	0.02	
Lagocephalus laevigatus	0.11	8	0.02	
Selene dorsalis	0.03	3	0.01	
Pistularia petimba	0.03	5	0.01	
Total	455.41		100.03	

PROJECT STATION: 2904  
 DATE: 28/ 8/02 GEAR TYPE: PT No: 4 POSITION: Lat S 900 Long E 1301  
 start stop duration  
 TIME :15:44:26 16:09:02 25 (min) Purpose code: 1  
 LOG :2188.92 2190.75 1.80 Area code : 2  
 FDEPTH: 10 10 GearCond.code:  
 BDEPTH: 57 87 Validity code: 3  
 Towing dir: 20° Wire cut: 150 m Speed: 30 kn\*10  
 Sorted: 13 Kg Total catch: 13.64 CATCH/HOUR: 32.74

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sarda sarda	24.72	2	75.50	
Trichiurus lepturus	4.20	5	12.83	
Sardinella maderensis	3.00	12	9.16	
Schedophilus pamarco	0.43	5	1.31	
Sepiella ornata	0.29	7	0.89	
Lagocephalus laevigatus	0.07	5	0.21	
Selene dorsalis	0.02	2	0.06	
Pistularia petimba	0.02	2	0.06	
Zeus faber	0.00	2		
Total	32.75		100.02	

PROJECT STATION: 2905  
 DATE: 29/ 8/02 GEAR TYPE: PT No: 7 POSITION: Lat S 911 Long E 1256  
 start stop duration  
 TIME :01:03:18 01:33:13 30 (min) Purpose code: 1  
 LOG :2248.62 2250.60 1.75 Area code : 2  
 FDEPTH: 10 10 GearCond.code:  
 BDEPTH: 24 21 Validity code: 3  
 Towing dir: 75° Wire cut: 140 m Speed: 45 kn\*10  
 Sorted: 311 Kg Total catch: 127.00 CATCH/HOUR: 254.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	207.60	4568	81.73	
Galeoides decadactylus	10.88	88	4.28	
Arius parkii	6.24	8	2.46	
Sardinella maderensis	6.16	64	2.43	
Ilisha africana	6.16	72	2.43	
Trichiurus lepturus	5.92	200	2.33	
Trachurus trecae	5.20	102	2.05	6296
Chloroscombrus chrysurus	1.84	16	0.72	
Sepiella ornata	1.36	32	0.54	
Sphyræna guanchancho	1.28	8	0.50	
Pteroscion pelli	0.56	16	0.22	
Selene dorsalis	0.40	8	0.16	
Sardinella aurita	0.40	8	0.16	
Total	254.00		100.01	

PROJECT STATION:2906  
 DATE:29/ 8/02 GEAR TYPE: PT No: 1 POSITION:Lat S 936  
 start stop duration Long E 1242  
 TIME :19:53:57 20:09:06 15 (min) Purpose code: 1  
 LOG :2365.02 2365.81 0.78 Area code : 2  
 FDEPTH: 270 265 GearCond.code:  
 BDEPTH: 404 410 Validity code: 4  
 Towing dir: 335ø Wire out: 600 m Speed: 32 kn\*10  
 Sorted: 5 Kg Total catch: 4.66 CATCH/HOUR: 18.64

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Zeus faber	6.28	4	33.69	
MELANOSTOMIATIDAE	5.24	96	28.11	
Shrimps, small, non comm.	3.96	896	21.24	
Triplophos hemingi	1.44	216	7.73	
MYCTOPHIDAE	0.76	184	4.08	
Yarella blackfordi	0.52	24	2.79	
Gadella imberbis	0.24	36	1.29	
Melanonus zugmayeri	0.20	12	1.07	
Total	18.64		100.00	

PROJECT STATION:2907  
 DATE:29/ 8/02 GEAR TYPE: PT No: 1 POSITION:Lat S 935  
 start stop duration Long E 1241  
 TIME :20:11:15 20:26:29 15 (min) Purpose code: 1  
 LOG :2365.92 2366.69 0.76 Area code : 2  
 FDEPTH: 265 265 GearCond.code:  
 BDEPTH: 411 421 Validity code: 3  
 Towing dir: 335ø Wire out: m Speed: kn\*10  
 Sorted: 439 Kg Total catch: 4.38 CATCH/HOUR: 17.52

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
MELANOSTOMIATIDAE	6.68	148	38.13	
Zeus faber	4.44	4	25.34	
Shrimps, small, non comm.	2.48	3400	14.16	
Triplophos hemingi	2.24	372	12.79	
STOMIIDAE	1.00	72	5.71	
MYCTOPHIDAE	0.48	1100	2.74	
Gadella imberbis	0.08	8	0.46	
Yarella blackfordi	0.08	8	0.46	
Hoplostethus sp.	0.04	4	0.23	
Total	17.52		100.02	

PROJECT STATION:2908  
 DATE:29/ 8/02 GEAR TYPE: No: POSITION:Lat S 935  
 start stop duration Long E 1241  
 TIME :20:38:00 20:54:12 15 (min) Purpose code: 1  
 LOG :2366.69 2368.25 1.57 Area code : 2  
 FDEPTH: 130 130 GearCond.code:  
 BDEPTH: 421 433 Validity code: 3  
 Towing dir: 335ø Wire out: 300 m Speed: 5 kn\*10  
 Sorted: 10 Kg Total catch: 47.76 CATCH/HOUR: 191.04

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
MYCTOPHIDAE	99.88	63628	52.28	
MELANOSTOMIATIDAE	34.76	1344	18.20	
Trichiurus lepturus	15.76	108	8.25	
Synagrops microlepis	15.24	1104	7.98	
Shrimps, small, non comm.	13.96	20976	7.31	
Small squids	6.60	256	3.45	
Læstrolepis intermedia	1.28	184	0.67	
Yarella blackfordi	1.08	276	0.57	
Saurida brasiliensis	0.92	36	0.48	
Hoplostethus sp.	0.92	1620	0.48	
Nemichthys scolopaceus	0.16	20	0.08	
STOMIIDAE	0.16	20	0.08	
Gadella imberbis	0.16	20	0.08	
Selene dorsalis	0.16	20	0.08	
Total	191.04		99.99	

PROJECT STATION:2909  
 DATE:30/ 8/02 GEAR TYPE: BT No: 8 POSITION:Lat S 949  
 start stop duration Long E 1256  
 TIME :13:02:59 13:32:40 30 (min) Purpose code: 1  
 LOG :2493.27 2495.02 1.75 Area code : 2  
 FDEPTH: 115 120 GearCond.code:  
 BDEPTH: 115 120 Validity code: 3  
 Towing dir: 240ø Wire out: 380 m Speed: 3 kn\*10  
 Sorted: 82 Kg Total catch: 243.27 CATCH/HOUR: 486.54

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	136.80	4962	28.12	6305
Dentex macrophthalmus	128.70	414	26.45	
Umbrina canariensis	78.90	180	16.22	
Trichiurus lepturus	55.20	78	11.35	
Dentex angolensis	23.94	102	4.92	
Rhinobatos albomaculatus	21.90	6	4.50	
Branchiostegus semifasciatus	13.08	12	2.69	
Dentex congoensis	4.74	36	0.97	
Illex coindetii	4.32	102	0.89	
Zeus faber	4.08	24	0.84	
Dentex canariensis	3.78	18	0.78	
Miracorvina angolensis	3.48	6	0.72	
Todaropsis eblanae	3.00	132	0.62	
Uranoscopus polli	1.08	6	0.22	
Scorpaena angolensis	0.84	6	0.17	
Drepane africana	0.78	6	0.16	
Chelidonichthys gabonensis	0.78	6	0.16	
Pterothrissus belloci	0.66	6	0.14	
Boops boops	0.30	6	0.06	
Saurida brasiliensis	0.18	6	0.04	
Total	486.54		100.02	

PROJECT STATION:2910  
 DATE:30/ 8/02 GEAR TYPE: PT No: 1 POSITION:Lat S 953  
 start stop duration Long E 1257  
 TIME :18:50:04 19:10:01 20 (min) Purpose code: 1  
 LOG :2529.38 2530.48 1.09 Area code : 2  
 FDEPTH: 90 90 GearCond.code:  
 BDEPTH: 114 115 Validity code: 3  
 Towing dir: 180ø Wire out: 245 m Speed: 3 kn\*10  
 Sorted: 8 Kg Total catch: 7.98 CATCH/HOUR: 23.94

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	14.10	12	58.90	
Trachurus trecae	7.83	276	32.71	6298
MELANOSTOMIATIDAE	0.87	105	3.63	
Saurida brasiliensis	0.36	270	1.50	
Loligo vulgaris	0.33	33	1.38	
Sepia orbignyana	0.21	3	0.88	
Sepia bertheloti	0.09	3	0.38	
Lagocephalus laevigatus	0.03	3	0.13	
Chaetodon sp.	0.03	18	0.13	
Synagrops microlepis	0.03	51	0.13	
Nemichthys scolopaceus	0.03	9	0.13	
Selene dorsalis	0.03	12	0.13	
Total	23.94		100.03	

PROJECT STATION:2911  
 DATE:30/ 8/02 GEAR TYPE: PT No: 1 POSITION:Lat S 955  
 start stop duration Long E 1256  
 TIME :19:15:32 19:30:34 15 (min) Purpose code: 1  
 LOG :2530.77 2531.71 0.93 Area code : 2  
 FDEPTH: 50 45 GearCond.code:  
 BDEPTH: 115 115 Validity code: 3  
 Towing dir: 160ø Wire out: 135 m Speed: 8 kn\*10  
 Sorted: Kg Total catch: 0.22 CATCH/HOUR: 0.88

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Loligo vulgaris	0.60	16	68.18	
Saurida brasiliensis	0.12	60	13.64	
Sepiella ornata	0.08	4	9.09	
Trachurus trecae, juvenile	0.04	28	4.55	
Merluccius sp.	0.04	44	4.55	
Total	0.88		100.01	

PROJECT STATION:2912  
 DATE:30/ 8/02 GEAR TYPE: PT No: 1 POSITION:Lat S 956  
 start stop duration Long E 1257  
 TIME :19:34:28 19:49:24 15 (min) Purpose code: 1  
 LOG :2531.99 2532.97 0.97 Area code : 2  
 FDEPTH: 20 20 GearCond.code:  
 BDEPTH: 115 114 Validity code: 3  
 Towing dir: 160ø Wire out: 140 m Speed: 4 kn\*10  
 Sorted: 4 Kg Total catch: 4.32 CATCH/HOUR: 17.28

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	4.24	4	24.54	
Dentex macrophthalmus	4.24	16	24.54	
Trigla sp.	3.16	100	18.29	
Sepia orbignyana	1.96	32	11.34	
Lagocephalus laevigatus	1.64	4	9.49	
Boops boops	0.56	16	3.24	
Loligo vulgaris	0.48	20	2.78	
Trachurus trecae	0.40	16	2.31	6297
Todaropsis eblanae	0.36	20	2.08	
Branchiostegus semifasciatus	0.12	56	0.69	
Uranoscopus sp.	0.04	8	0.23	
Ephippion guttifer	0.04	4	0.23	
Saurida brasiliensis	0.04	12	0.23	
Total	17.28		99.99	

PROJECT STATION:2913  
 DATE:30/ 8/02 GEAR TYPE: PT No: 1 POSITION:Lat S 950  
 start stop duration Long E 1307  
 TIME :22:31:52 22:46:54 15 (min) Purpose code: 1  
 LOG :2548.99 2549.90 0.91 Area code : 2  
 FDEPTH: 40 40 GearCond.code:  
 BDEPTH: 58 58 Validity code: 3  
 Towing dir: 175ø Wire out: 120 m Speed: 4 kn\*10  
 Sorted: 5 Kg Total catch: 5.50 CATCH/HOUR: 22.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	7.64	20	34.73	
Alloteuthis africana	4.28	3416	19.45	
Sepia orbignyana	3.36	40	15.27	
Trachurus trecae	3.08	112	14.00	6299
Synagrops microlepis	2.56	1708	11.64	
Bregmaceros sp.	0.44	1496	2.00	
Saurida brasiliensis	0.44	44	2.00	
Trachurus trecae, juvenile	0.20	84	0.91	6300
Total	22.00		100.00	

PROJECT STATION:2914  
 DATE:30/ 8/02 GEAR TYPE: PT No: 1 POSITION:Lat S 951  
 start stop duration Long E 1307  
 TIME :22:50:35 23:05:26 15 (min) Purpose code: 1  
 LOG :2550.16 2551.15 0.99 Area code : 2  
 FDEPTH: 17 17 GearCond.code:  
 BDEPTH: 59 60 Validity code: 3  
 Towing dir: 175ø Wire out: 150 m Speed: 4 kn\*10  
 Sorted: 1 Kg Total catch: 1.17 CATCH/HOUR: 4.68

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sepia orbignyana	1.40	44	29.91	
Trichiurus lepturus	1.28	4	27.35	
Alloteuthis africana	0.68	436	14.53	
Trachurus trecae	0.56	20	11.97	
Boops boops	0.32	8	6.84	
Sepia bertheloti	0.20	4	4.27	
Chaetodon sp.	0.12	4	2.56	
Shrimps, small, non comm.	0.08	168	1.71	
Trachurus trecae, juvenile	0.04	16	0.85	
Total	4.68		99.99	



PROJECT STATION:2915  
 DATE:31/ 8/02 GEAR TYPE: PT No: 7 POSITION:Lat S 949  
 start stop duration Long E 1312  
 TIME :00:40:45 01:10:36 30 (min) Purpose code: 1  
 LOG :2559.81 2561.75 1.93 Area code : 2  
 FDEPTH: 10 10 GearCond.code:  
 HDEPTH: 22 35 Validity code: 3  
 Towing dir: 250ø Wire out: 140 m Speed: 4 kn\*10  
 Sorted: 65 Kg Total catch: 129.38 CATCH/HOUR: 258.76

