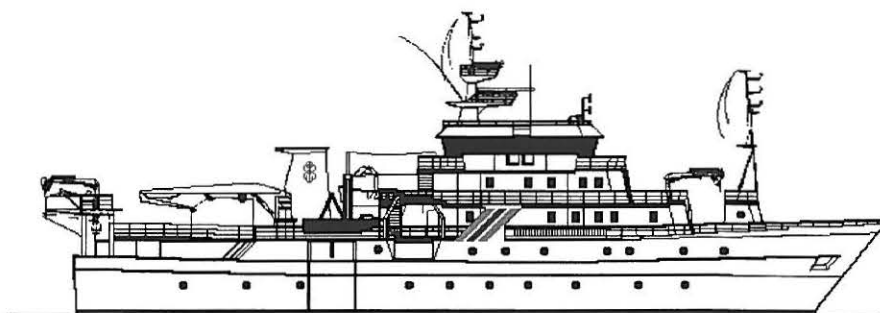


NORAD - FAO/UNDP PROJECT GLO 92/013

CRUISE REPORTS "DR. FRIDTJOF NANSEN"



SURVEYS OF THE FISH RESOURCES OF ANGOLA

Preliminary Cruise Report No 1/98

Survey of the pelagic resources

2 - 28 March 1998

**Institute of Marine Research
IMR, Bergen**

**Institute of Fisheries Research
IIP, Luanda**

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by

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Luanda, Angola

**Institute of Marine Research
Bergen, 1998**

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CHAPTER 1 INTRODUCTION

1.1 Objectives

The objectives of the survey, previously agreed upon with the Director of the Instituto de Investigação Pesqueira (IIP) are the following:

- To map the distribution and estimate the abundance of the 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 capensis*, the pilchard *Sardinops ocellata* and other pelagic species, mainly carangids.
- To carry out biological studies on the main species, i.e. estimate the biological condition length weight-relationships and reproductive stages. A special study on horse mackerel feeding habits would also be carried out.
- Map the general hydrographic regime in the survey area by continuous recording of a weather station and by using a CTD-sonde in a grid of stations covering the whole area. IIP standard profiles of temperature, salinity and oxygen will be also carried out at agreed locations in the Angolan coast.
- Conduct current measurements with ADCP system.
- On-the-job training for the Angolan participants on the main survey routines would be imparted, including scrutinising the echograms and biomass estimation with the acoustic system.

The aim of these surveys is to build a time series to allow a better understanding of the fluctuations in the main pelagic stocks and of the biology of the main species.

1.2 Participation

The scientific staff consisted of:

From IIP, Angola: Miguel ANDRE, Antonio BUCO (20/3 to 28/3), Antonio PEDRO, Bomba BAZIKA, Henriette LUTUBA (2/3 to 9/3), Makuta NKONDO, Filomena VAZ-VELHO.

From IMR, Bergen: Oddgeir ALVHEIM (2/3 to 9/3), Guillermo BURGOS, Reidar JOHANNESSEN, Tore MØRK, Helge ULLEBUST (9/3 to 28/3).

1.3 Narrative

The vessel left Luanda on March 2 and steamed with course to the Congo River where the survey started. The area north of the Congo River (Cabinda) was not covered because of restrictions in relation to oil drilling activities. During the whole cruise, the shelf was surveyed from approximately 20 m depth to beyond the 200 m depth contour until no important registrations of pelagic fish were expected. Acoustic sampling started following a course track in parallel transects set approximately 10 NM apart. Transects 6 and 7 should be interrupted because of a restricted-access area related to the activity of oil-platforms. From about N'Zeto, the course track continued in parallel transects but with an inter-transect distance of approximately 5 NM. This sampling strategy was kept until about 13° 10'S where the shelf became very narrow. Triangular transects with turning points on the coast separated by 5 to 10 NM were adopted until south of Tombua. Parallel transect separated by 5 to 7 NM were then set until the end of the cruise in the Cunene River. CTD (Conductivity-Temperature-Depth) and ADCP (Acoustic Doppler Current Profiler) measurements were taken on standard hydrographical sections and along the course track. A call was made in Luanda on March 9 to exchange a member of the scientific crew. The survey was resumed on the same day. On March 18 the survey was interrupted and a call was made in Lobito the day after. The crew of the vessel was changed and the surveyed continued on March 20. The survey was completed on March 26 and the vessel started to sail to Walvis Bay (Namibia) arriving on March 28. The surveyed area was divided in three regions. Congo River - north of Pta. das Palmerinhas (9°S) was covered between March 3 and March 10. The area between 9°S and 13°S was surveyed between March 10 and March 20. The area between 13°S and Cunene river was covered between March 20 and March 26.

1.4 Survey effort

Figures 1a-c show the cruise tracks with fishing stations and the hydrographic profiles and Table 1 summarises the survey effort in each region.

Table 1 Number of bottom (BT) and pelagic (PT) trawl stations, hydrographic stations and distance surveyed (NM) by area.				
Area	BT	PT	CTD	Distance Surveyed
Congo R. - Pta. Palmerinhas	7	23	65	1 165
Pta. Palmerinhas - Benguela	11	22	82	1 590
Benguela -Cunene	16	18	40	1 400
Total	35	63	187	4 155

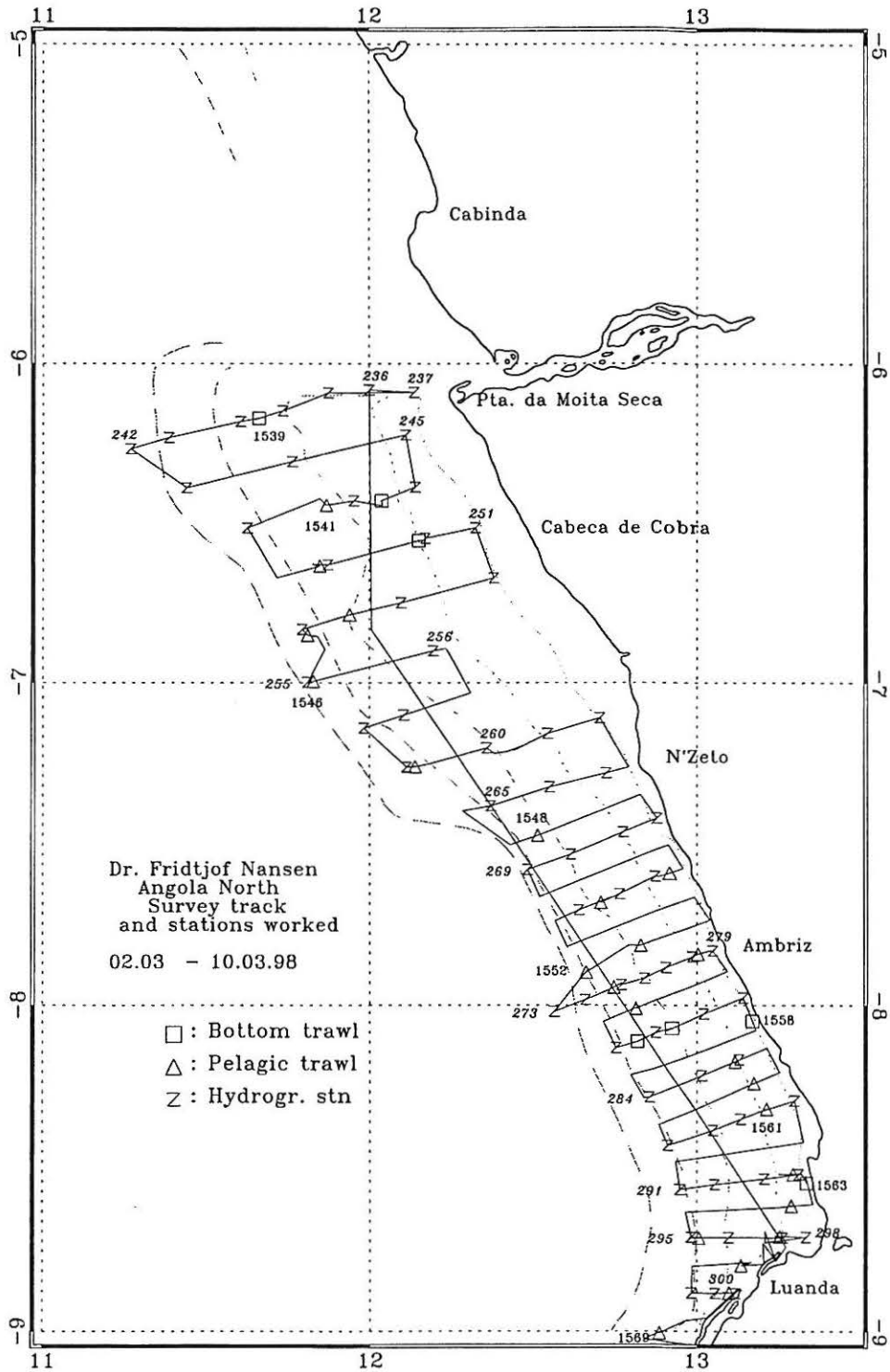


Figure 1a. Course track with fishing and hydrographic stations, Congo River - Pta. das Palmeirinhas.

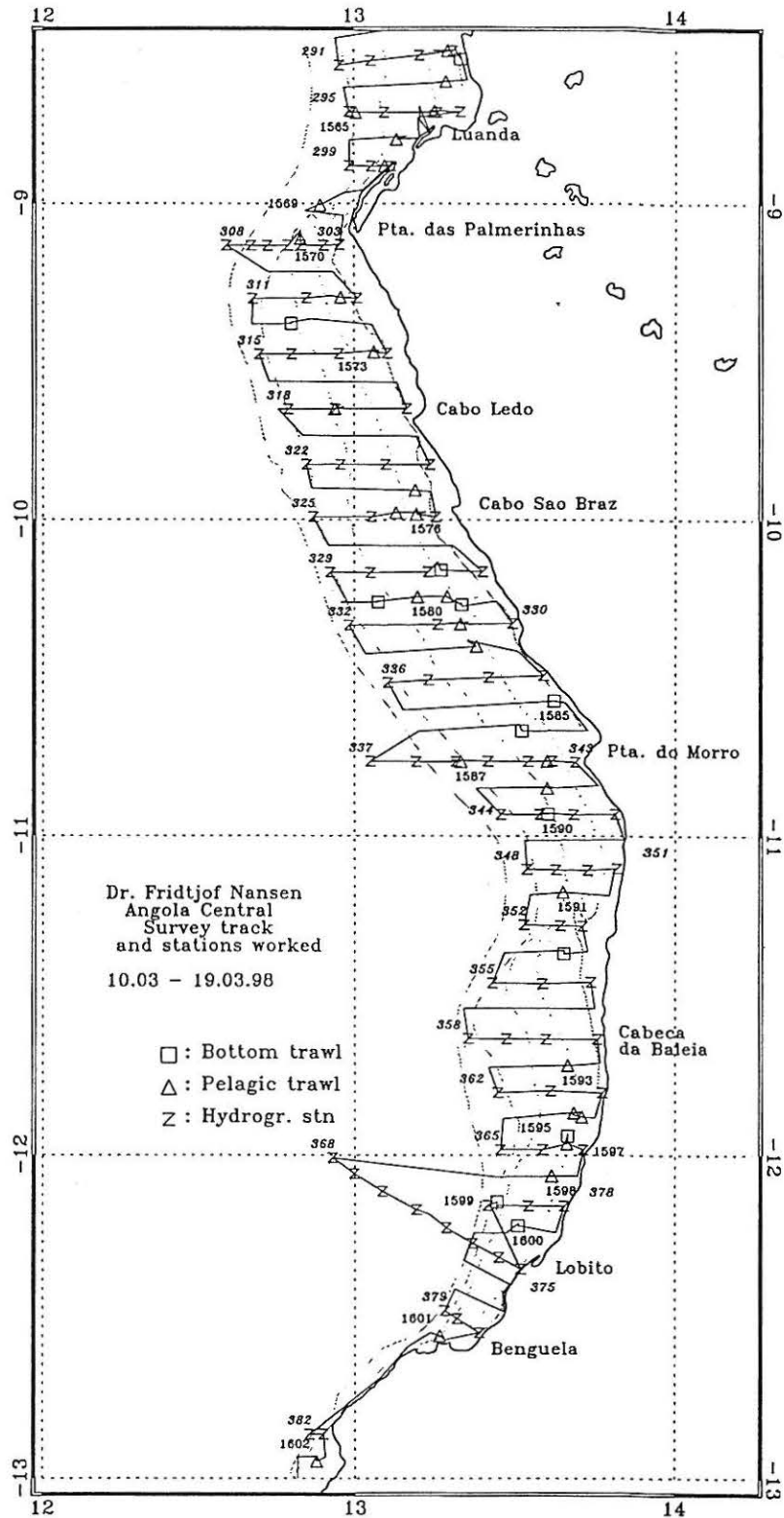


Figure 1b. Course track with fishing and hydrographic stations, Pta. das Palmeirinhas - Benguela.

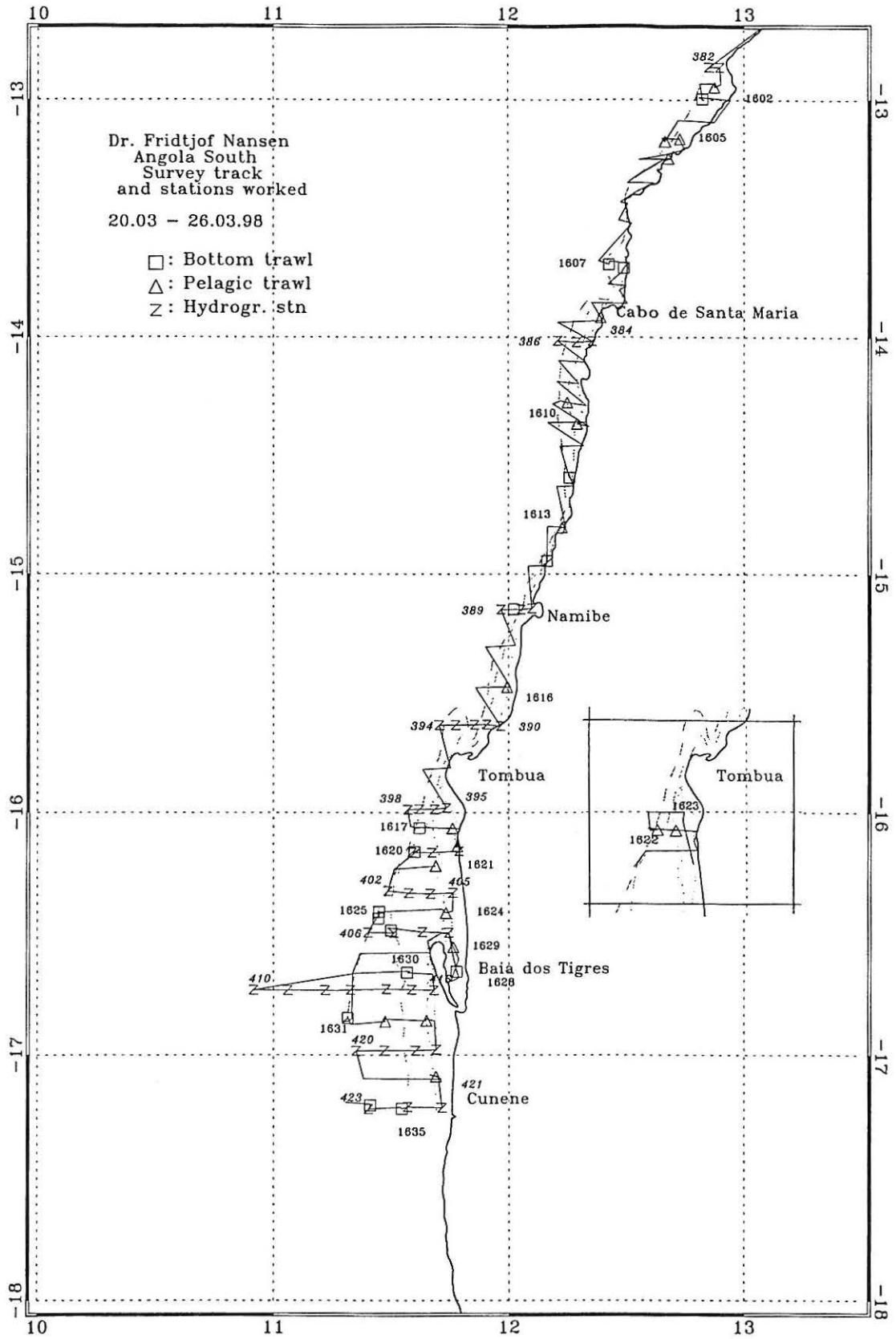


Figure 1c. Course track with fishing and hydrographic stations, Benguela - Cunene.

CHAPTER 2 METHODS

2.1 Hydrographic sampling

A Seabird 911+ CTD probe was used to obtain vertical profiles of temperature, salinity and oxygen. Real time plotting and logging was done using the Seabird Seasave software installed on a PC. The profiles were in general taken down to a few meters above the bottom. In deep stations, however, data logging was interrupted at 700 m. At each station two Niskin bottles were triggered for water samples, one near the surface and one near the bottom. In order to calibrate the oxygen and salinity sensors, water samples were analysed for dissolved oxygen using the Winkler method and salinity using a Guildline Portasal salinometer mod. 8410.

A total of 44 samples were accepted for oxygen calibration. A linear regression of the Winkler determinations on the CTD values gave the following results:

$$O_2 = 1.0008 * O_{2\text{CTD}} - 0.031$$

The standard deviation of the difference between both measurements was 0.0149.

A total of 52 salinity samples were accepted for calibration. The average difference between laboratory and CTD values was -0.0456 with a standard deviation of 0.0201.

Current measurements were carried out with a shipborne Acoustic Doppler Current Profiler (ADCP) from RD instruments. The ADCP was set to ping every 8 seconds, the depth cell was set to 8 m and the number of cells to 40. As a routine data were averaged over 300 seconds, stored on files and finally analysed by the PC software UMS (Underway Mapping System), supported by Sea Fisheries Research Institute, Cape Town, South Africa.

Meteorological observations including wind direction and speed, air temperature, global radiation and sea surface temperature (SST) were automatically logged every nautical mile using an Aanderaa meteorological station.

2.2 Fish sampling

Abundance estimation

The catches were sampled for species composition, by weight and numbers. Biological samples, i.e. length and weight compositions were taken for the target species. Records of fishing stations are presented in Annex I. Pooled length frequency distributions of selected species by area, are shown in Annex II. A description of the acoustic instruments and their standard settings is given in Annex III. This also includes a description of the fishing gear used.

The following target strength (TS) function was applied to convert S_A -values (mean integrator value for a given area) to number of fish:

$$TS = 20 \log L - 72 \text{ dB} \quad (1)$$

or in the form $C_F = 1.26 \cdot 10^6 \cdot L^{-2}$ (2)

where L is total length and C_F is the fish conversion factor.

This target strength to body length relationship has been used for all the target species although originally estimated for North Sea herring. No specific target strength determinations are at present available for the species under studies.

The following formula was used to calculate the number of fish in each length group (cm) for each fish concentration:

$$\rho_i = S_A \cdot \frac{p_i}{\sum_{i=1}^n \frac{p_i}{C_{Fi}}} \quad (3)$$

where:

- ρ_i = density of fish in length group i
- S_A = mean integrator value
- p_i = proportion of fish in length group i
- C_{Fi} = fish conversion factor for length group

The length distribution of a given species within an area was computed by weighing the length frequencies obtained in each trawl sample within the area by the average S_A value attributed to that species in the 5 mile where the sample was taken.

The biomass of fish in each length per unit area was calculated by multiplying the number of fish in each length class by their estimated mean weight obtained from the length-weight relationship of the particular region. The number and biomass per length group in a particular concentration was calculated by multiplying the estimated size distribution by the area occupied by the concentration. The number of individuals and total biomass in each area was obtained by summing up the number and biomass of each length group over the whole size. The number and biomass per length group in each concentration were at last summed to obtain the totals for each region.

In the case of co-occurrence of target species of the same genus like *Sardinella aurita* and *S. maderensis* or *Trachurus trecae* and *T. capensis*, the S_A values allocated to the category 'sardinella' or 'horse mackerel' were split according to their length distribution and their catch rate in numbers.

The mean integrator values in each sampling unit (S_A -values) were divided between the following categories of fish on the basis of trawl catches and characteristics of the echo traces:

- sardinella (*S. aurita* and *S. maderensis*)
- horse mackerel (*T. trecae* and *T. capensis*)
- pilchard
- anchovy
- big-eye grunt (*Brachydeuterus auritus*)
- P2 (carangids (other than *Trachurus sp*), scombrids, barracudas and hairtails)
- other demersal fish
- mesopelagic fish
- plankton

Biological sampling

Total length and body weight were recorded for sardinella and horse mackerel to the nearest 1 cm or 1 g below, respectively. Sex and reproductive stages were described by macroscopic examination, scoring each individually sampled fish according to the following categories:

- 1 Juvenile
- 2 Inactive
- 3 Active
- 4 Ripe
- 5 Running/ Spent

Stomachs were taken of horse mackerel for a study of the feeding habits of this species in relation to the observed diel vertical migrations. Ten stomachs per length group of 5 cm were collected at each station where the species occurred. The samples were immediately frozen for later analysis at the laboratories of IIP, Luanda.

CHAPTER 3 OCEANOGRAPHIC CONDITIONS

Surface distribution

Figures 2 a and b show the horizontal distribution of temperature and salinity, respectively, for the region between the Congo River and Pta. das Palmeirinhas. Anomalous conditions were found in the temperature and salinity distributions of this region. Very high sea surface temperatures (29-30°C) were registered between the Congo River and south of Cabeça de Cobra. SST of 28-29°C dominated the mid shelf in the rest of this area. Pockets of relatively colder water (<27°C) were found near the coast off Ambriz and north of Luanda. This suggests a weak process of coastal upwelling of subsurface water. The distribution of sea surface salinity shows the influence of fresh water surface layer originated in the Congo River that defines a north-south horizontal gradient that can be followed up to N'Zeto and influence the salinity field through out the whole area. Off Ambriz and north of Luanda, the highest values of salinity (34.9 psu) were detected confirming certain degree of mixing with upwelled waters.

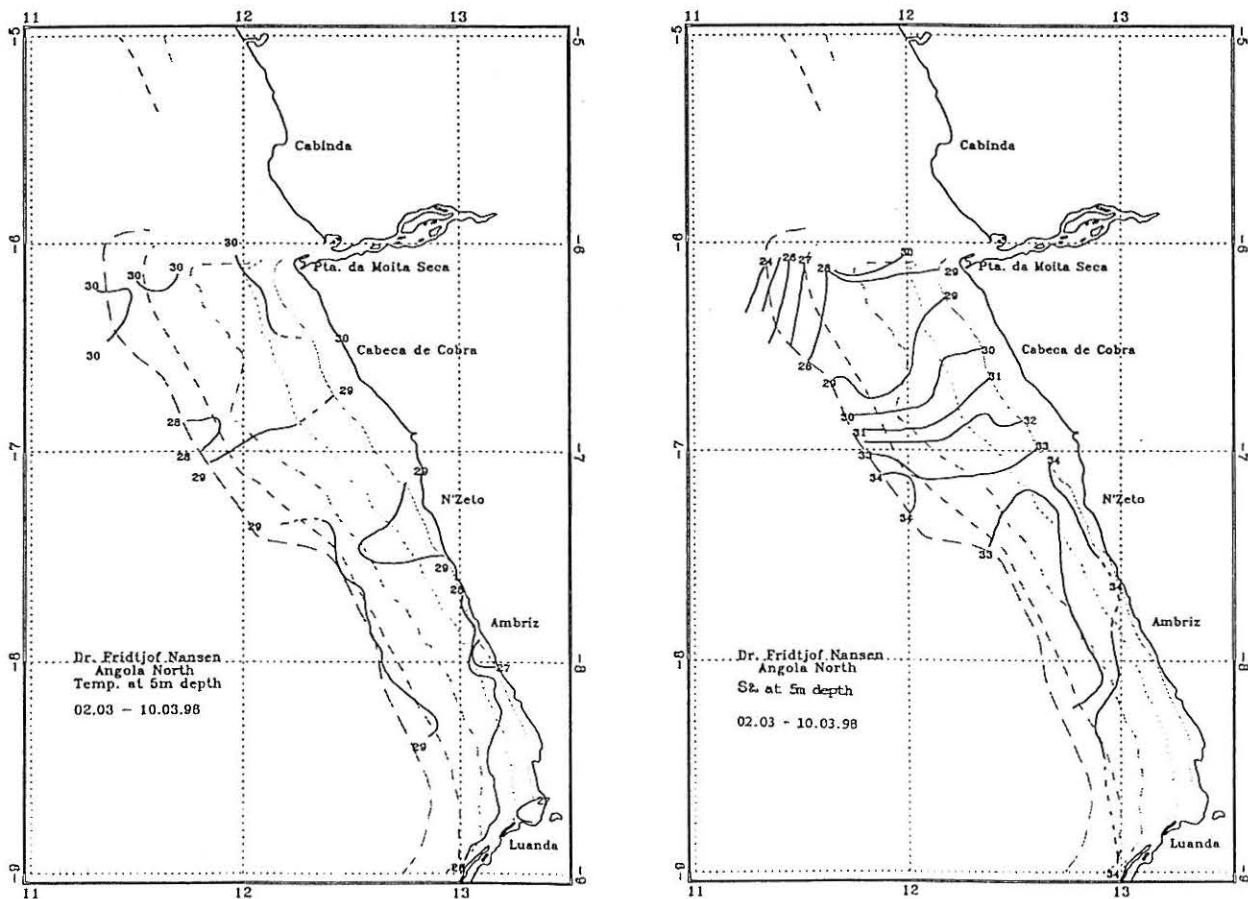


Figure 2. Horizontal distribution of temperature(°C) and salinity (‰), Congo River - Pta. das Palmeirinhas.

