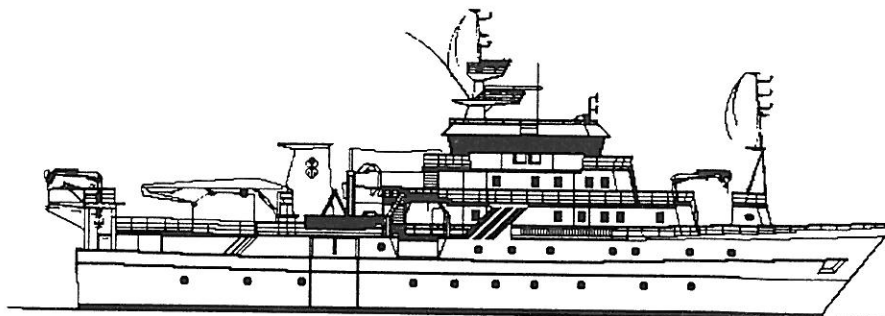


NORAD/FAO/UNDP GLO92/013 CRUISE REPORTS 'DR FRIDTJOF NANSEN'

PRELIMINARY CRUISE REPORT



SURVEYS OF FISH RESOURCES OF NAMIBIA

Cruise Report No 3/98

Survey of the horse mackerel resources

25 May - 14 June 1998

**Ministry of Fisheries & Resources
Swakopmund, Namibia**

**Institute of Marine Research
Bergen, Norway**

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25 May - 14 June 1998

by

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CHAPTER 1 INTRODUCTION

1.1 Objectives

1. Carry out a hydroacoustic survey on the pelagic and mid-water horse mackerel (*Trachurus capensis*), to:

- determine the abundance and spatial and vertical distribution of the exploited stock

- determine the size composition of the stock

- obtain length-weight relationships

- obtain biological information (sex ratio, reproductive stages and gonad weight)

2. Determine size composition and distribution of the other small pelagic species (pilchard, anchovy and round herring) and demersal species such as the juvenile hake which occur inshore and in the mid-water column.

3. Collect data on the basic oceanographic parameters per degree latitude, namely:

- temperature

- dissolved oxygen

- salinity

1.2 Participation

The scientific staff from the National Marine Information and Research Centre (NatMIRC), Swakopmund, Namibia were:

Ekkehard KLINGELHOEFFER (Team leader), Peter SCHNEIDER, Theopolina NAMWANDI, Paulus KAINGE, Justina SHIFIDI, Theo KAUIRA, Mathew HANGHOME and Nicolai ALKHOVIK, guest from the Midwater Trawl Association (first week of the survey).

The scientific staff from the Institute of Marine Research (IMR), Bergen, Norway, were:

Johannes HAMRE (Cruise leader), Bjørn Erik AXELSEN, Ronald PEDERSEN and Ingve FJELDSTAD.

1.3 Schedule

The RV "Dr. Fridtjof Nansen" left Walvis Bay at 10h00 on May 25 1998 and steamed westwards, starting directly on the grid line at 23°00' S (Walvis Bay). Due to the low and scattered abundance of horse mackerel south of Walvis Bay in previous years, the southernmost part of the survey (23°00' - 25°00' S) was covered at the end of the cruise. CTD profiles (Temperature, Salinity, O₂) were sampled at every degree latitude, from 17°15' S to 25°00' S.

RV "Dr. Fridtjof Nansen" arrived in Walvis Bay at 18h00 on June 14th. A total of 4140 NM were steamed.

1.4 Survey design

The survey consisted of transect lines parallel to the latitudes, covering a general depth range of 30 -600 meters, corresponding to approximately 2 NM from the coast and outwards (60 - 90 NM). In the north, the transect lines were extended to 2000-3000 meters in order to localise the far offshore stock component observed in the June 1997 survey.

In order to optimise the coverage of the distribution area, the distance between the transect lines was 20 NM in the southern area (20°00'- 25°00' S) and 15 NM in the northern area (17°15'- 20°00' S), due to traditionally higher abundance in the north. In the southern area west of Walvis Bay, additional transect line spaced with 10 NM distance was added in order to identify the northern and southern boundaries of the horse mackerel distribution areas.

The horse mackerel is typically observed in schools, both close to bottom and pelagically. However, at night time the schools were frequently dissolved, forming looser shoals or layers close to the surface. This caused problems for the registrations, in particular in the north on the inner part of the continental shelf, below approximately 250 meters bottom depth. There,

the juvenile horse mackerel seemed to aggregate directly underneath the surface at night, partly above the transducer range. Presence of juvenile horse mackerel at the surface was confirmed by surface trawling (buoys attached to the headline), yet there were no registrations on the echosounder, apart from a very thin noise-like layer that could sometimes be distinguished at the surface. In certain areas, schools were detected at the surface with the sonar. The grid lines that were worked at night were therefore redone during the day and the only day time S_A - values on the inner shelf (< approximately 250 meters) were used in the calculations.

The course track with the trawl and CTD stations is presented in **Figure 1**. Both pelagic and demersal trawls were used in the sampling (**Annex I**). The number of trawl hauls and CTD stations are listed in **Table 1**.

Table 1 Number of CTD and trawls stations.

Area	Bottom trawls (Bt)	Pelagic trawls (Pt)	Trawl failure (Bt)	Trawl failure (Pt)	Total trawls	Total CTDs
21°00' - 25°00' S	8	29	0	0	37	49
17°15' - 21°00' S	8	29	0	0	37	28
17°15' - 25°00' S	16	58	0	0	74	77

The area in southern Angola ie. 17°15' S (Cunene River) to 16°00' S (Tombuo) was surveyed by RV “Welwitschia” June 1-3. The grid lines were spaced with 7.5 NM and covered a depth range of 20 - 500 m.