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Sardinella maderensis	87.20	348	6301
Brachydeuterus auritus	77.20	2172	
Sardinella aurita	55.20	212	6302
Trachurus trecae	27.80	464	6303
Sphyræna guachancho	2.96	12	
Scomber japonicus	2.08	8	
Trichiurus lepturus	1.52	16	
Todaropsis eblanae	0.96	40	
Galeoides decadactylus	0.80	16	
Pomadasy incisus	0.76	4	
Chelidonichthys gabonensis	0.60	4	
Trachurus trecae, juvenile	0.60	192	6304
Sepia orbignyana	0.48	8	
Pagellus bellottii	0.32	4	
Boops boops	0.28	8	
Total	258.76	99.98	

PROJECT STATION:2916  
 DATE:31/ 8/02 GEAR TYPE: BT No: 8 POSITION:Lat S 1007  
 start stop duration Long E 1258  
 TIME :08:31:08 09:01:12 30 (min) Purpose code: 1  
 LOG :2621.17 2622.76 1.58 Area code : 2  
 FDEPTH: 116 109 GearCond.code:  
 HDEPTH: 116 109 Validity code: 3  
 Towing dir: ø Wire out: 350 m Speed: 31 kn\*10  
 Sorted: 96 Kg Total catch: 95.74 CATCH/HOUR: 191.48

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Trachurus trecae	62.50	2036	6307
Loligo vulgaris	37.00	1392	
Dentex congolensis	36.30	272	
Umbrina canariensis	19.30	56	
Dentex angolensis	15.60	92	
Zeus faber	6.16	26	
Rhinobatos albomaculatus	4.76	2	
Atractoscion aequidens	3.22	2	
Lagocephalus laevigatus	1.64	2	
Raja miraletus	1.22	2	
Trichiurus lepturus	1.22	2	
Chelidonichthys capensis	1.08	10	
Dentex barnardi	0.82	2	
Dentex canariensis	0.44	2	
Sardinella maderensis	0.22	2	
Total	191.48	100.01	

PROJECT STATION:2917  
 DATE:31/ 8/02 GEAR TYPE: BT No: 8 POSITION:Lat S 1003  
 start stop duration Long E 1316  
 TIME :11:39:46 11:59:32 20 (min) Purpose code: 1  
 LOG :2643.73 2644.83 1.09 Area code : 2  
 FDEPTH: 21 21 GearCond.code:  
 HDEPTH: 21 21 Validity code: 3  
 Towing dir: 327ø Wire out: 100 m Speed: 31 kn\*10  
 Sorted: 122 Kg Total catch: 1766.50 CATCH/HOUR: 5299.50

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Brachydeuterus auritus	4852.50	78996	
Trachurus trecae	219.60	6135	6306
Galeoides decadactylus	135.60	348	
Pomadasy incisus	42.60	261	
Pteroscion peli	23.94	522	
Miracorvina angolensis	10.44	45	
Sardinella maderensis	9.15	45	
Trichiurus lepturus	5.67	174	
Total	5299.50	100.00	

PROJECT STATION:2918  
 DATE:31/ 8/02 GEAR TYPE: BT No: 8 POSITION:Lat S 1010  
 start stop duration Long E 1307  
 TIME :15:29:03 15:44:28 15 (min) Purpose code: 1  
 LOG :2668.85 2669.65 0.79 Area code : 2  
 FDEPTH: 97 95 GearCond.code:  
 HDEPTH: 97 95 Validity code: 3  
 Towing dir: 64ø Wire out: 320 m Speed: 30 kn\*10  
 Sorted: Kg Total catch: 64.77 CATCH/HOUR: 259.08

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Dentex macrophthalmus	126.40	392	
Umbrina canariensis	86.80	156	
Zeus faber	13.48	48	
Malacocephalus indicus *	11.04	20	
Illex coindetii	7.48	920	
Dentex angolensis	4.32	36	
Sparus pagrus africanus *	3.12	4	
Trigla lyra	2.12	20	
Torpedo torpedo	2.04	4	
Pagellus bellottii	1.24	8	
Priacanthus arenatus	0.88	4	
Citharus linguatula	0.16	4	
Total	259.08	100.00	

PROJECT STATION:2919  
 DATE:31/ 8/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1017  
 start stop duration Long E 1305  
 TIME :20:16:44 20:27:19 11 (min) Purpose code: 1  
 LOG :2707.85 2708.50 0.60 Area code : 2  
 FDEPTH: 86 86 GearCond.code:  
 HDEPTH: 114 114 Validity code: 3  
 Towing dir: 165ø Wire out: 190 m Speed: 30 kn\*10  
 Sorted: 11 Kg Total catch: 1.10 CATCH/HOUR: 6.00

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Dentex macrophthalmus	5.18	11	6308
Trachurus trecae, juvenile	0.49	376	
Sepia orbignyana	0.33	5	
Total	6.00	100.00	

PROJECT STATION:2920  
 DATE:31/ 8/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1018  
 start stop duration Long E 1305  
 TIME :20:29:46 20:48:10 18 (min) Purpose code: 1  
 LOG :2708.57 2709.70 1.12 Area code : 2  
 FDEPTH: 50 50 GearCond.code:  
 HDEPTH: 114 113 Validity code: 4  
 Towing dir: 165ø Wire out: 190 m Speed: 40 kn\*10  
 Sorted: 38 Kg Total catch: 0.38 CATCH/HOUR: 1.27

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Trichiurus lepturus	1.20	3	6309
Trachurus trecae, juvenile	0.07	100	
Total	1.27	100.00	

PROJECT STATION:2921  
 DATE: 1/ 9/02 GEAR TYPE: BT No: 8 POSITION:Lat S 1027  
 start stop duration Long E 1313  
 TIME :08:36:48 09:08:23 32 (min) Purpose code: 1  
 LOG :2793.49 2795.31 1.81 Area code : 2  
 FDEPTH: 109 110 GearCond.code:  
 HDEPTH: 109 110 Validity code: 3  
 Towing dir: 330ø Wire out: 350 m Speed: 50 kn\*10  
 Sorted: 202 Kg Total catch: 201.78 CATCH/HOUR: 378.34

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Trichiurus lepturus	190.88	379	6310
Trachurus trecae	78.09	2824	
Umbrina canariensis	39.00	111	
Loligo vulgaris	27.66	1230	
Sarda sarda	23.06	26	
Dentex angolensis	5.76	45	
Dentex macrophthalmus	4.50	15	
Lagocephalus laevigatus	2.91	8	
Raja miraletus	2.59	4	
Chaetodon hoefleri	1.54	4	
Dentex congolensis	0.64	6	
Torpedo torpedo	0.56	2	
Priacanthus arenatus	0.43	2	
Dentex barnardi	0.34	4	
Zeus faber	0.32	8	
Pterothrissus belloci	0.17	3	
Trigla lyra	0.02	2	
Total	378.47	100.03	

PROJECT STATION:2922  
 DATE: 1/ 9/02 GEAR TYPE: PT No: 7 POSITION:Lat S 1020  
 start stop duration Long E 1330  
 TIME :88:59:56 88:59:56 30 (min) Purpose code: 1  
 LOG :2816.87 2818.63 1.76 Area code : 2  
 FDEPTH: 10 10 GearCond.code:  
 HDEPTH: 20 22 Validity code: 3  
 Towing dir: 170ø Wire out: 140 m Speed: 38 kn\*10  
 Sorted: 50 Kg Total catch: 142.36 CATCH/HOUR: 284.72

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Brachydeuterus auritus	224.26	12560	
Trachurus trecae	23.00	222	6311
Pomadasy jubelini	16.76	20	
Sardinella maderensis	11.50	44	6312
Sepia officinalis hierredda	4.06	6	
Lagocephalus laevigatus	3.16	6	
Chloroscombrus chrysurus	1.06	6	
Pomadasy incisus	0.66	6	
Selene dorsalis	0.26	6	
Total	284.72	100.01	



PROJECT STATION:2932  
 DATE: 3/ 9/02 GEAR TYPE: PT No: 7 POSITION:Lat S 1055  
 start stop duration Long E 1347  
 TIME :02:18:54 02:48:41 30 (min) Purpose code: 1  
 LOG :3072.90 3074.81 1.90 Area code : 2  
 FDEPTH: 10 10 GearCond.code: 2  
 BDEPTH: 14 33 Validity code: 3  
 Towing dir: 334ø Wire out: 150 m Speed: 40 kn\*10  
 Sorted: 30 Kg Total catch: 29.63 CATCH/HOUR: 59.26

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Sardinella maderensis	32.30 130	54.51	6327
Trachurus trecae	10.10 204	17.04	6328
Brachydeuterus auritus	6.20 38	10.46	
Pagellus bellottii	3.54 18	5.97	
Trichiurus lepturus	2.14 22	3.61	
Lagocephalus laevigatus	2.08 2	3.51	
Chloroscombrus chrysurus	1.68 22	2.83	
Octopus vulgaris	1.22 2	2.06	
Total	59.26	99.99	

PROJECT STATION:2933  
 DATE: 3/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1108  
 start stop duration Long E 1336  
 TIME :11:57:17 12:12:44 15 (min) Purpose code: 1  
 LOG :3141.65 3142.58 0.92 Area code : 2  
 FDEPTH: 60 65 GearCond.code: 2  
 BDEPTH: 159 182 Validity code: 3  
 Towing dir: 270ø Wire out: m Speed: kn\*10  
 Sorted: 40 Kg Total catch: 4.07 CATCH/HOUR: 16.28

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Trichiurus lepturus	13.80 40	84.77	
Todarodes sagittatus	2.16 8	13.27	
MYCTOPHIDAE	0.16 440	0.98	
Todaropsis eblanae	0.12 16	0.74	
Trachurus trecae, juvenile	0.04 20	0.25	
Total	16.28	100.01	

PROJECT STATION:2934  
 DATE: 3/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1108  
 start stop duration Long E 1334  
 TIME :12:15:51 12:30:54 15 (min) Purpose code: 1  
 LOG :3142.76 3143.65 0.87 Area code : 2  
 FDEPTH: 65 72 GearCond.code: 2  
 BDEPTH: 187 217 Validity code: 3  
 Towing dir: 270ø Wire out: 220 m Speed: 38 kn\*10  
 Sorted: 39 Kg Total catch: 39.95 CATCH/HOUR: 159.80

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
MYCTOPHIDAE	158.36 475080	99.10	
Trichiurus lepturus	1.44 4	0.90	
Total	159.80	100.00	

PROJECT STATION:2935  
 DATE: 3/ 9/02 GEAR TYPE: BT No: 8 POSITION:Lat S 1108  
 start stop duration Long E 1338  
 TIME :14:14:12 15:14:05 60 (min) Purpose code: 1  
 LOG :3153.50 3156.79 3.29 Area code : 2  
 FDEPTH: 116 186 GearCond.code: 2  
 BDEPTH: 116 186 Validity code: 3  
 Towing dir: 270ø Wire out: 400 m Speed: 30 kn\*10  
 Sorted: 117 Kg Total catch: 902.64 CATCH/HOUR: 902.64

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Synagrops microlepis	518.90 42142	57.49	
Trichiurus lepturus	280.70 747	31.10	
Cynoponticus ferox	36.19 8	4.01	
MYCTOPHIDAE	21.48 13283	2.38	
Merluccius polli	17.33 123	1.92	
Dentex macrophthalmeus	10.63 54	1.18	
Zeus faber	4.39 23	0.49	
Citharus linguatula	3.85 54	0.43	
Parapenaeus longirostris	3.39 855	0.38	
Zenopsis conchifer	3.16 54	0.35	
Pterothrissus belloci	1.54 8	0.17	
Illex colindetii	0.85 23	0.09	
Syacium micrurum	0.23 8	0.03	
Total	902.64	100.02	

PROJECT STATION:2936  
 DATE: 3/ 9/02 GEAR TYPE: PT No: 7 POSITION:Lat S 1115  
 start stop duration Long E 1344  
 TIME :19:28:08 19:59:17 31 (min) Purpose code: 1  
 LOG :3184.52 3186.43 1.91 Area code : 2  
 FDEPTH: 10 10 GearCond.code: 2  
 BDEPTH: 30 39 Validity code: 3  
 Towing dir: 270ø Wire out: 130 m Speed:370 kn\*10  
 Sorted: 60 Kg Total catch: 154.49 CATCH/HOUR: 299.01

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Brachydeuterus auritus	223.55 1877	74.76	
Sardinella maderensis	44.90 137	15.02	6329
Trachurus trecae	22.82 408	7.63	6330
Trichiurus lepturus	4.18 31	1.40	
Torpedo mamorata	1.55 4	0.52	
Sphyræna guachancho	0.66 4	0.22	
Todarodes sagittatus	0.54 12	0.18	
Grammoplites gruvelli	0.35 4	0.12	
Monoleone microstoma	0.27 12	0.09	
Penaeus kerathurus	0.12 4	0.04	
Parapenaeus longirostris	0.08 8	0.03	
Total	299.02	100.01	

PROJECT STATION:2937  
 DATE: 4/ 9/02 GEAR TYPE: PT No: 7 POSITION:Lat S 1126  
 start stop duration Long E 1343  
 TIME :05:06:28 05:36:39 30 (min) Purpose code: 1  
 LOG :3239.10 3241.13 2.02 Area code : 2  
 FDEPTH: 10 10 GearCond.code: 2  
 BDEPTH: 25 33 Validity code: 3  
 Towing dir: 270ø Wire out: 130 m Speed: 40 kn\*10  
 Sorted: 97 Kg Total catch: 96.75 CATCH/HOUR: 193.50