In the region Pta. das Palmeirinhas-Benguela (Fig 3 a and b), the horizontal distributions of both temperature and salinity showed a more 'average' pattern: isotherms run parallel to the coast line with SST increasing with increasing distance from the coast. However, overall surface temperatures were still high. Coastal pockets of relatively colder water were found off Cabo Ledo, between Cabo Sao Braz and Pta do Morro, off Cabeça da Baleia, and in front of Lobito. Salinity values were much higher than in the northern region and varied between 35 and 36 psu over the whole region.

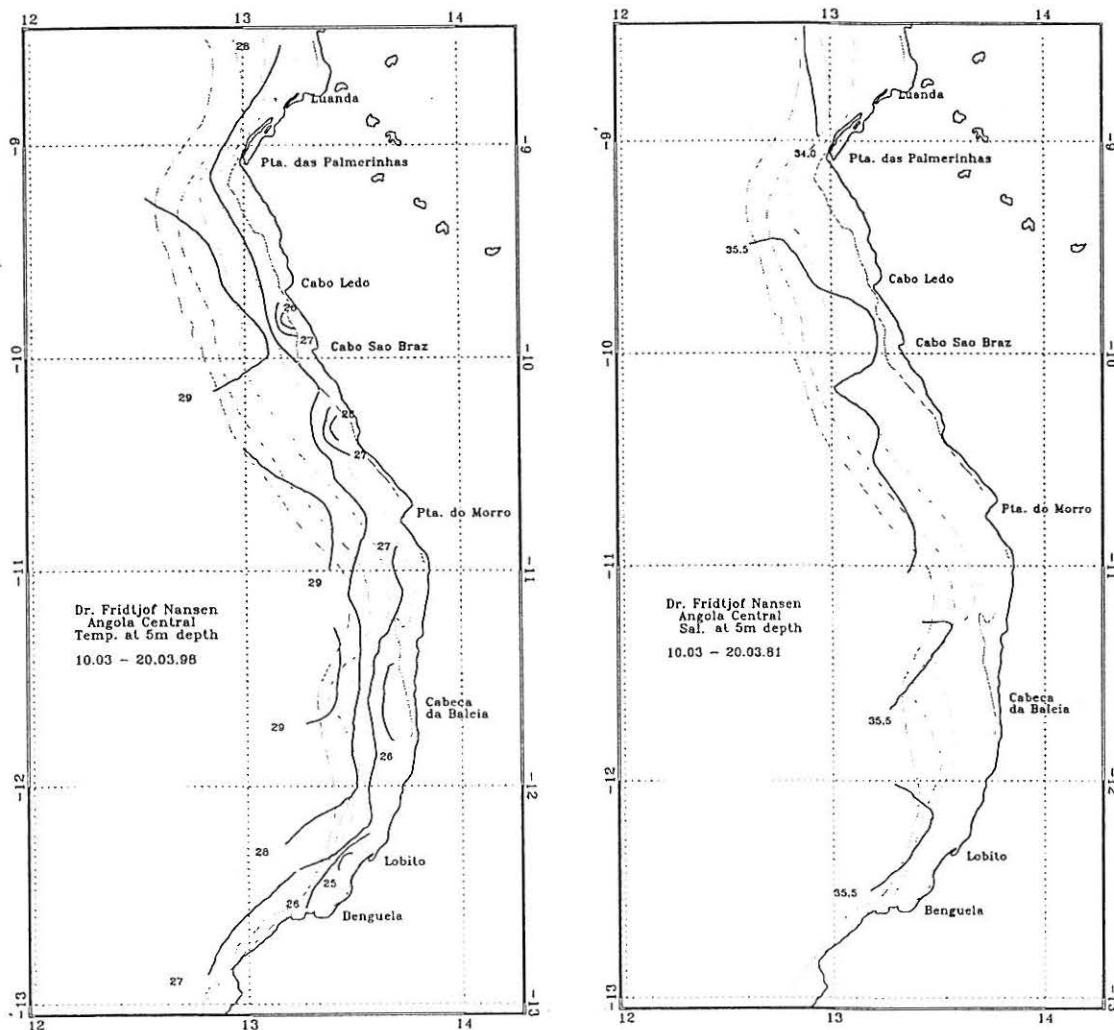


Figure 3. Horizontal distribution of temperature(°C) and salinity (‰), Pta. das Palmeirinhas - Benguela.

Figures 4 a and 4b show the temperature and salinity at 5 m depth, respectively, for the region from south of Benguela to Cunene River. In the narrow shelf between 13°S Benguela and Tombua, relatively cold surface temperature was recorded off Cabo de Santa Maria. The most important feature of the horizontal distribution of SST is the presence of the Angolan-Benguela front that produces a strong horizontal gradient that is represented by oblique isotherms in close sequence. This can be seen specially between 15° 30' and 16 20'S. Surface salinity was rather uniform varying between 35.4 and 35.8 psu.

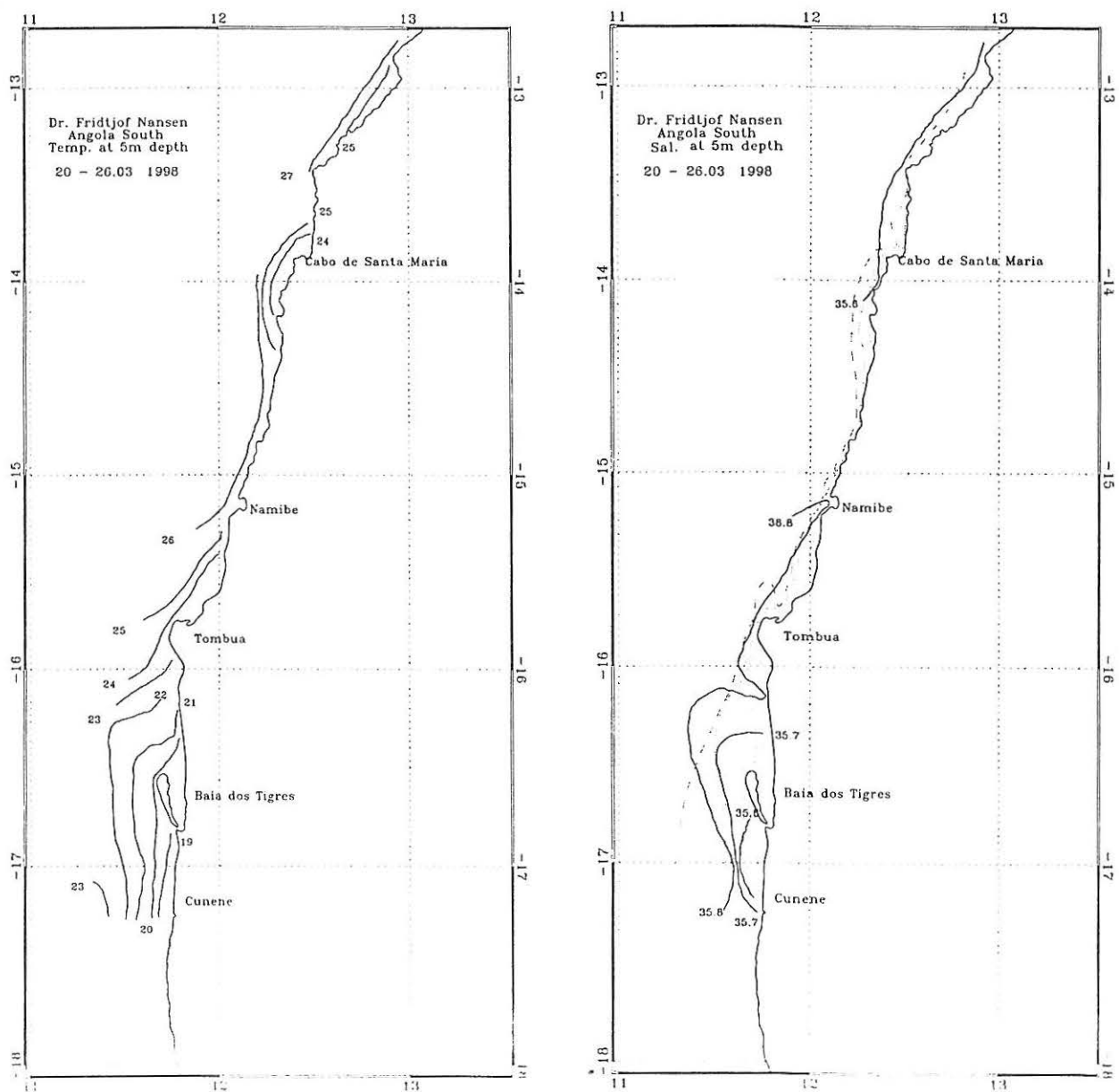


Figure 4. Horizontal distribution of temperature(°C) and salinity (‰), Benguela - Cunene.

Vertical distribution

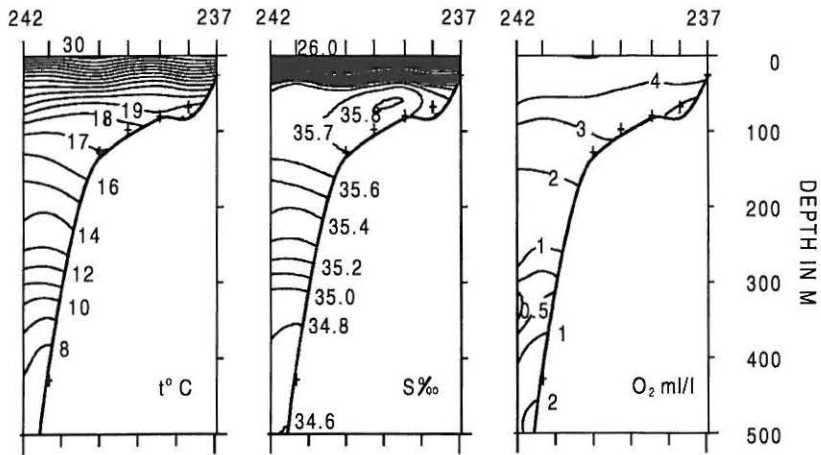
The vertical distributions of temperature, salinity and oxygen along the standard sections are shown in Figures 5 a-f.

The section of Pta. da Moita Seca, (Fig 5a) confirms the presence of a stable surface layer of warm brackish water and a pronounced stratification of the whole water column that suggests poor conditions for biological production. The same pattern can be observed in the sections off Ambriz (Fig. 5b) and off Pta. das Palmeirinhas (Fig. 5c). These two sections reveal a latitudinal transformation of the characteristics of the upper layer with a decrease in temperature and an increase in salinity. Only weak signs of convection of subsurface water is evident from the profiles of these two locations. The sections off Pta. do Morro and Lobito present a more dynamic profile with more 'average' values of salinity in the upper layer and some evidence of mixing with subsurface water. The last section off Baía dos Tigres shows very clear signs of upwelling with isolines bending upward towards the coast in all the three fields analysed. As a result, the shelf is dominated by cold, high salinity water with relatively low oxygen content.

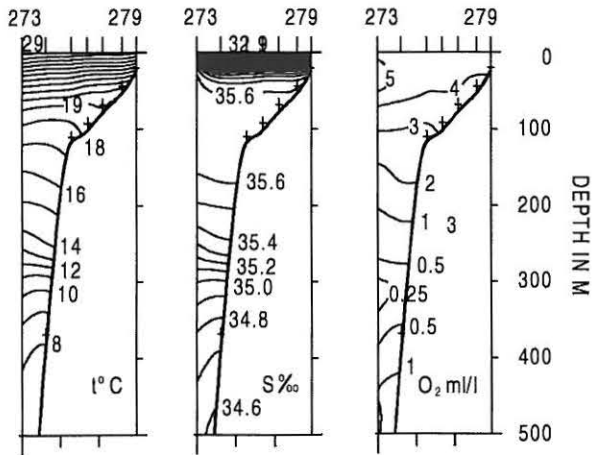
No signs of oxygen depletion were found in the surveyed area.

In general, the autumn survey of 1998 appears to normal, characterized by high surface water temperatures in the northern and central region. The influence of a brackish layer in the upper part of the water column was restricted mainly to the region between Congo River and Luanda. On the other hand, in the area surveyed south of Tombua very low surface temperatures were recorded more typical of a 'cold year'.

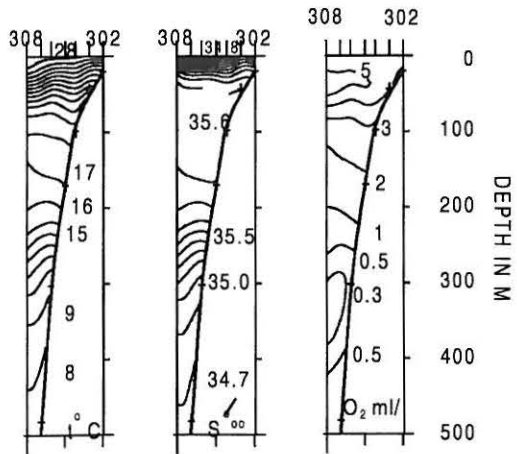
The surface temperature in the whole area ranged from 19 to 30°C and the salinity from 25 to 36 psu. Oxygen minimum was located about 300 m depth as usual. Low oxygen values (<1 ml/l) reached depths of less than 200 m only in the sections off Lobito and Baía dos Tigres.



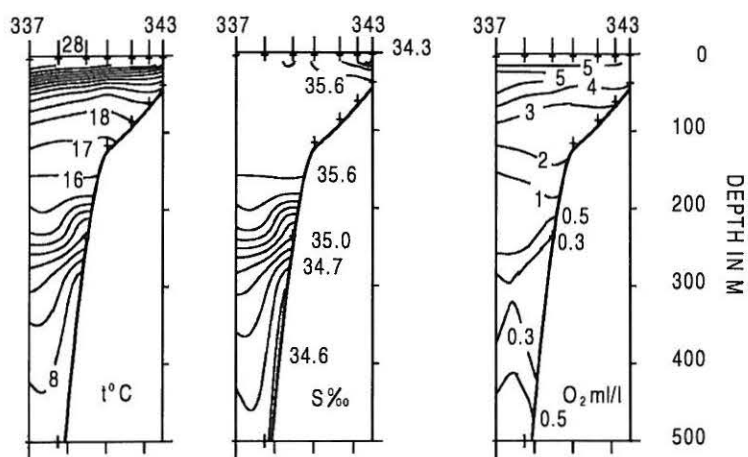
PTA. DA MOITA SECA 3 March 1998



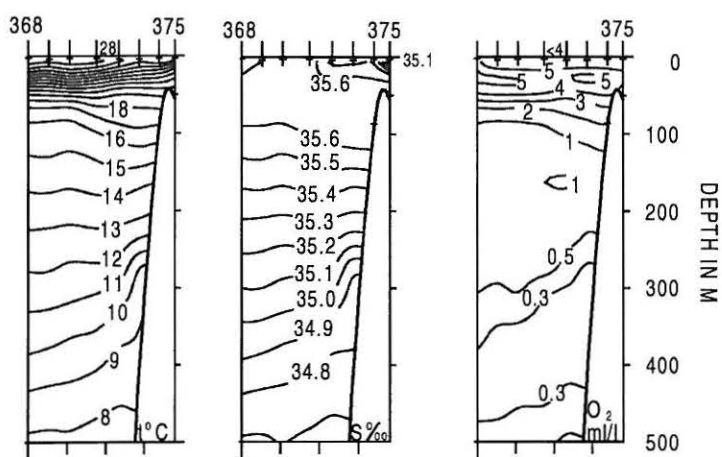
AMBRIZ 6 March 1998



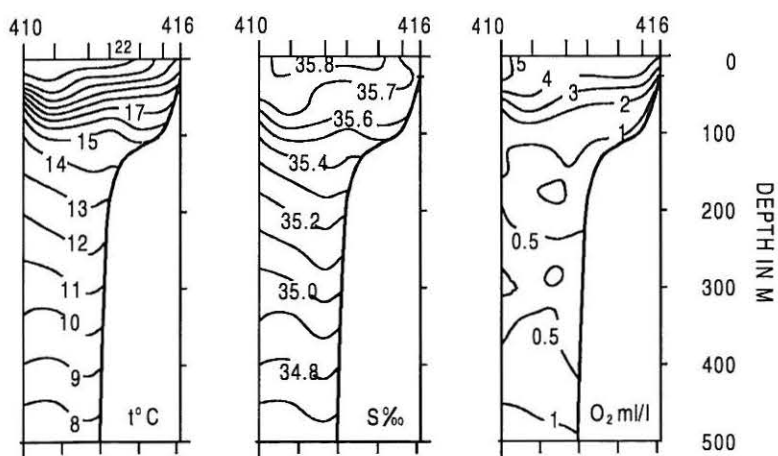
PTA DAS PALMEIRINHAS 9 - 10 March 1998



PTA DO MORRO 13 - 14 March 1998



LOBITO 16 - 17 March 1998



BAIA DOS TIGRES 25 March 1998

Figure 5. Vertical profiles of temperature(°C), salinity (‰) and oxygen (ml/l).

Current measurements (ADCP)

The results of the ADCP measurements at 35 m depth are shown in Figure 6. All accepted 5 minutes averages are presented. Although great variability exists both between close stations and inside the same station, a general southward circulation on the Angolan shelf seems emerge. An apparent deviation towards the opposite direction seemed to occur about 12°S. Strong coastal currents were detected in the northern and central region.

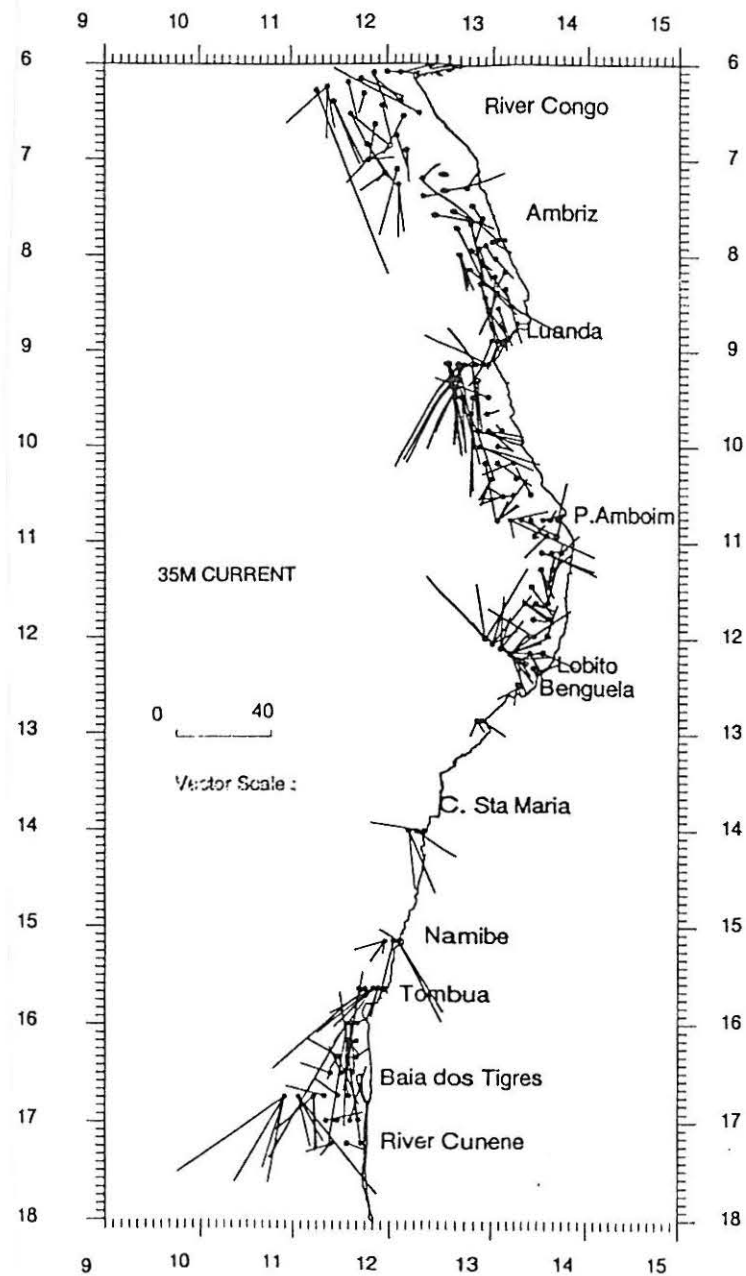


Figure 6. ADCP current measurements. Congo River to Cunene River.

Wind conditions

Wind measurements in the survey area are presented in Figure 7. In general, good weather and sea conditions accompanied the survey. Winds from the south and southwest prevailed. Only south of Tombua the wind speed reached values higher than 20 knots.

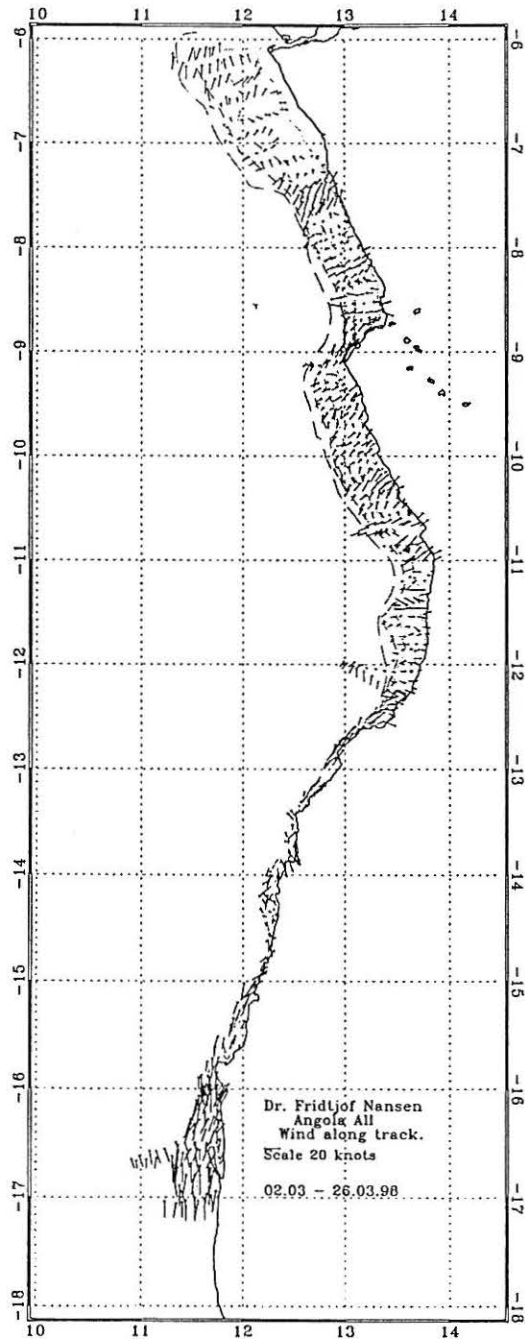


Figure 7. Wind measurements. Congo River to Cunene River.

CHAPTER 4 DISTRIBUTION, COMPOSITION AND BIOMASS ESTIMATES OF PELAGIC FISH

4.1 Congo River - Pta. das Palmeirinhas

4.1.1 Sardinella

Both *Sardinella aurita*, the round sardinella, and *Sardinella maderensis*, the flat sardinella, were found in the northern region from the Congo River to Pta. das Palmeirinhas. Figure 8 shows the geographical distribution of both sardinellas in the region represented by strata of ranked mean acoustic integrator values. Two main areas of concentration were detected: one at depths between 100 and 200 m between Pta. de Moita Seca and Cabeça de Cobra, and a second one forming a coastal stripe inside the 80m depth contour from Ambriz to Pta. das Palmeirinhas. The formation of an offshore concentration in an area where warm brackish surface water was recorded may be a behavioural response to avoid the most extreme conditions closer to the river mouth. The coastal stripe on the other hand coincides with the area of lower temperature and higher salinity in the region. Flat sardinella was more abundant than round sardinella and was distributed over the whole region. Round sardinella was found in the latitudinal limits of the distributional area with the highest recordings in front of Pta. das Palmeirinhas.

Round sardinella consisted mainly of mature individuals between 25 and 35 cm total length (Figure 9, left). The biomass estimate for *S. aurita* was 14 000 tonnes.

The total size distribution of flat sardinella showed several modes that may correspond to different cohorts. Modal sizes were found at 10, 18, 24 and 31 cm total body length (Figure 9, right). The biomass estimate for the species was 65 000 tonnes.

Compared with the results obtained in March last year, the biomass estimates for this region are significantly lower for both species. In 1997 the biomass of round sardinella was estimated to around 90 000 tonnes with a bi-modal size distribution around 15 and 23 cm. Flat sardinella was estimated to 120 000 consisting mainly of small individuals between 12 and 20 cm.

Relatively speaking, the estimations for of this cruise in the northern region resemble more those ones obtained in 1996 when more comparable environmental conditions were found.

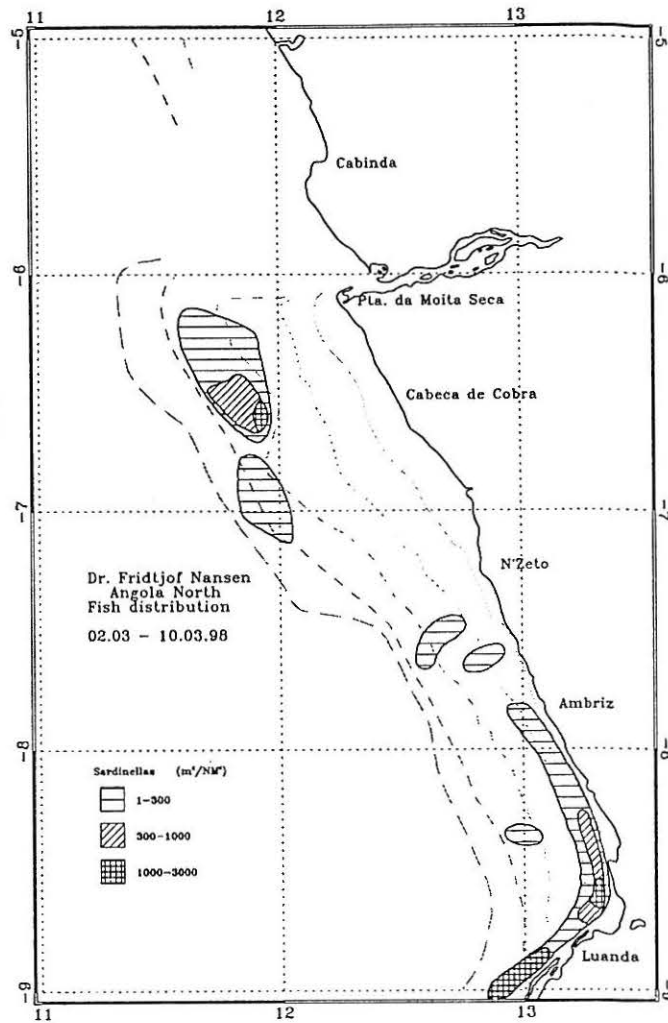


Figure 8. Distribution of *Sardinella* spp. Congo River-Pta. das Palmeirinhas.