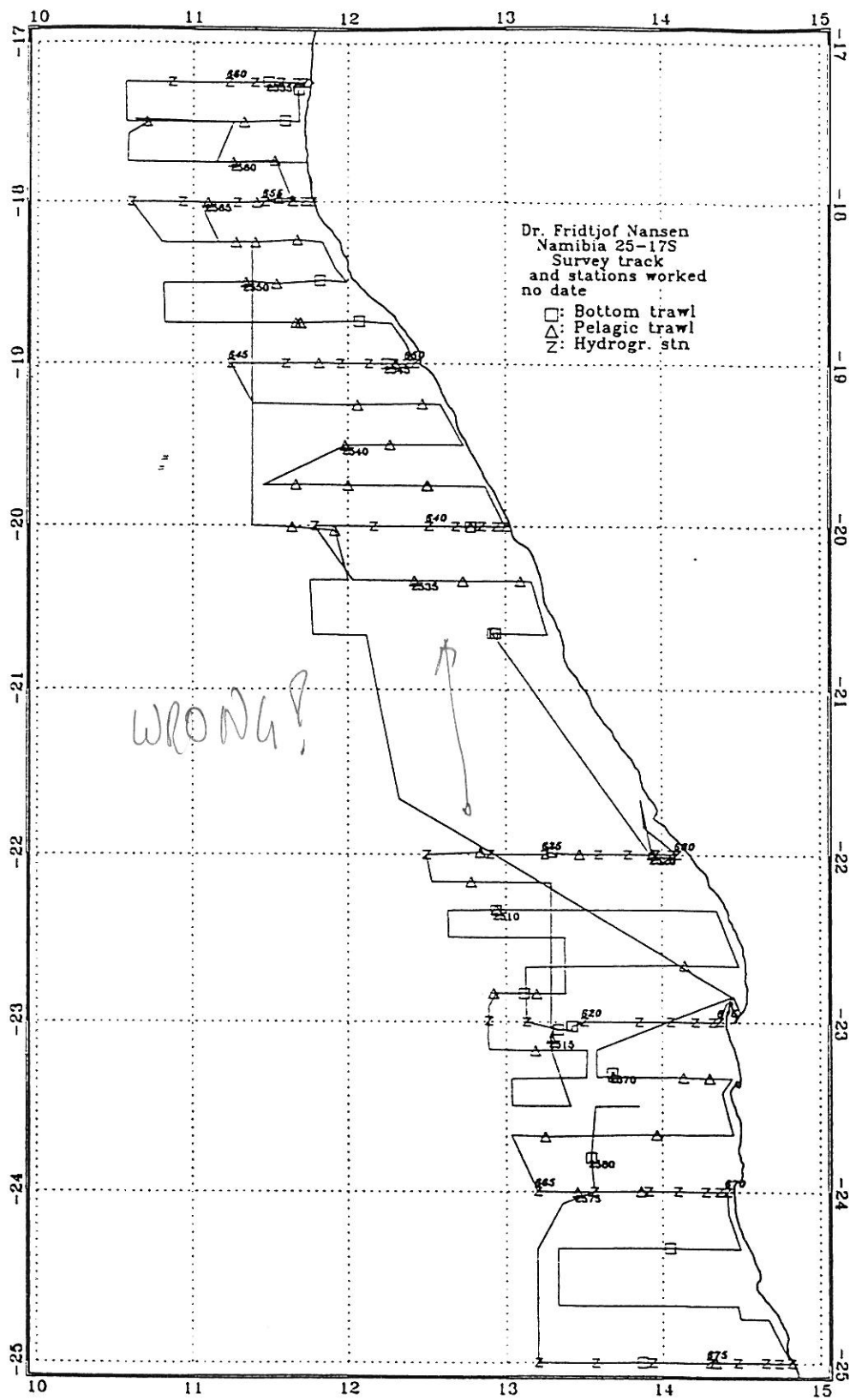


Figure 1 Course track and fishing stations, Easter Point to Cunene River.

CHAPTER 2 METHODS

2.1 Hydrography

A Seabird 911+ CTD probe was used to obtain vertical profiles of temperature (°C), salinity (psu) and oxygen (%). Real time plotting and logging was done using Seasave software. A total of 77 CTD stations were worked along 9 hydrographic sections from 25°00' S to 17°15' S at each degree latitude. The stations were positioned at the following distances from the coast: 2, 5, 10, 20, 30, 50 and 70 NM. (**Figure 1**). At each station, two Niskin bottles were triggered for water samples, one at approximately 5 meters depth and at approximately 10 meters above the bottom, or at maximally 1000 meters. The samples were analysed for dissolved oxygen using the Winkler method. The sea temperature at 5 m depth was recorded continuously during the cruise.

2.2 Biological sampling

2.2.1 *Species composition*

A representative sample of one to three baskets was taken from each trawl catch, depending on the size and species composition of the total catch. To ensure that the samples were representative the catches were well mixed and then split in fractions. One complete fraction was then separated from the rest of the catch and all the fish in it collected for analysis. The size and species composition of the sample was then extrapolated to the total catch, using number of baskets as scaling factor.

2.2.2 *Length composition*

A subsample of 100 horse mackerel individuals was collected from each sample for measurement of total length. For pilchard, round herring, anchovy and hake, 50 specimen

were collected. For all species, the length was recorded down to the nearest centimeter below.

2.2.3 *Biological data*

Biological data were collected for 10 fish per cm class and included the following parameters:

- Total length (down to the nearest mm below).
- Total weight (down to the nearest 100 mg below).
- Gutted weight (down to the nearest 100 mg below).
- Reproductive stage (1-8, see **Annex II**).
- Sex (male, female, juvenile).
- Gonad weight (down to the nearest 100 mg below).

Otoliths were collected from five individuals in each 1 cm length group. Both otoliths were collected and stored in envelopes. Length/ weight data were entered in NAN-SIS, but biological data were processed on Microsoft EXCEL worksheets.

2.3 **Acoustic methodology**

A description of the acoustic instruments with their standard settings is given in **Annex III**.

2.3.1 Scutinization

Scutinization of the acoustic data was carried out twice a day using the Bergen Echo Intergrator (BEI) to partition intergrator values to species or species groups. Trawl samples were used for species identification as well characteristic acoustic traits of the recordings. Intergrator values were recorded for every 0.1 nautical miles (NM), with depth-specific layers aggregations for all aggregations of horse mackerel. Schools were allocated to individual boxes. Horse mackerel can normally be identified according to the TS sample distribution (42- 48 dB, peaking at 48 dB) and the typical 'trace jumps' of analoge SA trace. In case of uncertainty of the species or mix of species in the observations, trawl sampling were executed. For consistency with the calculations in previous acoustic surveys, the horse mackerel of 21 cm and above has been classified maturing/adult and below ≤ 21 cm as juveniles. Species and species groups defined were:

- Juvenile horse mackerel. P2 (<21 cm)
- Adults and maturing horse mackerel (≥ 21 cm)
- Pelagic 1 (pilchard, anchovy and round herring)
- Pilchard
- Pelagic mix
- Gobies
- Other demersal species (mainly juvenile hake)
- Plankton and mesopelagic
- Mesopelagic
- Dentex

2.3.2 Post-stratification of fish distribution areas

S_A - values integrated over 5 NM were plotted in maps for stratification of distribution areas. Isolines were drawn in straight lines through the midpoints between zero- and positive S_A -values. Sub-strata for separate calculation of mean S_A were defined whenever differently spaced transect lines were present within strata. The areas of the strata were measured using a planimeter (cm²) and scaled to absolute units (NM²). The average SA value for each stratum was calculated excluding those values obtained between course lines for conversion of reflected area to fish biomass.