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Sardinella maderensis	193.50 1210	100.00	6331
Total	193.50	100.00	

PROJECT STATION:2938  
 DATE: 4/ 9/02 GEAR TYPE: BT No: 8 POSITION:Lat S 1132  
 start stop duration Long E 1326  
 TIME :10:00:13 10:30:27 30 (min) Purpose code: 1  
 LOG :3273.69 3275.47 1.78 Area code : 2  
 FDEPTH: 122 129 GearCond.code: 2  
 BDEPTH: 122 129 Validity code: 3  
 Towing dir: 90ø Wire out: 400 m Speed: 36 kn\*10  
 Sorted: 162 Kg Total catch: 843.18 CATCH/HOUR: 1686.36

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Dentex macrophthalmus	1493.44 5834	88.56	
Scomber japonicus	88.92 696	5.27	
Zeus faber	29.44 20	1.75	
Todarodes sagittatus	25.58 52	1.52	
Sarda sarda	16.32 10	0.97	
Umbrina canariensis	9.46 10	0.56	
Spicara alta	9.26 62	0.55	
Epigonus telescopus	5.72 72	0.34	
Dentex congoensis	3.64 42	0.22	
Dentex angolensis	2.50 20	0.15	
Drepane africana	2.08 10	0.12	
Total	1686.36	100.01	

PROJECT STATION:2939  
 DATE: 4/ 9/02 GEAR TYPE: PT No: 7 POSITION:Lat S 1139  
 start stop duration Long E 1344  
 TIME :15:54:18 16:24:10 30 (min) Purpose code: 1  
 LOG :3312.77 3314.95 2.18 Area code : 2  
 FDEPTH: 10 10 GearCond.code: 2  
 BDEPTH: 33 30 Validity code: 3  
 Towing dir: 360ø Wire out: 150 m Speed: 38 kn\*10  
 Sorted: Kg Total catch: CATCH/HOUR:

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

PROJECT STATION:2940  
 DATE: 5/ 9/02 GEAR TYPE: BT No: 8 POSITION:Lat S 1202  
 start stop duration Long E 1383  
 TIME :09:32:38 10:29:17 30 (min) Purpose code: 1  
 LOG :3461.25 3463.30 2.04 Area code : 2  
 FDEPTH: 18 19 GearCond.code: 2  
 BDEPTH: 18 19 Validity code: 3  
 Towing dir: 195ø Wire out: 100 m Speed:400 kn\*10  
 Sorted: 80 Kg Total catch: 242.67 CATCH/HOUR: 485.34

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Brachydeuterus auritus	114.40 798	23.57	
Pomadasy jubelini	88.08 188	18.15	
Lithognathus normyrus	50.96 178	10.50	
Selene dorsalis	45.16 488	9.30	
Galeoides decadactylus	42.38 94	8.73	
Trachurus trecae	34.10 278	7.03	6332
Atractoscion aequidens	31.02 28	6.39	
Sphyræna guachancho	23.82 84	4.91	
Trichiurus lepturus	21.28 354	4.38	
Pagellus bellottii	17.50 106	3.61	
Sardinella maderensis	10.70 32	2.20	6333
Sepia orbignyana	1.78 22	0.37	
Dentex canariensis	1.66 6	0.34	
Miracorvina angolensis	1.50 6	0.31	
Pomadasy incisus	1.00 6	0.21	
Total	485.34	100.00	

PROJECT STATION:2941  
 DATE: 5/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1210  
 start stop duration Long E 1334  
 TIME :18:43:40 18:53:33 10 (min) Purpose code: 1  
 LOG :3512.87 3513.45 0.57 Area code : 2  
 FDEPTH: 47 47 GearCond.code: 2  
 BDEPTH: 72 72 Validity code: 3  
 Towing dir: 123ø Wire out: 120 m Speed: 35 kn\*10  
 Sorted: 1 Kg Total catch: 1.29 CATCH/HOUR: 7.74

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Lagocephalus laevigatus	7.14 18	92.25	
Sepia orbignyana	0.60 12	7.75	
Total	7.74	100.00	

PROJECT STATION:2942  
 DATE: 5/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1210  
 start stop duration Long E 1334  
 TIME :19:10:01 19:24:29 14 (min) Purpose code: 1  
 LOG :3514.57 3515.61 1.03 Area code : 2  
 FDEPTH: 15 15 GearCond.code: 2  
 BDEPTH: 72 76 Validity code: 3  
 Towing dir: 297ø Wire out: 120 m Speed: 40 kn\*10  
 Sorted: 4 Kg Total catch: 3.83 CATCH/HOUR: 16.41

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Trachurus trecae	12.09	309	6334
Scomberomorus tritor	3.99	26	24.31
Sepia orbignyana	0.21	4	1.28
Saurida brasiliensis	0.09	9	0.55
Cynoponticus ferox	0.04	4	0.24
Total	16.42	100.05	

PROJECT STATION:2943  
 DATE: 6/ 9/02 GEAR TYPE: PT No: 7 POSITION:Lat S 1226  
 start stop duration Long E 1328  
 TIME :04:27:37 04:56:14 29 (min) Purpose code: 1  
 LOG :3573.67 3575.94 2.24 Area code : 2  
 FDEPTH: 10 10 GearCond.code: 2  
 BDEPTH: 41 42 Validity code: 3  
 Towing dir: 30ø Wire out: 140 m Speed: 38 kn\*10  
 Sorted: 23 Kg Total catch: 23.49 CATCH/HOUR: 48.60

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Sardinella maderensis	38.28	143	6335
Sarda sarda	6.19	6	12.74
Sardinella aurita	1.61	8	6336
Trachinotus ovatus	1.10	4	2.26
CARTROL	0.97	2	2.00
Sphyraena sphyraena	0.46	2	0.95
Total	48.61	100.03	

PROJECT STATION:2944  
 DATE: 6/ 9/02 GEAR TYPE: BT No: 8 POSITION:Lat S 1231  
 start stop duration Long E 1320  
 TIME :09:13:47 09:28:49 15 (min) Purpose code: 1  
 LOG :3606.43 3607.33 0.90 Area code : 2  
 FDEPTH: 88 99 GearCond.code: 2  
 BDEPTH: 88 99 Validity code: 3  
 Towing dir: 312ø Wire out: 350 m Speed: 35 kn\*10  
 Sorted: 79 Kg Total catch: 1238.20 CATCH/HOUR: 4952.80

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Trachurus trecae	4400.00	51368	6337
Dentex macrophthalmus	269.60	1840	5.44
Scomberomorus tritor	72.00	240	1.45
Trichiurus lepturus	65.60	320	1.32
Pterothrissus belloci	48.00	560	0.97
Chaetodon hoefleri	44.80	240	0.90
Pagellus bellottii	19.20	80	0.39
Boops boops	16.00	160	0.32
Todarodes sagittatus	8.80	480	0.18
Dentex barnardi	8.80	80	0.18
Total	4952.80	99.99	

PROJECT STATION:2945  
 DATE: 6/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1237  
 start stop duration Long E 1310  
 TIME :18:20:51 18:21:02 30 (min) Purpose code: 1  
 LOG :3677.67 3679.51 1.81 Area code : 2  
 FDEPTH: 10 10 GearCond.code: 2  
 BDEPTH: 169 160 Validity code: 1  
 Towing dir: 170ø Wire out: 140 m Speed:350 kn\*10  
 Sorted: 64 Kg Total catch: 176.94 CATCH/HOUR: 353.88

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Synagrops microlepis	171.72	28722	48.52
MYCTOPHIDAE	132.12	80304	37.33
Trachurus trecae	36.00	750	10.17
Trachurus trecae, juvenile	14.04	2184	3.97
Total	353.88	99.99	

PROJECT STATION:2946  
 DATE: 7/ 9/02 GEAR TYPE: PT No: 7 POSITION:Lat S 1257  
 start stop duration Long E 1256  
 TIME :02:11:56 02:41:44 30 (min) Purpose code: 1  
 LOG :3718.75 3720.74 1.96 Area code : 2  
 FDEPTH: 10 10 GearCond.code: 2  
 BDEPTH: 29 43 Validity code: 1  
 Towing dir: 306ø Wire out: 140 m Speed: 40 kn\*10  
 Sorted: 36 Kg Total catch: 36.03 CATCH/HOUR: 72.06

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Sardinella maderensis	62.50	270	6340
Trachurus trecae	5.22	16	7.24
Trichiurus lepturus	2.46	12	3.41
Pomatomus saltatrix	0.98	2	1.36
Sardinella aurita	0.90	4	1.25
Total	72.06	99.99	

PROJECT STATION:2947  
 DATE: 8/ 9/02 GEAR TYPE: BT No: 8 POSITION:Lat S 1319  
 start stop duration Long E 1236  
 TIME :12:14:08 12:46:20 32 (min) Purpose code: 1  
 LOG :3799.30 3800.96 1.65 Area code : 1  
 FDEPTH: 113 111 GearCond.code: 1  
 BDEPTH: 113 111 Validity code: 4  
 Towing dir: 205ø Wire out: 380 m Speed: 30 kn\*10  
 Sorted: 63 Kg Total catch: 345.40 CATCH/HOUR: 647.63

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Dentex macrophthalmus	464.06	3146	71.66
Trichiurus lepturus	45.38	383	7.01
Dentex barnardi	19.69	94	3.04
Rhinobatos albomaculatus	19.13	21	2.95
Raja miraletus	17.25	11	2.66
Zeus faber	17.06	32	2.63
Dentex angolensis	14.63	41	2.26
Umbrina canariensis	11.81	21	1.82
Trigla lyra	10.50	53	1.62
Scorpaena normani	9.94	11	1.53
Spicara alta	7.88	21	1.22
Citharus linguatula	4.50	11	0.69
Monolene microstoma	4.13	11	0.64
Trachurus trecae	1.93	39	0.30
Total	647.89	100.03	6342

PROJECT STATION:2948  
 DATE: 8/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1338  
 start stop duration Long E 1232  
 TIME :18:46:09 18:57:31 11 (min) Purpose code: 1  
 LOG :3845.30 3846.05 0.75 Area code : 1  
 FDEPTH: 44 44 GearCond.code: 1  
 BDEPTH: 67 78 Validity code: 3  
 Towing dir: 324ø Wire out: 160 m Speed: 40 kn\*10  
 Sorted: 16 Kg Total catch: 15.72 CATCH/HOUR: 85.75

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
MYCTOPHIDAE	61.64	32493	71.88
Trichiurus lepturus	7.80	11	9.10
Dentex macrophthalmus	7.25	38	8.45
Boops boops	6.44	185	7.51
Pagellus bellottii	2.24	11	2.61
Erythrocles monodi	0.38	38	0.44
Total	85.75	99.99	

PROJECT STATION:2949  
 DATE: 8/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1338  
 start stop duration Long E 1231  
 TIME :18:59:11 19:09:02 10 (min) Purpose code: 1  
 LOG :3846.19 3846.93 0.74 Area code : 1  
 FDEPTH: 15 15 GearCond.code: 1  
 BDEPTH: 86 346 Validity code: 3  
 Towing dir: 324ø Wire out: 150 m Speed: 45 kn\*10  
 Sorted: 15 Kg Total catch: 15.28 CATCH/HOUR: 91.68

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
MYCTOPHIDAE	83.70	76302	91.30
Trichiurus lepturus	7.98	30	8.70
Total	91.68	100.00	

PROJECT STATION:2950  
 DATE: 9/ 9/02 GEAR TYPE: PT No: 7 POSITION:Lat S 1409  
 start stop duration Long E 1220  
 TIME :07:46:34 08:16:31 30 (min) Purpose code: 1  
 LOG :3933.18 3935.33 2.15 Area code : 1  
 FDEPTH: 10 10 GearCond.code: 1  
 BDEPTH: 31 37 Validity code: 3  
 Towing dir: 7ø Wire out: 140 m Speed: 45 kn\*10  
 Sorted: Kg Total catch: CATCH/HOUR:

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

PROJECT STATION:2951  
 DATE: 9/ 9/02 GEAR TYPE: BT No: 8 POSITION:Lat S 1421  
 start stop duration Long E 1217  
 TIME :12:37:00 13:25:53 49 (min) Purpose code: 1  
 LOG :3971.87 3974.51 2.64 Area code : 1  
 FDEPTH: 94 92 GearCond.code: 3  
 BDEPTH: 94 92 Validity code: 3  
 Towing dir: 350ø Wire out: 320 m Speed: 30 kn\*10  
 Sorted: 246 Kg Total catch: 1726.59 CATCH/HOUR: 2114.19

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Trachurus trecae	1682.57	9060	79.58
Atractoscion aequidens	126.00	146	5.96
Trachurus trecae, juvenile	122.57	4234	5.80
Dentex macrophthalmus	74.57	506	3.53
Pagellus bellottii	53.14	334	2.51
Dentex glibbosus	14.49	51	0.69
Zeus faber	9.34	17	0.44
Dentex angolensis	7.54	43	0.36
Centropristis gramulosus	6.00	9	0.28
Trichiurus lepturus	5.57	17	0.26
Dentex canariensis	5.40	9	0.26
Trigla lyra	4.11	1	0.19
Conger conger	2.88	1	0.14
Total	2114.18	100.00	

PROJECT STATION:2952  
 DATE: 9/ 9/02 GEAR TYPE: PT No: 4 POSITION:Lat S 1425  
 start stop duration Long E 1218  
 TIME :19:18:42 19:48:44 30 (min) Purpose code: 1  
 LOG :4003.13 4004.91 1.74 Area code : 1  
 FDEPTH: 10 10 GearCond.code: 1  
 HDEPTH: 96 114 Validity code: 3  
 Towing dir: 270ø Wire out: 150 m Speed: 35 kn\*10  
 Sorted: 62 Kg Total catch: 62.08 CATCH/HOUR: 124.16