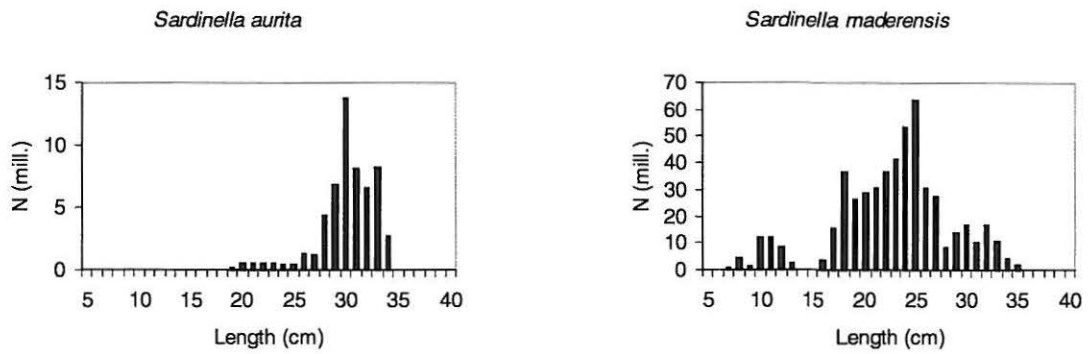


Figure 9. Total length distribution of round sardinella (*Sardinella aurita*) and flat sardinella (*S. maderensis*). Congo River-Pta. das Palmeirinhas.

4.1.2 Cunene horse mackerel

Figure 10 shows the distribution of horse mackerel for the region from Congo River to Pta. das Palmeirinhas. The species was found scattered throughout this region. The densities were usually low, except for two small areas; one off Ambriz and the other in front of Luanda.

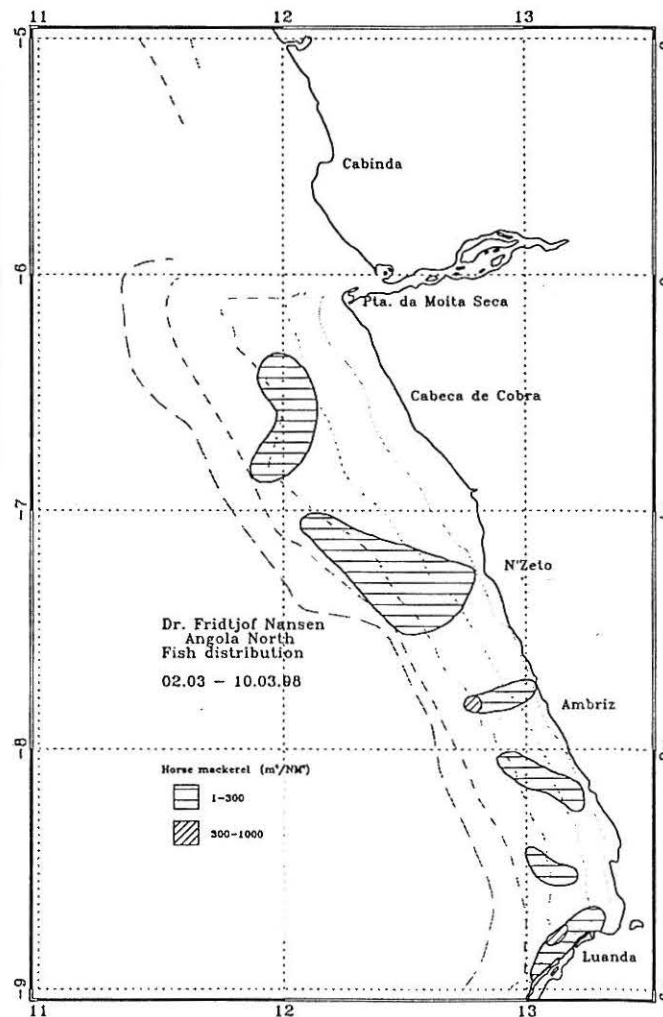


Figure 10. Distribution of Cunene horse mackerel (*Trachurus trecae*). Congo River - Pta. das Palmeirinhas.

Figure 11 shows the length distribution of horse mackerel for the whole region. Young fish dominated in most of the samples and defined a mode around 18 cm dominated in most of the samples; the second mode that can be observed in the range 37 to 42 cm total was detected off Luanda. The estimated biomass for *T. trecae* for this region was 18 000 tonnes.

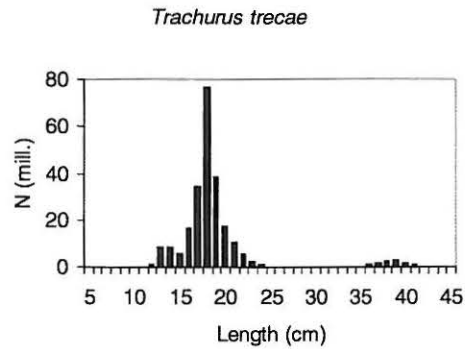


Figure 11. Total length distribution of Cunene horse mackerel (*Trachurus trecae*). Congo River-Pta. das Palmeirinhas.

Compared with last year results, the estimated total biomass represented a reduction of more than seven times from last year level of 138 000 tonnes.

4.1.3 Other pelagic species.

This category includes a large number of pelagic species of the families Carangidae, Sphyraenidae, Trichiuridae, and Scombridae, usually mixed in a highly diverse pelagic community. This makes the abundance estimation with acoustics, at species level, practically impossible. For this reason all these species are treated together to give an idea of the order of magnitude of these resources. Figure 12 shows the distribution of 'pelagic fish type 2' for the region. Table 2 presents the catch rates of the main categories included in this group. The size distribution of the main species of this group in each area are presented in Annex 2.

'Pelagic fish type 2' were found distributed throughout the area in relatively low densities except for two patches, one south of Ambriz and the other at the latitude in front of Luanda. The biomass estimate was obtained using an overall average body length of 30.5 cm and resulted in a value of about 92 000 tonnes.

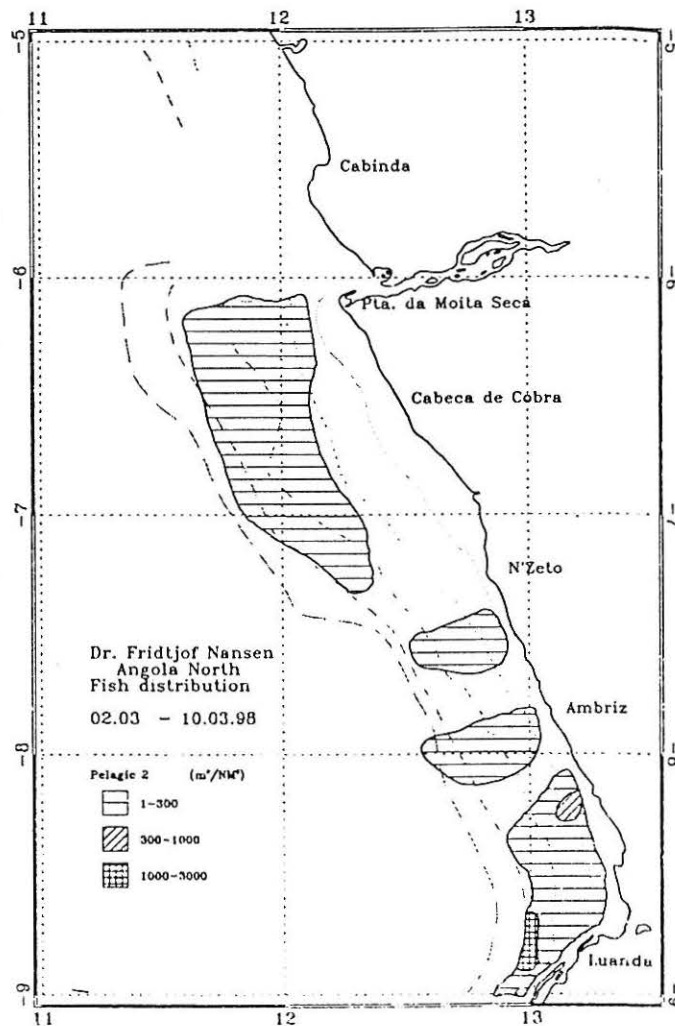


Figure 12. Distribution of other pelagic species. Congo River - Pta. das Palmeirinhas.

Carangids other than *Trachurus* sp. were the most important members of this group in the catches of this area. The most abundant species were African lookdown (*Selene dorsalis*) and Atlantic bumper (*Chloroscombrus chrysurus*). The former species was distributed in the whole depth range while the latter was found concentrated in water shallower than 100 m depth. Hairtails (*Trichiurus lepturus*), as usual, were found occupying a wide depth range and at the slope were recorded associated with small tunas preying on mesopelagic fish.

Table 2. Catch rates (kg/h) of main groups of pelagic fish. Cabinda - Pta. das Palmeirinhas.

St. No.	Oth. Caran.	Barracudas	Scombrids	Hairtails
1539	141.92			9.08
1540	3.60			4.41
1541	9.10			36.00
1542	15.38			
1543				
1544	15.38			
1545	15.16			79.60
1546	1.18		51.09	60.58
1547			22.45	0.31
1548				
1549	4.14	0.08	8.50	
1550	68.80		14.80	13.50
1551	6.46			
1552				250.50
1553	24.74		51.40	720.00
1554	0.48	5.58	2.54	
1555			7.29	
1556				20.90
1557	1215.71			183.34
1558	32.60	10.24		
1559	14.25	21.10	28.06	1.47
1560	7562.70	159.30	5.88	
1561	6148.90	69.30		
1562			1.31	
1563	290.80	85.75		39.75
1564	56.22	7.45	16.44	
1565			13.24	
1566	766.00	43.60	13.92	0.36
1567	2.46			271.78
1568	5.93	52.48		70.41
MEAN	546.73	15.16	7.90	58.73

4.2 Pta. Das Palmeirinhas - Benguela

4.2.1 Sardinella

Concentrations of both species of sardinella were found in the inner part of the shelf throughout the region, with highest concentrations south of Pta. das Palmeirinhas, between Cabo Sao Braz and Pta. do Morro, and between Cabeça da Baleia and Lobito. Figure 13 shows the distribution for this region of both species combined, with an indication of their relative densities expressed in ranked mean integrator values. The length distributions for round and flat sardinellas are presented in Figure 14. Mature individuals between 27 and 36 cm total body length dominated the size spectrum of this region in both species. The estimated biomass for sardinella was 389 000 tonnes distributed in 106 000 tonnes for round sardinella and 283 000 tonnes for flat sardinella.

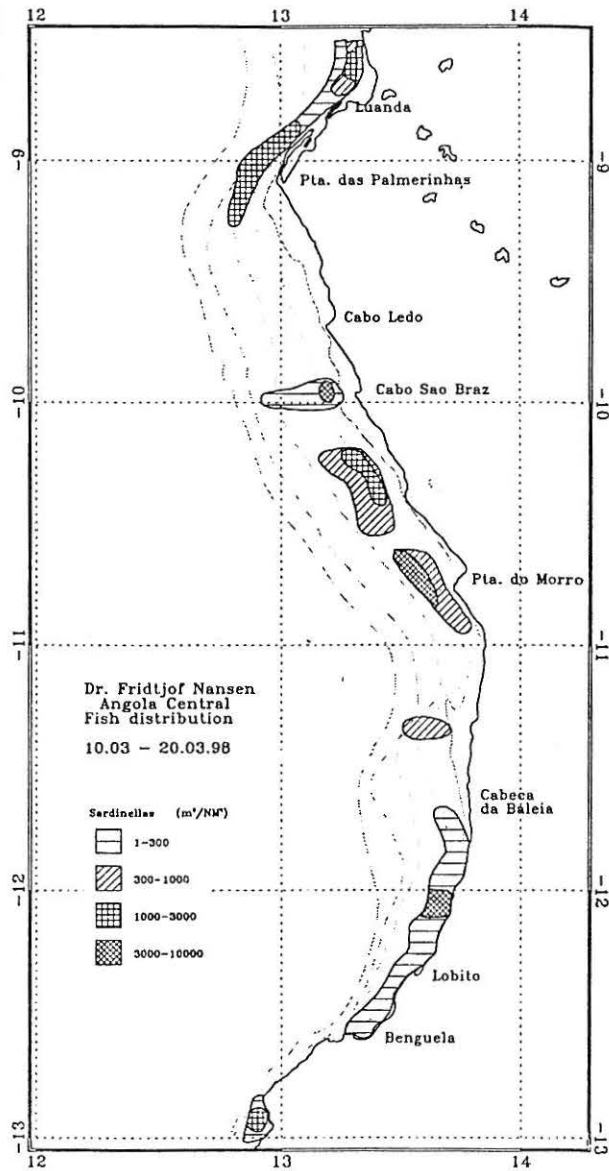


Figure 13. Distribution of *Sardinella* spp. Pta. das Palmeirinhas - Benguela.

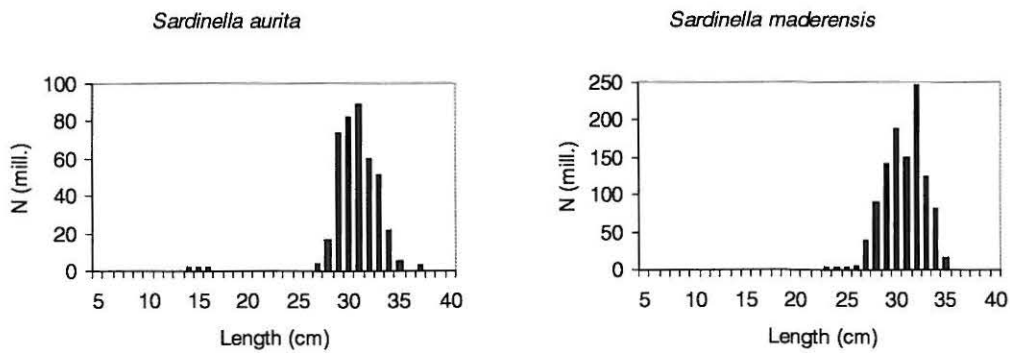


Figure 14. Total length distribution of round sardinella (*Sardinella aurita*) and flat sardinella (*S. maderensis*). Pta. das Palmeirinhas - Benguela.

4.2.2 Cunene horse mackerel

Horse mackerel were distributed over most of shelf in low densities (Figure 15). Larger concentrations were only found, close to the coast, south of Cabo Sao Braz, in front of Pta. do Morro and between Cabeça da Baleia and Lobito.

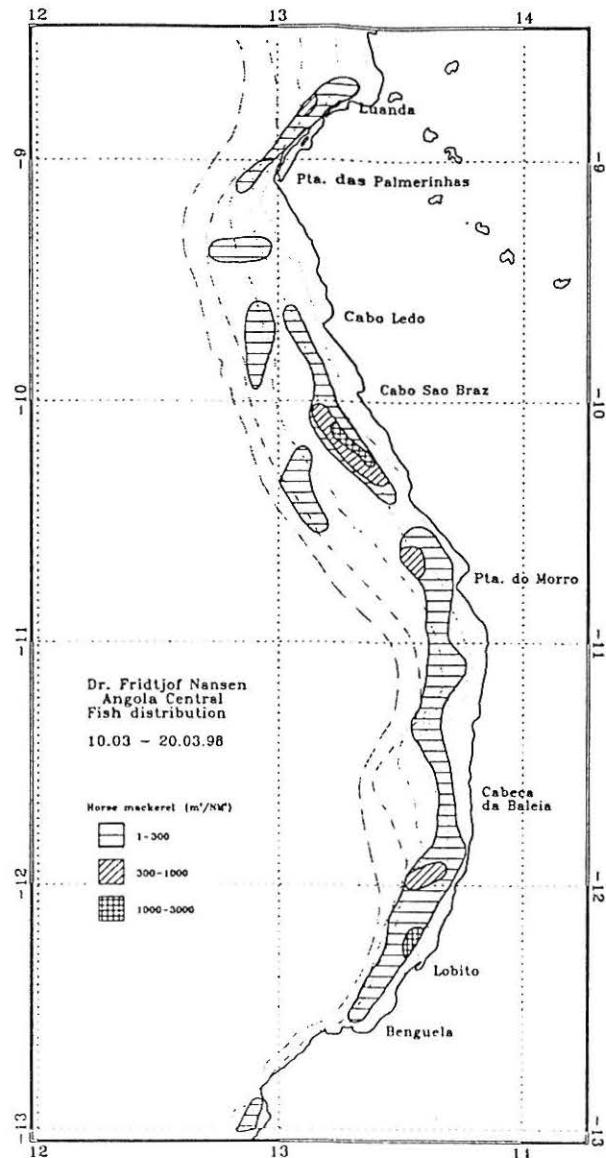


Figure 15. Distribution of horse mackerel (*Trachurus trecae*), Pta. das Palmeirinhas - Benguela.

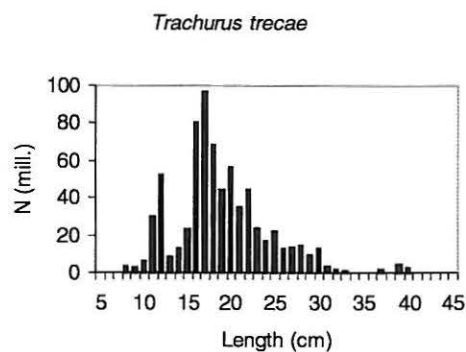


Figure 16. Total length distribution of horse mackerel (*Trachurus trecae*), Pta. das Palmeirinhas-Benguela.

Figure 16 presents the length distribution of *Cunene* horse mackerel in the central region.

A wide range of sizes were found in the samples of this region with several overlapping modes. A preliminary decomposition of the size distribution suggested that besides the mode around 18 cm found in the northern area, possible modes could be distinguished at 12, 22, 26 and 29 cm.

The estimated biomass for the central area was 58 000 tonnes.

4.2.3 Other pelagic species

Figure 17 shows that 'pelagic species type 2' were occupying most of the shelf but were found concentrated only off Cabo Sao Braz and in the outer shelf in front of Pta. do Morro.

Catch rates of the main components of this group of pelagic fish are presented in Table 3. Hairtails were found over the whole depth range but were particularly abundant close to the shelf break. As in the northern region, the most important species of 'other carangids' were *Selene dorsalis* and *Chloroscombrus chrysurus*. Barracudas (*Sphyraena sphyraena* and *S. guachancho*) were frequently caught at depths less than 100 m depth. Scombrids were represented by *Scomberomorus tritor* in shallow waters and by *Scomber japonicus*, *Sarda sarda* and *Euthynnus alletteratus* in the mid shelf and slope area.

The estimated biomass for the area was about 92 000 tonnes, using an average length of 30 cm.

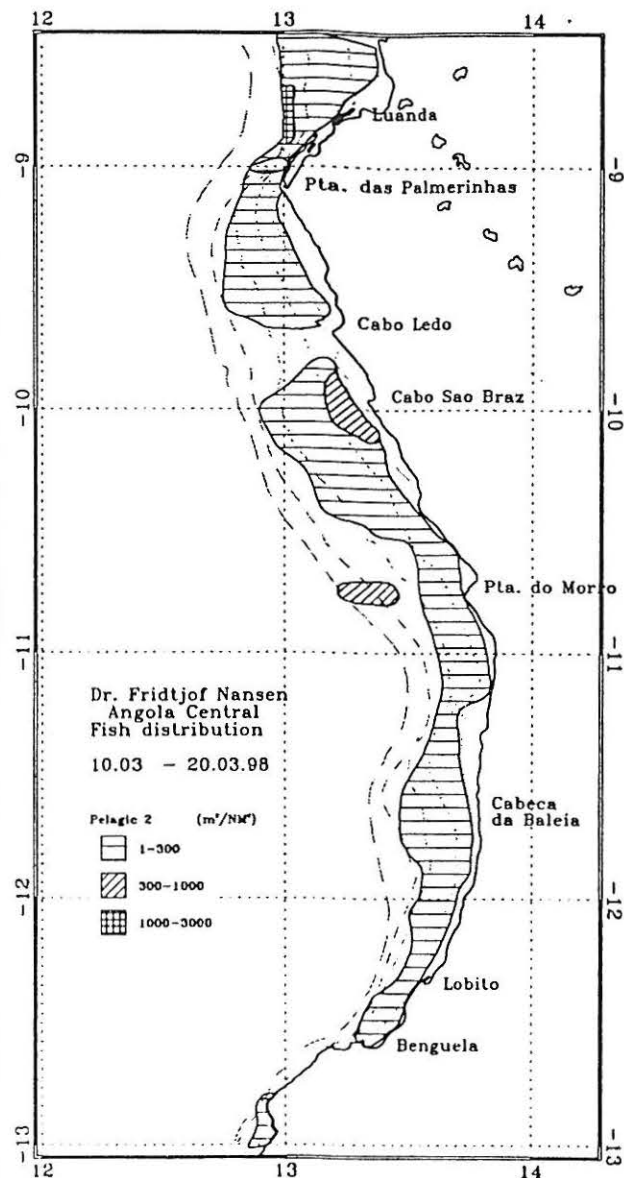


Figure 17. Distribution of other pelagic species, Pta. das Palmeirinhas - Benguela.

Table 3. Catch rates (kg/h) of main groups of pelagic fish. Pta. das Palmeirinhas - Benguela.

St. No.	Oth. Caran.	Barracudas	Scombrids	Hairtails
1569	2.31		2.03	764.31
1570		3.43	8.71	36.94
1571			3.30	
1572	150.00			85.80
1573	68.17	9.67	46.67	
1574	6.66		18.00	
1575	2.05		1.92	
1576	612.62	76.51	8.81	
1577		7.94		
1578	14.32	25.60	2.40	21.02
1579	42.00			
1580				
1581			17.70	
1582	108.00			23.74
1583	42.89	100.17	31.59	
1584	65.06	34.40		3.16
1585	187.40	8.60		24.60
1586	5.74	66.00		48.78
1587			4.54	12.32
1588		53.45	22.91	44.73
1589	14.57		0.89	2.57
1590				42.60
1591			10.05	
1592	6.30	7.44		
1593	15.84	1.56	25.00	19.20
1594	0.82	5.12		
1596	5.45			
1597	4.58	40.02		108.78
1598		160.59	45.03	9.64
1599				2.02
1600	142.50		2.85	204.00
1601	11			483
1602	80.75	509		90
MEAN	48.15	33.62	7.65	61.43

4.3. Benguela - Cunene

4.3.1 Sardinella

Round and flat sardinella were found forming discrete concentrations along the shelf of southern Angola from south of Benguela to Baía dos Tigres (Figure 18).

The length distributions for both round and flat sardinella are depicted in Figure 19. The distribution for both species show two distinct size groups. For flat sardinella, this is the result of combining the young sardinella from inside Baía dos Tigres with the mature fish of 28-38 cm body length that dominated the rest of the area. Similar spatial segregation was found in round sardinella except that young fish was also caught between Namibe and Tombua. Both species of sardinella in this region showed a better condition than the ones from the northern and central region; they had, in average, a body weight 10 % higher.

The biomass of sardinella in the southern region was estimated in 75 000 tonnes, 80% of which was flat sardinella.

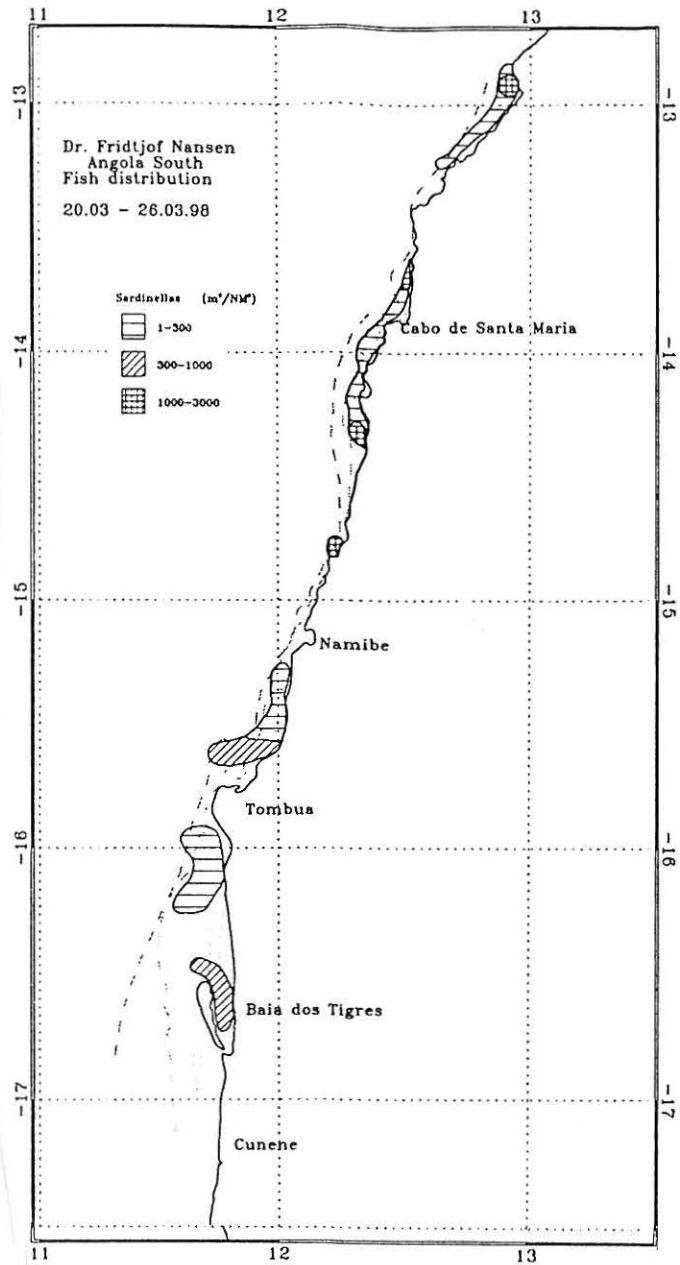


Figure 18. Distribution of *Sardinella* spp. Benguela - Cunene.