2.3.3 Conversion of reflected area to fish biomass

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

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

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

where L is the total length of the fish (cm) and C_F is the conversion factor. This target strength to length relationship has been used for other species such as pilchard, anchovy and round herring, although originally obtained from measurements of North Sea herring. Previous experiments have revealed uncertainty of the validity of the target strength function applied at present. However, the North Sea herring equation will be applied until a more reliable target strength function for horse mackerel is determined.

The number of fish in each length frequency group (cm) in an area was calculated applying the formula:

$$N_i = S_A \cdot A \cdot P_i / \sum_{i=1}^n (P_i / C_{Fi})$$

where

N_i	=	number of fish in length group i
A	=	area in NM^2
S_A	=	mean integrator value in the area
P_i	=	proportion of fish in length group i in samples from the area
C_{Fi}	=	fish conversion factor for length group i

The overall length frequency distributions of the stratas were extrapolated from trawl samples where $n > 100$. In order to standardise the contribution from the different samples

according to the abundance in the respective sampling area, each station was weighted according to the mean S_A -value of grid line the sample(s) was taken at. This strategy was chosen in order to avoid bias caused by unrepresentative S_A -values following from patchy distribution of the fish (schooling). The biomass in the different stratas was calculated from number of fish using the fitted length-weight relation for the fish sampled in the respective area, pooled by every two degrees latitude. Total number of fish and biomass is summed for all length groups.

CHAPTER 3 RESULTS

3.1 Weather conditions

The weather conditions were stable and generally favourable for hydroacoustic surveying of the fish stock. It was predominantly overcast and swells or sudden changes in the weather conditions seem unlikely to have affected fish behaviour or instrument performance in disfavour of detection of the fish.

3.1.1 Wind speed and direction

The wind speed varied from 5 to 20 knots throughout the survey area (**Figure 2**), except between cape Frio and Cunene River where wind speed was close to 30 knots. Wind direction was predominantly southern in the southern part of the survey area whereas south-easter winds dominated in the north. (**Figure 3**).

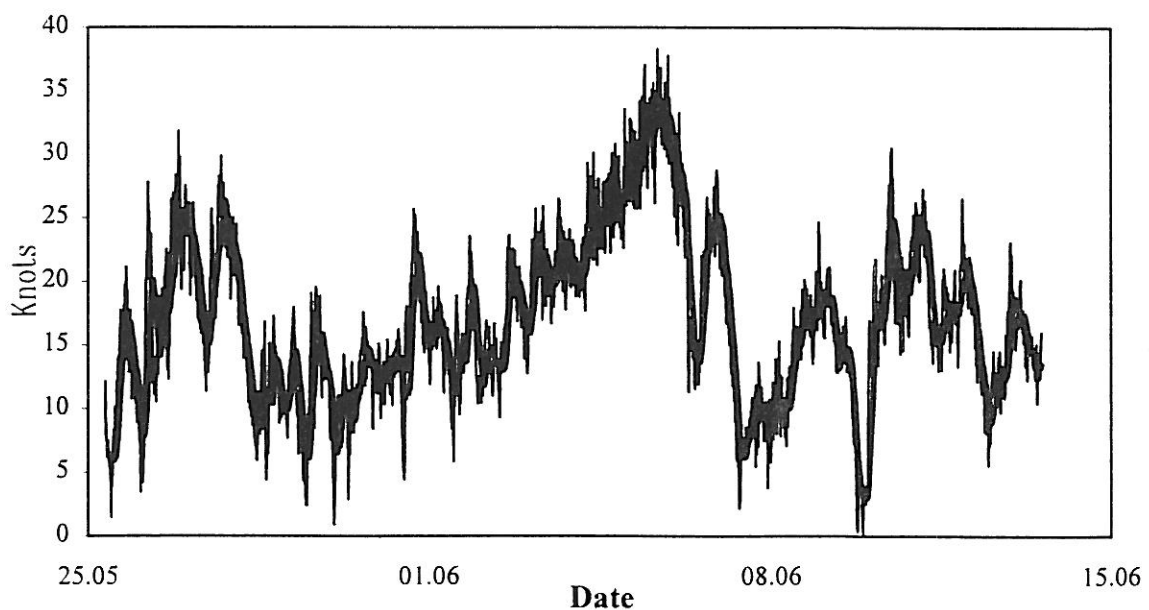


Figure 2: Wind speed (knots), May 25 - June 14, 1998.