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	102.80	576	82.80	6345
Trachurus trecae, juvenile	9.86	212	7.94	6346
Trichiurus lepturus	5.96	22	4.80	
Saurida brasiliensis	4.32	1766	3.48	
Scomberomorus tritor	0.90	4	0.72	
Lagocephalus laevigatus	0.32	2	0.26	
Total	124.16		100.00	

PROJECT STATION:2957  
 DATE:10/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1517  
 start stop duration Long E 1158  
 TIME :18:42:58 18:58:43 16 (min) Purpose code: 1  
 LOG :4154.08 4155.16 1.07 Area code : 1  
 FDEPTH: 20 20 GearCond.code: 1  
 HDEPTH: 112 114 Validity code: 3  
 Towing dir: 211ø Wire out: 130 m Speed: 42 kn\*10  
 Sorted: 9 Kg Total catch: 9.78 CATCH/HOUR: 36.68

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	17.51	124	47.74	6355
Scomberomorus tritor	7.50	26	20.45	
Trachurus capensis	6.56	45	17.88	6356
Trichiurus lepturus	4.05	4	11.04	
Elops lacerta	1.05	19	2.86	
Total	36.67		99.97	

PROJECT STATION:2953  
 DATE:10/ 9/02 GEAR TYPE: PT No: 7 POSITION:Lat S 1455  
 start stop duration Long E 1210  
 TIME :03:17:41 03:47:28 30 (min) Purpose code: 1  
 LOG :4061.11 4062.85 1.75 Area code : 1  
 FDEPTH: 10 10 GearCond.code: 1  
 HDEPTH: 89 67 Validity code: 3  
 Towing dir: 34ø Wire out: 150 m Speed: 38 kn\*10  
 Sorted: 62 Kg Total catch: 61.78 CATCH/HOUR: 123.56

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	80.60	558	65.23	6348
Trachurus trecae	29.70	262	24.04	6349
Sardinella aurita	12.00	70	9.71	6347
Ommastrephes bartrami	1.02	2	0.83	
Trichiurus lepturus	0.24	4	0.19	
Total	123.56		100.00	

PROJECT STATION:2958  
 DATE:11/ 9/02 GEAR TYPE: PT No: 2 POSITION:Lat S 1530  
 start stop duration Long E 1143  
 TIME :02:39:19 03:09:31 30 (min) Purpose code: 1  
 LOG :4220.48 4222.22 1.73 Area code : 1  
 FDEPTH: 22 25 GearCond.code: 1  
 HDEPTH: 641 367 Validity code: 3  
 Towing dir: 100ø Wire out: m Speed: Kn\*10  
 Sorted: 54 Kg Total catch: 54.08 CATCH/HOUR: 108.16

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	55.30	530	51.13	6357
Scomber japonicus	20.40	104	18.86	
Trichiurus lepturus	11.90	174	11.00	
MYCTOPHIDAE	7.20	282	6.66	
Atractoscion aequidens	4.26	2	3.94	
Shrimps, small, non comm.	4.06	1312	3.75	
Pomatomus saltatrix	2.28	2	2.11	
Trachurus capensis	1.36	10	1.26	6358
Etrumeus whiteheadi	1.06	16	0.98	
Dentex macrophthalmus	0.34	2	0.31	
Total	108.16		100.00	

PROJECT STATION:2954  
 DATE:10/ 9/02 GEAR TYPE: BT No: 8 POSITION:Lat S 1509  
 start stop duration Long E 1202  
 TIME :08:12:59 08:39:03 26 (min) Purpose code: 1  
 LOG :4097.79 4099.36 1.55 Area code : 1  
 FDEPTH: 124 162 GearCond.code: 1  
 HDEPTH: 124 162 Validity code: 3  
 Towing dir: 100ø Wire out: 400 m Speed: 40 kn\*10  
 Sorted: 94 Kg Total catch: 669.10 CATCH/HOUR: 1544.08

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	1162.62	7655	75.30	6350
Trachurus capensis	172.41	865	11.17	6351
Atractoscion aequidens	70.04	58	4.54	
Scomberomorus tritor	65.56	263	4.25	
Zeus faber	45.00	62	2.91	
Spondyliosoma cantharus	14.22	30	0.92	
Dentex macrophthalmus	6.23	30	0.40	
Ubrina canariensis	3.39	16	0.22	
Todarodes sagittatus	1.85	16	0.12	
Pagellus bellottii	1.85	5	0.12	
Dentex angolensis	1.62	7	0.10	
Total	1544.79		100.05	

PROJECT STATION:2959  
 DATE:11/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1536  
 start stop duration Long E 1144  
 TIME :05:08:42 05:38:41 30 (min) Purpose code: 1  
 LOG :4233.44 4235.50 2.07 Area code : 1  
 FDEPTH: 30 30 GearCond.code: 1  
 HDEPTH: 124 402 Validity code: 3  
 Towing dir: 280ø Wire out: 150 m Speed: 40 kn\*10  
 Sorted: Kg Total catch: CATCH/HOUR:

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

PROJECT STATION:2960  
 DATE:11/ 9/02 GEAR TYPE: BT No: 8 POSITION:Lat S 1537  
 start stop duration Long E 1148  
 TIME :08:21:30 08:21:38 15 (min) Purpose code: 1  
 LOG :4252.20 4253.14 0.93 Area code : 1  
 FDEPTH: 110 109 GearCond.code: 1  
 HDEPTH: 110 109 Validity code: 3  
 Towing dir: 100ø Wire out: 350 m Speed: 38 kn\*10  
 Sorted: Kg Total catch: CATCH/HOUR:

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

PROJECT STATION:2955  
 DATE:10/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1514  
 start stop duration Long E 1200  
 TIME :18:01:36 18:16:36 15 (min) Purpose code: 1  
 LOG :4151.51 4152.45 1.17 Area code : 1  
 FDEPTH: 80 80 GearCond.code: 1  
 HDEPTH: 107 112 Validity code: 3  
 Towing dir: 211ø Wire out: 230 m Speed: 37 kn\*10  
 Sorted: 12 Kg Total catch: 12.59 CATCH/HOUR: 50.36

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex macrophthalmus	36.40	228	72.28	
Myliobatis aquila	8.84	4	17.55	
Trachurus trecae	3.60	28	7.15	6352
Sepia orbignyana	0.68	4	1.35	
Ubrina ronchus	0.52	4	1.03	
Parapandalus narval	0.24	40	0.48	
Chelidonichthys gabonensis	0.08	4	0.16	
Total	50.36		100.00	

PROJECT STATION:2961  
 DATE:11/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1533  
 start stop duration Long E 1147  
 TIME :10:34:19 10:51:08 17 (min) Purpose code: 1  
 LOG :4263.68 4264.71 1.03 Area code : 1  
 FDEPTH: 86 86 GearCond.code: 1  
 HDEPTH: 110 114 Validity code: 3  
 Towing dir: 185ø Wire out: 250 m Speed: 38 kn\*10  
 Sorted: Kg Total catch: CATCH/HOUR:

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

PROJECT STATION:2962  
 DATE:11/ 9/02 GEAR TYPE: BT No: 8 POSITION:Lat S 1542  
 start stop duration Long E 1154  
 TIME :14:01:09 14:24:06 23 (min) Purpose code: 1  
 LOG :4283.85 4285.08 1.23 Area code : 1  
 FDEPTH: 61 72 GearCond.code: 1  
 HDEPTH: 61 72 Validity code: 3  
 Towing dir: 30ø Wire out: 210 m Speed: 30 kn\*10  
 Sorted: 184 Kg Total catch: 1949.83 CATCH/HOUR: 5086.51

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	4537.38	65903	89.20	6359
Atractoscion aequidens	198.60	631	3.90	
Pagellus bellottii	90.39	905	1.78	
Myliobatis aquila	52.33	55	1.03	
Ommastrephes pteropus	51.23	274	1.01	
Lithognathus normyrus	39.70	164	0.78	
Sarpa salpa	38.19	164	0.75	
Mobula sp.	25.04	3	0.49	
Dentex macrophthalmus	24.65	357	0.48	
Etrumeus whiteheadi	14.24	522	0.28	
Dentex barnardi	6.31	83	0.12	
Ubrina canariensis	4.33	110	0.10	
Scomber japonicus	3.03	29	0.06	
Citharus linguatula	0.29	3	0.01	
Trichiurus lepturus	0.29	55	0.01	
Total	5086.60		100.00	

PROJECT STATION:2956  
 DATE:10/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1515  
 start stop duration Long E 1159  
 TIME :18:20:18 18:35:18 15 (min) Purpose code: 1  
 LOG :4152.65 4153.57 0.91 Area code : 1  
 FDEPTH: 65 65 GearCond.code: 1  
 HDEPTH: 113 111 Validity code: 3  
 Towing dir: 211ø Wire out: 200 m Speed: 40 kn\*10  
 Sorted: 92 Kg Total catch: 0.92 CATCH/HOUR: 3.68

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex macrophthalmus	1.68	12	45.65	
Trachurus trecae, juvenile	1.52	48	41.30	6353
Trachurus capensis	0.48	12	13.04	6354
Total	3.68		99.99	

PROJECT STATION:2963  
 DATE:11/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1544 Long E 1152  
 start stop duration  
 TIME :16:44:54 16:54:34 10 (min) Purpose code: 1  
 LOG :4298.02 4298.61 0.58 Area code : 1  
 FDEPTH: 75 70 GearCond.code: 1  
 BDEPTH: 168 318 Validity code: 3  
 Towing dir: 1ø Wire out: 240 m Speed: 36 kn\*10

Sorted: 115 Kg Total catch: 115.59 CATCH/HOUR: 693.54

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	610.80	10092	88.07	6360
Etrumeus whiteheadi	21.12	504	3.05	
Merluccius capensis	12.24	30	1.76	
Trachurus capensis	11.10	78	1.60	6361
Mylicobatis aquilla	9.00	6	1.30	
Dentex macrophthalmus	8.46	84	1.22	
Sarda sarda	6.72	6	0.97	
Trichiurus lepturus	6.42	162	0.93	
Todarodes sagittatus	3.18	12	0.46	
Synagrops microlepis	2.28	666	0.33	
Hyperoglyphe mosellii	2.22	6	0.32	
Total	693.54		100.01	

PROJECT STATION:2968  
 DATE:11/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1528 Long E 1146  
 start stop duration  
 TIME :21:45:24 21:55:29 10 (min) Purpose code: 1  
 LOG :4334.89 4335.47 0.58 Area code : 1  
 FDEPTH: 25 25 GearCond.code: 1  
 BDEPTH: 328 534 Validity code: 3  
 Towing dir: 330ø Wire out: 150 m Speed: 40 kn\*10

Sorted: 52 Kg Total catch: 52.15 CATCH/HOUR: 312.90

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Shrimps, small, non comm.	109.68	1754880	35.05	
MYCTOPHIDAE	101.46	111606	32.43	
TRACHINIDAE	59.40	60	18.98	
Trachurus trecae	20.04	156	6.40	6367
Trachurus capensis	13.74	78	4.39	6368
Trichurus lepturus	7.26	78	2.32	
Scomber japonicus	1.32	6	0.42	
Total	312.90		99.99	

PROJECT STATION:2964  
 DATE:11/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1544 Long E 1152  
 start stop duration  
 TIME :16:54:34 17:04:53 10 (min) Purpose code: 1  
 LOG :4298.61 4299.42 1.59 Area code : 1  
 FDEPTH: 70 70 GearCond.code: 1  
 BDEPTH: 318 89 Validity code: 3  
 Towing dir: 95ø Wire out: 230 m Speed: 40 kn\*10

Sorted: 90 Kg Total catch: 90.56 CATCH/HOUR: 543.36

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	516.60	8490	95.08	6362
Etrumeus whiteheadi	9.30	222	1.71	
Trichiurus lepturus	7.68	186	1.41	
Sarda sarda	4.74	6	0.87	
Merluccius capensis	2.40	6	0.44	
Pcomatomus saltatrix	1.86	6	0.34	
Trachurus capensis	0.78	6	0.14	
Total	543.36		99.99	

PROJECT STATION:2969  
 DATE:11/ 9/02 GEAR TYPE: PT No: 2 POSITION:Lat S 1533 Long E 1147  
 start stop duration  
 TIME :23:23:42 23:38:15 15 (min) Purpose code: 1  
 LOG :4343.24 4344.12 0.88 Area code : 1  
 FDEPTH: 90 85 GearCond.code: 1  
 BDEPTH: 113 112 Validity code: 3  
 Towing dir: 180ø Wire out: m Speed: kn\*10

Sorted: Kg Total catch: CATCH/HOUR:

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

PROJECT STATION:2965  
 DATE:11/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1542 Long E 1152  
 start stop duration  
 TIME :17:09:27 17:19:19 10 (min) Purpose code: 1  
 LOG :4299.50 4300.10 0.60 Area code : 1  
 FDEPTH: 40 40 GearCond.code: 1  
 BDEPTH: 89 94 Validity code: 3  
 Towing dir: 95ø Wire out: 160 m Speed: 35 kn\*10

Sorted: 30 Kg Total catch: 30.04 CATCH/HOUR: 180.24

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	178.20	2616	98.87	6363
Scomberomus tritor	1.32	6	0.73	
Trichiurus lepturus	0.36	6	0.20	
Etrumeus whiteheadi	0.36	6	0.20	
Total	180.24		100.00	