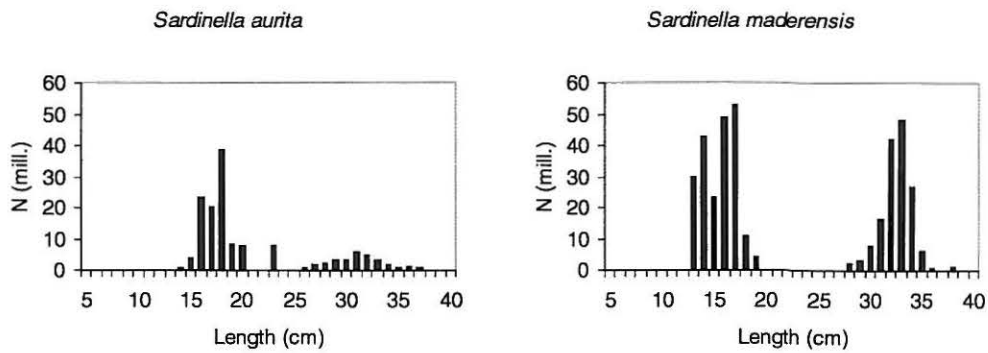


Figure 19. Total length distribution of round sardinella (*Sardinella aurita*) and flat sardinella (*S. maderensis*). Benguela - Tombua.

4.3.2 Horse mackerel

In southern Angola, two species of horse mackerel coexist: Cunene horse mackerel (*Trachurus trecae*) a typical species of the warm Angolan waters, and Cape horse mackerel (*Trachurus capensis*) a species associated with the cold waters of the Benguela Current. Figure 20 presents the distribution of both species combined in the form of strata of ranked mean integrator value. Horse mackerel occupied all the narrow shelf between Benguela and Tombua, and became specially abundant further south where the shelf widens.

An isolated sample of adult Cape horse mackerel was taken as north as Namibe but the main area of distribution of this species in southern Angola was located south of Tombua, in deep waters close to the beginning of the slope break. Cunene horse mackerel, on the other hand was found dominating the whole water column of the mid and inner shelf.

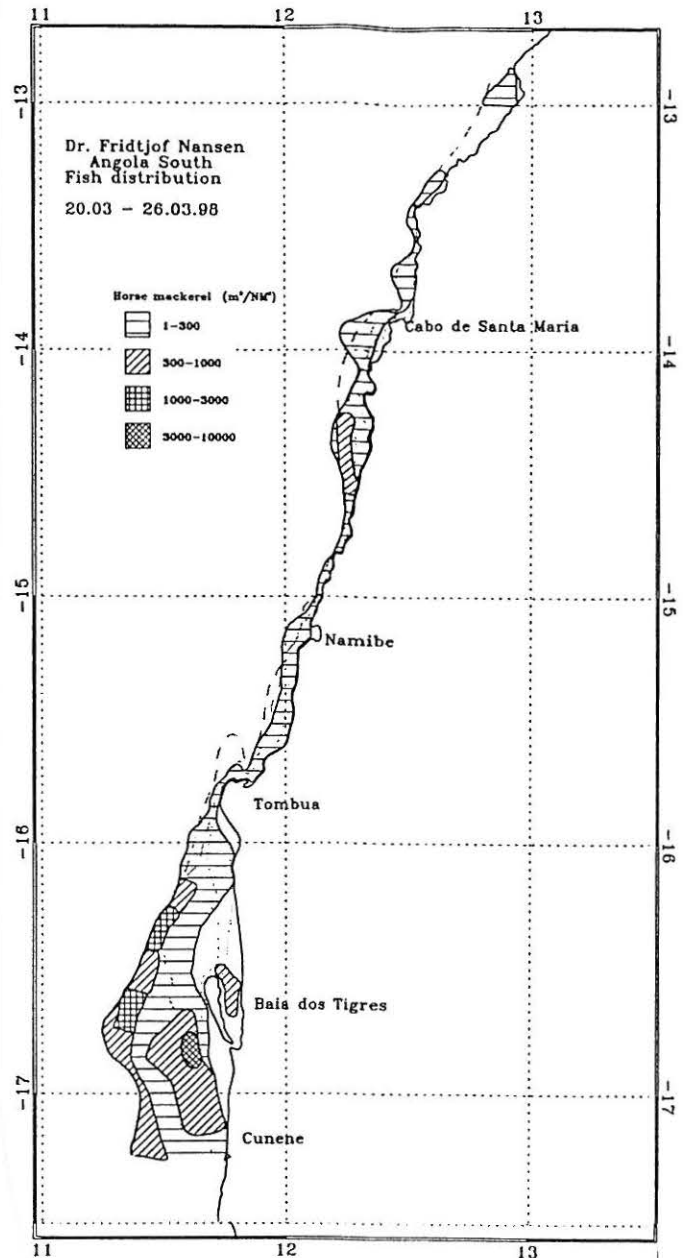


Figure 20. Distribution of horse mackerel. Benguela - Cunene.

Horse mackerel show a distinct day-night change in schooling behavior. During daytime, it remains aggregated in dense schools close to the bottom while during night it seems to disperse in the upper water column. Given the high concentrations of horse mackerel detected in this area, a small exercise of re-sampling three transects south of Tombua during the night was carried out on March 23-24 (Figure 3). The results of this analysis will be utilized for a separate study.

Figure 21 presents the size distributions of Cunene and Cape horse mackerel for the southern region.

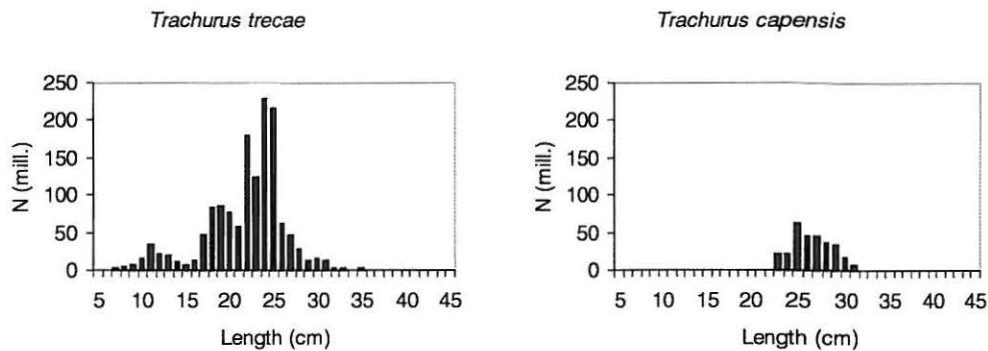


Figure 21. Total length distribution of Cunene horse mackerel (*Trachurus trecae*) and Cape horse mackerel (*T. capensis*). Benguela-Cunene.

The size distribution of Cunene horse mackerel presented 3 modes around 12, 19 and 24 cm body length. Cape horse mackerel consisted of fish between 21 and 31 cm body length with a less clear definition of modes.

The biomass estimate for horse mackerel in the southern region was 215 000 tonnes split in 163 000 tonnes for Cunene horse mackerel and 52 000 tonnes for Cape horse mackerel.

4.3.3 Other pelagic species

'Pelagic species type 2' were found along the shelf of southern Angola with an estimated biomass of 35 000 tonnes. The main group in this region was the hairtails, followed by the scombrids.

Among the other species of pelagic expected to be in the area, only the European anchovy (*Engraulis encrasicolus*) was caught in few trawls in small amounts. No acoustic registrations or catches of pilchard (*Sardinops ocellatus*) or round herring (*Etrumeus whiteheadi*) were recorded in the area and therefore no biomass estimation are presented.

Survey	Cunene-Benguela	Benguela-Luanda	Luanda-Cabinda	Benguela-Cabinda	TOTAL
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	510
2/94	*	245	290	535	535
1/95	*	140	24	164	
2/95	+	277	297	574	574
1/96	49	175	70	245	294
2/96	+	130	233	363	363
1/97		195	†300	495	495
1/98	75	389	†79	468	543

* not surveyed

† surveyed from Congo River to Pta das Palmerinhas

5.2 Horse mackerel

The most striking result of the present cruise was the low biomass estimate of horse mackerel for the Angolan shelf of about 239 000 tonnes. This estimate represented a reduction of more than 40 % from the same estimate for the warm season of 1997 considering the whole Angolan shelf, and a reduction of 60% if only the northern and central region are considered (Table 5).

It is difficult to assess what are the reasons for this apparent decrease in stock size of Cunene horse mackerel. On one hand, from the series of surveys carried out on board "Dr. Fridtjof Nansen" it seems clear that the distribution and characteristics of water masses on the Angolan shelf have an effect on the geographical distribution and schooling behaviour of pelagic species. For instance, during the warm season of 1995 extreme anomalies in the temperature

and salinity fields were recorded in the whole Angolan shelf to the extent of referring to this process as part of a Benguela 'el Niño phenomenon'. Low biomass estimates for both sardinella and horse mackerel were obtained during that survey, marking a decreasing change in an otherwise increasing trend in the time series before that cruise. A migration outside the survey area combined with a change in schooling behaviour were suggested as a possible explanation of the low estimates rather than a real decrease in stock size. In fact, in a second cruise carried out six months later during the cold season of 1995 more 'average' oceanographic conditions were found. The biomass estimates for sardinella and horse mackerel, in this case, agreed with the rest of the time series suggesting that no decrease of the stock biomass had taken place.

Survey	Cunene-Benguela	Benguela-Luanda	Luanda-Cabinda	Benguela-Cabinda	TOTAL
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

* not surveyed

† surveyed from Congo River- Pta das Palmerinhas

Abnormal conditions were not encountered during this survey and the biomass estimate for sardinella falls within the expected level.

For a better understanding of the change in the estimated biomass for Cunene horse mackerel between the last two cruises, the biomass per length class for the area Congo River - Benguela was obtained for both cruises (Figure 22). In the warm season of 1997, the biomass of fish

Survey	Cunene-Benguela	Benguela-Luanda	Luanda-Cabinda	Benguela-Cabinda	TOTAL
1/85	30	195	40	235	265
3/85	50	90	40	130	180
4/851/86	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

* not surveyed

† surveyed from Congo River- Pta das Palmerinhas

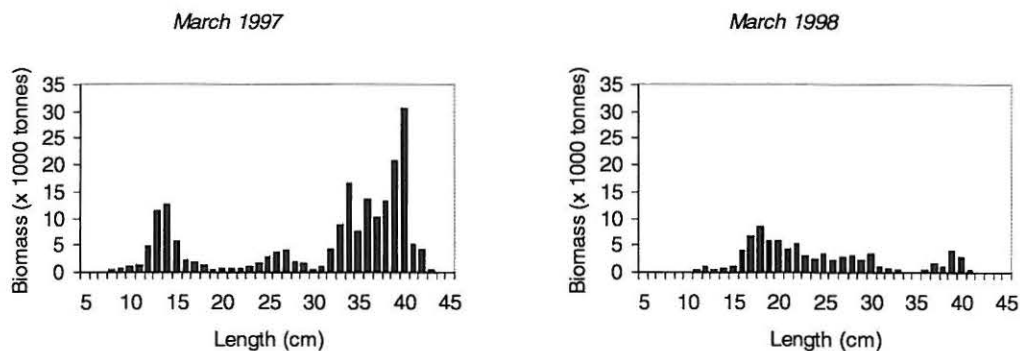


Figure 22. Estimated biomass per one centimetre length class of *Trachurus trecae* in the region Congo River - Benguela during March 1997 and March 1998.

5.3 Pilchard

No registrations in the echograms or catches of *Sardinops ocellata* were recorded during this cruise in the southern part of Angola.

larger than 30 cm accounted for 136 000 tonnes while in the same season in 1998 they only contributed with 15 000 tonnes. After taking this difference into account, the two estimates become more consistent. Although migration of mature fish outside the area can not be ruled out, it is also reasonable to suggest that commercial fisheries may have played an important role in the observed change and that there has been a real reduction of the stock biomass caused by a high fishing pressure on larger fish.

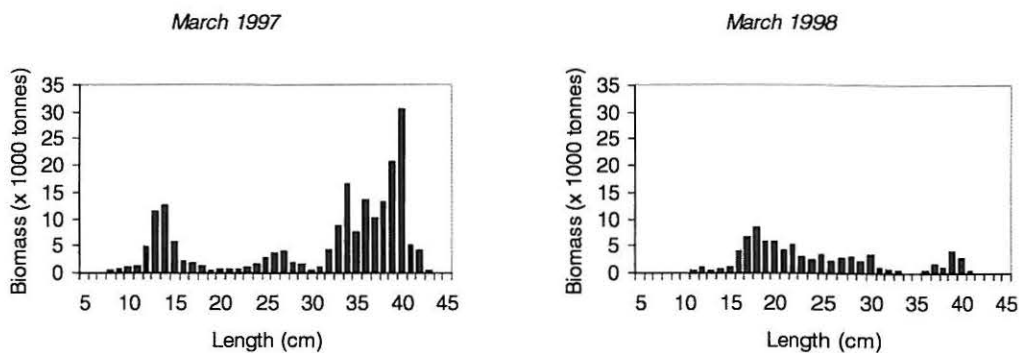


Figure 22. Estimated biomass per one centimetre length class of *Trachurus trecae* in the region Congo River - Benguela during March 1997 and March 1998.

Since this alarming result on the status of the stock of Cunene horse mackerel in Angola is based only on the results of this survey, it is recommended to complement this study with data from the commercial fisheries on total catch and size composition of the catch in the period concerned. It is also recommended to reduce fishing effort on Cunene horse mackerel to the minimum possible until the next pelagic cruise, to be carried out during the cold season of the current year, confirms or rejects the last results obtained.

Another result to consider is the estimated 52 000 tonnes for the biomass of Cape horse mackerel in southern Angola, still at a low level as compared to the estimates up to 1992 (Table 6). It is likely that this species, representative of the cold waters associated with the Benguela current system, migrates according to the position of the Angola - Benguela front and therefore constitutes an even more fluctuating resource for Angola.

Table 6 Biomass estimates of Cape horse mackerel by surveys (1 000 tonnes).		
Survey	Months	Biomass
1/85	Jan-Feb	170
2/85	Apr-May	75
3/85	Aug	220
4/85	Nov	270
1/86	Jan	40
2/86	Apr-May	10
1/89	Feb	125
2/89	Apr	135
3/89	Nov	240
1/91	Jun	310
2/91	Sep	95
3/92	Sep	247
2/95	Sep	63
1/96	Mar	0
2/96	Sep	40
1/97	Mar	20
1/98	Mar	52

5.3 Pilchard

No registrations in the echograms or catches of *Sardinops ocellata* were recorded during this cruise in the southern part of Angola.

Annex I Records of fishing stations

PROJECT STATION: 1539
 DATE: 3/ 3/98 GEAR TYPE: BT No: 2 POSITION: Lat S 610 Long E 1140
 start stop duration
 TIME :13:28:06 13:58:09 30 (min) Purpose code: 1
 LOG :5312.20 5313.62 1.38 Area code : 1
 FDEPTH: 117 112 GearCond.code: 1
 BDEPTH: 117 112 Validity code:
 Towing dir: 80ø Wire out: 400 m Speed: 30 kn*10
 Sorted: 65 Kg Total catch: 242.76 CATCH/HOUR: 485.52

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex congoensis	160.00	1920	32.95	
Selene dorsalis	140.80	864	29.09	3633
Trachurus trecae	104.80	1708	21.59	3632
Spicara alta	30.32	320	6.24	
Dentex angolensis	29.12	176	6.00	
Trichiurus lepturus	9.08	14	1.87	
Lepidotrigla cadmani	3.68	48	0.76	
Illex coindetii	2.96	40	0.61	
Boops boops	2.08	64	0.43	
Octopus vulgaris	1.52	2	0.31	
Chloroscombrus chrysurus	1.12	8	0.23	
Citharus linguatula	0.04	2	0.01	
Total	485.52		100.00	

PROJECT STATION: 1540
 DATE: 4/ 3/98 GEAR TYPE: BT No: 2 POSITION: Lat S 626 Long E 1202
 start stop duration
 TIME :01:02:07 01:22:02 20 (min) Purpose code: 1
 LOG :5413.22 5414.17 0.95 Area code : 1
 FDEPTH: 78 81 GearCond.code: 1
 BDEPTH: 78 81 Validity code:
 Towing dir: 180ø Wire out: 300 m Speed: 30 kn*10
 Sorted: 83 Kg Total catch: 179.84 CATCH/HOUR: 539.52

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex angolensis	102.60	546	19.02	
Brachydeuterus auritus	86.40	1608	16.01	
Dentex congoensis	72.00	1056	13.35	
Dentex canariensis	58.80	1056	10.90	
Umbrina canariensis	45.00	96	8.34	
NETTASTOMATIDAE	30.24	1854	5.60	
Lepidotrigla cadmani	20.07	99	3.72	
Epinephelus aeneus	19.50	6	3.61	
Cynoglossus canariensis	18.54	54	3.44	
Dentex barnardi	9.27	54	1.72	
Stromateus fiatola	9.18	9	1.70	
Cynoponticus ferrox	9.00	18	1.67	
Sepia bertheloti	6.84	324	1.27	
Mystriophis rostellatus	6.48	54	1.20	
Pomadasys incisus	4.80	15	0.89	
Sphoeroides sp.	4.50	27	0.83	
Octopus vulgaris	4.50	9	0.83	
Branchiostegus semifasciatus	4.41	9	0.82	
Trichiurus lepturus	4.41	9	0.82	
Uranoscopus sp.	3.69	27	0.68	
Raja miraletus	3.66	6	0.68	
Caranx crysos	3.60	45	0.67	
Conger conger	3.45	3	0.64	
Brotula barbata	2.70	27	0.50	
Dentex gibbosus	2.52	9	0.47	
Citharus linguatula	1.80	45	0.33	
Chaetodon hoefleri	1.44	9	0.33	
Arnoglossus imperialis	0.90	90	0.17	
Torpedo torpedo	0.57	3	0.11	
Parapeanaeus longirostris	0.54	162	0.10	
Solenocera africana	0.09	36	0.02	
Total	541.50		100.38	

PROJECT STATION: 1541
 DATE: 4/ 3/98 GEAR TYPE: PT No: 2 POSITION: Lat S 627 Long E 1152
 start stop duration
 TIME :02:55:31 03:25:22 30 (min) Purpose code: 1
 LOG :5425.48 5427.23 1.73 Area code : 1
 FDEPTH: 15 15 GearCond.code: 1
 BDEPTH: 112 112 Validity code:
 Towing dir: 260ø Wire out: 125 m Speed: 35 kn*10
 Sorted: 86 Kg Total catch: 256.47 CATCH/HOUR: 512.94

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	410.90	3210	80.11	3635
Sardinella aurita	56.00	232	10.92	3634
Trichiurus lepturus	36.00	46	7.02	
Selene dorsalis	7.56	42	1.47	
Chloroscombrus chrysurus	1.54	14	0.30	
Saurida brasiliensis	0.70	176	0.14	
Trachurus trecae	0.24	8	0.05	
Total	512.94		100.01	

PROJECT STATION: 1542
 DATE: 4/ 3/98 GEAR TYPE: PT No: 2 POSITION: Lat S 638 Long E 1151
 start stop duration
 TIME :07:27:36 07:57:20 30 (min) Purpose code: 1
 LOG :5463.10 5464.49 1.39 Area code : 1
 FDEPTH: 0 0 GearCond.code: 1
 BDEPTH: 130 136 Validity code: 1
 Towing dir: 262ø Wire out: 200 m Speed: 30 kn*10
 Sorted: Kg Total catch: 29.33 CATCH/HOUR: 58.66

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sphyrna lewini	40.00	2	68.19	
Selene dorsalis	14.34	104	24.45	3636
Sardinella maderensis	2.76	10	4.71	
Chloroscombrus chrysurus	1.04	2	1.77	
Sardinella aurita	0.52	2	0.89	
Total	58.66		100.01	

PROJECT STATION: 1543
 DATE: 4/ 3/98 GEAR TYPE: BT No: 2 POSITION: Lat S 633 Long E 1209
 start stop duration
 TIME :10:28:08 10:47:31 19 (min) Purpose code: 1
 LOG :5485.53 5486.52 0.97 Area code : 1
 FDEPTH: 54 51 GearCond.code: 8
 BDEPTH: 54 51 Validity code: 2
 Towing dir: 76ø Wire out: 240 m Speed: 30 kn*10
 Sorted: 45 Kg Total catch: 45.12 CATCH/HOUR: 142.48

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sparus caeruleostictus *	33.47	60	23.49	
Lutjanus agennes	30.32	3	21.28	
Epinephelus goreensis	17.68	3	12.41	
Plectorhinchus mediterraneus	11.24	6	7.89	
Dentex canariensis	8.91	13	6.25	
Acanthurus monroviae	7.67	9	5.38	
Epinephelus aeneus	7.23	3	5.07	
Lolligoncula mercatoris	7.20	4241	5.05	
Dentex barnardi	4.39	16	3.08	
Epinephelus costae	3.47	3	2.44	
Mustelus mustelus	2.75	3	1.93	
Zeus faber	1.96	3	1.38	
Raja miraletus	1.67	3	1.17	
Fistularia petimba	1.42	6	1.00	
Torpedo torpedo	1.39	3	0.98	
Pagellus bellottii	1.29	9	0.91	
Chaetodon hoefleri	0.41	3	0.29	
Total	142.47		100.00	

PROJECT STATION: 1544
 DATE: 4/ 3/98 GEAR TYPE: PT No: 2 POSITION: Lat S 647 Long E 1156
 start stop duration
 TIME :16:17:36 16:47:43 30 (min) Purpose code: 1
 LOG :5534.93 5537.02 2.05 Area code : 1
 FDEPTH: 15 15 GearCond.code: 1
 BDEPTH: 106 119 Validity code: 1
 Towing dir: 255ø Wire out: 200 m Speed: 40 kn*10
 Sorted: Kg Total catch: 8.69 CATCH/HOUR: 17.38

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachinotus ovatus	15.38	34	88.49	
Sardinella maderensis	1.24	4	7.13	
Naucrates ductor	0.76	2	4.37	
Total	17.38		99.99	

PROJECT STATION: 1545
 DATE: 4/ 3/98 GEAR TYPE: PT No: 2 POSITION: Lat S 651 Long E 1149
 start stop duration
 TIME :18:23:22 18:53:40 30 (min) Purpose code: 1
 LOG :5546.17 5548.15 1.82 Area code : 1
 FDEPTH: 0 0 GearCond.code: 1
 BDEPTH: 302 253 Validity code: 1
 Towing dir: 156ø Wire out: 200 m Speed: 33 kn*10
 Sorted: Kg Total catch: 66.10 CATCH/HOUR: 132.20

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	79.60	330	60.21	3637
MYCTOPHIDAE	14.54	11050	11.00	
Selene dorsalis	10.80	36	8.17	3639
Sardinella maderensis	9.74	64	7.37	3638
Shrimps, small, non comm.	7.00	13792	5.30	
Alloteuthis africana	4.76	1566	3.60	
Trachinotus ovatus	4.36	8	3.30	
Sardinella aurita	1.40	6	1.06	
Total	132.20		100.01	

PROJECT STATION:1546
 DATE: 4/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 660
 start stop duration Long E 1150
 TIME :21:01:10 21:32:10 31 (min) Purpose code: 1
 LOG :5560.76 5562.61 1.81 Area code : 1
 FDEPTH: 10 10 GearCond.code: 1
 BDEPTH: 416 362 Validity code: 1
 Towing dir: 76° Wire out: 175 m Speed: 35 kn*10
 Sorted: Kg Total catch: 95.61 CATCH/HOUR: 185.05

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	60.58	85	32.74	3641
MYCTOPHIDAE	57.68	23383	31.17	
Euthynnus alletteratus	32.32	31	17.47	
Auxis thazard	18.77	50	10.14	
Sardinella maderensis	11.65	68	6.30	3640
Shrimps, small, non comm.	1.57	619	0.85	
Sardinella aurita	1.30	6	0.70	
Selene dorsalis	1.18	2	0.64	
Total	185.05		100.01	

PROJECT STATION:1551
 DATE: 6/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 749
 start stop duration Long E 1250
 TIME :16:12:33 16:42:32 30 (min) Purpose code: 1
 LOG :5914.55 5916.78 2.13 Area code : 1
 FDEPTH: 15 15 GearCond.code: 1
 BDEPTH: 90 100 Validity code: 1
 Towing dir: 243° Wire out: 200 m Speed: 40 kn*10
 Sorted: Kg Total catch: 3.59 CATCH/HOUR: 7.18

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Caranx crysos	4.90	2	68.25	
Trachinotus ovatus	1.56	2	21.73	
Naucrates ductor	0.72	2	10.03	
Total	7.18		100.01	

PROJECT STATION:1547
 DATE: 5/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 716
 start stop duration Long E 1208
 TIME :04:34:45 05:06:04 31 (min) Purpose code: 1
 LOG :5628.89 5631.11 2.17 Area code : 1
 FDEPTH: 15 15 GearCond.code: 1
 BDEPTH: 254 209 Validity code: 1
 Towing dir: 75° Wire out: 175 m Speed: 35 kn*10
 Sorted: Kg Total catch: 16.39 CATCH/HOUR: 31.72

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Auxis thazard	22.45	75	70.78	
Alloteuthis africana	5.09	1603	16.05	
MYCTOPHIDAE	3.87	3910	12.20	
Trichiurus lepturus	0.31	2	0.98	
Total	31.72		100.01	

PROJECT STATION:1552
 DATE: 6/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 754
 start stop duration Long E 1240
 TIME :18:07:27 18:23:12 16 (min) Purpose code: 1
 LOG :5928.12 5928.96 0.82 Area code : 1
 FDEPTH: 50 55 GearCond.code: 1
 BDEPTH: 222 166 Validity code: 1
 Towing dir: 53° Wire out: 200 m Speed: 30 kn*10
 Sorted: Kg Total catch: 302.70 CATCH/HOUR: 1135.13