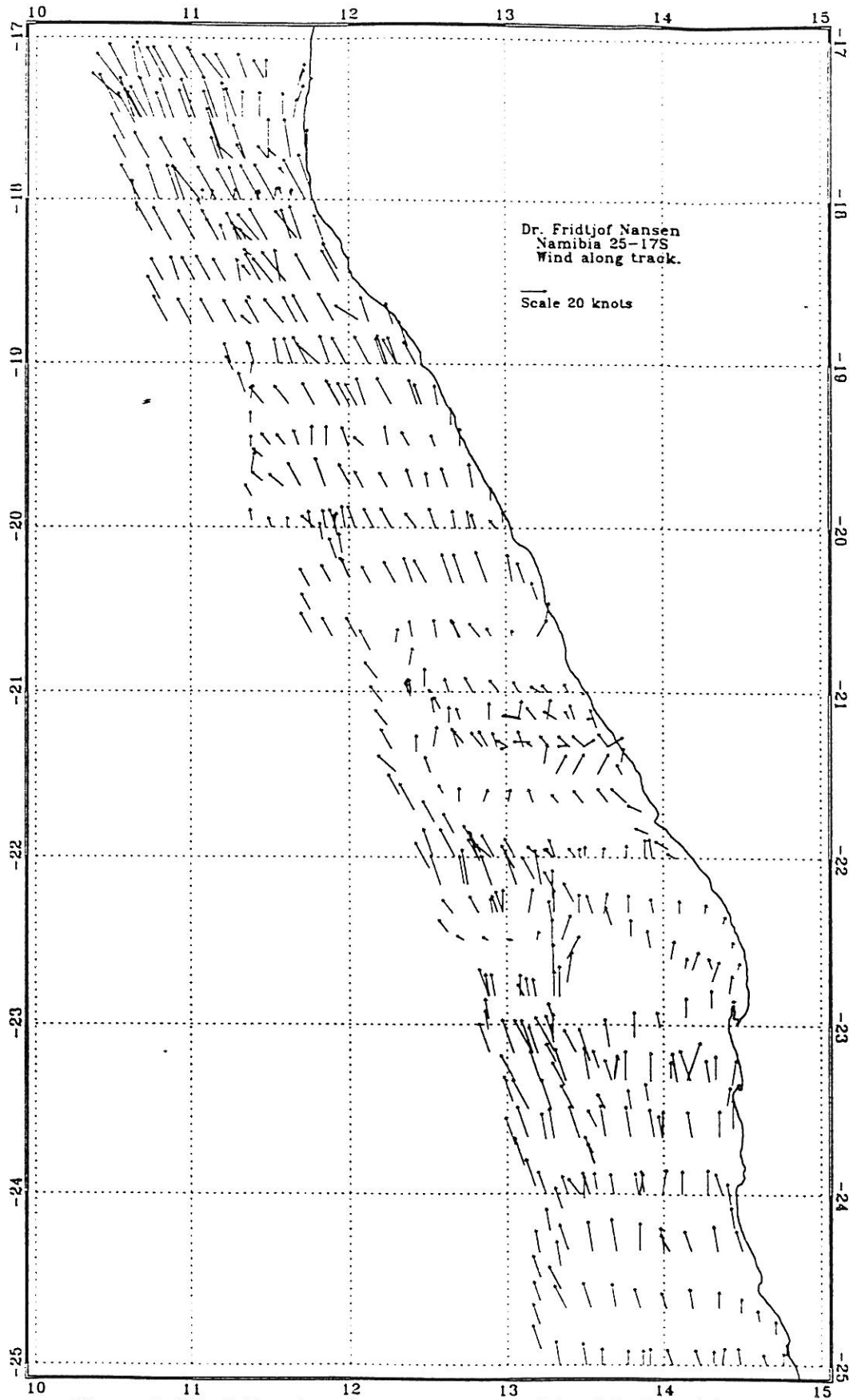


Figure 3 Wind direction along course track, May 25 - June 14, 1998.

3.2 Hydrography

The temperature in the upper 100 meters of the water column increased with the distance from the coast (12°C on the inner shelf to 14°C on the outer shelf at 25°00' S) and with decreasing latitude (16°C on the inner shelf to 17°C on the outer shelf at 17°15' S). Salinity the upper 100 meters of the water column also tended to increase with decreasing latitude (35.0 ‰ at 25°00' S and 35.6 ‰ at 17°15' S). The oxygen level however seemed to decrease with decreasing latitude (6.0 ‰ at 25°00' S and 4.0 ‰ at 17°15' S). The CTD profiles are given in **Annex IV** (the profile for 18°00' S is missing due to data- error).

3.3 Fish distribution

Horse mackerel was widely distributed throughout the survey area. The juvenile fish (<21 cm) was predominantly recorded in inshore waters, whereas maturing/adults (≥21 cm) were found offshore. Relatively high concentrations of horse mackerel were recorded at the Angolan border (17°15' S), suggesting that the Cape horse mackerel distribution extends into Angolan waters. The horizontal distribution of horse mackerel is indicated in **Figure 4**. Degree of shading illustrates average m² reflected area pr. NM² for the various strata.

Juvenile horse mackerel was recorded between between 19°00' and 23°00' S in one stratum at 20- 250 m bottom depth. The dominant cohort in this area was 10 - 11 cm. Adult horse mackerel was recorded in two strata between 17°15' and 20°00' S and in three strata between 21°00' and 25°00' S at 200- 2000 m bottom depth. The distribution of horse mackerel in the offshore region between 200 - 300 m bottom depth south of 23°00' S' (**Figure 4**) has only occasionally been recorded in previous acoustic surveys by RV "Dr Fridtjof Nansen", initialised in 1990.

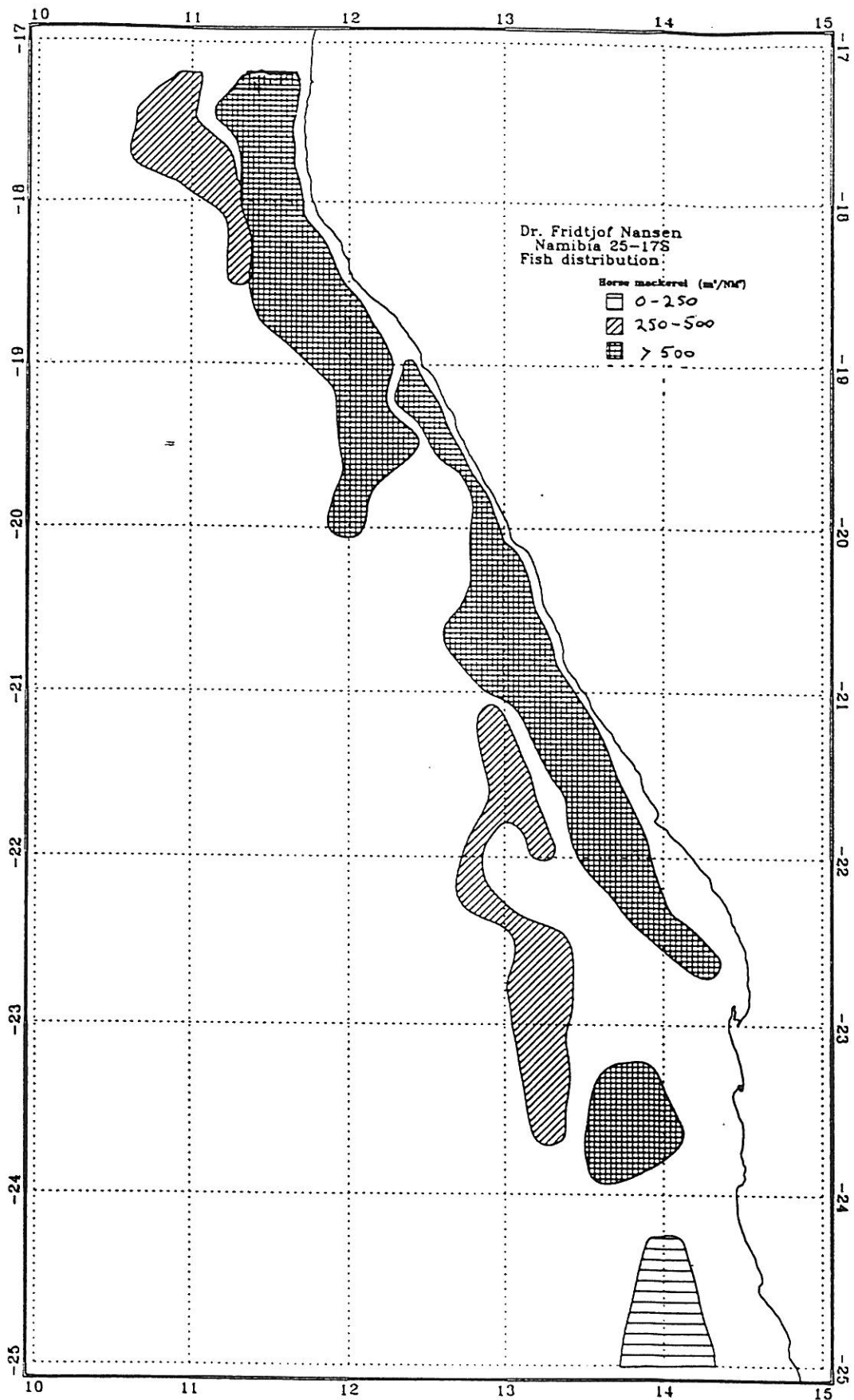


Figure 4 Horizontal distribution of horse mackerel in the survey area.