PROJECT STATION:2970  
 DATE:11/ 9/02 GEAR TYPE: PT No: 2 POSITION:Lat S 1534 Long E 1147  
 start stop duration  
 TIME :23:41:31 23:55:47 14 (min) Purpose code: 1  
 LOG :4344.32 4345.24 0.92 Area code : 1  
 FDEPTH: 60 60 GearCond.code: 1  
 BDEPTH: 115 113 Validity code: 3  
 Towing dir: 180ø Wire out: 210 m Speed: 35 kn\*10

Sorted: 1 Kg Total catch: 1.74 CATCH/HOUR: 7.46

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Atractoscion aequidens	5.53	4	74.13	
Trachurus trecae	1.93	21	25.87	6369
Total	7.46		100.00	

PROJECT STATION:2966  
 DATE:11/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1529 Long E 1147  
 start stop duration  
 TIME :21:15:06 21:25:06 10 (min) Purpose code: 1  
 LOG :4333.22 4333.78 0.56 Area code : 1  
 FDEPTH: 114 146 GearCond.code: 1  
 BDEPTH: 150 207 Validity code: 3  
 Towing dir: 345ø Wire out: 400 m Speed: 37 kn\*10

Sorted: 24 Kg Total catch: 24.53 CATCH/HOUR: 147.18

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Atractoscion aequidens	107.10	60	72.77	
Shrimps, small, non comm.	11.46	576	7.79	
Squalus megalops	6.96	12	4.73	
Dentex macrophthalmus	6.18	24	4.20	
TRACHINIDAE	4.68	6	3.18	
Trachurus capensis	3.90	18	2.65	6365
MYCTOPHIDAE	3.72	1932	2.53	
Trachurus trecae	1.20	18	0.82	6364
Synagrops microlepis	1.14	84	0.77	
GONOSTOMATIDAE	0.60	12	0.41	
Trichiurus lepturus	0.24	6	0.16	
Total	147.18		100.01	

PROJECT STATION:2971  
 DATE:12/ 9/02 GEAR TYPE: PT No: 2 POSITION:Lat S 1536 Long E 1147  
 start stop duration  
 TIME :00:06:03 00:20:53 15 (min) Purpose code: 1  
 LOG :4345.87 4346.85 0.97 Area code : 1  
 FDEPTH: 25 25 GearCond.code: 1  
 BDEPTH: 113 114 Validity code: 3  
 Towing dir: 180ø Wire out: 90 m Speed: 35 kn\*10

Sorted: 11 Kg Total catch: 11.31 CATCH/HOUR: 45.24

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex macrophthalmus	22.60	104	49.96	
Trachurus capensis	12.96	64	28.65	6370
Squalus megalops	4.32	4	9.55	
Atractoscion aequidens	4.32	4	9.55	
Scomber japonicus	1.04	4	2.30	
Total	45.24		100.01	

PROJECT STATION:2967  
 DATE:11/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1528 Long E 1147  
 start stop duration  
 TIME :21:29:29 21:39:52 10 (min) Purpose code: 1  
 LOG :4333.98 4334.58 0.59 Area code : 1  
 FDEPTH: 75 75 GearCond.code: 1  
 BDEPTH: 225 290 Validity code: 3  
 Towing dir: 320ø Wire out: 210 m Speed: 40 kn\*10

Sorted: 7 Kg Total catch: 7.93 CATCH/HOUR: 47.58

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Squalus megalops	18.90	6	39.72	
Shrimps, small, non comm.	14.22	24378	29.89	
Trachurus trecae	5.82	114	12.23	6366
MYCTOPHIDAE	3.42	4188	7.19	
Hoplostethus cadenati	1.74	774	3.66	
GONOSTOMATIDAE	1.68	30	3.53	
Trachurus capensis	0.72	6	1.51	
Trichiurus lepturus	0.54	6	1.13	
Synagrops microlepis	0.30	24	0.63	
Todaropsis oblanae	0.24	6	0.50	
Total	47.58		99.99	

PROJECT STATION:2972  
 DATE:12/ 9/02 GEAR TYPE: PT No: 7 POSITION:Lat S 1555 Long E 1143  
 start stop duration  
 TIME :03:11:52 03:12:06 20 (min) Purpose code: 1  
 LOG :4374.13 4375.33 1.18 Area code : 1  
 FDEPTH: 10 10 GearCond.code: 1  
 BDEPTH: 26 31 Validity code: 3  
 Towing dir: 360ø Wire out: 150 m Speed: 36 kn\*10

Sorted: 134 Kg Total catch: 2324.52 CATCH/HOUR: 6973.56

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
J E L L Y F I S H	4335.00	27975	62.16	
Trachurus trecae, juvenile	2548.29	58752	36.54	6371
Decapterus rhonchus	49.80	675	0.71	
Pomatomus saltatrix	27.51	207	0.39	
Trichiurus lepturus	5.70	156	0.08	
Atractoscion aequidens	5.19	51	0.07	
Boops boops	2.07	156	0.03	
Total	6973.56		99.98	

PROJECT STATION:2973  
 DATE:12/ 9/02 GEAR TYPE: BT No: 8 POSITION:Lat S 1559 Long E 1140  
 start stop duration  
 TIME :07:33:49 08:03:51 30 (min) Purpose code: 1  
 LOG :4394.86 4396.68 1.81 Area code : 1  
 FDEPTH: 96 92 GearCond.code: 1  
 BDEPTH: 96 92 Validity code: 3  
 Towing dir: 190ø Wire out: 350 m Speed: 37 kn\*10  
 Sorted: 116 Kg Total catch: 1976.23 CATCH/HOUR: 3952.46

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae, juvenile	3609.10	83844	91.31	6372
Trachurus capensis, juvenile	153.68	9724	3.89	6373
Dentex macrophthalmus	54.74	1564	1.38	
COBIIDAE	30.60	8568	0.77	
Ommastrephes bartrami	25.84	272	0.65	
Sepia orbignyana	19.72	68	0.50	
Atractoscion aequidens	15.60	68	0.39	
Zeus faber	7.82	34	0.20	
Synagrops microlepis	7.14	3128	0.18	
Merluccius capensis	6.80	170	0.17	
Syacium micrurum	5.78	510	0.15	
Pomatomus saltatrix	5.44	34	0.14	
Loligo vulgaris	5.10	170	0.13	
Ubrina ronchus	2.72	68	0.07	
Dentex barnardi	2.38	34	0.06	
Total	3952.46		99.99	

PROJECT STATION:2974  
 DATE:12/ 9/02 GEAR TYPE: BT No: 8 POSITION:Lat S 1604 Long E 1147  
 start stop duration  
 TIME :10:00:41 10:10:22 10 (min) Purpose code: 1  
 LOG :4409.86 4410.46 0.60 Area code : 1  
 FDEPTH: 25 24 GearCond.code: 1  
 BDEPTH: 25 24 Validity code: 3  
 Towing dir: 185ø Wire out: 130 m Speed: 37 kn\*10  
 Sorted: 27 Kg Total catch: 6016.81 CATCH/HOUR: 36100.86

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae, juvenile	35994.00	1028412	99.70	6374
Decapterus rhonchus	106.86	1338	0.30	
Total	36100.86		100.00	

PROJECT STATION:2975  
 DATE:12/ 9/02 GEAR TYPE: BT No: 8 POSITION:Lat S 1612 Long E 1143  
 start stop duration  
 TIME :15:10:12 15:25:05 15 (min) Purpose code: 1  
 LOG :4445.76 4446.53 0.76 Area code : 1  
 FDEPTH: 51 54 GearCond.code: 1  
 BDEPTH: 51 54 Validity code: 3  
 Towing dir: 270ø Wire out: 190 m Speed: 31 kn\*10  
 Sorted: 95 Kg Total catch: 3245.13 CATCH/HOUR: 12980.52

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis	8668.28	740196	66.78	6376
Trachurus trecae, juvenile	4261.44	445076	32.83	6375
Etrumeus whiteheadi	43.92	2468	0.34	
Dentex macrophthalmus	6.88	688	0.05	
Total	12980.52		100.00	

PROJECT STATION:2976  
 DATE:12/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1618 Long E 1138  
 start stop duration  
 TIME :18:47:27 18:58:11 11 (min) Purpose code: 1  
 LOG :4469.63 4470.27 0.65 Area code : 1  
 FDEPTH: 55 55 GearCond.code: 1  
 BDEPTH: 76 74 Validity code: 3  
 Towing dir: 92ø Wire out: 180 m Speed: 45 kn\*10  
 Sorted: 14 Kg Total catch: 14.07 CATCH/HOUR: 76.75

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis	46.36	1985	60.40	6378
Trachurus trecae, juvenile	25.91	720	33.76	6377
Arius parkii	2.45	11	3.19	
Dentex macrophthalmus	0.87	44	1.13	
Octopus sp.	0.76	5	0.99	
Sepiella ornata	0.27	5	0.35	
Etrumeus whiteheadi	0.11	5	0.14	
Total	76.73		99.96	

PROJECT STATION:2977  
 DATE:12/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1618 Long E 1139  
 start stop duration  
 TIME :19:02:46 19:12:49 10 (min) Purpose code: 1  
 LOG :4470.58 4471.26 0.66 Area code : 1  
 FDEPTH: 20 20 GearCond.code: 1  
 BDEPTH: 72 68 Validity code: 3  
 Towing dir: 90ø Wire out: 130 m Speed: 42 kn\*10  
 Sorted: 1 Kg Total catch: 1.32 CATCH/HOUR: 7.92

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sepia orbignyana	7.50	24	94.70	
Trachurus trecae, juvenile	0.36	24	4.55	6379
Trachurus capensis	0.06	42	0.76	6380
Total	7.92		100.01	

PROJECT STATION:2978  
 DATE:12/ 9/02 GEAR TYPE: PT No: 7 POSITION:Lat S 1624 Long E 1146  
 start stop duration  
 TIME :23:23:53 23:53:36 30 (min) Purpose code: 1  
 LOG :4508.89 4510.82 1.91 Area code : 1  
 FDEPTH: 10 10 GearCond.code: 1  
 BDEPTH: 20 47 Validity code: 4  
 Towing dir: 270ø Wire out: 150 m Speed: 38 kn\*10  
 Sorted: 75 Kg Total catch: 225.45 CATCH/HOUR: 450.90

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
JELLYFISH	271.20		60.15	
Trachurus capensis	137.04	14376	30.39	6382
Trachurus trecae, juvenile	41.58	7344	9.22	6381
Sepia orbignyana	0.60	30	0.13	
Etrumeus whiteheadi	0.48	36	0.11	
Total	450.90		100.00	

PROJECT STATION:2979  
 DATE:13/ 9/02 GEAR TYPE: PT No: 2 POSITION:Lat S 1630 Long E 1137  
 start stop duration  
 TIME :02:47:22 03:01:40 14 (min) Purpose code: 1  
 LOG :4532.06 4532.85 0.78 Area code : 1  
 FDEPTH: 60 60 GearCond.code: 1  
 BDEPTH: 86 83 Validity code: 3  
 Towing dir: 90ø Wire out: 180 m Speed: 40 kn\*10  
 Sorted: Kg Total catch: CATCH/HOUR:

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

PROJECT STATION:2980  
 DATE:13/ 9/02 GEAR TYPE: PT No: 2 POSITION:Lat S 1630 Long E 1138  
 start stop duration  
 TIME :03:06:21 03:18:54 13 (min) Purpose code: 1  
 LOG :4533.12 4533.87 0.74 Area code : 1  
 FDEPTH: 50 50 GearCond.code: 1  
 BDEPTH: 82 79 Validity code: 3  
 Towing dir: 90ø Wire out: 160 m Speed: 38 kn\*10  
 Sorted: 62 Kg Total catch: 308.50 CATCH/HOUR: 1423.85

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis, juvenile	1423.85	74423	100.00	6383
Total	1423.85		100.00	

PROJECT STATION:2981  
 DATE:13/ 9/02 GEAR TYPE: PT No: 2 POSITION:Lat S 1630 Long E 1139  
 start stop duration  
 TIME :03:24:23 03:41:10 17 (min) Purpose code: 1  
 LOG :4534.18 4535.24 1.05 Area code : 1  
 FDEPTH: 20 20 GearCond.code: 1  
 BDEPTH: 78 70 Validity code: 3  
 Towing dir: 90ø Wire out: m Speed: kn\*10  
 Sorted: 5 Kg Total catch: 5.13 CATCH/HOUR: 18.11

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis, juvenile	13.13	1189	72.50	6384
Sepia officinalis hierredda	2.82	4	15.57	
Etrumeus whiteheadi	1.91	173	10.55	
CLUSD01	0.25	7	1.38	
Total	18.11		100.00	

PROJECT STATION:2947  
 DATE: 8/ 9/02 GEAR TYPE: BT No: 8 POSITION:Lat S 1319 Long E 1236  
 start stop duration  
 TIME :12:14:08 12:46:20 32 (min) Purpose code: 1  
 LOG :3799.30 3800.96 1.65 Area code : 1  
 FDEPTH: 113 111 GearCond.code: 1  
 BDEPTH: 113 111 Validity code: 4  
 Towing dir: 205ø Wire out: 380 m Speed: 30 kn\*10  
 Sorted: 63 Kg Total catch: 345.40 CATCH/HOUR: 647.63

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex macrophthalmus	464.06	3146	71.66	
Trichurus lepturus	45.38	383	7.01	
Dentex barnardi	19.69	94	3.04	
Rhinobatos albomaculatus	19.13	21	2.95	
Raja miraletus	17.25	11	2.66	
Zeus faber	17.06	32	2.63	
Dentex angolensis	14.63	41	2.26	
Ubrina canariensis	11.81	21	1.82	
Trigla lyra	10.50	53	1.62	
Scorpaena normani	9.94	11	1.53	
Spicara alta	7.88	21	1.22	
Citharus linguatula	4.50	11	0.69	
Monolene microstoma	4.13	11	0.64	
Trachurus trecae	1.93	39	0.30	6342
Total	647.89		100.03	