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
MYCTOPHIDAE	884.63	395483	77.93	
Trichiurus lepturus	250.50	735	22.07	
Total	1135.13		100.00	

PROJECT STATION:1548
 DATE: 5/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 729
 start stop duration Long E 1231
 TIME :15:39:46 16:09:43 30 (min) Purpose code: 1
 LOG :5729.89 5731.93 1.98 Area code : 1
 FDEPTH: 15 15 GearCond.code: 1
 BDEPTH: 114 107 Validity code: 1
 Towing dir: 68° Wire out: 175 m Speed: 35 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:1553
 DATE: 6/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 757
 start stop duration Long E 1245
 TIME :22:05:31 22:56:34 30 (min) Purpose code: 1
 LOG :5953.05 5954.79 1.73 Area code : 1
 FDEPTH: 5 5 GearCond.code: 1
 BDEPTH: 120 117 Validity code: 1
 Towing dir: 69° Wire out: 175 m Speed: 35 kn*10
 Sorted: 66 Kg Total catch: 433.40 CATCH/HOUR: 866.80

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	720.00	1260	83.06	
MYCTOPHIDAE	61.60	77000	7.11	
Auxis thazard	27.40	72	3.16	3647
Euthynnus alletteratus	24.00	16	2.77	3648
Selene dorsalis	23.60	56	2.72	3646
Saurida brasiliensis	8.40	2720	0.97	
Trachinotus ovatus	1.14	2	0.13	
Trachurus trecae	0.66	22	0.08	
Total	866.80		100.00	

PROJECT STATION:1549
 DATE: 6/ 3/98 GEAR TYPE: PT No: 1 POSITION:Lat S 736
 start stop duration Long E 1255
 TIME :01:36:28 02:06:22 30 (min) Purpose code: 1
 LOG :5821.36 5823.44 2.04 Area code : 1
 FDEPTH: 10 10 GearCond.code: 1
 BDEPTH: 36 42 Validity code: 1
 Towing dir: 243° Wire out: 175 m Speed: 35 kn*10
 Sorted: 8 Kg Total catch: 8.29 CATCH/HOUR: 16.58

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Scomberomorus tritor	8.50	8	51.27	
Alectis alexandrinus	3.00	4	18.09	
Sardinella maderensis	2.04	144	12.30	3642
Alloteuthis africana	1.40	374	8.44	
Trachinotus ovatus	1.02	2	6.15	
Sardinella aurita	0.12	10	0.72	
Boops boops	0.10	10	0.60	
Sphyraena sphyraena	0.08	2	0.48	
Saurida brasiliensis	0.08	18	0.48	
Brachydeuterus auritus	0.08	22	0.48	
Decapterus punctatus	0.08	8	0.48	
Bregmaceros sp.	0.04	64	0.24	
Decapterus rhonchus	0.04	2	0.24	
Total	16.58		99.97	

PROJECT STATION:1554
 DATE: 7/ 3/98 GEAR TYPE: PT No: 1 POSITION:Lat S 751
 start stop duration Long E 1300
 TIME :01:21:31 01:51:29 30 (min) Purpose code: 1
 LOG :5971.50 5973.53 1.99 Area code : 1
 FDEPTH: 15 15 GearCond.code: 1
 BDEPTH: 47 33 Validity code: 1
 Towing dir: 78° Wire out: 175 m Speed: 35 kn*10
 Sorted: 26 Kg Total catch: 25.78 CATCH/HOUR: 51.56

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	30.00	836	58.18	3649
Ilisha africana	6.62	120	12.84	
Sphyraena guachancho	5.58	32	10.82	
Scomberomorus tritor	2.54	4	4.93	
Brachydeuterus auritus	2.42	62	4.69	
Tylosurus acus rafale	1.36	2	2.64	
Brachydeuterus auritus	0.74	494	1.44	
Saurida brasiliensis	0.70	168	1.36	
Cypselurus sp.	0.62	2	1.20	
Chloroscombrus chrysurus	0.28	8	0.54	
Alloteuthis africana	0.26	98	0.50	
Bregmaceros sp.	0.20	660	0.39	
Selene dorsalis	0.20	2	0.39	
Penaeus notialis	0.02	2	0.04	
Engraulis encrasicolus	0.02	8	0.04	
Total	51.56		100.00	

PROJECT STATION:1550
 DATE: 6/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 741
 start stop duration Long E 1243
 TIME :04:05:38 04:35:36 30 (min) Purpose code: 1
 LOG :5837.68 5839.77 2.08 Area code : 1
 FDEPTH: 15 15 GearCond.code: 1
 BDEPTH: 100 94 Validity code: 1
 Towing dir: 65° Wire out: 175 m Speed: 35 kn*10
 Sorted: Kg Total catch: 89.50 CATCH/HOUR: 179.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Selene dorsalis	51.50	172	28.77	3643
Brachydeuterus auritus	45.50	458	25.42	
Sardinella maderensis	27.60	148	15.42	3644
Trachinotus ovatus	17.30	36	9.66	
Trichiurus lepturus	13.50	32	7.54	
Auxis thazard	10.36	10	5.79	
Scomber japonicus	4.44	2	2.48	
Sardinella aurita	4.40	24	2.46	3645
Saurida brasiliensis	2.36	330	1.32	
Naucrates ductor	1.44	10	0.80	
Trachurus trecae	0.60	10	0.34	
Total	179.00		100.00	

PROJECT STATION:1555
 DATE: 7/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 801
 start stop duration Long E 1249
 TIME :05:02:34 05:16:51 14 (min) Purpose code: 1
 LOG :6000.36 6001.26 0.89 Area code : 1
 FDEPTH: 40 40 GearCond.code: 1
 BDEPTH: 115 114 Validity code: 1
 Towing dir: 60° Wire out: 180 m Speed: 35 kn*10
 Sorted: Kg Total catch: 1.70 CATCH/HOUR: 7.29

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Euthynnus alletteratus	7.29	9	100.00	
Total	7.29		100.00	

PROJECT STATION:1556
DATE: 7/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 807
start stop duration Long E 1249
TIME :07:59:08 08:04:55 6 (min) Purpose code: 1
LOG :6021.80 6022.11 0.32 Area code : 1
FDEPTH: 121 119 GearCond.code: 1
BDEPTH: 121 119 Validity code: 1
Towing dir: 246° Wire out: 460 m Speed: 30 kn*10
Sorted: Kg Total catch: 6.11 CATCH/HOUR: 61.10

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Trichiurus lepturus	20.90	40	34.21
Dentex congolensis	16.70	620	27.33
Dentex angolensis	9.20	60	15.06
Fistularia petimba	6.20	10	10.15
Spicara alta	2.40	50	3.93
Dentex barnardi	2.40	10	3.93
Saurida brasiliensis	1.90	640	3.11
Illex coindetii	1.40	70	2.29
Total	61.10		100.01

PROJECT STATION:1557
DATE: 7/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 804
start stop duration Long E 1256
TIME :09:33:28 09:54:12 21 (min) Purpose code: 1
LOG :6032.16 6033.26 1.10 Area code : 1
FDEPTH: 104 111 GearCond.code: 1
BDEPTH: 104 111 Validity code: 1
Towing dir: 248° Wire out: 400 m Speed: 30 kn*10
Sorted: 155 Kg Total catch: 3001.32 CATCH/HOUR: 8575.20

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Brachydeuterus auritus	3647.14	40120	42.53
Trachurus trecae	3371.14	45751	39.31
Selene dorsalis	1215.71	5060	14.18
Trichiurus lepturus	183.34	526	2.14
Sepia officinalis hierredda	46.66	66	0.54
Atractoscion aequidens	41.00	40	0.48
Sardinella aurita	38.77	329	0.45
Epinephelus goreensis	31.43	3	0.37
Total	8575.19		100.00

PROJECT STATION:1558
DATE: 7/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 803
start stop duration Long E 1310
TIME :12:28:58 12:59:12 30 (min) Purpose code: 1
LOG :6054.06 6055.85 1.78 Area code : 1
FDEPTH: 24 24 GearCond.code: 1
BDEPTH: 24 24 Validity code: 1
Towing dir: 150° Wire out: 125 m Speed: 35 kn*10
Sorted: 125 Kg Total catch: 340.85 CATCH/HOUR: 681.70

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Galeoides decadactylus	345.40	1130	50.67
Ilisha africana	118.00	5342	17.31
Brachydeuterus auritus	106.60	1884	15.64
Chloroscombrus chrysurus	20.40	340	2.99
Pseudolithus senegalensis	20.00	16	2.93
Pseudolithus typus	18.10	46	2.66
Selene dorsalis	12.20	360	1.79
Sphyraena guachancho	10.24	26	1.50
Arius parkii	9.72	10	1.43
Sardinella maderensis	8.40	126	1.23
Pteroscion pelli	4.20	180	0.62
Panulirus regius	3.96	8	0.58
Cynoglossus browni	1.82	2	0.27
Stromateus fiatola	1.78	2	0.26
Gymnura micrura	0.52	2	0.08
Penaeus notialis	0.36	6	0.05
Total	681.70		100.01

PROJECT STATION:1559
DATE: 7/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 810
start stop duration Long E 1307
TIME :19:15:03 19:46:03 31 (min) Purpose code: 1
LOG :6109.18 6110.97 1.76 Area code : 1
FDEPTH: 10 10 GearCond.code: 1
BDEPTH: 57 70 Validity code: 1
Towing dir: 248° Wire out: 175 m Speed: 35 kn*10
Sorted: Kg Total catch: 110.23 CATCH/HOUR: 213.35

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Sardinella maderensis	71.03	656	33.29
Brachydeuterus auritus	46.06	497	21.59
Trachurus trecae	24.58	406	11.52
Sphyraena guachancho	21.10	39	9.89
Euthynnus alletteratus	12.97	19	6.08
Sarda sarda	9.48	8	4.44
Chloroscombrus chrysurus	6.91	43	3.24
Decapterus rhonchus	6.31	50	2.96
Scomberomorus tritor	5.61	4	2.63
Saurida brasiliensis	3.29	377	1.54
Sardinella aurita	1.88	37	0.88
Trichiurus lepturus	1.47	2	0.69
Selene dorsalis	1.03	6	0.48
Alloteuthis africana	0.62	83	0.29
Naucrates ductor	0.58	2	0.27
Engraulis encrasicolus	0.43	31	0.20
Total	213.35		99.99

PROJECT STATION:1560
DATE: 7/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 814
start stop duration Long E 1311
TIME :22:13:55 22:34:22 20 (min) Purpose code: 1
LOG :6132.03 6133.27 1.21 Area code : 1
FDEPTH: 10 10 GearCond.code: 1
BDEPTH: 49 43 Validity code: 1
Towing dir: 67° Wire out: 175 m Speed: 35 kn*10
Sorted: 68 Kg Total catch: 2982.76 CATCH/HOUR: 8948.28

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Chloroscombrus chrysurus	7465.50	98967	83.43
Brachydeuterus auritus	783.00	22731	8.75
Sardinella maderensis	351.00	5130	3.92
Sphyraena guachancho	159.30	675	1.78
Selene dorsalis	97.20	1350	1.09
Ilisha africana	43.20	945	0.48
Sepia officinalis hierredda	22.95	135	0.26
Saurida brasiliensis	8.10	2025	0.09
Sarda sarda	5.88	6	0.07
Alloteuthis africana	5.40	1350	0.06
Trachurus trecae	5.40	135	0.06
Engraulis encrasicolus	1.35	540	0.02
Total	8948.28		100.01

PROJECT STATION:1561
DATE: 8/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 819
start stop duration Long E 1313
TIME :00:00:37 03:29:20 30 (min) Purpose code: 1
LOG :6180.11 6182.14 1.98 Area code : 1
FDEPTH: 15 15 GearCond.code: 1
BDEPTH: 47 58 Validity code: 1
Towing dir: 250° Wire out: 175 m Speed: 40 kn*10
Sorted: 53 Kg Total catch: 4510.43 CATCH/HOUR: 9020.86

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Chloroscombrus chrysurus	6077.50	133960	67.37
Sardinella maderensis	1853.00	22100	20.54
Brachydeuterus auritus	812.60	18360	9.01
Ilisha africana	129.20	2380	1.43
Selene dorsalis	47.60	680	0.53
Sphyraena sphyraena	37.80	2	0.42
Sphyraena guachancho	31.50	60	0.35
Decapterus rhonchus	23.80	170	0.26
Squalus megalops	7.86	2	0.09
Total	9020.86		100.00

PROJECT STATION:1562
DATE: 8/ 3/98 GEAR TYPE: PT No: 1 POSITION:Lat S 831
start stop duration Long E 1318
TIME :12:00:41 12:40:33 40 (min) Purpose code: 1
LOG :6252.36 6255.15 2.72 Area code : 1
FDEPTH: 10 10 GearCond.code: 1
BDEPTH: 32 49 Validity code: 1
Towing dir: 260° Wire out: 200 m Speed: 40 kn*10
Sorted: 1 Kg Total catch: 0.87 CATCH/HOUR: 1.31

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Scomberomorus tritor	1.31	2	100.00
Total	1.31		100.00

PROJECT STATION:1563
DATE: 8/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 833
start stop duration Long E 1320
TIME :13:53:35 14:17:33 24 (min) Purpose code: 1
LOG :6264.69 6266.04 1.34 Area code : 1
FDEPTH: 20 18 GearCond.code: 1
BDEPTH: 20 18 Validity code: 1
Towing dir: 350° Wire out: 100 m Speed: 30 kn*10
Sorted: 106 Kg Total catch: 645.74 CATCH/HOUR: 1614.35

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Pomadasys jubelini	415.00	2040	25.71
Chloroscombrus chrysurus	261.25	4838	16.18
Brachydeuterus auritus	217.50	12223	13.47
Pteroscion pelli	140.75	4233	8.72
Arius parkii	94.00	75	5.82
Sphyraena guachancho	85.75	450	5.31
Pseudolithus senegalensis	83.75	148	5.19
Ilisha africana	80.50	615	4.99
Galeoides decadactylus	60.75	475	3.76
Trichiurus lepturus	39.75	350	2.46
Stromateus fiatola	37.00	100	2.29
Selene dorsalis	22.00	1400	1.36
Penaeus notialis	18.25	363	1.13
Drepane africana	16.75	25	1.04
Rhizoprionodon acutus	15.25	25	0.94
Pomadasys incisus	14.25	75	0.88
Trachinotus teraia	7.55	3	0.47
Sardinella maderensis	3.53	53	0.22
Panulirus regius	0.78	3	0.05
Total	1614.36		99.99

PROJECT STATION:1564
 DATE: 8/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 837
 start stop duration Long E 1318
 TIME :16:13:51 16:46:49 33 (min) Purpose code: 1
 LOG :6282.21 6284.52 2.31 Area code : 1
 FDEPTH: 20 20 GearCond.code: 1
 BDEPTH: 38 53 Validity code:
 Towing dir: 268ø Wire out: 130 m Speed: 40 kn*10

Sorted: Kg Total catch: 160.94 CATCH/HOUR: 292.62

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	130.82	2460	44.71	3667
Rhizoprionodon acutus	43.64	13	14.91	
Sardinella aurita	37.27	465	12.74	3668
Alectis alexandrinus	29.45	7	10.06	
Chloroscombrus chrysurus	22.55	353	7.71	3669
Scomberomorus tritor	14.73	7	5.03	
Sphyræna guachancho	7.45	11	2.55	
Selene dorsalis	4.22	25	1.44	
Sarda sarda	1.71	2	0.58	
Sepia juveniles	0.47		0.16	
Lagocephalus laevisgatus	0.31	93	0.11	
Total	292.62		100.00	

PROJECT STATION:1568
 DATE: 9/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 853
 start stop duration Long E 1306
 TIME :21:27:37 21:44:36 17 (min) Purpose code: 1
 LOG :6411.11 6412.27 1.14 Area code : 1
 FDEPTH: 20 18 GearCond.code: 1
 BDEPTH: 81 97 Validity code:
 Towing dir: 270ø Wire out: 100 m Speed: 40 kn*10

Sorted: Kg Total catch: 65.26 CATCH/HOUR: 230.33

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	70.41	311	30.57	
Sphyræna guachancho	52.48	4	22.78	
Sardinella aurita	45.88	187	19.92	3674
Sardinella maderensis	38.65	166	16.78	3675
Trachurus trecae	8.65	25	3.76	
MYCTOPHIDAE	7.76	4285	3.37	
Selene dorsalis	5.93	14	2.57	
GADIDAE	0.28	85	0.12	
Alloteuthis africana	0.28	85	0.12	
Total	230.32		99.99	

PROJECT STATION:1569
 DATE:10/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 900
 start stop duration Long E 1253
 TIME :00:38:01 00:50:40 13 (min) Purpose code: 1
 LOG :6434.53 6435.18 0.62 Area code : 1
 FDEPTH: 18 18 GearCond.code: 1
 BDEPTH: 251 243 Validity code: 1
 Towing dir: 60ø Wire out: 175 m Speed: 40 kn*10

Sorted: Kg Total catch: 189.49 CATCH/HOUR: 874.57

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	764.31	4205	87.39	3678
Sardinella maderensis	67.15	231	7.68	3676
MYCTOPHIDAE	23.26	30531	2.66	
Sardinella aurita	15.51	55	1.77	3677
Trachinotus ovatus	2.31		0.26	
Auxis thazard	2.03	5	0.23	
Total	874.57		99.99	

PROJECT STATION:1570
 DATE:10/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 907
 start stop duration Long E 1249
 TIME :04:18:56 04:39:52 21 (min) Purpose code: 1
 LOG :6463.01 6464.56 1.54 Area code : 2
 FDEPTH: 18 18 GearCond.code: 1
 BDEPTH: 116 131 Validity code: 1
 Towing dir: 360ø Wire out: 175 m Speed: 45 kn*10

Sorted: Kg Total catch: 56.78 CATCH/HOUR: 162.23

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	98.00	409	60.41	3679
Trichiurus lepturus	36.94	57	22.77	
Sardinella aurita	15.14	60	9.33	3680
Auxis thazard	8.71	9	5.37	
Sphyræna guachancho	3.43	3	2.11	
Total	162.22		99.99	

PROJECT STATION:1571
 DATE:10/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 918
 start stop duration Long E 1257
 TIME :11:32:10 12:02:18 30 (min) Purpose code: 1
 LOG :6515.01 6516.99 1.96 Area code : 1
 FDEPTH: 15 15 GearCond.code: 1
 BDEPTH: 35 45 Validity code:
 Towing dir: 270ø Wire out: 175 m Speed: 40 kn*10

Sorted: Kg Total catch: 1.65 CATCH/HOUR: 3.30

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Scomberomorus tritor	3.30	4	100.00	
Total	3.30		100.00	

PROJECT STATION:1572
 DATE:10/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 923
 start stop duration Long E 1248
 TIME :15:45:36 15:49:38 4 (min) Purpose code: 1
 LOG :6548.45 6548.69 0.24 Area code : 1
 FDEPTH: 113 114 GearCond.code: 1
 BDEPTH: 113 114 Validity code: 1
 Towing dir: 360ø Wire out: 450 m Speed: 30 kn*10

Sorted: Kg Total catch: 20.21 CATCH/HOUR: 303.15

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Selene dorsalis	150.00	360	49.48	
Trichiurus lepturus	85.80	105	28.30	
Brachydeuterus auritus	13.50	75	4.45	
Umbrina canariensis	9.60	60	3.17	
Lagocephalus laevisgatus	9.30	15	3.07	
Pterothrissus bellocci	7.95	45	2.62	
Dentex angolensis	6.15	30	2.03	
Zeus faber	6.00	15	1.98	
Sepia juveniles	5.25	795	1.73	
Engraulis encrasicolus	4.35	930	1.43	
Dentex macrophthalmus	2.55	15	0.84	
Monolene microstoma	0.90	30	0.30	
Boops boops	0.75	15	0.25	
Trachurus trecae	0.60	15	0.20	
Parapenaeus longirostris	0.30	75	0.10	
Thorogobius angolensis	0.15	210	0.05	
Total	303.15		100.00	

PROJECT STATION:1565
 DATE: 8/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 843
 start stop duration Long E 1300
 TIME :19:46:37 20:15:48 29 (min) Purpose code: 1
 LOG :6309.89 6311.61 1.72 Area code : 1
 FDEPTH: 0 0 GearCond.code: 1
 BDEPTH: 185 233 Validity code:
 Towing dir: 270ø Wire out: 175 m Speed: 35 kn*10

Sorted: Kg Total catch: 106.70 CATCH/HOUR: 220.76

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
MYCTOPHIDAE	206.07	143882	93.35	
Euthynnus alletteratus	13.24	10	6.00	
Naucrates ductor	1.45	2	0.66	
Total	220.76		100.01	

PROJECT STATION:1566
 DATE: 8/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 843
 start stop duration Long E 1315
 TIME :22:50:50 23:05:58 15 (min) Purpose code: 1
 LOG :6331.03 6331.89 0.88 Area code : 1
 FDEPTH: 10 10 GearCond.code: 1
 BDEPTH: 55 59 Validity code: 1
 Towing dir: 270ø Wire out: 175 m Speed: 40 kn*10

Sorted: 71 Kg Total catch: 287.46 CATCH/HOUR: 1149.84

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	765.20	8984	66.55	3671
Brachydeuterus auritus	122.80	12820	10.68	
Rhizoprionodon acutus	51.20	16	4.45	
Sardinella maderensis	47.20	484	4.10	3670
Hemicaranx bicolor	46.80	180	4.07	
Sphyræna guachancho	43.60	72	3.79	
Trachurus trecae	22.40	268	1.95	3735
MYCTOPHIDAE	21.20		1.84	
Sarda sarda	13.92	16	1.21	
Echeneis naucrates	9.44	16	0.82	
Alloteuthis africana	1.60	288	0.14	
Ilisha africana	1.40		0.12	
Sepia officinalis hierredda	0.80	20	0.07	
Selene dorsalis	0.80	20	0.07	
Saurida brasiliensis	0.56	128	0.05	
Engraulis encrasicolus	0.56	128	0.05	
Trichiurus lepturus	0.36	36	0.03	
Bregmaceros sp.	0.20	72	0.02	
Total	1150.04		100.01	

PROJECT STATION:1567
 DATE: 9/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 848
 start stop duration Long E 1308
 TIME :17:23:33 18:00:27 37 (min) Purpose code: 1
 LOG :6383.40 6385.46 2.02 Area code : 1
 FDEPTH: 65 55 GearCond.code: 1
 BDEPTH: 90 80 Validity code: 1
 Towing dir: 90ø Wire out: 150 m Speed: 33 kn*10

Sorted: Kg Total catch: 528.72 CATCH/HOUR: 857.38

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	409.78	861	47.79	3673
Trichiurus lepturus	271.78	563	31.70	3674
Alopias superciliosus	162.16	2	18.91	
Stromateus fiatola	11.19	16	1.31	
Selene dorsalis	2.46	6	0.29	
Total	857.37		100.00	

PROJECT STATION:1573
 DATE:10/ 3/98 GEAR TYPE: PT No: 1 POSITION:Lat S 928
 start stop duration Long E 1304
 TIME :18:53:58 19:11:50 18 (min) Purpose code: 1
 LOG :6575.55 6576.66 1.09 Area code : 1
 FDEPTH: 15 10 GearCond.code: 1
 BDEPTH: 30 24 Validity code: 1
 Towing dir: 90ø Wire out: 150 m Speed: 35 kn*10
 Sorted: Kg Total catch: 41.83 CATCH/HOUR: 139.43

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Scomberomorus tritor	46.67	37	33.47	
Selene dorsalis	40.67	77	29.17	3681
Trachinotus ovatus	16.33	33	11.71	
Sphyræna guanchancho	9.67	33	6.94	
Decapterus rhonchus	7.77	167	5.57	3682
Albula vulpes	7.33	17	5.26	
Trachinotus gorensis	3.40	3	2.44	
Brachydeuterus auritus	1.73	763	1.24	
Sardinella spp. (juv.)	1.30	37	0.93	
Sardinella maderensis	1.30	3	0.93	
Alloteuthis africana	1.23	23	0.88	
Trachurus trecae	1.23	20	0.88	
Sardinella aurita	0.80	7	0.57	
Total		139.43		99.99

PROJECT STATION:1577
 DATE:11/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 959
 start stop duration Long E 1308
 TIME :21:23:47 21:36:36 13 (min) Purpose code: 1
 LOG :6787.05 6787.92 0.85 Area code : 2
 FDEPTH: 20 20 GearCond.code: 1
 BDEPTH: 68 61 Validity code: 1
 Towing dir: 90ø Wire out: 130 m Speed: 40 kn*10
 Sorted: 98 Kg Total catch: 195.16 CATCH/HOUR: 900.74

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella aurita	592.62	2566	65.79	3691
Sardinella maderensis	286.15	1394	31.77	3690
Alloteuthis africana	9.60		1.07	
Sphyræna guanchancho	7.94		0.88	
Todaropsis eblanæ	2.31		0.26	
Saurida brasiliensis	2.12		0.24	
Total		900.74		100.01

PROJECT STATION:1578
 DATE:12/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 1010
 start stop duration Long E 1317
 TIME :05:00:01 05:29:57 30 (min) Purpose code: 1
 LOG :6854.93 6856.73 1.76 Area code : 2
 FDEPTH: 50 45 GearCond.code: 1
 BDEPTH: 50 45 Validity code: 1
 Towing dir: 340ø Wire out: 220 m Speed: 31 kn*10
 Sorted: 95 Kg Total catch: 911.23 CATCH/HOUR: 1822.46

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	1264.80	37814	69.40	3692
Pagellus bellottii	239.94	1972	13.17	
Trachurus trecae	111.60	892	6.12	3693
Galeoides decadactylus	52.26	74	2.87	
Pomadasys incisus	36.80	112	2.02	
Sphyræna guanchancho	25.60	38	1.40	
Trichiurus lepturus	21.02	38	1.15	
Pseudolithus typus	18.00	16	0.99	
Pomadasys jubelini	12.80	14	0.70	
Selene dorsalis	9.30	94	0.51	
Pteroscion pelli	8.92	18	0.49	
Decapterus rhonchus	5.02	38	0.28	
Citharus linguatula	4.66	18	0.26	
Penaeus notialis	3.90	18	0.21	
Arius parkii	3.80	2	0.21	
Sarda sarda	2.40	2	0.13	
Argyrosomus hololepidotus	1.64	2	0.09	
Total		1822.46		100.00