3.4 Size composition

Trawl data for all stations (ie 2506- 2580, **Annex V**) were entered to the NAN-SIS data base. Summary of catch rates (kg h^{-1}) are given in **Annex VI**. The overall length frequency distribution in the survey area is given in **figure 5**. Overall length frequency distribution in the period 1995 through 1997 is included for comparison.

The length frequency distributions of horse mackerel, pilchard and hake were pooled according to two regions ie. south and north of $21^{\circ}00'$ S for comparison between the northern and southern parts of the stock distribution area. The length frequencies are presented in for horse mackerel, pilchard and hake are presented in **Annex VII**.

3.4.1 *South of $21^{\circ}00'$ S*

The adult horse mackerel stock found offshore and had a modal peak of 30 cm total length. The juvenile stock, limited to inshore areas, had a modal peak of 11 cm.

One modal peak of 21- 22 cm was observed for the pilchard stock. The hake peaked at around 24 cm.

3.4.2 *North of $21^{\circ}00'$ S*

Three modal peaks were observed for the horse mackerel north of $21^{\circ}00'$ S, namely: 11- 12 cm, 16- 17 cm and 21- 22 cm.

Modal peaks were identified for pilchard at 13 cm and 22 cm. In this region, the hake length distribution had a modal peak at 24- 29 cm.

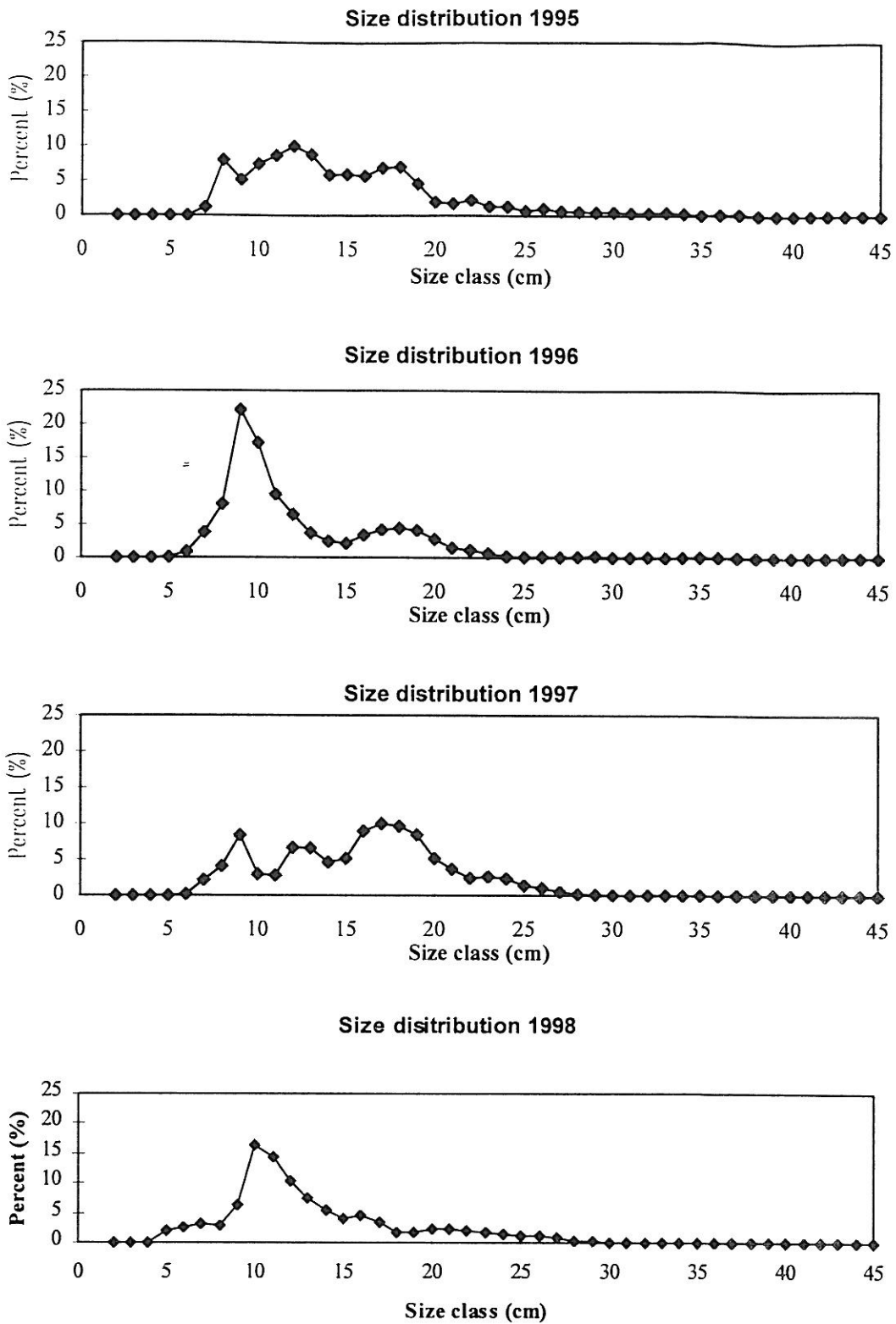


Figure 5 Overall size distribution for horse mackerel in June surveys in the period 1995 through 1998.

3.4.3 Inshore, offshore and far offshore stock components

The length frequency distribution for the inshore (20- 200 m), offshore (200- 500 m) and far offshore (> 500 m) areas north of 21°00' S (**Figure 6**) indicates an increase in length with increasing depth, suggesting that fish in this region migrates westwards as they grow. Similarly, the length frequency distribution for the far offshore component north of 18°00' S compared to the offshore component between 22°00' S and 23°00' S and the one south of 23°00' S (**Figure 7**) suggests a southward migration pattern of maturing/ adult fish on the outer continental shelf.