PROJECT STATION:2948  
 DATE: 8/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1338 Long E 1232  
 start stop duration  
 TIME :18:46:09 18:57:31 11 (min) Purpose code: 1  
 LOG :3845.30 3846.05 0.75 Area code : 1  
 FDEPTH: 44 44 GearCond.code: 1  
 BDEPTH: 67 78 Validity code: 3  
 Towing dir: 324ø Wire out: 160 m Speed: 40 kn\*10  
 Sorted: 16 Kg Total catch: 15.72 CATCH/HOUR: 85.75

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
MYCTOPHIDAE	61.64	32493	71.88	
Trichurus lepturus	7.80	11	9.10	
Dentex macrophthalmus	7.25	38	8.45	
Bocps bocps	6.44	185	7.51	
Pagellus bellottii	2.24	11	2.61	
Erythrocles monodi	0.38	38	0.44	
Total	85.75		99.99	

PROJECT STATION:2949  
 DATE: 8/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1338  
 start stop duration Long E 1231  
 TIME :18:59:11 19:09:02 10 (min) Purpose code: 1  
 LOG :3846.19 3846.93 0.74 Area code : 1  
 FDEPTH: 15 15 GearCond.code: 1  
 BDEPTH: 86 346 Validity code: 3  
 Towing dir: 324ø Wire out: 150 m Speed: 45 kn\*10  
 Sorted: 15 Kg Total catch: 15.28 CATCH/HOUR: 91.68

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
MYCTOPHIDAE	83.70	76302	91.30	
Trichiurus lepturus	7.98	30	8.70	
Total	91.68		100.00	

PROJECT STATION:2950  
 DATE: 9/ 9/02 GEAR TYPE: PT No: 7 POSITION:Lat S 1409  
 start stop duration Long E 1220  
 TIME :07:46:34 08:16:31 30 (min) Purpose code: 1  
 LOG :3933.18 3935.33 2.15 Area code : 1  
 FDEPTH: 10 10 GearCond.code: 3  
 BDEPTH: 31 37 Validity code: 3  
 Towing dir: 7ø Wire out: 140 m Speed: 45 kn\*10  
 Sorted: Kg Total catch: CATCH/HOUR:

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

PROJECT STATION:2951  
 DATE: 9/ 9/02 GEAR TYPE: BT No: 8 POSITION:Lat S 1421  
 start stop duration Long E 1217  
 TIME :12:37:00 13:25:53 49 (min) Purpose code: 1  
 LOG :3971.87 3974.51 2.64 Area code : 1  
 FDEPTH: 94 92 GearCond.code: 3  
 BDEPTH: 94 92 Validity code: 3  
 Towing dir: 350ø Wire out: 320 m Speed: 30 kn\*10  
 Sorted: 246 Kg Total catch: 1726.59 CATCH/HOUR: 2114.19

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	1682.57	9060	79.58	6343
Atractoscion aequidens	126.00	146	5.96	
Trachurus trecae, juvenile	122.57	4234	5.80	6344
Dentex macrophthalmus	74.57	506	3.53	
Pagellus bellottii	53.14	334	2.51	
Dentex gibbosus	14.49	51	0.69	
Zeus faber	9.34	17	0.44	
Dentex angolensis	7.54	43	0.36	
Centropristis granulosa	6.00	9	0.28	
Trichiurus lepturus	5.57	17	0.26	
Dentex canariensis	5.40	9	0.26	
Trigla lyra	4.11	1	0.19	
Conger conger	2.88	1	0.14	
Total	2114.18		100.00	

PROJECT STATION:2952  
 DATE: 9/ 9/02 GEAR TYPE: PT No: 4 POSITION:Lat S 1425  
 start stop duration Long E 1218  
 TIME :19:18:42 19:48:44 30 (min) Purpose code: 1  
 LOG :4003.13 4004.91 1.74 Area code : 1  
 FDEPTH: 10 10 GearCond.code: 3  
 BDEPTH: 96 114 Validity code: 3  
 Towing dir: 270ø Wire out: 150 m Speed: 35 kn\*10  
 Sorted: 62 Kg Total catch: 62.08 CATCH/HOUR: 124.16

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	102.80	576	82.80	6345
Trachurus trecae, juvenile	9.86	212	7.94	6346
Trichiurus lepturus	5.96	22	4.80	
Saurida brasiliensis	4.32	1766	3.48	
Scomberomorus tritor	0.90	4	0.72	
Lagocephalus laevigatus	0.32	2	0.26	
Total	124.16		100.00	

PROJECT STATION:2953  
 DATE:10/ 9/02 GEAR TYPE: PT No: 7 POSITION:Lat S 1455  
 start stop duration Long E 1210  
 TIME :03:17:41 03:47:28 30 (min) Purpose code: 1  
 LOG :4061.11 4062.85 1.75 Area code : 1  
 FDEPTH: 10 10 GearCond.code: 3  
 BDEPTH: 89 67 Validity code: 3  
 Towing dir: 34ø Wire out: 150 m Speed: 38 kn\*10  
 Sorted: 62 Kg Total catch: 61.78 CATCH/HOUR: 123.56

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	80.60	558	65.23	6348
Trachurus trecae	29.70	262	24.04	6349
Sardinella aurita	12.00	70	9.71	6347
Onmastrophes bartrami	1.02	2	0.83	
Trichiurus lepturus	0.24	4	0.19	
Total	123.56		100.00	

PROJECT STATION:2954  
 DATE:10/ 9/02 GEAR TYPE: BT No: 8 POSITION:Lat S 1509  
 start stop duration Long E 1202  
 TIME :08:12:59 08:39:03 26 (min) Purpose code: 1  
 LOG :4097.79 4099.36 1.55 Area code : 1  
 FDEPTH: 124 162 GearCond.code: 3  
 BDEPTH: 124 162 Validity code: 3  
 Towing dir: 100ø Wire out: 400 m Speed: 40 kn\*10  
 Sorted: 94 Kg Total catch: 669.10 CATCH/HOUR: 1544.08

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	1162.62	7655	75.30	6350
Trachurus capensis	172.41	865	11.17	6351
Atractoscion aequidens	70.04	58	4.54	
Scomberomorus tritor	65.56	263	4.25	
Zeus faber	45.00	62	2.91	
Spondylosoma cantharus	14.22	30	0.92	
Dentex macrophthalmus	6.23	30	0.40	
Umbrina canariensis	3.39	16	0.22	
Todarodes sagittatus	1.85	16	0.12	
Pagellus bellottii	1.85	5	0.12	
Dentex angolensis	1.62	7	0.10	
Total	1544.79		100.05	

PROJECT STATION:2955  
 DATE:10/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1514  
 start stop duration Long E 1200  
 TIME :18:01:36 18:16:36 15 (min) Purpose code: 1  
 LOG :4151.51 4152.45 1.17 Area code : 1  
 FDEPTH: 80 80 GearCond.code: 3  
 BDEPTH: 107 112 Validity code: 3  
 Towing dir: 211ø Wire out: 230 m Speed: 37 kn\*10  
 Sorted: 12 Kg Total catch: 12.59 CATCH/HOUR: 50.36

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex macrophthalmus	36.40	228	72.28	
Mylicbatis aquila	8.84	4	17.55	
Trachurus trecae	3.60	28	7.15	6352
Sepia orbignyana	0.68	4	1.35	
Umbrina ronchus	0.52	4	1.03	
Parapandalus narval	0.24	40	0.48	
Chelidonichthys gabonensis	0.08	4	0.16	
Total	50.36		100.00	

PROJECT STATION:2956  
 DATE:10/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1515  
 start stop duration Long E 1159  
 TIME :18:20:18 18:35:18 15 (min) Purpose code: 1  
 LOG :4152.65 4153.57 0.91 Area code : 1  
 FDEPTH: 65 65 GearCond.code: 3  
 BDEPTH: 113 111 Validity code: 3  
 Towing dir: 211ø Wire out: 200 m Speed: 40 kn\*10  
 Sorted: 92 Kg Total catch: 0.92 CATCH/HOUR: 3.68

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex macrophthalmus	1.68	12	45.65	
Trachurus trecae, juvenile	1.52	48	41.30	6353
Trachurus capensis	0.48	12	13.04	6354
Total	3.68		99.99	

PROJECT STATION:2957  
 DATE:10/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1517  
 start stop duration Long E 1158  
 TIME :18:42:58 18:58:43 16 (min) Purpose code: 1  
 LOG :4154.08 4155.16 1.07 Area code : 1  
 FDEPTH: 20 20 GearCond.code: 3  
 BDEPTH: 112 114 Validity code: 3  
 Towing dir: 211ø Wire out: 130 m Speed: 42 kn\*10  
 Sorted: 9 Kg Total catch: 9.78 CATCH/HOUR: 36.68

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	17.51	124	47.74	6355
Scomberomorus tritor	7.50	26	20.45	
Trachurus capensis	6.56	45	17.88	6356
Trichiurus lepturus	4.05	4	11.04	
Elops lacerta	1.05	19	2.86	
Total	36.67		99.97	

PROJECT STATION:2958  
 DATE:11/ 9/02 GEAR TYPE: PT No: 2 POSITION:Lat S 1530  
 start stop duration Long E 1143  
 TIME :02:39:19 03:09:31 30 (min) Purpose code: 1  
 LOG :4220.48 4222.22 1.73 Area code : 1  
 FDEPTH: 22 25 GearCond.code: 3  
 BDEPTH: 641 367 Validity code: 3  
 Towing dir: 100ø Wire out: m Speed: kn\*10  
 Sorted: 54 Kg Total catch: 54.08 CATCH/HOUR: 108.16

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	55.30	530	51.13	6357
Scomber japonicus	20.40	104	18.86	
Trichiurus lepturus	11.90	174	11.00	
MYCTOPHIDAE	7.20	282	6.66	
Atractoscion aequidens	4.26	2	3.94	
Shrimps, small, non comm.	4.06	1312	3.75	
Pomatomus saltatrix	2.28	2	2.11	
Trachurus capensis	1.36	10	1.26	6358
Etrumeus whiteheadi	1.06	16	0.98	
Dentex macrophthalmus	0.34	2	0.31	
Total	108.16		100.00	



PROJECT STATION:2959  
 DATE:11/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1536  
 start stop duration Long E 1144  
 TIME :05:08:42 05:38:41 30 (min) Purpose code: 1  
 LOG :4233.44 4235.50 2.07 Area code : 1  
 FDEPTH: 30 30 GearCond.code:  
 BDEPTH: 124 402 Validity code: 3  
 Towing dir: 280ø Wire out: 150 m Speed: 40 kn\*10

Sorted: Kg Total catch: CATCH/HOUR:  
 SPECIES CATCH/HOUR % OF TOT. C SAMP  
 weight numbers  
 NO CATCH 0.00  
 Total

PROJECT STATION:2960  
 DATE:11/ 9/02 GEAR TYPE: BT No: 8 POSITION:Lat S 1537  
 start stop duration Long E 1148  
 TIME :08:21:30 08:21:38 15 (min) Purpose code: 1  
 LOG :4252.20 4253.14 0.93 Area code : 1  
 FDEPTH: 110 109 GearCond.code:  
 BDEPTH: 110 109 Validity code: 3  
 Towing dir: 100ø Wire out: 350 m Speed: 38 kn\*10

Sorted: Kg Total catch: CATCH/HOUR:  
 SPECIES CATCH/HOUR % OF TOT. C SAMP  
 weight numbers  
 NO CATCH 0.00  
 Total

PROJECT STATION:2961  
 DATE:11/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1533  
 start stop duration Long E 1147  
 TIME :10:34:19 10:51:08 17 (min) Purpose code: 1  
 LOG :4263.68 4264.71 1.03 Area code : 1  
 FDEPTH: 85 86 GearCond.code:  
 BDEPTH: 110 114 Validity code: 3  
 Towing dir: 185ø Wire out: 250 m Speed: 38 kn\*10

Sorted: Kg Total catch: CATCH/HOUR:  
 SPECIES CATCH/HOUR % OF TOT. C SAMP  
 weight numbers  
 NO CATCH 0.00  
 Total

PROJECT STATION:2962  
 DATE:11/ 9/02 GEAR TYPE: BT No: 8 POSITION:Lat S 1542  
 start stop duration Long E 1154  
 TIME :14:01:09 14:24:06 23 (min) Purpose code: 1  
 LOG :4283.85 4285.08 1.23 Area code : 1  
 FDEPTH: 61 72 GearCond.code:  
 BDEPTH: 61 72 Validity code: 3  
 Towing dir: 30ø Wire out: 210 m Speed: 30 kn\*10

Sorted: 184 Kg Total catch: 1949.83 CATCH/HOUR: 5086.51  
 SPECIES CATCH/HOUR % OF TOT. C SAMP  
 weight numbers  
 Trachurus trecae 4537.38 65903 89.20 6359  
 Atractoscion aequidens 198.60 631 3.90  
 Pagellus bellottii 90.39 905 1.78  
 Myliobatis aquila 52.33 55 1.03  
 Omnastrephes pteropus 51.23 274 1.01  
 Lithognathus morrynus 39.70 164 0.78  
 Sarpa salpa 38.19 164 0.75  
 Notula sp. 25.04 3 0.49  
 Dentex macrophthalms 24.65 357 0.48  
 Etrumeus whiteheadi 14.24 522 0.28  
 Dentex barnardi 6.31 83 0.12  
 Umbrina canariensis 4.93 110 0.10  
 Scomber japonicus 3.03 29 0.06  
 Citharus linguatula 0.29 3 0.01  
 Trichiurus lepturus 0.29 55 0.01  
 Total 5086.60 100.00