PROJECT STATION:1574
 DATE:11/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 939
 start stop duration Long E 1256
 TIME :03:39:52 04:10:12 30 (min) Purpose code: 1
 LOG :6652.33 6654.15 1.79 Area code : 2
 FDEPTH: 10 10 GearCond.code: 1
 BDEPTH: 103 94 Validity code: 1
 Towing dir: 90ø Wire out: 175 m Speed: 40 kn*10
 Sorted: Kg Total catch: 23.97 CATCH/HOUR: 47.94

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Saurida brasiliensis	22.00	4120	45.89	
Auxis thazard	18.00	68	37.55	
Selene dorsalis	6.66	14	13.89	3683
Trachurus trecae	1.06	26	2.21	3684
Sepia juveniles	0.12	34	0.25	
Lagocephalus laevigatus	0.10	18	0.21	
Total		47.94		100.00

PROJECT STATION:1575
 DATE:11/ 3/98 GEAR TYPE: PT No: 1 POSITION:Lat S 954
 start stop duration Long E 1312
 TIME :16:53:31 17:24:28 31 (min) Purpose code: 1
 LOG :6758.06 6759.90 1.82 Area code : 1
 FDEPTH: 10 10 GearCond.code: 1
 BDEPTH: 32 42 Validity code: 1
 Towing dir: 270ø Wire out: 130 m Speed: 35 kn*10
 Sorted: Kg Total catch: 2.05 CATCH/HOUR: 3.97

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Selene dorsalis	2.05	2	51.64	
Scomberomorus tritor	1.92	2	48.36	
Total		3.97		100.00

PROJECT STATION:1579
 DATE:12/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 1016
 start stop duration Long E 1305
 TIME :10:22:33 10:38:41 16 (min) Purpose code: 1
 LOG :6897.65 6898.50 0.82 Area code : 2
 FDEPTH: 112 114 GearCond.code: 1
 BDEPTH: 112 114 Validity code: 1
 Towing dir: 270ø Wire out: 400 m Speed: 30 kn*10
 Sorted: Kg Total catch: 55.63 CATCH/HOUR: 208.61

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	108.75	2138	52.13	3694
Seriola carpenteri	42.00	4	20.13	
Raja miraletus	10.54	19	5.05	
Ommastrephes pteropus	9.26		4.44	
Dentex angolensis	7.05	56	3.38	
Zeus faber	6.00	23	2.88	
Pagellus bellottii	5.66	79	2.71	
Sepia bertheloti	5.10	4	2.44	
Brachydeuterus auritus	4.28	30	2.05	
Chelidonichthys gabonensis	3.79	34	1.82	
Lagocephalus laevigatus	2.85	8	1.37	
Fistularia petimba	1.54	4	0.74	
Saurida brasiliensis	0.94	176	0.45	
Dentex macrophthalmus	0.45	4	0.22	
Citharus linguatula	0.41	11	0.20	
Total		208.62		100.01

PROJECT STATION:1576
 DATE:11/ 3/98 GEAR TYPE: PT No: 1 POSITION:Lat S 959
 start stop duration Long E 1312
 TIME :19:39:24 20:11:00 32 (min) Purpose code: 1
 LOG :6776.76 6778.58 1.79 Area code : 2
 FDEPTH: 15 15 GearCond.code: 1
 BDEPTH: 40 27 Validity code: 1
 Towing dir: 90ø Wire out: 130 m Speed: 35 kn*10
 Sorted: 133 Kg Total catch: 818.25 CATCH/HOUR: 1534.22

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	571.50	6075	37.25	3688
Sardinella maderensis - Juv.	272.25	5228	17.75	3686
Brachydeuterus auritus	246.38	11936	16.06	3689
Sardinella maderensis	135.00	653	8.80	3685
Ilisha africana	109.69	1654	7.15	3687
Galeoides decadactylus	56.03	304	3.65	
Sphyræna guanchancho	51.38	68	3.35	
Sphyræna sphyraena	25.13	338	1.64	
Selene dorsalis	21.71	180	1.42	
Caranx crysos	12.04	23	0.78	
Scomberomorus tritor	8.81	2	0.57	
Stromateus fiatola	7.69	9	0.50	
Alectis alexandrinus	7.37	9	0.48	
Pagellus bellottii	3.53	11	0.23	
Pomadasys rogeri	2.08	4	0.14	
Total		1530.59		99.77

PROJECT STATION:1580
 DATE:12/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 1015
 start stop duration Long E 1312
 TIME :12:03:55 12:20:33 17 (min) Purpose code: 1
 LOG :6909.69 6910.71 1.05 Area code : 2
 FDEPTH: 25 25 GearCond.code: 1
 BDEPTH: 90 93 Validity code: 1
 Towing dir: 270ø 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:1581
 DATE:12/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 1015 Long E 1318
 TIME :13:45:48 13:49:30 4 (min) Purpose code: 1
 LOG :6920.92 6921.16 0.25 Area code : 2
 FDEPTH: 25 25 GearCond.code: 1
 BDEPTH: 65 67 Validity code: 1
 Towing dir: 270° Wire out: 170 m Speed: 40 kn*10
 Sorted: Kg Total catch: 4.57 CATCH/HOUR: 68.55

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	50.85	195	74.18	3695
Sarda sarda	17.70	15	25.82	
Total	68.55		100.00	

PROJECT STATION:1582
 DATE:12/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 1016 Long E 1320
 TIME :14:55:26 15:02:09 7 (min) Purpose code: 1
 LOG :6927.65 6927.96 0.30 Area code : 2
 FDEPTH: 57 58 GearCond.code: 1
 BDEPTH: 57 58 Validity code: 1
 Towing dir: 160° Wire out: 220 m Speed: 30 kn*10
 Sorted: 77 Kg Total catch: 967.71 CATCH/HOUR: 8294.66

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	7841.14	72789	94.53	3696
Trachurus trecae	216.00	754	2.60	
Chloroscombrus chrysurus	108.00	1080	1.30	
Pagellus bellottii	92.83	651	1.12	
Trichiurus lepturus	23.74	214	0.29	
Dentex angolensis	12.94	111	0.16	
Total	8294.65		100.00	

PROJECT STATION:1583
 DATE:12/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 1020 Long E 1320
 TIME :17:55:05 18:18:02 23 (min) Purpose code: 1
 LOG :6951.99 6953.49 1.48 Area code : 2
 FDEPTH: 20 25 GearCond.code: 1
 BDEPTH: 68 60 Validity code: 1
 Towing dir: 90° Wire out: 150 m Speed: 40 kn*10
 Sorted: Kg Total catch: 942.35 CATCH/HOUR: 2458.30

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	1526.09	6198	62.08	3698
Sardinella aurita	313.04	1174	12.73	3697
Trachurus trecae	284.87	1268	11.59	3699
Brachydeuterus auritus	159.65	1268	6.49	
Sphyræna guachancho	100.17	16	4.07	
Chloroscombrus chrysurus	42.89	344	1.74	
Euthynnus alletteratus	24.26	13	0.99	
Euthynnus alletteratus	7.33	5	0.30	
Total	2458.30		99.99	

PROJECT STATION:1584
 DATE:13/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 1024 Long E 1323
 TIME :00:32:27 01:02:35 30 (min) Purpose code: 1
 LOG :7008.30 7010.39 2.03 Area code : 2
 FDEPTH: 25 25 GearCond.code: 1
 BDEPTH: 66 71 Validity code: 1
 Towing dir: 270° Wire out: 180 m Speed: 40 kn*10
 Sorted: 77 Kg Total catch: 696.70 CATCH/HOUR: 1393.40

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella aurita	963.48	3944	69.15	3701
Sardinella maderensis	294.80	1242	21.16	3700
Chloroscombrus chrysurus	44.26	426	3.18	
Sphyræna guachancho	34.40	54	2.47	
Brachydeuterus auritus	27.52	240	1.98	
Selene dorsalis	20.80	36	1.49	
Trichiurus lepturus	3.16	18	0.23	
Trachurus trecae	3.16	92	0.23	
Engraulis encrasicolus	1.66	352	0.12	
Saurida brasiliensis	0.18	92	0.01	
Total	1393.42		100.02	

PROJECT STATION:1585
 DATE:13/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 1034 Long E 1338
 TIME :11:44:38 12:14:37 30 (min) Purpose code: 1
 LOG :7096.24 7097.80 1.53 Area code : 2
 FDEPTH: 30 24 GearCond.code: 1
 BDEPTH: 30 24 Validity code: 1
 Towing dir: 90° Wire out: 120 m Speed: 35 kn*10
 Sorted: Kg Total catch: 557.29 CATCH/HOUR: 1114.58

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	606.00	82416	54.37	
Chloroscombrus chrysurus	170.00	1514	15.25	3702
Panulirus regius	110.00	170	9.87	
Sarpa salpa	70.00	110	6.28	
Galeoides decadactylus	52.00	420	4.67	
Pomadasys rogeri	26.60	270	2.39	
Trichiurus lepturus	24.60	50	2.21	
Selene dorsalis	17.40	220	1.56	
Pseudolithus moorii	12.00	20	1.08	
Sphyræna guachancho	8.60	40	0.77	
Dentex barnardi	7.20	30	0.65	
Pomadasys jubelini	4.70	20	0.42	
Cynoglossus canariensis	2.70	10	0.24	
Pagellus bellottii	2.30	10	0.21	
Lagocephalus laevigatus	0.20	10	0.02	
Pteroscion pelli	0.14	140	0.01	
Total	1114.44		100.00	

PROJECT STATION:1586
 DATE:13/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 1040 Long E 1332
 TIME :14:38:28 15:01:22 23 (min) Purpose code: 1
 LOG :7120.28 7121.59 1.30 Area code : 2
 FDEPTH: 76 73 GearCond.code: 1
 BDEPTH: 76 73 Validity code: 1
 Towing dir: 340° Wire out: 320 m Speed: 30 kn*10
 Sorted: Kg Total catch: 1013.00 CATCH/HOUR: 2642.61

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	1870.96	12827	70.80	3703
Trachurus trecae	373.04	3185	14.12	3704
Brachydeuterus auritus	170.17	12180	6.44	
Sphyræna guachancho	66.00	57	2.50	
Trachurus trecae	63.13	172	2.39	3705
Trichiurus lepturus	48.78	201	1.85	
Pseudolithus senegalensis	17.22	29	0.65	
Dentex barnardi	13.83	86	0.52	
Zeus faber	8.61	57	0.33	
Selene dorsalis	5.74	29	0.22	
Dentex angolensis	4.43	86	0.17	
Pagellus bellottii	0.78	29	0.03	
Total	2642.69		100.02	

PROJECT STATION:1587
 DATE:13/ 3/98 GEAR TYPE: PT No: 1 POSITION:Lat S 1046 Long E 1320
 TIME :21:01:30 21:31:17 30 (min) Purpose code: 1
 LOG :7170.56 7172.31 1.73 Area code : 2
 FDEPTH: 17 20 GearCond.code: 1
 BDEPTH: 217 270 Validity code: 1
 Towing dir: 270° Wire out: 150 m Speed: 35 kn*10
 Sorted: Kg Total catch: 30.63 CATCH/HOUR: 61.26

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
MYCTOPHIDAE	44.40	22200	72.48	
Trichiurus lepturus	12.32	92	20.11	3706
Sarda sarda	2.60	2	4.24	
Euthynnus alletteratus	1.94	2	3.17	
Total	61.26		100.00	

PROJECT STATION:1588
 DATE:14/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 1046 Long E 1336
 TIME :00:22:17 00:33:02 11 (min) Purpose code: 1
 LOG :7193.15 7193.86 0.70 Area code : 2
 FDEPTH: 30 30 GearCond.code: 1
 BDEPTH: 73 77 Validity code: 1
 Towing dir: 270° Wire out: 150 m Speed: 40 kn*10
 Sorted: 61 Kg Total catch: 456.80 CATCH/HOUR: 2491.64

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	1722.27	6775	69.12	3708
Sardinella aurita	634.09	2291	25.45	3707
Sphyræna guachancho	53.45	38	2.15	
Trichiurus lepturus	44.73	82	1.80	
Scomber japonicus	22.91	38	0.92	
Trachurus trecae	12.55	38	0.50	
Engraulis encrasicolus	1.64	409	0.07	
Total	2491.64		100.01	

PROJECT STATION:1589
DATE:14/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 1051
start stop duration Long E 1336
TIME :03:38:19 03:59:37 21 (min) Purpose code: 1
LOG :7218.67 7219.88 1.20 Area code : 2
FDEPTH: 10 10 GearCond.code:
BDEPTH: 92 83 Validity code:
Towing dir: 90ø Wire out: 175 m Speed: 40 kn*10
Sorted: Kg Total catch: 7.96 CATCH/HOUR: 22.74

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Selene dorsalis	14.57	26	64.07	
Lagocephalus laevigatus	4.71	20	20.71	
Trichiurus lepturus	2.57	3	11.30	
Auxis thazard	0.89	3	3.91	
Alloteuthis africana	0.00	3		
Total	22.74		99.99	

PROJECT STATION:1590
DATE:14/ 3/98 GEAR TYPE: BT No: POSITION:Lat S 1056
start stop duration Long E 1336
TIME :07:51:53 08:22:07 30 (min) Purpose code: 1
LOG :7252.77 7254.38 1.57 Area code : 2
FDEPTH: 109 120 GearCond.code: 1
BDEPTH: 109 120 Validity code: 1
Towing dir: 270ø Wire out: 400 m Speed: 30 kn*10
Sorted: Kg Total catch: 165.33 CATCH/HOUR: 330.66

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	100.80	550	30.48	3711
Pentheroscion mbizi	57.00	334	17.24	
Trachurus trecae	48.20	676	14.58	3710
Trichiurus lepturus	42.60	126	12.88	3712
Umbrina canariensis	25.00	104	7.56	
Dentex macrophthalmus	11.20	54	3.39	
Dentex angolepis	9.80	44	2.96	
Dentex barnardi	6.10	26	1.84	
Torpedo torpedo	5.76	16	1.74	
Pterothrissus belloci	4.76	124	1.44	
Brotula barbata	4.06	8	1.23	
Zeus faber	3.80	32	1.15	
Epinephelus goreensis	3.20	2	0.97	
Pagellus bellottii	2.06	14	0.62	
Raja miraletus	1.38	2	0.42	
Alloteuthis africana	1.20	4200	0.36	
Uranoscopus polli	1.20	6	0.36	
Scorpaena normani	0.88	4	0.27	
Shrimps, small, non comm.	0.54	184	0.16	
Pteroscion peli	0.32	2	0.10	
Engraulis encrasicolus	0.22	110	0.07	
Saurida brasiliensis	0.22	10	0.07	
Parapanaeus longirostris	0.22	22	0.07	
Todaropsis eblanae	0.14	2	0.04	
Total	330.66		100.00	

PROJECT STATION:1591
DATE:15/ 3/98 GEAR TYPE: PT No: 1 POSITION:Lat S 1111
start stop duration Long E 1339
TIME :08:44:28 09:15:45 31 (min) Purpose code: 1
LOG :7339.75 7341.74 1.88 Area code : 2
FDEPTH: 80 80 GearCond.code: 1
BDEPTH: 111 98 Validity code: 1
Towing dir: 90ø Wire out: 250 m Speed: 40 kn*10
Sorted: Kg Total catch: 5.19 CATCH/HOUR: 10.05

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sarda sarda	10.05	8	100.00	
Total	10.05		100.00	

PROJECT STATION:1592
DATE:15/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 1122
start stop duration Long E 1339
TIME :14:00:43 14:11:02 10 (min) Purpose code: 1
LOG :7379.80 7380.42 0.63 Area code : 2
FDEPTH: 36 35 GearCond.code:
BDEPTH: 36 35 Validity code:
Towing dir: 360ø Wire out: 140 m Speed: 30 kn*10
Sorted: Kg Total catch: 6.81 CATCH/HOUR: 40.86

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pomadasy peroteti	15.90	12	38.91	
Pagellus bellottii	8.46	48	20.70	
Sphyræna guachancho	7.44	12	18.21	
Selene dorsalis	6.30	12	15.42	
Dentex barnardi	1.80	6	4.41	
Sepia orbignyana	0.54	6	1.32	
Alloteuthis africana	0.42	126	1.03	
Total	40.86		100.00	

PROJECT STATION:1593
DATE:16/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 1143
start stop duration Long E 1340
TIME :01:53:07 02:22:59 30 (min) Purpose code: 1
LOG :7487.44 7489.21 1.73 Area code : 2
FDEPTH: 10 10 GearCond.code:
BDEPTH: 65 76 Validity code:
Towing dir: 268ø Wire out: 175 m Speed: 40 kn*10
Sorted: Kg Total catch: 58.11 CATCH/HOUR: 116.22

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	49.20	184	42.33	3713
Euthynnus alletteratus	25.00	22	21.51	
Trichiurus lepturus	19.20	56	16.52	
Selene dorsalis	9.80	18	8.43	
Trachinotus ovatus	3.74	10	3.22	
Caranx crysos	2.30	2	1.98	
Brachydeuterus auritus	2.26	14	1.94	
Sphyræna guachancho	1.56	2	1.34	
Sardinella aurita	1.08	4	0.93	
Alloteuthis africana	0.96		0.83	
Trachurus trecae	0.74	10	0.64	3714
Saurida brasiliensis	0.26	68	0.22	
Engraulis encrasicolus	0.12	178	0.10	
Total	116.22		99.99	

PROJECT STATION:1594
DATE:16/ 3/98 GEAR TYPE: PT No: 1 POSITION:Lat S 1153
start stop duration Long E 1343
TIME :07:47:31 08:17:25 30 (min) Purpose code: 1
LOG :7534.40 7536.18 1.75 Area code : 2
FDEPTH: 10 20 GearCond.code: 1
BDEPTH: 41 60 Validity code: 1
Towing dir: 270ø Wire out: 150 m Speed: 35 kn*10
Sorted: Kg Total catch: 4.25 CATCH/HOUR: 8.50

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sphyræna guachancho	5.12	6	60.24	
Sardinella maderensis	2.56	8	30.12	3715
Chloroscombrus chrysurus	0.82	2	9.65	
Total	8.50		100.01	

PROJECT STATION:1596
DATE:16/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 1158
start stop duration Long E 1340
TIME :14:35:10 15:00:37 25 (min) Purpose code: 1
LOG :7587.13 7589.04 1.89 Area code : 2
FDEPTH: 20 20 GearCond.code: 1
BDEPTH: 59 61 Validity code: 1
Towing dir: 360ø Wire out: 110 m Speed: 40 kn*10
Sorted: Kg Total catch: 92.97 CATCH/HOUR: 223.13

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	164.88	854	73.89	3717
Sardinella aurita	52.80	206	23.66	3718
Trachinotus ovatus	5.45	12	2.44	
Total	223.13		99.99	

PROJECT STATION:1597
DATE:16/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 1156
start stop duration Long E 1340
TIME :15:30:42 16:00:51 30 (min) Purpose code: 1
LOG :7591.05 7592.43 1.36 Area code : 2
FDEPTH: 60 58 GearCond.code: 1
BDEPTH: 60 58 Validity code: 1
Towing dir: 180ø Wire out: 240 m Speed: 30 kn*10
Sorted: Kg Total catch: 359.95 CATCH/HOUR: 719.90

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	333.00	35890	46.26	
Trichiurus lepturus	108.78	74	15.11	
Pomadasy incisus	108.04	548	15.01	
Pagellus bellottii	56.08	310	7.79	
Sphyræna guachancho	37.20	2	5.17	
Trachurus trecae	18.64	208	2.59	3719
Dentex barnardi	16.14	104	2.24	
Trachurus trecae, juvenile	9.84	458	1.37	3720
Raja miraletus	6.22	8	0.86	
Lithognathus mormyrus	6.14	14	0.85	
Torpedo torpedo	4.74	8	0.66	
Selene dorsalis	4.58	30	0.64	
Zeus faber	3.26	22	0.45	
Sphyræna guachancho	2.82	8	0.39	
Pseudotolithus senegalensis	1.98	8	0.28	
Bembrops heterurus	1.78	30	0.25	
Fistularia petimba	0.30	8	0.04	
Pseudupeneus prayensis	0.22	8	0.03	
Scorpaena normani	0.14	8	0.02	
Total	719.90		100.01	

PROJECT STATION:1598
 DATE:16/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 1204
 start stop duration Long E 1337
 TIME :18:15:11 18:32:24 17 (min) Purpose code: 1
 LOG :7607.90 7609.02 1.14 Area code : 2
 FDEPTH: 20 20 GearCond.code: 1
 BDEPTH: 70 50 Validity code: 1
 Towing dir: 90ø Wire out: 100 m Speed: 40 kn*10
 Sorted: Kg Total catch: 480.48 CATCH/HOUR: 1695.81

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Sardinella maderensis	678.53 2605	40.01	3722
Trachurus trecae	443.82 3565	26.17	3721
Sardinella aurita	291.18 1228	17.17	3723
Sphyraena guachancho	141.18 7	8.33	
Scomber japonicus	35.75 88	2.11	
Brachydeuterus auritus	35.47 1553	2.09	
Lagocephalus laevigatus	23.93 18	1.41	
Sphyraena guachancho	19.41 35	1.14	
Trichiurus lepturus	9.64 46	0.57	
Sarda sarda	9.28 11	0.55	
Sepia bertheloti	4.24 11	0.25	
Saurida brasiliensis	2.40 247	0.14	
Alloteuthis africana	0.64 247	0.04	
Engraulis encrasicolus	0.35 212	0.02	
Total	1695.82	100.00	

PROJECT STATION:1602
 DATE:18/ 3/98 GEAR TYPE: PT No: 2 POSITION:Lat S 1257
 start stop duration Long E 1252
 TIME :02:43:31 02:55:47 12 (min) Purpose code: 1
 LOG :7852.77 7853.70 0.93 Area code : 2
 FDEPTH: 25 25 GearCond.code: 1
 BDEPTH: 72 73 Validity code: 1
 Towing dir: 360ø Wire out: 120 m Speed: 40 kn*10
 Sorted: 102 Kg Total catch: 609.75 CATCH/HOUR: 3048.75

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Sardinella maderensis	1862.50 5600	61.09	3733
Sphyraena guachancho	480.00 25	15.74	
Trachurus trecae	362.50 2950	11.89	3734
Trichiurus lepturus	90.00 600	2.95	
Selene dorsalis	80.75 225	2.65	
Sardinella aurita	71.00 175	2.33	3732
Stromateus fiatola	47.25 50	1.55	
Sphyraena guachancho	29.00 25	0.95	
Engraulis encrasicolus	26.75 7300	0.88	
Total	3049.75	100.03	

PROJECT STATION:1599
 DATE:17/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 1209
 start stop duration Long E 1327
 TIME :07:57:06 08:27:01 30 (min) Purpose code: 1
 LOG :7713.41 7714.83 1.43 Area code : 2
 FDEPTH: 110 108 GearCond.code: 1
 BDEPTH: 110 108 Validity code: 1
 Towing dir: 192ø Wire out: 400 m Speed: 30 kn*10
 Sorted: Kg Total catch: 214.38 CATCH/HOUR: 428.76

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Dentex macrophthalmus	252.00 1864	58.77	
Boops boops	93.00 1138	21.69	
Trachurus trecae	28.50 486	6.65	3725
Dentex angolensis	24.00 124	5.60	
Zeus faber	9.48 18	2.21	
Pagellus bellottii	7.68 90	1.79	
Dentex barnardi	6.48 18	1.51	
Dentex gibbosus	2.70 6	0.63	
Trichiurus lepturus	2.02 4	0.47	
Raja miraletus	1.54 4	0.36	
Chaetodon hoefleri	0.84 6	0.20	
Chelidonicichthys capensis	0.28 4	0.07	
Illex coindetii	0.24 12	0.06	
Total	428.76	100.01	

PROJECT STATION:1603
 DATE:20/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 1260
 start stop duration Long E 1249
 TIME :15:26:27 15:47:07 21 (min) Purpose code: 1
 LOG :8017.46 8018.48 0.99 Area code : 3
 FDEPTH: 109 140 GearCond.code: 1
 BDEPTH: 109 140 Validity code: 1
 Towing dir: 270ø Wire out: 380 m Speed: 31 kn*10
 Sorted: Kg Total catch: 129.65 CATCH/HOUR: 370.43

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Trachurus trecae	197.14 1791	53.22	3736
Trichiurus lepturus	66.86 260	18.05	
Carcharhinus falciformis	26.29 6	7.10	
Selene dorsalis	20.00 57	5.40	
Umbrina canariensis	18.46 29	4.98	
Merluccius polli	11.97 51	3.23	
Pagellus bellottii	8.23 117	2.22	
Zeus faber	5.43 9	1.47	
Boops boops	4.37 120	1.18	
Dentex macrophthalmus	2.11 14	0.57	
Sepia officinalis hierredda	2.03 3	0.55	
Dentex angolensis	1.63 9	0.44	
Torpedo torpedo	1.57 3	0.42	
Octopus sp.	1.26 3	0.34	
Brotula barbata	1.03 3	0.28	
Pterothrissus belloci	1.03 11	0.28	
Citharus linguatula	0.29 9	0.08	
Chelidonicichthys gabonensis	0.29 3	0.08	
Scorpaena normani	0.26 3	0.07	
Shrimps, small, non comm.	0.14 37	0.04	
Dicologoglossa cuneata	0.03 3	0.01	
Lophiodes sp.	0.03 3	0.01	
Total	370.45	100.02	

PROJECT STATION:1600
 DATE:17/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 1213
 start stop duration Long E 1331
 TIME :11:45:28 11:53:03 8 (min) Purpose code: 1
 LOG :7742.95 7743.37 0.41 Area code : 2
 FDEPTH: 91 91 GearCond.code: 1
 BDEPTH: 91 91 Validity code: 1
 Towing dir: 10ø Wire out: 370 m Speed: 30 kn*10
 Sorted: Kg Total catch: 114.93 CATCH/HOUR: 861.98