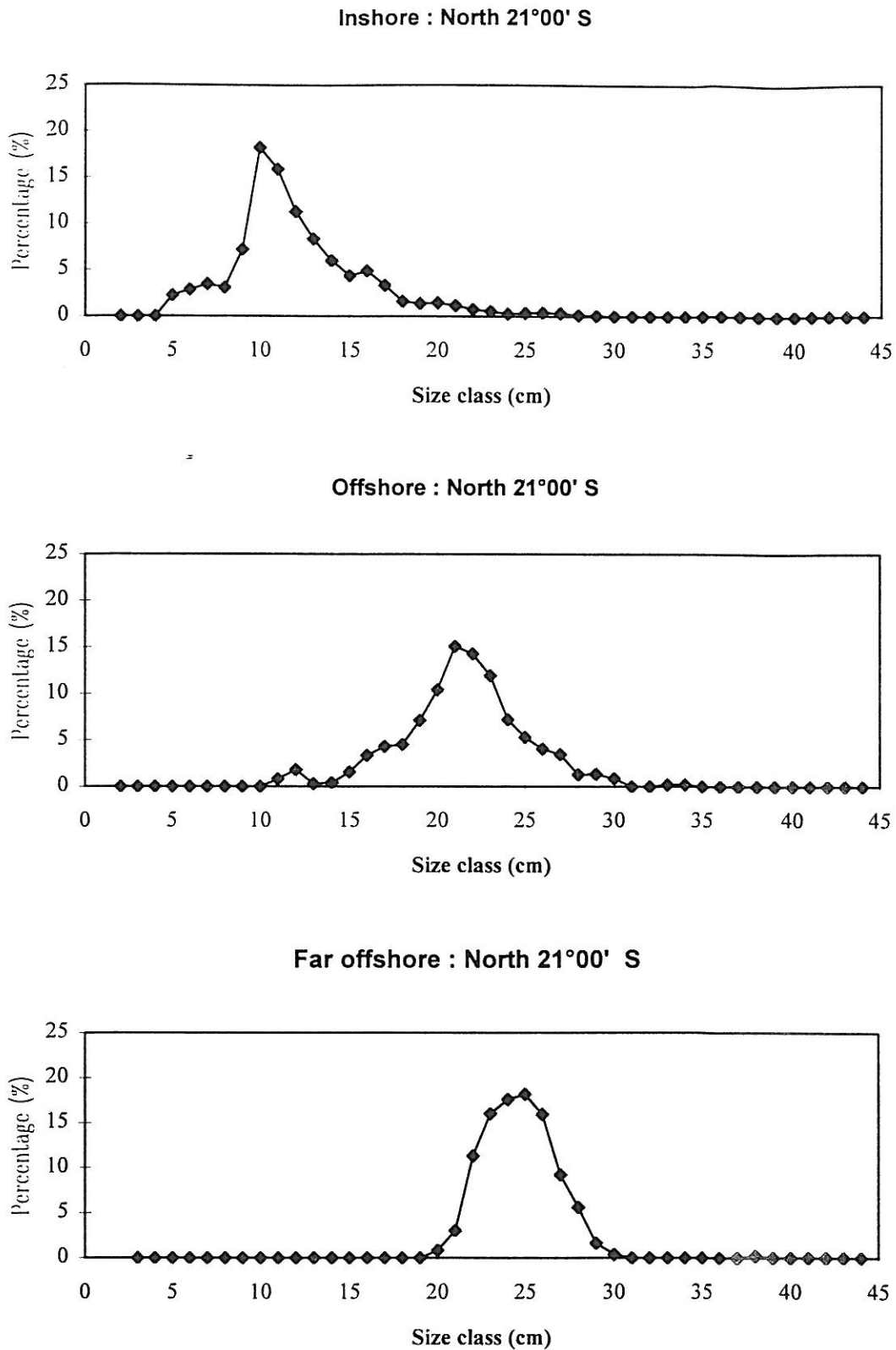
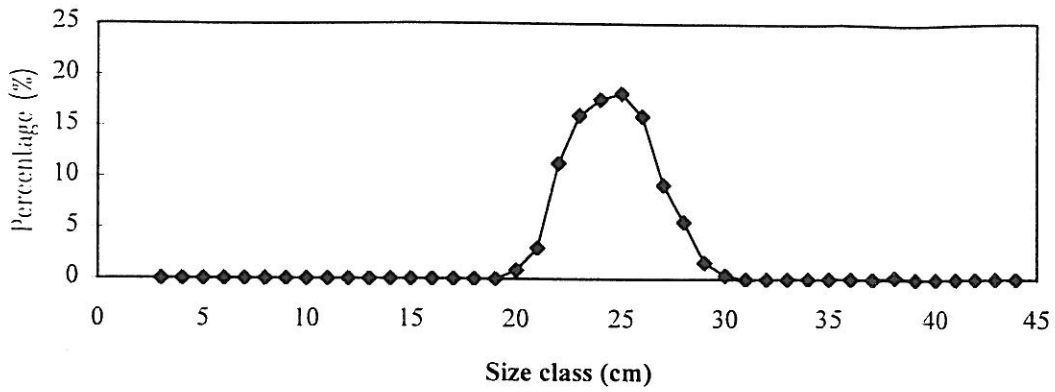
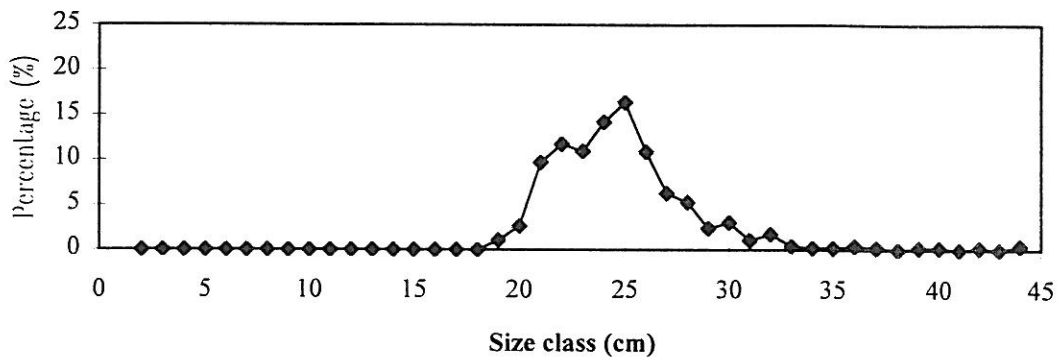


Figure 6 Size distribution of horse mackerel on the inner, intermediate and outer continental shelf North of 21°00' in June 1998.

a) Far offshore : 17°15' S - 18°00' S



b) Offshore : 22°00' S - 23°00' S



c) Offshore : 23°00' S - 25°00' S

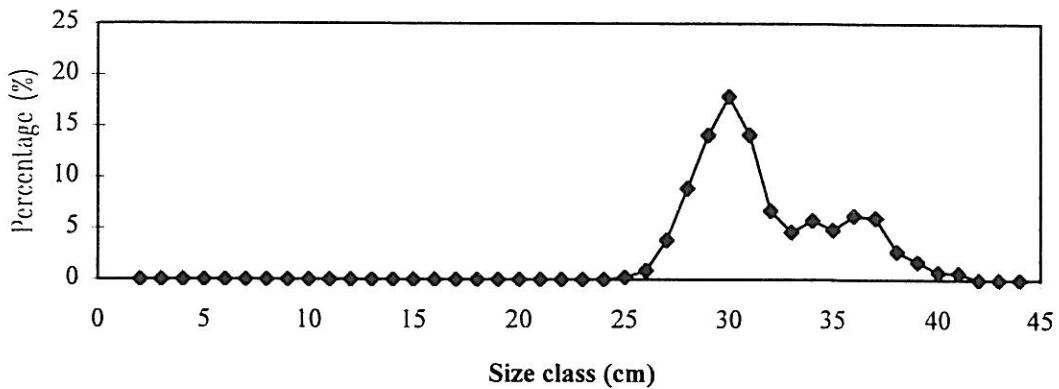


Figure 7 Size distribution of the offshore horse mackerel throughout the region in June 1998.