PROJECT STATION:2963  
 DATE:11/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1544  
 start stop duration Long E 1152  
 TIME :16:44:54 16:54:34 10 (min) Purpose code: 1  
 LOG :4298.02 4298.61 0.58 Area code : 1  
 FDEPTH: 75 70 GearCond.code:  
 BDEPTH: 168 318 Validity code: 3  
 Towing dir: 1ø Wire out: 240 m Speed: 36 kn\*10

Sorted: 115 Kg Total catch: 115.59 CATCH/HOUR: 693.54  
 SPECIES CATCH/HOUR % OF TOT. C SAMP  
 weight numbers  
 Trachurus trecae 610.80 10092 88.07 6360  
 Etrumeus whiteheadi 21.12 504 3.05  
 Merluccius capensis 12.24 30 1.76  
 Trachurus capensis 11.10 78 1.60 6361  
 Myliobatis aquila 9.00 6 1.30  
 Dentex macrophthalms 8.46 84 1.22  
 Sarda sarda 6.72 6 0.97  
 Trichiurus lepturus 6.42 162 0.93  
 Todarodes sagittatus 3.18 12 0.46  
 Synagrops microlepis 2.28 666 0.33  
 Hyperoglyphe moselii 2.22 6 0.32  
 Total 693.54 100.01

PROJECT STATION:2964  
 DATE:11/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1544  
 start stop duration Long E 1152  
 TIME :16:54:34 17:04:53 10 (min) Purpose code: 1  
 LOG :4298.61 4299.42 1.59 Area code : 1  
 FDEPTH: 70 70 GearCond.code:  
 BDEPTH: 318 89 Validity code: 3  
 Towing dir: 95ø Wire out: 230 m Speed: 40 kn\*10

Sorted: 90 Kg Total catch: 90.56 CATCH/HOUR: 543.36  
 SPECIES CATCH/HOUR % OF TOT. C SAMP  
 weight numbers  
 Trachurus trecae 516.60 8490 95.08 6362  
 Etrumeus whiteheadi 9.30 222 1.71  
 Trichiurus lepturus 7.68 186 1.41  
 Sarda sarda 4.74 6 0.87  
 Merluccius capensis 2.40 6 0.44  
 Pomatomus saltatrix 1.86 6 0.34  
 Trachurus capensis 0.78 6 0.14  
 Total 543.36 99.99

PROJECT STATION:2965  
 DATE:11/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1542  
 start stop duration Long E 1152  
 TIME :17:09:27 17:19:19 10 (min) Purpose code: 1  
 LOG :4299.50 4300.10 0.60 Area code : 1  
 FDEPTH: 40 40 GearCond.code:  
 BDEPTH: 89 94 Validity code: 3  
 Towing dir: 95ø Wire out: 160 m Speed: 35 kn\*10

Sorted: 30 Kg Total catch: 30.04 CATCH/HOUR: 180.24  
 SPECIES CATCH/HOUR % OF TOT. C SAMP  
 weight numbers  
 Trachurus trecae 178.20 2616 98.87 6363  
 Scomberomorus tritor 1.32 6 0.73  
 Trichiurus lepturus 0.36 6 0.20  
 Etrumeus whiteheadi 0.36 6 0.20  
 Total 180.24 100.00

PROJECT STATION:2966  
 DATE:11/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1529  
 start stop duration Long E 1147  
 TIME :21:15:06 21:25:06 10 (min) Purpose code: 1  
 LOG :4333.22 4333.78 0.56 Area code : 1  
 FDEPTH: 114 146 GearCond.code:  
 BDEPTH: 150 207 Validity code: 3  
 Towing dir: 345ø Wire out: 400 m Speed: 37 kn\*10

Sorted: 24 Kg Total catch: 24.53 CATCH/HOUR: 147.18  
 SPECIES CATCH/HOUR % OF TOT. C SAMP  
 weight numbers  
 Atractoscion aequidens 107.10 60 72.77  
 Shrimps, small, non comm. 11.46 576 7.79  
 Squalus megalops 6.96 12 4.73  
 Dentex macrophthalms 6.18 24 4.20  
 TRACHINIDAE 4.68 6 3.18  
 Trachurus capensis 3.90 18 2.65 6365  
 MYCTOPHIDAE 3.72 1932 2.53  
 Trachurus trecae 1.20 18 0.82 6364  
 Synagrops microlepis 1.14 84 0.77  
 GONOSTOMATIDAE 0.60 12 0.41  
 Trichiurus lepturus 0.24 6 0.16  
 Total 147.18 100.01

PROJECT STATION:2967  
 DATE:11/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1528  
 start stop duration Long E 1147  
 TIME :21:29:29 21:39:52 10 (min) Purpose code: 1  
 LOG :4333.98 4334.58 0.59 Area code : 1  
 FDEPTH: 75 75 GearCond.code:  
 BDEPTH: 225 290 Validity code: 3  
 Towing dir: 320ø Wire out: 210 m Speed: 40 kn\*10

Sorted: 7 Kg Total catch: 7.93 CATCH/HOUR: 47.58  
 SPECIES CATCH/HOUR % OF TOT. C SAMP  
 weight numbers  
 Squalus megalops 18.90 6 39.72  
 Shrimps, small, non comm. 14.22 24378 29.89  
 Trachurus trecae 5.82 114 12.23 6366  
 MYCTOPHIDAE 3.42 4188 7.19  
 Hoplostethus cadenati 1.74 774 3.66  
 GONOSTOMATIDAE 1.68 30 3.53  
 Trachurus capensis 0.72 6 1.51  
 Trichiurus lepturus 0.54 6 1.13  
 Synagrops microlepis 0.30 24 0.63  
 Todaropsis eblanae 0.24 6 0.50  
 Total 47.58 99.99

PROJECT STATION:2968  
 DATE:11/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1528  
 start stop duration Long E 1146  
 TIME :21:45:24 21:55:29 10 (min) Purpose code: 1  
 LOG :4334.89 4335.47 0.58 Area code : 1  
 FDEPTH: 25 25 GearCond.code:  
 BDEPTH: 328 534 Validity code: 3  
 Towing dir: 330ø Wire out: 150 m Speed: 40 kn\*10

Sorted: 52 Kg Total catch: 52.15 CATCH/HOUR: 312.90  
 SPECIES CATCH/HOUR % OF TOT. C SAMP  
 weight numbers  
 Shrimps, small, non comm. 109.68 1754880 35.05  
 MYCTOPHIDAE 101.46 111606 32.43  
 TRACHINIDAE 59.40 60 18.98  
 Trachurus trecae 20.04 156 6.40 6367  
 Trachurus capensis 13.74 78 4.39 6368  
 Trichiurus lepturus 7.26 78 2.32  
 Scomber japonicus 1.32 6 0.42  
 Total 312.90 99.99

PROJECT STATION:2969  
 DATE:11/ 9/02 GEAR TYPE: PT No: 2 POSITION:Lat S 1533  
 start stop duration Long E 1147  
 TIME :23:23:42 23:38:15 15 (min) Purpose code: 1  
 LOG :4343.24 4344.12 0.88 Area code : 1  
 FDEPTH: 90 85 GearCond.code:  
 BDEPTH: 113 112 Validity code: 3  
 Towing dir: 180° Wire out: m Speed: kn\*10

Sorted: Kg Total catch: CATCH/HOUR:  
 SPECIES CATCH/HOUR % OF TOT. C SAMP  
 weight numbers  
 N O C A T C H 0.00  
 Total

PROJECT STATION:2970  
 DATE:11/ 9/02 GEAR TYPE: PT No: 2 POSITION:Lat S 1534  
 start stop duration Long E 1147  
 TIME :23:41:31 23:55:47 14 (min) Purpose code: 1  
 LOG :4344.32 4345.24 0.92 Area code : 1  
 FDEPTH: 60 60 GearCond.code:  
 BDEPTH: 115 113 Validity code: 3  
 Towing dir: 180° Wire out: 210 m Speed: 35 kn\*10

Sorted: 1 Kg Total catch: 1.74 CATCH/HOUR: 7.46  
 SPECIES CATCH/HOUR % OF TOT. C SAMP  
 weight numbers  
 Atractoscion aequidens 5.53 4 74.13  
 Trachurus trecae 1.93 21 25.87 6369  
 Total 7.46 100.00

PROJECT STATION:2971  
 DATE:12/ 9/02 GEAR TYPE: PT No: 2 POSITION:Lat S 1536  
 start stop duration Long E 1147  
 TIME :00:06:03 00:20:53 15 (min) Purpose code: 1  
 LOG :4345.87 4346.85 0.97 Area code : 1  
 FDEPTH: 25 25 GearCond.code:  
 BDEPTH: 113 114 Validity code: 3  
 Towing dir: 180° Wire out: 90 m Speed: 35 kn\*10

Sorted: 11 Kg Total catch: 11.31 CATCH/HOUR: 45.24  
 SPECIES CATCH/HOUR % OF TOT. C SAMP  
 weight numbers  
 Dentex macropthalmus 22.60 104 49.96  
 Trachurus capensis 12.96 64 28.65 6370  
 Squallus megalops 4.32 4 9.55  
 Atractoscion aequidens 4.32 4 9.55  
 Scomber japonicus 1.04 4 2.30  
 Total 45.24 100.01

PROJECT STATION:2972  
 DATE:12/ 9/02 GEAR TYPE: PT No: 7 POSITION:Lat S 1555  
 start stop duration Long E 1143  
 TIME :03:11:52 03:12:06 20 (min) Purpose code: 1  
 LOG :4374.13 4375.33 1.18 Area code : 1  
 FDEPTH: 10 10 GearCond.code:  
 BDEPTH: 26 31 Validity code: 3  
 Towing dir: 360° Wire out: 150 m Speed: 36 kn\*10

Sorted: 134 Kg Total catch: 2324.52 CATCH/HOUR: 6973.56  
 SPECIES CATCH/HOUR % OF TOT. C SAMP  
 weight numbers  
 J E L L Y F I S H 4335.00 27975 62.16  
 Trachurus trecae, juvenile 2548.29 58752 36.54 6371  
 Decapterus rhonchus 49.80 675 0.71  
 Pomatomus saltatrix 27.51 207 0.39  
 Trichiurus lepturus 5.70 156 0.08  
 Atractoscion aequidens 5.19 51 0.07  
 Boops boops 2.07 156 0.03  
 Total 6973.56 99.98

PROJECT STATION:2973  
 DATE:12/ 9/02 GEAR TYPE: 3T No: 8 POSITION:Lat S 1559  
 start stop duration Long E 1140  
 TIME :07:33:49 08:03:51 30 (min) Purpose code: 1  
 LOG :4394.86 4396.68 1.81 Area code : 1  
 FDEPTH: 96 92 GearCond.code:  
 BDEPTH: 96 92 Validity code: 3  
 Towing dir: 190° Wire out: 350 m Speed: 37 kn\*10

Sorted: 116 Kg Total catch: 1976.23 CATCH/HOUR: 3952.46  
 SPECIES CATCH/HOUR % OF TOT. C SAMP  
 weight numbers  
 Trachurus trecae, juvenile 3609.10 83844 91.31 6372  
 Trachurus capensis, juvenile 153.68 9724 3.89 6373  
 Dentex macropthalmus 54.74 1564 1.38  
 COBIIDAE 30.60 8568 0.77  
 Ommastrephes bartrami 25.94 272 0.65  
 Sepia orbignyana 19.72 68 0.50  
 Atractoscion aequidens 15.60 68 0.39  
 Zeus faber 7.82 34 0.20  
 Synagrops microlepis 7.14 3128 0.18  
 Merluccius capensis 6.80 170 0.17  
 Syacium micrurus 5.78 510 0.15  
 Pomatomus saltatrix 5.44 34 0.14  
 Loligo vulgaris 5.10 170 0.13  
 Umbrina ronchus 2.72 68 0.07  
 Dentex barnardi 2.38 34 0.06  
 Total 3952.46 99.99

PROJECT STATION:2974  
 DATE:12/ 9/02 GEAR TYPE: BT No: 8 POSITION:Lat S 1604  
 start stop duration Long E 1147  
 TIME :10:00:41 10:10:22 10 (min) Purpose code: 1  
 LOG :4409.86 4410.46 0.60 Area code : 1  
 FDEPTH: 25 24 GearCond.code:  
 BDEPTH: 25 24 Validity code: 3  
 Towing dir: 185° Wire out: 130 m Speed: 37 kn\*10

Sorted: 27 Kg Total catch: 6016.81 CATCH/HOUR: 36100.86  
 SPECIES CATCH/HOUR % OF TOT. C SAMP  
 weight numbers  
 Trachurus trecae, juvenile 35994.00 1028412 99.70 6374  
 Decapterus rhonchus 106.86 1338 0.30  
 Total 36100.86 100.00

PROJECT STATION:2975  
 DATE:12/ 9/02 GEAR TYPE: BT No: 8 POSITION:Lat S 1612  
 start stop duration Long E 1143  
 TIME :15:10:12 15:25:05 15 (min) Purpose code: 1  
 LOG :4445.76 4446.53 0.76 Area code : 1  
 FDEPTH: 51 54 GearCond.code:  
 BDEPTH: 51 54 Validity code: 3  
 Towing dir: 270° Wire out: 190 m Speed: 31 kn\*10