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Dentex macrophthalmus	226.50 2843	26.28	3726
Trichiurus lepturus	204.00 600	23.67	
Selene dorsalis	142.50 308	16.53	
Trachurus trecae	135.00 1703	15.66	3727
Trachurus trecae	67.50 1268	7.83	3728
Pagellus bellottii	30.15 180	3.50	
Zeus faber	15.53 53	1.80	
Stromateus fiatola	9.08 8	1.05	
Pteroscion pelli	7.28 8	0.84	
Lagocephalus laevigatus	6.38 8	0.74	
Alloteuthis africana	4.20 1808	0.49	
Scomber japonicus	2.85 8	0.33	
Dentex gibbosus	2.25 8	0.26	
Dentex barnardi	2.25 15	0.26	
Pomadasys incisus	1.88 8	0.22	
Boops boops	1.58 15	0.18	
Brachydeuterus auritus	1.50 8	0.17	
Chaetodon hoefleri	0.75 8	0.09	
Chelidonicichthys gabonensis	0.38 8	0.04	
Dentex angolensis	0.38 8	0.04	
Pseudupeneus prayensis	0.08 8	0.01	
Total	862.02	99.99	

PROJECT STATION:1604
 DATE:20/ 3/98 GEAR TYPE: PT No: 1 POSITION:Lat S 1310
 start stop duration Long E 1240
 TIME :20:11:07 20:32:43 22 (min) Purpose code: 1
 LOG :8053.89 8055.03 1.08 Area code : 3
 FDEPTH: 5 5 GearCond.code: 1
 BDEPTH: 385 672 Validity code: 1
 Towing dir: 270ø Wire out: 160 m Speed: 30 kn*10
 Sorted: Kg Total catch: 50.94 CATCH/HOUR: 138.93

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
MYCTOPHIDAE	105.55 119618	75.97	
Auxis thazard	24.11 46	17.35	
Ommastrephes pteropus	4.94 49	3.56	
Euthynnus alletteratus	3.14 3	2.26	
Ariomma bondi	1.09 22	0.78	
Total	138.83	99.92	

PROJECT STATION:1601
 DATE:17/ 3/98 GEAR TYPE: PT No: 1 POSITION:Lat S 1233
 start stop duration Long E 1316
 TIME :19:43:04 19:43:04 12 (min) Purpose code: 1
 LOG :7806.59 7807.26 0.66 Area code : 2
 FDEPTH: 20 17 GearCond.code: 1
 BDEPTH: 97 43 Validity code: 1
 Towing dir: 118ø Wire out: 150 m Speed: 35 kn*10
 Sorted: Kg Total catch: 216.07 CATCH/HOUR: 1080.35

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Trichiurus lepturus	483.00 1435	44.71	
Sardinella maderensis	286.50 815	26.52	3729
MYCTOPHIDAE	253.00 100360	23.42	
Sardinella aurita	20.40 50	1.89	3730
Trachurus trecae	13.85 110	1.28	3731
Brachydeuterus auritus	12.60 40	1.17	
Trachinotus ovatus	11.00 20	1.02	
Total	1080.35	100.01	

PROJECT STATION:1605
 DATE:20/ 3/98 GEAR TYPE: PT No: 1 POSITION:Lat S 1310
 start stop duration Long E 1243
 TIME :22:11:25 22:18:11 7 (min) Purpose code: 1
 LOG :8065.95 8066.34 0.38 Area code : 3
 FDEPTH: 30 30 GearCond.code: 1
 BDEPTH: 107 109 Validity code: 1
 Towing dir: 280ø Wire out: 100 m Speed: 30 kn*10
 Sorted: Kg Total catch: 34.10 CATCH/HOUR: 292.29

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
MYCTOPHIDAE	249.60 213549	85.39	
Trichiurus lepturus	15.51 34	5.31	
Sepiella ornata	8.40 420	2.87	
Synagrops microlepis	8.40 840	2.87	
Scomber japonicus	6.77 26	2.32	
Auxis thazard	3.60 9	1.23	
Total	292.28	99.99	

PROJECT STATION:1606
 DATE:21/ 3/98 GEAR TYPE: PT No: 1 POSITION:Lat S 1315 Long E 1241
 start stop duration
 TIME :01:59:45 02:20:00 20 (min) Purpose code: 1
 LOG :8094.99 8096.25 1.23 Area code : 2
 FDEPTH: 30 30 GearCond.code: 1
 BDEPTH: 92 108 Validity code: 1
 Towing dir: 250ø Wire out: 170 m Speed: 42 kn*10

Sorted: Kg Total catch: 95.29 CATCH/HOUR: 285.87

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	208.80	564	73.04	
Sardinella maderensis	52.20	192	18.26	3736
Sardinella aurita	16.50	36	5.77	3737
Alloteuthis africana	2.40	276	0.84	
Selene dorsalis	1.65	3	0.58	
Trachinotus ovatus	1.50	3	0.52	
Trachurus trecae	1.20	18	0.42	3738
Sphyraena guachancho	0.99	6	0.35	
Ommastrephes pteropus	0.33	96	0.12	
Sepia sp.	0.30	9	0.10	
Total	285.87		100.00	

PROJECT STATION:1610
 DATE:22/ 3/98 GEAR TYPE: PT No: 4 POSITION:Lat S 1417 Long E 1215
 start stop duration
 TIME :23:59:43 00:23:55 24 (min) Purpose code: 1
 LOG :8282.45 8284.16 1.68 Area code : 3
 FDEPTH: 0 0 GearCond.code: 1
 BDEPTH: 103 136 Validity code: 1
 Towing dir: 270ø Wire out: 160 m Speed: 42 kn*10

Sorted: Kg Total catch: 18.42 CATCH/HOUR: 46.05

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Euthynnus alletteratus	20.75	15	45.06	
Selene dorsalis	15.58	50	33.83	
Trachinotus ovatus	3.50	8	7.60	
Sarda sarda	1.70	3	3.69	
Trachurus trecae	1.38	30	3.00	3742
Trichiurus lepturus	1.25	15	2.71	
MYCTOPHIDAE	1.15	28	2.50	
Lagocephalus laevigatus	0.53	3	1.15	
Alloteuthis africana	0.23	55	0.50	
Total	46.07		100.04	

PROJECT STATION:1607
 DATE:21/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 1342 Long E 1226
 start stop duration
 TIME :08:39:47 08:56:07 16 (min) Purpose code: 1
 LOG :8154.38 8155.30 0.90 Area code : 3
 FDEPTH: 122 124 GearCond.code: 1
 BDEPTH: 122 124 Validity code: 1
 Towing dir: 360ø Wire out: 360 m Speed: 30 kn*10

Sorted: Kg Total catch: 132.37 CATCH/HOUR: 496.39

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex macrophthalmus	251.63	2265	50.69	
Trachurus trecae	105.00	784	21.15	3739
Dentex angolensis	45.75	139	9.22	
Boops boops	33.38	128	6.72	
Rhabdosargus globiceps	20.10	4	4.05	
Zeus faber	13.80	11	2.78	
Sparus pagrus africanus *	12.98	19	2.61	
Chelidonichthys capensis	3.68	4	0.74	
Raja miraletus	3.23	4	0.65	
Scorpaena stephanica	3.08	4	0.62	
Dentex barnardi	1.98	8	0.38	
Pagellus bellottii	1.24	11	0.25	
Todaropsis eblanae	0.68	15	0.14	
Total	496.43		100.00	

PROJECT STATION:1611
 DATE:22/ 3/98 GEAR TYPE: PT No: 4 POSITION:Lat S 1422 Long E 1218
 start stop duration
 TIME :02:37:26 03:09:00 32 (min) Purpose code: 1
 LOG :8302.18 8304.28 2.09 Area code : 3
 FDEPTH: 10 10 GearCond.code: 1
 BDEPTH: 89 57 Validity code: 1
 Towing dir: 90ø Wire out: 160 m Speed: 40 kn*10

Sorted: 106 Kg Total catch: 415.69 CATCH/HOUR: 779.42

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	318.34	1869	40.84	3743
Trachurus trecae	229.50	2166	29.44	3745
Selene dorsalis	70.31	180	9.02	
Sarda sarda	55.13	34	7.07	
Trichiurus lepturus	45.00	163	5.77	
Pomatomus saltatrix	21.60	23	2.77	
Sardinella aurita	19.86	84	2.55	3744
Trachinotus ovatus	8.33	17	1.07	
Sphyraena guachancho	4.50	6	0.58	
Alloteuthis africana	2.81	1046	0.36	
Scomber japonicus	2.25	6	0.29	
Lagocephalus laevigatus	0.73	6	0.09	
Decapterus rhonchus	0.68	11	0.09	
Saurida brasiliensis	0.39	73	0.05	
Total	779.43		99.99	

PROJECT STATION:1608
 DATE:21/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 1343 Long E 1230
 start stop duration
 TIME :10:01:19 10:01:29 20 (min) Purpose code: 1
 LOG :8167.99 8169.12 1.12 Area code : 3
 FDEPTH: 108 109 GearCond.code: 1
 BDEPTH: 108 109 Validity code: 1
 Towing dir: 220ø Wire out: 360 m Speed: 30 kn*10

Sorted: Kg Total catch: 144.12 CATCH/HOUR: 432.36

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	189.90	1239	43.92	3740
Trichiurus lepturus	140.10	32	32.40	
Dentex barnardi	43.50	105	10.06	
Dentex angolensis	36.00	111	8.33	
Pagellus bellottii	13.65	84	3.16	
Zeus faber	3.66	9	0.85	
Sparus pagrus africanus *	3.00	3	0.69	
Spondyliosoma cantharus	1.65	3	0.38	
OMMASTREPHIDAE	0.90	3	0.21	
Total	432.36		100.00	

PROJECT STATION:1612
 DATE:22/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 1436 Long E 1216
 start stop duration
 TIME :07:28:30 07:56:20 28 (min) Purpose code: 1
 LOG :8343.47 8345.08 1.59 Area code : 3
 FDEPTH: 118 129 GearCond.code: 1
 BDEPTH: 118 129 Validity code: 1
 Towing dir: 320ø Wire out: 400 m Speed: 30 kn*10

Sorted: Kg Total catch: 92.36 CATCH/HOUR: 197.91

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	68.79	579	34.76	3746
Dentex angolensis	66.64	161	33.67	
Trachurus trecae, juvenile	21.43	1014	10.83	3747
Dentex canariensis	13.44	79	6.79	
Squatina oculata	6.26	4	3.16	
Dentex barnardi	5.83	9	2.95	
Pseudupeneus prayensis	4.56	77	2.30	
Dentex gibbosus	3.66	4	1.85	
Chelidonichthys capensis	2.08	13	1.05	
Boops boops	1.97	51	1.00	
Raja doutrei	1.52	2	0.77	
Scorpaena normani	1.09	2	0.55	
Todaropsis eblanae	0.64	11	0.32	
Total	197.91		100.00	

PROJECT STATION:1609
 DATE:21/ 3/98 GEAR TYPE: PT No: 4 POSITION:Lat S 1355 Long E 1224
 start stop duration
 TIME :10:00:54 13:20:00 26 (min) Purpose code: 1
 LOG :8199.38 8201.04 1.29 Area code : 3
 FDEPTH: 30 30 GearCond.code: 1
 BDEPTH: 42 124 Validity code: 1
 Towing dir: 320ø Wire out: 180 m Speed: 42 kn*10

Sorted: Kg Total catch: 7.30 CATCH/HOUR: 16.85

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	12.28	35	72.88	3741
Sardinella aurita	1.66	5	9.85	
Selene dorsalis	1.48	2	8.78	
Zeus faber	1.43	2	8.49	
Total	16.85		100.00	

PROJECT STATION:1613
 DATE:22/ 3/98 GEAR TYPE: PT No: 1 POSITION:Lat S 1448 Long E 1214
 start stop duration
 TIME :10:52:14 11:02:33 10 (min) Purpose code: 1
 LOG :8368.61 8369.23 0.63 Area code : 3
 FDEPTH: 20 20 GearCond.code: 1
 BDEPTH: 78 179 Validity code: 1
 Towing dir: 270ø Wire out: 140 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:1614
 DATE:22/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 1457
 start stop duration Long E 1210
 TIME :12:48:17 13:20:13 32 (min) Purpose code: 1
 LOG :8382.93 8384.67 1.72 Area code : 3
 FDEPTH: 80 113 GearCond.code:
 BDEPTH: 80 113 Validity code:
 Towing dir: 360° Wire out: 300 m Speed: 31 kn*10
 Sorted: Kg Total catch: 125.06 CATCH/HOUR: 234.49

PROJECT STATION:1618
 DATE:23/ 3/98 GEAR TYPE: PT No: 1 POSITION:Lat S 1604
 start stop duration Long E 1145
 TIME :11:00:13 11:30:57 31 (min) Purpose code: 1
 LOG :8545.53 8547.33 1.75 Area code : 3
 FDEPTH: 5 10 GearCond.code:
 BDEPTH: 36 45 Validity code:
 Towing dir: 270° Wire out: 160 m Speed: 42 kn*10
 Sorted: Kg Total catch: 87.31 CATCH/HOUR: 168.99

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex canariensis	58.13		24.79	
Dentex barnardi	46.69		19.91	
Sparus pagrus africanus *	36.56	11	15.59	
Spondyliosoma cantharus	29.63	58	12.64	
Squalus megalops	15.94	11	6.80	
Dentex gibbosus	6.69	9	2.85	
Sparus auriga *	6.38	6	2.72	
Dentex angolensis	6.38	32	2.72	
Lithognathus mormyrus	6.06	28	2.58	
Squatina oculata	5.63	4	2.40	
Dasyatis marmorata	3.56	2	1.52	
Seriola lalandi	2.81	2	1.20	
Raja sp.	2.53	2	1.08	
Chelidonichthys gabonensis	2.33	4	0.99	
Diplodus cervinus cervinus	2.10	4	0.90	
Zeus faber	1.58	2	0.67	
Sphyraena guachancho	1.18	9	0.50	
Pseudupeneus prayensis	0.34	2	0.14	
Total	234.52		100.00	

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Argyrosomus hololepidotus	52.26	2	30.92	
Trachurus trecae	42.00	321	24.85	3754
Sphyra lewini	25.16	2	14.89	
Myliobatis aquila	13.55	6	8.02	
Lithognathus mormyrus	12.12	89	7.17	
Pomadasys incisus	6.60	70	3.91	
Atractoscion aequidens	6.06	14	3.59	
Sardinella maderensis	5.85	17	3.46	3755
Sardinella aurita	2.65	8	1.57	3756
Loligo vulgaris	1.10	4	0.65	
Selene dorsalis	0.74	17	0.44	
Trachinotus ovatus	0.58	2	0.34	
Umbrina canariensis	0.33	2	0.20	
Total	169.00		100.01	

PROJECT STATION:1615
 DATE:22/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 1509
 start stop duration Long E 1201
 TIME :16:45:55 17:02:14 16 (min) Purpose code: 1
 LOG :8410.48 8411.30 0.82 Area code : 3
 FDEPTH: 128 124 GearCond.code: 1
 BDEPTH: 128 124 Validity code: 1
 Towing dir: 90° Wire out: 420 m Speed: 30 kn*10
 Sorted: 177 Kg Total catch: 2019.12 CATCH/HOUR: 7571.70

PROJECT STATION:1619
 DATE:23/ 3/98 GEAR TYPE: PT No: 4 POSITION:Lat S 1608
 start stop duration Long E 1147
 TIME :13:05:41 13:36:28 31 (min) Purpose code: 1
 LOG :8557.75 8559.94 2.18 Area code : 3
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 30 30 Validity code:
 Towing dir: 360° Wire out: 160 m Speed: 44 kn*10
 Sorted: Kg Total catch: 96.71 CATCH/HOUR: 187.18

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex macrophthalmus	63822.00	334620	842.90	
Trachurus capensis	29040.00	89760	383.53	3748
Spicara alta	12540.00	44880	165.62	
Umbrina canariensis	5676.00	25740	74.96	
Argyrosomus hololepidotus	4182.00	2340	55.23	
Rhabdosargus globiceps	2224.20	660	29.38	
Dentex angolensis	1339.80	3960	17.69	
Zenopsis conchifer	1102.20	660	14.56	
Pagellus bellottii	666.60	3300	8.80	
Spondyliosoma cantharus	554.40	660	7.32	
Total	121147.20		1599.99	

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella aurita	98.71	315	52.74	3757
Sardinella maderensis	77.42	221	41.36	3758
Sarda sarda	4.37	6	2.33	
Pomatomus saltatrix	3.02	6	1.61	
Decapterus rhonchus	1.06	4	0.57	
Sphyraena guachancho	0.97	2	0.52	
Selene dorsalis	0.81	25	0.43	
Lithognathus mormyrus	0.45	2	0.24	
Chloroscombrus chrysurus	0.27	2	0.14	
Sepia sp.	0.10	6	0.05	
Total	187.18		99.99	

PROJECT STATION:1616
 DATE:22/ 3/98 GEAR TYPE: PT No: 1 POSITION:Lat S 1529
 start stop duration Long E 1160
 TIME :21:27:52 21:51:12 23 (min) Purpose code: 1
 LOG :8447.74 8448.84 1.09 Area code : 3
 FDEPTH: 5 5 GearCond.code: 1
 BDEPTH: 47 74 Validity code: 1
 Towing dir: 270° Wire out: 150 m Speed: 30 kn*10
 Sorted: Kg Total catch: 36.31 CATCH/HOUR: 94.72

PROJECT STATION:1620
 DATE:23/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 1610
 start stop duration Long E 1136
 TIME :15:00:09 16:40:24 30 (min) Purpose code: 1
 LOG :8577.53 8579.16 1.58 Area code : 3
 FDEPTH: 72 61 GearCond.code: 1
 BDEPTH: 72 61 Validity code: 1
 Towing dir: 90° Wire out: 260 m Speed: 30 kn*10
 Sorted: Kg Total catch: 52.31 CATCH/HOUR: 104.62

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	48.26	183	50.95	
Trachurus trecae	11.06	68	11.68	3749
Argyrosomus hololepidotus	8.19	5	8.65	
Sardinella maderensis	6.76	18	7.14	3750
Sardinella maderensis - Juv.	6.18	331	6.52	3751
Spondyliosoma cantharus	4.15	10	4.38	
Boops boops	2.24	13	2.36	
Sardinella aurita	1.96	26	2.07	3752
Alloteuthis africana	1.90	326	2.01	
Saurida brasiliensis	1.28	34	1.35	
Sepia bertheloti	1.07	3	1.13	
Illex coindetii	1.07	3	1.13	
Selene dorsalis	0.60	34	0.63	
Total	94.72		100.00	

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	85.40	1018	81.63	3759
Argyrosomus hololepidotus	7.40	8	7.07	
Spondyliosoma cantharus	6.08	10	5.81	
Squatina oculata	1.82	4	1.74	
Pagellus bellottii	1.52	8	1.45	
Chelidonichthys capensis	1.24	8	1.19	
Scorpaena stephanica	0.66	2	0.63	
Todaropsis eblanae	0.50	4	0.48	
Total	104.62		100.00	

PROJECT STATION:1617
 DATE:23/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 1604
 start stop duration Long E 1137
 TIME :09:29:39 09:39:45 10 (min) Purpose code: 1
 LOG :8534.53 8535.05 0.51 Area code : 3
 FDEPTH: 115 129 GearCond.code:
 BDEPTH: 115 129 Validity code:
 Towing dir: 280° Wire out: 400 m Speed: 30 kn*10
 Sorted: Kg Total catch: 146.37 CATCH/HOUR: 878.22

PROJECT STATION:1621
 DATE:23/ 3/98 GEAR TYPE: PT No: 1 POSITION:Lat S 1613
 start stop duration Long E 1141
 TIME :19:08:39 19:35:40 27 (min) Purpose code: 1
 LOG :8598.96 8600.54 1.57 Area code : 3
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 57 53 Validity code:
 Towing dir: 60° Wire out: 140 m Speed: 30 kn*10
 Sorted: Kg Total catch: 93.69 CATCH/HOUR: 208.20

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	586.20	8568	66.75	3753
Dentex macrophthalmus	76.20	354	8.68	
Atractoscion aequidens	72.00	78	8.20	
Zeus faber	31.56	54	3.59	
Sarda sarda	30.00	18	3.42	
Squalus megalops	18.66	30	2.12	
Spondyliosoma cantharus	18.42	30	2.10	
Dentex gibbosus	15.72	30	1.79	
Dentex angolensis	7.32	18	0.83	
Dentex barnardi	6.96	12	0.79	
Trigla lyra	5.22	36	0.59	
Pagellus bellottii	4.86	18	0.55	
Zenopsis conchifer	2.46	12	0.28	
Merluccius polli	2.22	6	0.25	
Trichiurus lepturus	0.42	6	0.05	
Total	878.22		99.99	

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae, juvenile	86.89	4293	41.73	3760
Sardinella maderensis	57.11	149	27.43	3762
Trachurus trecae	36.67	271	17.61	3761
Sphyra lewini	22.22	2	10.67	
Engraulis encrasicolus	3.18	180	1.53	3763
Loligo vulgaris	0.91	16	0.44	
Alloteuthis africana	0.64	62	0.31	
Trichiurus lepturus	0.58	2	0.28	
Total	208.20		100.00	

PROJECT STATION:1622
 DATE:24/ 3/98 GEAR TYPE: PT No: 4 POSITION:Lat S 1605 Long E 1137
 start stop duration Purpose code: 1
 TIME :23:54:49 00:25:32 31 (min) Area code : 3
 LOG :8637.57 8639.73 2.13 GearCond.code:
 FDEPTH: 10 10 Validity code:
 BDEPTH: 112 412
 Towing dir: 270° Wire out: 160 m Speed: 42 kn*10

Sorted: 33 Kg Total catch: 500.25 CATCH/HOUR: 968.23

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
MYCTOPHIDAE	870.97	863710	89.95	
Trichurus lepturus	45.58	3745	4.71	
Trachurus trecae, juvenile	40.06	1161	4.14	3764
Trachinus ovatus	10.45	29	1.08	
Sepia sp.	0.87	29	0.09	
Synagrops microlepis	0.29	29	0.03	
Total	968.22		100.00	

PROJECT STATION:1627
 DATE:24/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 1629 Long E 1130
 start stop duration Purpose code: 1
 TIME :17:08:20 17:26:43 18 (min) Area code : 3
 LOG :8765.01 8766.04 1.03 GearCond.code: 1
 FDEPTH: 102 102 Validity code: 1
 BDEPTH: 102 102
 Towing dir: 280° Wire out: 360 m Speed: 30 kn*10

Sorted: Kg Total catch: 1000.76 CATCH/HOUR: 3335.87

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	1467.33	7620	43.99	3771
Dentex macrophthalmus	1296.83	11547	38.88	
Pagellus bellottii	294.00	1757	8.81	
Trachurus capensis	206.67	1500	6.20	3772
Argyrosomus hololepidotus	60.00	77	1.80	
Merluccius polli	7.23	27	0.22	
Pteroscion peli	3.87	53	0.12	
Total	3335.93		100.02	

PROJECT STATION:1623
 DATE:24/ 3/98 GEAR TYPE: PT No: 1 POSITION:Lat S 1605 Long E 1141
 start stop duration Purpose code: 1
 TIME :01:49:10 02:24:20 35 (min) Area code : 3
 LOG :8649.08 8651.47 2.36 GearCond.code:
 FDEPTH: 20 25 Validity code:
 BDEPTH: 50 55
 Towing dir: 270° Wire out: 100 m Speed: 40 kn*10

Sorted: 101 Kg Total catch: 492.70 CATCH/HOUR: 844.63

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	784.29	2311	92.86	3765
Engraulis encrasicolus	38.57	3910	4.57	3767
Trachurus trecae	12.09	69	1.43	3766
Trachurus trecae, juvenile	9.69	694	1.15	3768
Total	844.64		100.01	

PROJECT STATION:1628
 DATE:24/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 1639 Long E 1146
 start stop duration Purpose code: 1
 TIME :20:40:44 20:51:34 11 (min) Area code : 3
 LOG :8793.97 8794.57 0.59 GearCond.code:
 FDEPTH: 16 17 Validity code:
 BDEPTH: 16 17
 Towing dir: 350° Wire out: 80 m Speed: 30 kn*10

Sorted: 21 Kg Total catch: 127.56 CATCH/HOUR: 695.78

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	488.29	10440	70.18	3773
Sardinella aurita	90.65	1538	13.03	3774
Trachurus trecae	44.18	360	6.35	3775
Pteroscion peli	36.98	327	5.31	
Engraulis encrasicolus	24.55	2193	3.53	3776
Sepia bertheloti	7.53	33	1.08	
Stromateus fiatola	3.60	33	0.52	
Total	695.78		100.00	

PROJECT STATION:1624
 DATE:24/ 3/98 GEAR TYPE: PT No: 1 POSITION:Lat S 1625 Long E 1144
 start stop duration Purpose code: 1
 TIME :10:00:25 10:00:31 27 (min) Area code : 3
 LOG :8719.51 8720.81 1.28 GearCond.code:
 FDEPTH: 20 20 Validity code:
 BDEPTH: 48 55
 Towing dir: 280° Wire out: 150 m Speed: 30 kn*10

Sorted: Kg Total catch: 0.14 CATCH/HOUR: 0.31

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae, juvenile	0.31	120	100.00	3769
Total	0.31		100.00	

PROJECT STATION:1629
 DATE:24/ 3/98 GEAR TYPE: PT No: 1 POSITION:Lat S 1633 Long E 1146
 start stop duration Purpose code: 1
 TIME :22:44:31 22:58:47 14 (min) Area code : 3
 LOG :8809.51 8810.23 0.73 GearCond.code:
 FDEPTH: 20 20 Validity code:
 BDEPTH: 20 20
 Towing dir: 330° Wire out: 100 m Speed: 30 kn*10