3.5 Length-weight relationship

The biological data for horse mackerel were pooled by two degrees latitude, giving the following regions: 17°15' - 19°00' S, 19°00' - 21°00' S, 21°00' - 23°00' S and 23°00' - 25°00' S. The length- weight relationship was derived fitting a power function to the length- weight data (**Annex VIII**). The correlation coefficients (R^2) showed that the fitted length-weight functions fit the data well for both total weight and gutted weight.

Mean weight (total weight and gutted weight) was estimated for the mid- length in each length group using the fitted length- weight function in the respective regions. The condition factor (CF) was calculated for each length group using the formula:

$$CF = 100 \cdot W \cdot L^{-3}$$

where W is weight (total weight or gutted weight in g) and L is total length (cm). Estimated weight of the mean length in each length group and respective condition factors are given in **Annex IX**.

The condition factor was also calculated for the northern (north of 21°00'' S) and southern (south of 21°00'' S) parts of the survey area. The condition factor was then derived fitting a power function with a fixed power of 3 to the length- weight data for the two areas. The condition factor was somewhat higher south of 21°00'' S (0,762) than north of 21°00'' S (0,742), and in order to examine whether the difference has been persistent for the past few years, data for previous years were examined (**Table 2**).

Table 2: Condition factor north and south of 21°00'' S and total biomass for the period 1995 through 1998.

Year	South of 21°	North of 21°	Total biomass (1000 tonnes)
1995	0.7869	0.7345	1 503
1996	0.8228	0.7992	974
1997	0.8459	0.8579	782
1998	0.7616	0.7420	1 914

Though the condition factor actually was higher in the north than in the south in 1997, the condition factor generally seems to be highest in the south, probably due spawning taking place in this region. The condition factor varies considerably from year to year, and appears to be inversely related to fish biomass, suggesting that the condition of the fish is density dependent. Consequently, it is not recommendable to use a fixed condition factor, but rather to assess the length- weight relationship in different regions from year to year. The length-weight relation applied in the biomass estimate may affect the outcome considerably, consequently a large number of fish should be sampled in order to obtain a reliable length-weight key.

Also in 1997, the biological data were pooled by two degree latitude, except for south of 21°00'' where the data were pooled in one group due to scarcity of samples in this region (17°15''- 19°00'' S, 19°00''- 21°00'' S and 21°00''- 26°00'' S). This strategy seems to be compatible with the above analysis and is suggested sustained for future surveys.

3.6 Reproductive status

The greater portion of the stock north of 21°00' S comprised of females. No spawning was recorded amongst the adult stock throughout the region. Mean total weight (g), mean gonad weight (g) and percentage of fish in each gonad maturity stage is presented for the regions 17°15' - 19°00' S, 19°00' - 21°00' S, 21°00' - 23°00' S and 23°00' - 25°00' S in **Annex X**.

3.7 Abundance

The total biomass of horse mackerel in June 1998 was estimated at about 1 900 000 tonnes compared with less than 800 000 tonnes obtained during the RV 'Dr. Fridtjof Nansen' surveys in June 1997. The juvenile stock is estimated to be approximately 800 000 tonnes which is the highest juvenile stock recorded since 1994.

The total estimated biomass of juvenile (< 21 cm) and maturing/ adult (≥ 21 cm) horse mackerel in the 1998 survey is given in **Table 3**. For comparison, biomass estimates from acoustic surveys since 1994 are included. Abundance in numbers and 1000 tonnes per length group is presented for all strata in **Annex XI**.

Table 3 Summary of estimated horse mackerel biomass (1000 tonnes) in the period 1994 through 1998.

Juveniles ≤ 21 cm	1994	1995	1996	1997	1998
Easter Point - Ambrose Bay	94	243	108	0.4	205
Ambrose Bay - Cunene River	1 108	481	579	428	613
Cunene River - Tombua	58	41	no survey	no survey	no survey
Sub total < 20 cm	1 260	765	687	432	818
Maturing/ adults > 21 cm					
Easter Point - Ambrose Bay	7	252	146	51	482
Ambrose Bay - Cunene River	224	431	141	303	616
Cunene River - Tombua	6	95	no survey	no survey	no survey
Sub total > 20 cm	237	748	287	354	1 098
Total	1 497	1 543	974	786	1 916

CHAPTER 4 CONCLUDING REMARKS

4.1 Survey conditions

Weather conditions were favourable for acoustical surveying of the horse mackerel stock. Both the inshore and the offshore horse mackerel seemed to be distributed within the transducer range in daytime, but surface schooling occurred inshore at night, especially in the north, and these areas therefore had to be surveyed during the day.

Pelagic schools were sometimes difficult to sample, particularly during the day. In the south sampling was particularly difficult, presumably due to escapement of the large individuals present in this area. Dense concentrations of jellyfish occasionally hampered trawling, particularly in the southern region and in certain areas of the north.

4.2 Distribution

Horse mackerel occurred throughout the survey area. The densest aggregations were observed between 17°15' and 22°40' S. The length of the fish generally increased with increasing distance from the coast and with increasing latitude. Juveniles mainly occurred on the shallowest part of the continental shelf.

In the 1996 and 1997 survey reports, the lack of the adult horse mackerel in northern Namibian waters gave rise to the hypothesis that the fish migrate out of this area when reaching maturity, i.e. at a length of 24 cm and above. It was further suggested that the maturing fish might migrate southwards to spawn, and that the post-spawners may not return to northern Namibian waters. The present survey revealed a similar distribution pattern. The northern stock component was dominated by intermediate sized individuals, whereas the stock component south off Walvis Bay was dominated by larger individuals. Cape horse mackerel is also abundant in South African waters, and a southwards spawning migration out of the survey area may thus cause error in estimated stock size.

4.3 Abundance

The present estimate of about 1 900 000 tonnes is the largest recorded in Namibian waters since June 1990 (**Table 4**). The highest total stock estimate was 2.1 mill. tonnes in 1992, of which 0,7 mill tones were recorded in Angolan waters.

Table 4 Estimated biomass (1000 tonnes) of horse mackerel from hydro-acoustic surveys in the period from 1990 to 1998.