Sorted: 95 Kg Total catch: 3245.13 CATCH/HOUR: 12980.52  
 SPECIES CATCH/HOUR % OF TOT. C SAMP  
 weight numbers  
 Trachurus capensis 8668.28 740196 66.78 6376  
 Trachurus trecae, juvenile 4261.44 445076 32.83 6375  
 Etrumeus whiteheadi 43.92 2466 0.34  
 Dentex macropthalmus 6.88 688 0.05  
 Total 12980.52 100.00

PROJECT STATION:2976  
 DATE:12/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1618  
 start stop duration Long E 1138  
 TIME :18:47:27 18:58:11 11 (min) Purpose code: 1  
 LOG :4469.63 4470.27 0.65 Area code : 1  
 FDEPTH: 55 55 GearCond.code:  
 BDEPTH: 76 74 Validity code: 3  
 Towing dir: 92° Wire out: 180 m Speed: 45 kn\*10

Sorted: 14 Kg Total catch: 14.07 CATCH/HOUR: 76.75  
 SPECIES CATCH/HOUR % OF TOT. C SAMP  
 weight numbers  
 Trachurus capensis 46.36 1985 60.40 6378  
 Trachurus trecae, juvenile 25.91 720 33.76 6377  
 Arius parkii 2.45 11 3.19  
 Dentex macropthalmus 0.87 44 1.13  
 Octopus sp. 0.76 5 0.99  
 Sepiella ornata 0.27 5 0.35  
 Etrumeus whiteheadi 0.11 5 0.14  
 Total 76.73 99.96

PROJECT STATION:2977  
 DATE:12/ 9/02 GEAR TYPE: PT No: 1 POSITION:Lat S 1618  
 start stop duration Long E 1139  
 TIME :19:02:46 19:12:49 10 (min) Purpose code: 1  
 LOG :4470.58 4471.26 0.66 Area code : 1  
 FDEPTH: 20 20 GearCond.code:  
 BDEPTH: 72 68 Validity code: 3  
 Towing dir: 90° Wire out: 130 m Speed: 42 kn\*10

Sorted: 1 Kg Total catch: 1.32 CATCH/HOUR: 7.92  
 SPECIES CATCH/HOUR % OF TOT. C SAMP  
 weight numbers  
 Sepia orbignyana 7.50 24 94.70  
 Trachurus trecae, juvenile 0.36 24 4.55 6379  
 Trachurus capensis 0.06 42 0.76 6380  
 Total 7.92 100.01

PROJECT STATION:2978  
 DATE:12/ 9/02 GEAR TYPE: PT No: 7 POSITION:Lat S 1624  
 start stop duration Long E 1146  
 TIME :23:23:53 23:53:36 30 (min) Purpose code: 1  
 LOG :4508.89 4510.82 1.91 Area code : 1  
 FDEPTH: 10 10 GearCond.code:  
 BDEPTH: 20 47 Validity code: 4  
 Towing dir: 270° Wire out: 150 m Speed: 38 kn\*10

Sorted: 75 Kg Total catch: 225.45 CATCH/HOUR: 450.90  
 SPECIES CATCH/HOUR % OF TOT. C SAMP  
 weight numbers  
 JELLYFISH 271.20 60.15  
 Trachurus capensis 137.04 14376 30.39 6382  
 Trachurus trecae, juvenile 41.58 7344 9.22 6381  
 Sepia orbignyana 0.60 30 0.13  
 Etrumeus whiteheadi 0.48 36 0.11  
 Total 450.90 100.00

PROJECT STATION:2979  
 DATE:13/ 9/02 GEAR TYPE: FT No: 2 POSITION:Lat S 1630  
 start stop duration Long E 1137  
 TIME :02:47:22 03:01:40 14 (min) Purpose code: 1  
 LOG :4532.06 4532.85 0.78 Area code : 1  
 FDEPTH: 60 60 GearCond.code:  
 BDEPTH: 86 83 Validity code: 3  
 Towing dir: 90° Wire out: 180 m Speed: 40 kn\*10

Sorted: Kg Total catch: CATCH/HOUR:  
 SPECIES CATCH/HOUR % OF TOT. C SAMP  
 weight numbers  
 N O C A T C H 0.00  
 Total

PROJECT STATION:2980  
 DATE:13/ 9/02 GEAR TYPE: PT No: 2 POSITION:Lat S 1630  
 start stop duration Long E 1138  
 TIME :03:06:21 03:18:54 13 (min) Purpose code: 1  
 LOG :4533.12 4533.87 0.74 Area code : 1  
 FDEPTH: 50 50 GearCond.code:  
 BDEPTH: 82 79 Validity code: 3  
 Towing dir: 90° Wire out: 160 m Speed: 38 kn\*10

Sorted: 62 Kg Total catch: 308.50 CATCH/HOUR: 1423.85  
 SPECIES CATCH/HOUR % OF TOT. C SAMP  
 weight numbers  
 Trachurus capensis, juvenile 1423.85 74423 100.00 6383  
 Total 1423.85 100.00

PROJECT STATION:2981  
 DATE:13/ 9/02 GEAR TYPE: PT No: 2 POSITION:Lat S 1630 Long E 1139  
 start stop duration  
 TIME :03:24:23 03:41:10 17 (min) Purpose code: 1  
 LOG :4534.18 4535.24 1.05 Area code : 1  
 FDEPTH: 20 20 GearCond.code: 1  
 BDEPTH: 78 70 Validity code: 3  
 Towing dir: 90ø Wire out: m Speed: kn\*10

Sorted: 5 Kg Total catch: 5.13 CATCH/HOUR: 18.11

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis, juvenile	13.13	1189	72.50	6384
Sepia officinalis hlerredda	2.82	4	15.57	
Etrumeus whiteheadi	1.91	173	10.55	
CLUS001	0.25	7	1.38	
Total	18.11		100.00	

PROJECT STATION:2987  
 DATE:14/ 9/02 GEAR TYPE: BT No: 8 POSITION:Lat S 1647 Long E 1140  
 start stop duration  
 TIME :06:13:36 06:22:20 9 (min) Purpose code: 1  
 LOG :4718.83 4719.39 0.55 Area code : 1  
 FDEPTH: 41 42 GearCond.code: 1  
 BDEPTH: 41 42 Validity code: 3  
 Towing dir: 360ø Wire out: 200 m Speed: 36 kn\*10

Sorted: 37 Kg Total catch: 9999.93 CATCH/HOUR: 66666.20

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinops ocellatus	62802.80	2833760	94.20	6391
Engraulis encrasicolus	3863.40	366573	5.80	6390
Total	66666.20		100.00	

PROJECT STATION:2982  
 DATE:13/ 9/02 GEAR TYPE: BT No: 8 POSITION:Lat S 1636 Long E 1134  
 start stop duration  
 TIME :09:55:14 10:10:04 15 (min) Purpose code: 1  
 LOG :4576.31 4577.26 0.95 Area code : 1  
 FDEPTH: 98 100 GearCond.code: 1  
 BDEPTH: 98 100 Validity code: 3  
 Towing dir: 270ø Wire out: 350 m Speed: 36 kn\*10

Sorted: 29 Kg Total catch: 3857.00 CATCH/HOUR: 15428.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis, juvenile	14310.80	661808	92.76	6386
Trachurus trecae, juvenile	755.44	23400	4.90	6385
Etrumeus whiteheadi	148.96	4788	0.97	
Dentex macrophthalmus	143.64	4788	0.93	
Merluccius capensis	37.24	532	0.24	
Atractoscion aequidens	26.60	532	0.17	
Synagrops microlepis	5.32	2128	0.03	
Total	15428.00		100.00	

PROJECT STATION:2988  
 DATE:14/ 9/02 GEAR TYPE: BT No: 8 POSITION:Lat S 1654 Long E 1130  
 start stop duration  
 TIME :09:34:37 09:43:33 9 (min) Purpose code: 1  
 LOG :4747.23 4747.74 0.50 Area code : 1  
 FDEPTH: 112 109 GearCond.code: 1  
 BDEPTH: 112 109 Validity code: 3  
 Towing dir: 90ø Wire out: 350 m Speed: 36 kn\*10

Sorted: 60 Kg Total catch: 4780.36 CATCH/HOUR: 31869.07

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis, juvenile	25656.33	1101207	80.51	6393
Etrumeus whiteheadi	5346.13	128413	16.78	6392
Sardinops ocellatus	468.27	6373	1.47	6394
Dentex macrophthalmus	246.33	6813	0.77	
Merluccius capensis	141.53	1047	0.44	
Synagrops microlepis	10.47	3147	0.03	
Total	31869.06		100.00	

PROJECT STATION:2983  
 DATE:13/ 9/02 GEAR TYPE: PT No: 7 POSITION:Lat S 1640 Long E 1147  
 start stop duration  
 TIME :00:00:48 00:00:51 15 (min) Purpose code: 1  
 LOG :4635.01 4635.91 0.90 Area code : 1  
 FDEPTH: 5 5 GearCond.code: 1  
 BDEPTH: 16 16 Validity code: 3  
 Towing dir: ø Wire out: 120 m Speed: 37 kn\*10

Sorted: 37 Kg Total catch: 151.64 CATCH/HOUR: 606.56

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Engraulis encrasicolus	580.00	112320	95.62	
Sardinops ocellatus	20.64	1920	3.40	6387
Total	600.64		99.02	

PROJECT STATION:2989  
 DATE:14/ 9/02 GEAR TYPE: BT No: 8 POSITION:Lat S 1707 Long E 1137  
 start stop duration  
 TIME :16:15:15 16:45:09 30 (min) Purpose code: 1  
 LOG :4805.40 4807.02 1.60 Area code : 1  
 FDEPTH: 88 87 GearCond.code: 1  
 BDEPTH: 88 87 Validity code: 3  
 Towing dir: 360ø Wire out: 330 m Speed: 32 kn\*10

Sorted: 29 Kg Total catch: 1106.56 CATCH/HOUR: 2213.12

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis, juvenile	1970.24	10506	89.03	6396
Trachurus trecae, juvenile	72.94	1880	3.30	6395
Dentex macrophthalmus	56.40	676	2.55	
Trichurus lepturus	35.34	150	1.60	
Todarodes sagittatus	33.84	76	1.53	
Pterothrissus belloci	33.84	150	1.53	
Dentex macrophthalmus	7.52	526	0.34	
Chelidonichthys capensis	3.00	76	0.14	
Total	2213.12		100.02	

PROJECT STATION:2984  
 DATE:13/ 9/02 GEAR TYPE: PT No: 2 POSITION:Lat S 1642 Long E 1139  
 start stop duration  
 TIME :23:08:07 23:39:35 31 (min) Purpose code: 1  
 LOG :4668.93 4671.04 2.10 Area code : 1  
 FDEPTH: 20 15 GearCond.code: 1  
 BDEPTH: 63 91 Validity code: 3  
 Towing dir: 270ø Wire out: 100 m Speed: 40 kn\*10

Sorted: Kg Total catch: CATCH/HOUR:

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

PROJECT STATION:2985  
 DATE:14/ 9/02 GEAR TYPE: PT No: 2 POSITION:Lat S 1642 Long E 1136  
 start stop duration  
 TIME :23:00:21 00:00:18 15 (min) Purpose code: 1  
 LOG :4671.60 4672.48 0.86 Area code : 1  
 FDEPTH: 70 70 GearCond.code: 1  
 BDEPTH: 92 94 Validity code: 3  
 Towing dir: 270ø Wire out: 210 m Speed: 40 kn\*10

Sorted: 6 Kg Total catch: 46.42 CATCH/HOUR: 185.68

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis	180.80	8396	97.37	6389
Trachurus trecae	4.88	180	2.63	6388
Total	185.68		100.00	

PROJECT STATION:2986  
 DATE:14/ 9/02 GEAR TYPE: PT No: 2 POSITION:Lat S 1648 Long E 1120  
 start stop duration  
 TIME :03:20:55 03:50:38 30 (min) Purpose code: 1  
 LOG :4697.50 4699.31 1.81 Area code : 1  
 FDEPTH: 10 10 GearCond.code: 1  
 BDEPTH: 138 128 Validity code: 3  
 Towing dir: 90ø Wire out: 150 m Speed: 38 kn\*10

Sorted: Kg Total catch: 0.26 CATCH/HOUR: 0.52

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Etrumeus whiteheadi	0.44	8	84.62	
Trachurus capensis	0.08	2	15.38	
Total	0.52		100.00	



## ANNEX III ACOUSTIC INSTRUMENTS

### Echo sounder

The SIMRAD EK500/38 kHz scientific sounder was used during the survey for fish abundance estimation. The lowering keel was not submerged during the survey. The Bergen Echo Integrator system (BEI) was used to scrutinise the acoustic records. The acoustic transducers (18, 38, 120 and 200 kHz) were calibrated 07 September in Baía dos Elephantes. The settings of 38 kHz echo sounder were as follows:

#### Transceiver-1 menu (38 kHz, mounted in lowering keel)

Transducer depth	20.07-1508: 5.5 m (keel not submerged), 16.08-17.08: 8.0 m (subm.)
Absorption coeff.	10 dB/km
Pulse length	Medium (1 ms)
Bandwith	Wide
Max Power	2000 Watt
2-way beam angle	-21.0 dB
Sv Transducer gain	27.37 dB
TS Transducer gain	27.49 dB
Angle sensitivity	21.9
3 dB beamwidth	7.0 ° alongship 6.7 ° athwardship
Alongship offset	0.14 °
Athwardship effect	-0.02 °

#### Display menu

Echogram	1 (38 kHz)
Bottom range	15 m
Bottom range start	10 m
Sv colour min	-67 dB

#### Printer menu

Echogram	1 (38 kHz)
Range	100 m, 250 m, 500 m
Range start	0
Bottom range	12 m
Bottom range start	10 m
TVG	20 log R
Sv Colour min	- 67 dB

**Bottom detection menu**      Minimum level -50 dB