Sorted: 8 Kg Total catch: 24.69 CATCH/HOUR: 105.81

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae, juvenile	43.33	2096	40.95	3777
Atractoscion aequidens	33.04	373	31.23	
Myliobatis aquila	12.86	39	12.15	
Pagellus bellottii	11.44	720	10.81	
Sardinella maderensis	3.34	51	3.16	
Engraulis encrasicolus	1.03	116	0.97	
Sphyræna guachancho	0.77	13	0.73	
Total	105.81		100.00	

PROJECT STATION:1625
 DATE:24/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 1625 Long E 1127
 start stop duration Purpose code: 1
 TIME :13:12:09 13:16:28 4 (min) Area code : 3
 LOG :8740.80 8741.03 0.21 GearCond.code:
 FDEPTH: 131 146 Validity code:
 BDEPTH: 131 146
 Towing dir: 20° Wire out: 450 m Speed: 30 kn*10

Sorted: Kg Total catch: 56.86 CATCH/HOUR: 852.90

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Anthias anthias	429.00	3465	50.30	
Atractoscion aequidens	153.00	120	17.94	
Helicolenus dactylopterus	115.50	840	13.54	
Dentex macrophthalmus	78.75	345	9.23	
Zeus faber	66.75	120	7.83	
Dentex angolensis	9.90	15	1.16	
Total	852.90		100.00	

PROJECT STATION:1630
 DATE:25/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 1640 Long E 1134
 start stop duration Purpose code: 1
 TIME :12:32:44 12:50:53 18 (min) Area code : 3
 LOG :8928.33 8929.25 0.90 GearCond.code:
 FDEPTH: 98 95 Validity code:
 BDEPTH: 98 95
 Towing dir: 90° Wire out: 340 m Speed: 30 kn*10

Sorted: 113 Kg Total catch: 675.42 CATCH/HOUR: 2251.40

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	784.00	5420	34.82	3779
Dentex macrophthalmus	616.00	9280	27.36	
Trachurus trecae, juvenile	318.80	3300	14.16	3778
Merluccius polli	300.00	3240	13.33	
Mustelus mustelus	156.00	20	6.93	
Atractoscion aequidens	24.00	40	1.07	
Zeus faber	16.80	40	0.75	
Pagellus bellottii	12.00	120	0.53	
Myliobatis aquila	7.60	20	0.34	
Umbra canariensis	5.80	100	0.26	
Pterothrissus belloci	5.60	40	0.25	
Loligo vulgaris	2.20	60	0.10	
Trichurus lepturus	1.60	20	0.07	
Todaropsis sp.	1.00	40	0.04	
Total	2251.40		100.01	

PROJECT STATION:1626
 DATE:24/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 1626 Long E 1127
 start stop duration Purpose code: 1
 TIME :14:21:30 14:50:22 29 (min) Area code : 3
 LOG :8748.79 8750.19 1.36 GearCond.code:
 FDEPTH: 115 121 Validity code: 1
 BDEPTH: 115 121
 Towing dir: 20° Wire out: 420 m Speed: 32 kn*10

Sorted: Kg Total catch: 319.17 CATCH/HOUR: 660.35

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Zeus faber	310.34	484	47.00	
Anthias anthias	150.21	1622	22.75	
Dentex macrophthalmus	83.79	596	12.69	
Helicolenus dactylopterus	57.72	341	8.74	
Trachurus capensis	20.48	112	3.10	3770
Oxynotus centrina	18.62	6	2.82	
Pagellus bellottii	3.97	19	0.60	
Trigla sp.	3.72	31	0.56	
Chelidonichthys sp.	3.29	12	0.50	
Pontinus kuhlii	3.17	12	0.48	
Scorpaena angolensis	2.98	6	0.45	
Arius parkii	0.93	12	0.14	
Trachurus trecae	0.74	6	0.11	
Epinephelus costae	0.37	6	0.06	
Total	660.33		100.00	

PROJECT STATION:1631
 DATE:25/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 1651 Long E 1119
 start stop duration Purpose code: 1
 TIME :16:17:08 16:26:48 10 (min) Area code : 3
 LOG :8960.23 8960.71 0.47 GearCond.code:
 FDEPTH: 181 182 Validity code:
 BDEPTH: 181 182
 Towing dir: 360° Wire out: 580 m Speed: 30 kn*10

Sorted: 101 Kg Total catch: 1457.60 CATCH/HOUR: 8745.60

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis	6289.14	36978	71.91	3780
Merluccius polli	1595.88	12012	18.25	
Dentex macrophthalmus	660.66	2832	7.55	
Atractoscion aequidens	156.18	174	1.79	
Scorpaena normani	34.32	174	0.39	
Malacocephalus occidentalis	9.42	174	0.11	
Total	8745.60		100.00	

PROJECT STATION:1632
 DATE:25/ 3/98 GEAR TYPE: PT No: 1 POSITION:Lat S 1652
 start stop duration Long E 1128
 TIME :18:22:31 18:38:46 16 (min) Purpose code: 1
 LOG :8975.28 8976.13 0.84 Area code : 3
 FDEPTH: 15 15 GearCond.code:
 BDEPTH: 115 117 Validity code:
 Towing dir: 290ø Wire out: 150 m Speed: 30 kn*10
 Sorted: Kg Total catch: 415.20 CATCH/HOUR: 1557.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	1552.50	27413	99.71	3781
Trichiurus lepturus	4.50	23	0.29	
Total	1557.00		100.00	

PROJECT STATION:1633
 DATE:25/ 3/98 GEAR TYPE: PT No: 1 POSITION:Lat S 1652
 start stop duration Long E 1139
 TIME :20:39:07 20:51:07 12 (min) Purpose code: 1
 LOG :8990.62 8991.36 0.73 Area code : 3
 FDEPTH: 30 30 GearCond.code:
 BDEPTH: 57 62 Validity code:
 Towing dir: 270ø Wire out: 110 m Speed: 30 kn*10
 Sorted: 40 Kg Total catch: 240.06 CATCH/HOUR: 1200.30

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	1086.00	7320	90.48	3782
Arius heudeloti	100.50	285	8.37	
Merluccius polli	10.20	90	0.85	
Pteroscion peli	3.30	30	0.27	
Engraulis encrasicolus	0.30	60	0.02	
Total	1200.30		99.99	

PROJECT STATION:1634
 DATE:26/ 3/98 GEAR TYPE: PT No: 4 POSITION:Lat S 1705
 start stop duration Long E 1141
 TIME :04:15:03 04:37:03 22 (min) Purpose code: 1
 LOG :9050.63 9052.19 1.55 Area code : 3
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 42 61 Validity code:
 Towing dir: ø Wire out: 160 m Speed: 40 kn*10
 Sorted: Kg Total catch: 465.95 CATCH/HOUR: 1270.77

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	1128.00	10230	88.77	3782
Euthynnus alletteratus	142.77	76	11.23	
Total	1270.77		100.00	

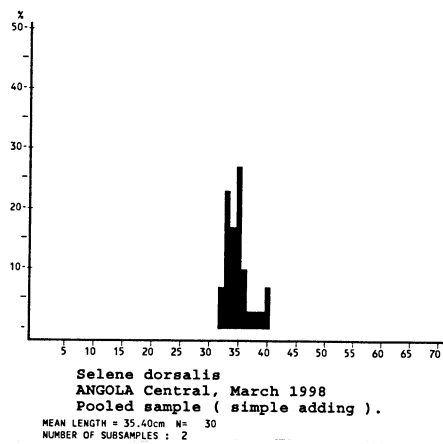
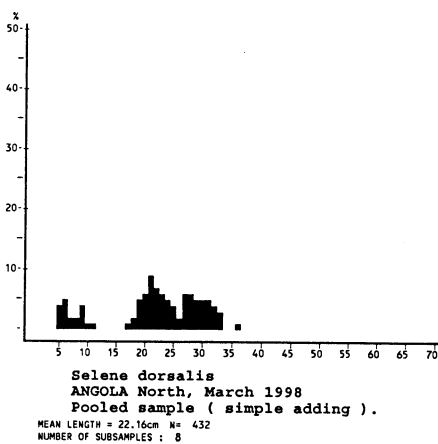
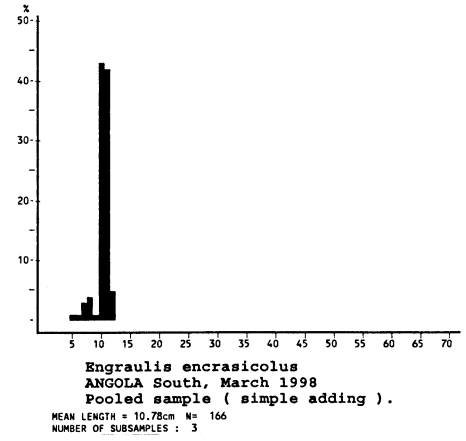
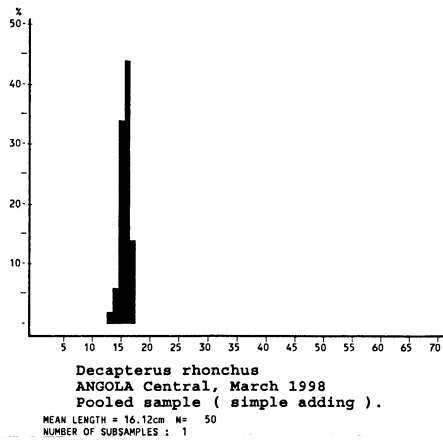
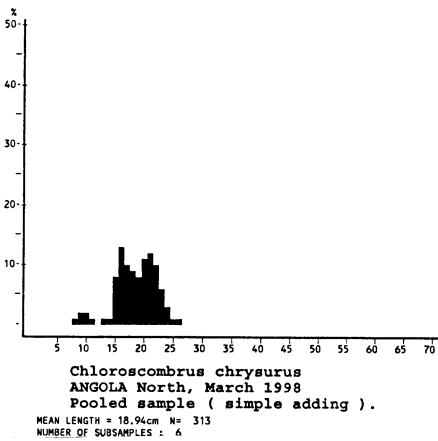
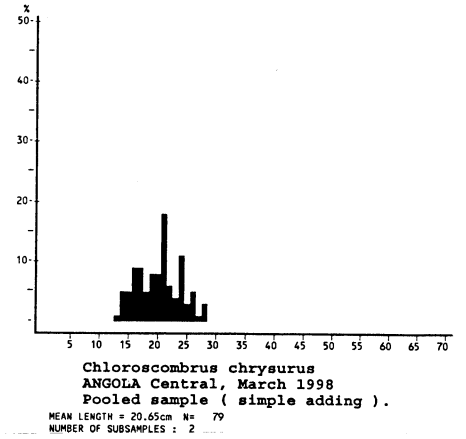
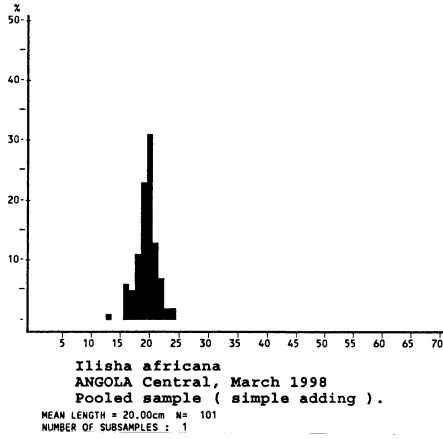
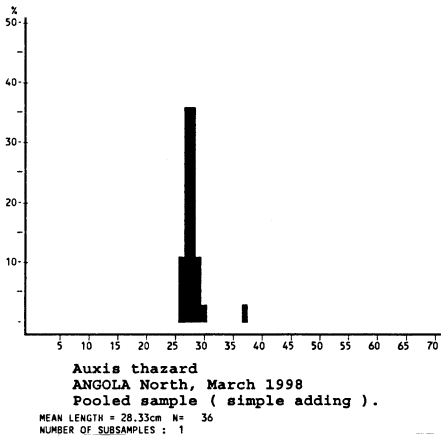
PROJECT STATION:1635
 DATE:26/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 1713
 start stop duration Long E 1133
 TIME :08:11:27 08:20:19 9 (min) Purpose code: 1
 LOG :9078.43 9078.91 0.47 Area code : 2
 FDEPTH: 122 121 GearCond.code:
 BDEPTH: 122 121 Validity code:
 Towing dir: 270ø Wire out: 400 m Speed: 30 kn*10
 Sorted: 99 Kg Total catch: 759.49 CATCH/HOUR: 5063.27

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex macrophthalmus	3588.00	29720	70.86	
Trachurus trecae	1144.67	10527	22.61	3783
Trachurus capensis	179.67	1640	3.55	3784
Merluccius polli	150.93	720	2.98	
Total	5063.27		100.00	

PROJECT STATION:1636
 DATE:26/ 3/98 GEAR TYPE: BT No: 2 POSITION:Lat S 1712
 start stop duration Long E 1125
 TIME :09:51:41 09:58:27 7 (min) Purpose code: 1
 LOG :9088.81 9089.15 0.34 Area code : 3
 FDEPTH: 187 183 GearCond.code:
 BDEPTH: 187 183 Validity code:
 Towing dir: 20ø Wire out: 650 m Speed: 30 kn*10
 Sorted: 102 Kg Total catch: 1319.75 CATCH/HOUR: 11312.14

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis	7387.71	47469	65.31	3785
Merluccius polli	1709.31	15823	15.11	
Dentex macrophthalmus	1704.86	9360	15.07	
Atractoscion aequidens	230.57	223	2.04	
Zenopsis conchifer	130.37	557	1.15	
Pterothrissus bellocci	78.00	669	0.69	
Pontinus accraensis	52.37	780	0.46	
Synagrops microlepis	13.37	1114	0.12	
Chlorophthalmus atlanticus	5.57	223	0.05	
Total	11312.13		100.00	

Annex II Length distributions of main species



Annex III Instruments and fishing gear used

The Simrad scientific echo sounder EK 500/38 kHz, was used during the survey for estimation of fish density. The Bergen Echo Integrator system (BEI) logging the echogram raw data from the echo sounder, was used to scrutinise the acoustic records, and to allocate integrator data to fish species. All raw data was stored to tape, and a backup of the database of scrutinised data, stored. The details of the settings of the 38 kHz echo sounder were as follows:

Transceiver-1 menu

Transducer depth	5-7 m
Absorption coeff.	10 dB/km
Pulse length	medium
Bandwidth	wide
Max. power	2 000 W
Angle sensitivity	21.9
2-way beam angle	-21.0 dB
SV transducer gain	28.1 dB
TS transducer gain	28.0 dB
3 dB Beamwidth	6.8 deg
Alongship offset	0.00 deg
Athwardship offset	0.04 deg

Display menu

Echogram	1
Bottom range	12 m
Bottom start	10 m
TVG	20 log R
SV Colour minimum	-72 dB
TS Colour minimum	-65 dB

Printer settings

Range	0-100, 0-250 m, 0-500 m
TVG	20 log R
Sv Colour minimum	-72 dB

Bottom detection menu

Minimum level	-45 dB
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FISHING GEAR

The vessel has two different "Åkrehamn" pelagic trawls and one "Gisund super" bottom trawl. For all trawls, the Tyborøn, 7.8 (1670 kg) trawl doors were used. Complete drawings of the trawls used are included.

Annex III (cont.)

F/F Dr. Fridtjof Nansen

OVER/UNDER/SIDER

OVERDEL:
50 STK 11" PLASTKULER

UNDERDEL:
14 M/M VIRE OMSP. MED

14 M/M BLYTAU
+ KJETTING
TOTAL VEKT UNDER 400 KG.

SIDER.

1/2 HOGG 5,00 MTR
STRF. 6,00 MTR
ARM 6,00 MTR
TAMP 2,60 MTR

TOT. 35,00 MTR
22 M/M Ø COMB. TAU

1/2 HOGG 4,00 MTR
STRF. 6,00 MTR
ARM 22,40 MTR
TAMP 2,60 MTR

TOT. 35,00 MTR
28 M/M Ø
FL. DANLINE

MASKER	TRAAD	LENGDE	MASKER
M/M	NR.	I MTR. I EVING	

3200.0 240 22.4 4

3200.0 240 32.0 4 9.5L

1620.0 160 13.0 4

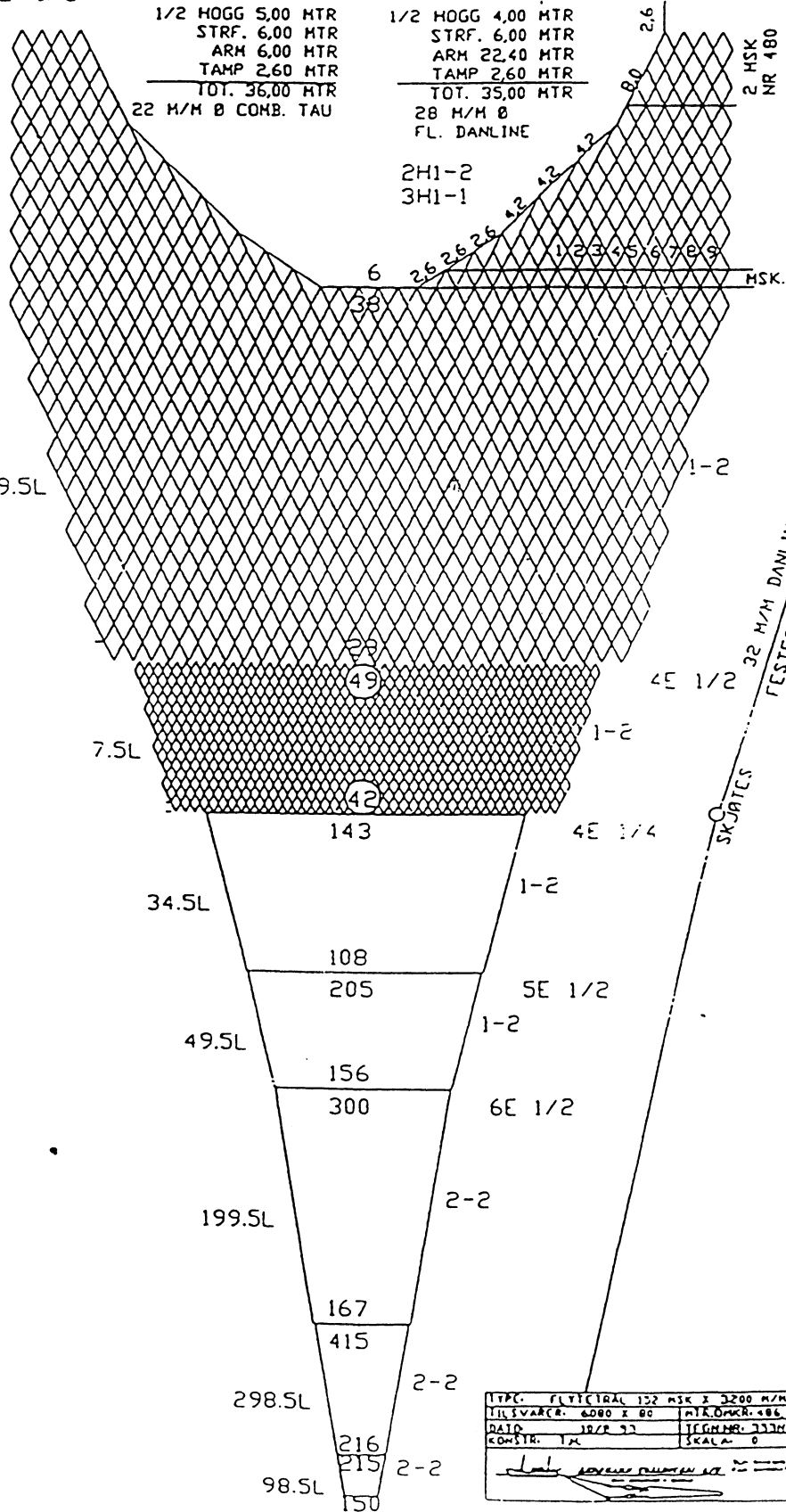
400.0 48 14.0 4

200.0 32 10.00 4

100.0 24 20.0 4

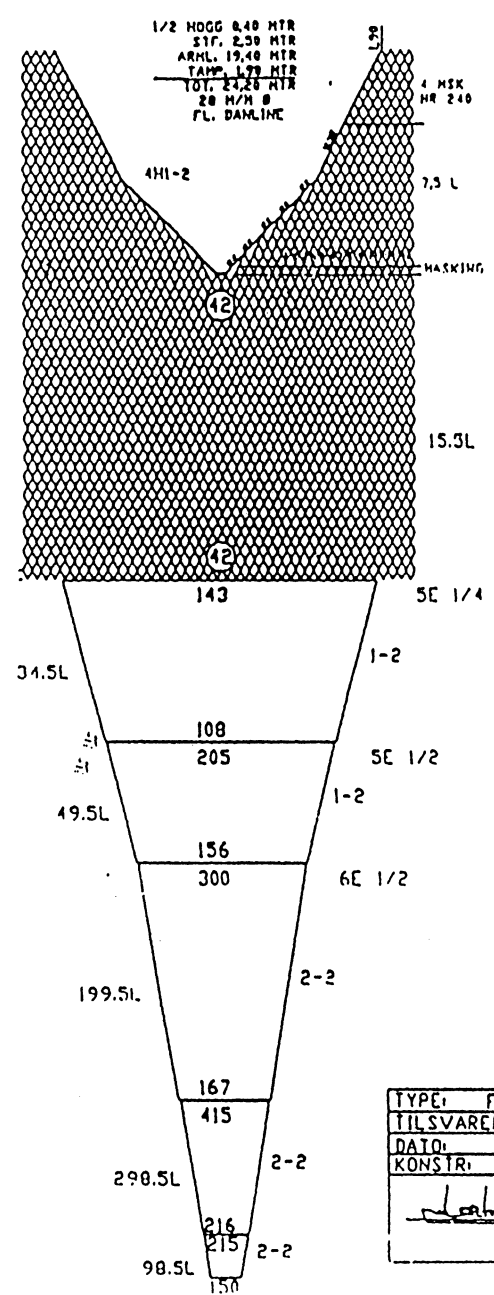
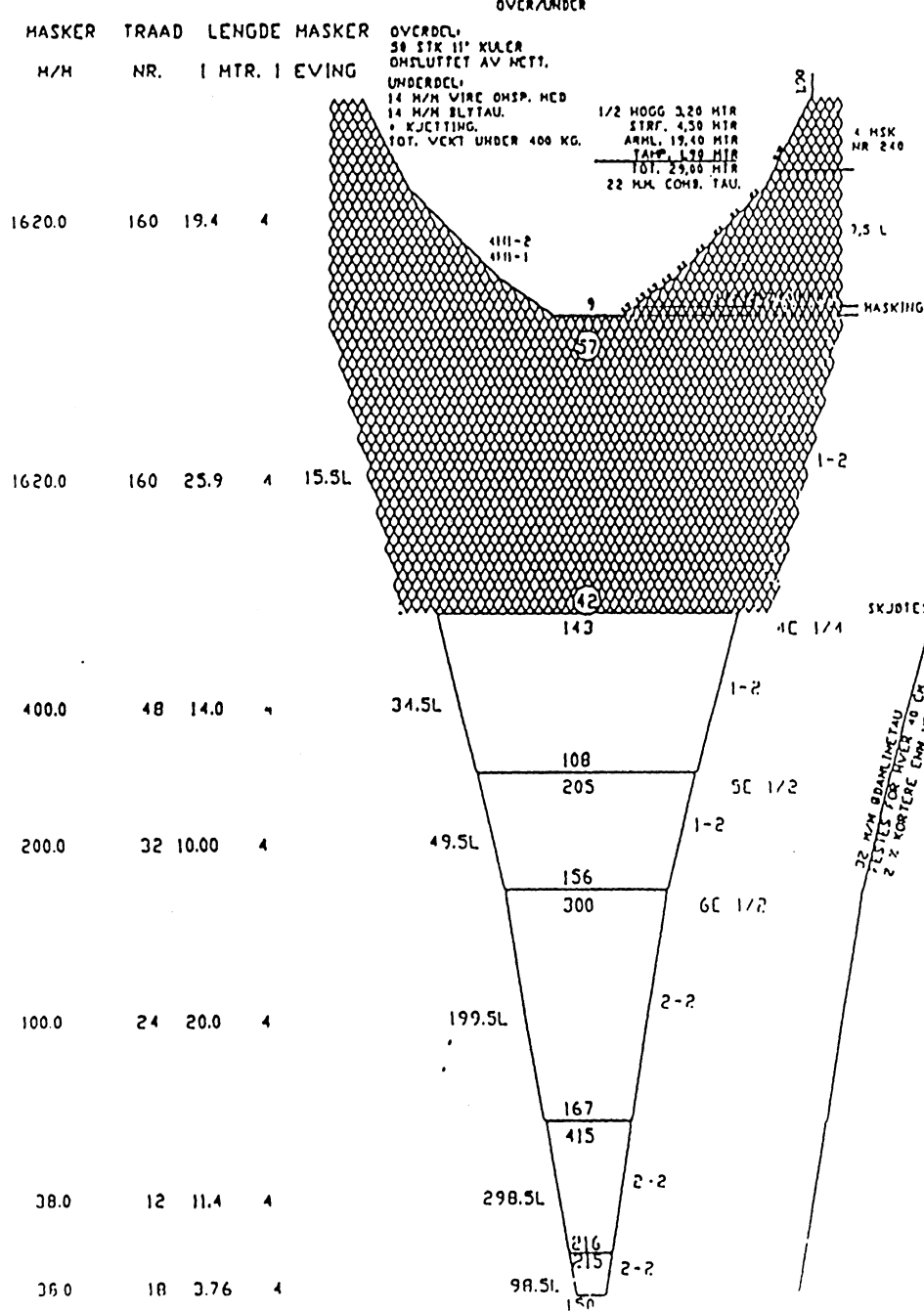
38.0 12 11.4 4

38.0 18 3.76 4



TYPE	FLYTETRAL 152 MSK X 3200 M/M
ILL SVARER	6000 X 80 MTR. OMKR. 486+
DATO	10/12 97
KONSTR.	1 M
TITELNR.	333M
SKALA	0

F/F Dr. Fridtjof Nansen



TYPE:	FLYTETRAL 190 MSK X 1620 M/H
TILSVARER:	4010 X 80 MTR.OMKR.320
DATO:	23/6 93
KONSTR:	T-H
SKALA:	0

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