Survey	Vessel	Total abundance (1000 tonnes)
December 1989	Ocher (USSR)	1 200
March 1990	Nansen (20 - 500m)	1 400
June 1990	Nansen (20 - 500m)	2 000
March 1991	Nansen (20 - 500m)	1 500
November 1991	Nansen (20 - 500m)	1 300 + 400 (south Angola)
June 1992	Nansen (20 - 500m)	1 400 + 700 (south Angola)
June 1993	Nansen (20 - 120m)	250 + 90 (south Angola)
June 1994	Nansen (20 - 500m)	1 450 + 60 (south Angola)
December 1994	Nansen (20 - 200m)	600 + 20 (south Angola)
June 1995	Nansen (20 - 500m)	1 400 + 100 (south Angola)
June 1996	Nansen (20 - 500m)	1 000
June 1997	Nansen (20 - 500m)	800
June 1998	Nansen (20 - 500m)	1 900

TS = 20 log L -72; Reference: Cruise reports : 1990 - 1998

The estimate in 1997, Angola not included, was 0.8 mill. tonnes. Thus the present estimate suggests a pronounced increase in the stock size in 1998. However, some variation from year to year may be related to bias in the survey methodology. Certain types of fish behaviour may induce various problems obtaining echoes from the target species, e.g surface schooling in the north. A common problem encountered in the south this year was horse mackerel in layers of of meso- pelagic fish, sometimes also including young pelagic hake. In such immense backscattering layers, single echoes from the horse mackerel can not be distinguished, complicating species identification. Schools were sometimes observed to segregate from the upper boundary of the layers, and were identified as horse mackerel through trawling. Nevertheless, horse mackerel occurring in multispecies aggregations of fish is a potential source of underestimation error.

The increase in estimated abundance from 1997 to 1998 is however unlikely to be caused by underestimation in 1997 alone. Fishing effort has been reduced the last few years (Internal Stock Assessment Reports 1997 and 1998, NatMirc), and due to the reduction in the seal population from 1994 to 1996, natural mortality may have been reduced as well. Thus, increased survival and growth may have contributed to the observed increase in stock size. The impact of seal predation on horse mackerel should be investigated, and a joint management of the seal and pelagic fish species such as pilchard, horse mackerel and round herring might be considered.

Migration in and out of the survey area may affect the abundance estimates considerably. The present survey extended from 17°15' S to 25°00' S. Horse mackerel was observed at both the northern and southern boundaries of the survey area, suggesting that the stock was only partly covered. The area between 16°00' S and 17°15' S was surveyed by R/V “Welwitschia” in June 1-3, and considerable amounts of horse mackerel were observed. However, no trawl samples were obtained, neither were acoustical raw data stored. These observations are therefore not included in the estimate. In Angolan waters, Cunene horse mackerel (*Trachurus trecae*) is the dominant horse mackerel species, whereas the principal species in Namibian waters is Cape horse mackerel (*Trachurus capensis*). Only Cape horse mackerel was recorded south of 17°15' S in the present survey, and since the two species normally have an overlapping distribution area, Cape horse mackerel may have been present north of the border. Irrespective of the actual degree of overlapping between the two species, the fish aggregations observed on either side of the border suggest that estimated abundance of Cape horse mackerel is affected by the proportion of the stock present in Angolan waters at the time of surveying. The increase in abundance from 1997 to 1998 combined with a limited degree of coverage suggests that migration may be one of the primary sources of error in the present assessment methodology.

The high abundance of maturing/ adult fish (>21 cm) suggests that the length distributions of previous years is biased towards an under- representation of fish around 10 cm. The small horse mackerel normally occupies the innermost part of the continental shelf, and since the grid lines are normally interrupted between the 20 m and 30 m isobath, an extreme inner-shelf distribution pattern may cause the coverage of the juvenile fish to be poor. Surface schooling above transducer range may further contribute to the underestimation of the juvenile stock component. The basis for predicting the recruitment to the adult stock may be not be reliable, and an additional index for the abundance of the juvenile component of the stock should be considered.

The length- target strength relation presently applied for horse mackerel has originally been derived for North sea herring, and might be inaccurate. This relation should be further addressed in order to establish a reliable conversion factor from reflected area to fish biomass. However, the present TS- function has been applied consequently in the time series established for horse mackerel, and the variation in stock size can therefore not be related to the TS- function.

4.4 Recommendations

In general, the survey effort should be increased in order to obtain acceptable coverage of the stock. At present, three weeks of survey time is allocated to surveying the horse mackerel stock, and one additional week of survey time seems to be required. The overall survey area should be extended both northwards and southwards in order to improve the coverage. Due to the patchy distribution pattern, particularly in the south, the grid lines should be spaced with a fixed distance of 15 NM or less in the entire survey area.

The grid lines should be worked as close to the shore as possible. It is suggested that the inner shelf is consequently surveyed during the day to avoid problems associated with surface schooling. The sonar echo-integration methodology (SODAPS) should be adapted for horse mackerel and applied on the inner shelf were the fish ascend to the surface. The possibility of assessing juvenile fish on the innermost parts of the continental shelf (<20 meters) using aeroplanes equipped with video- camera should be considered. One or two days of surveying should offer sufficient coverage if weather conditions are good.

Horse mackerel is an extremely nervous and fast swimming species. It is capable of rapid burst swimming that may enable escapement from sampling trawls. Thus size selectivity is a potential source of error in stock assessment and determination of length frequency composition. The southern stock component generally consists of large individuals, and has traditionally been relatively hard to sample. Nevertheless, this area is favoured area by mid-water trawlers during the winter months due to big size composition in the catches. The mid-water trawls have as much as 60 m trawl opening, and tow at speeds of 5-6 knots, whereas the pelagic sampling trawls of “Dr. Fridtjof Nansen” only have an opening of approximately 20 meters at maximum towing speed of 3-4 knots. It has generally been easier to sample the horse mackerel in the north, but if bigger specimen tend to escape the sampling gear, these samples may be biased towards smaller individuals and/or specimen with lower condition.

Therefore, experiments should be carried out in order to determine whether the catches deviate from catches of a mid-water trawler fishing on identical recordings. This way, sampling error could be quantified, and a correction factor could be established, assuming that commercial trawls fish non-selectively. If samples cannot be obtained from certain areas, making use of samples from commercial vessels might be considered. If the sampling methodology proves generally unreliable, one option might be to have a mid-water trawler sampling in the track of the surveying vessel.

The natural behaviour of the fish should be investigated in order to improve the understanding of the processes determining the horizontal and vertical distribution of the fish. A tool predicting the vertical dynamics of the fish according to environmental factors and presence of other species would aid the both process of sampling and that of species identification of acoustical observations.

ANNEX I 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 follow.

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 B 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 B
FL. DAMLINE

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

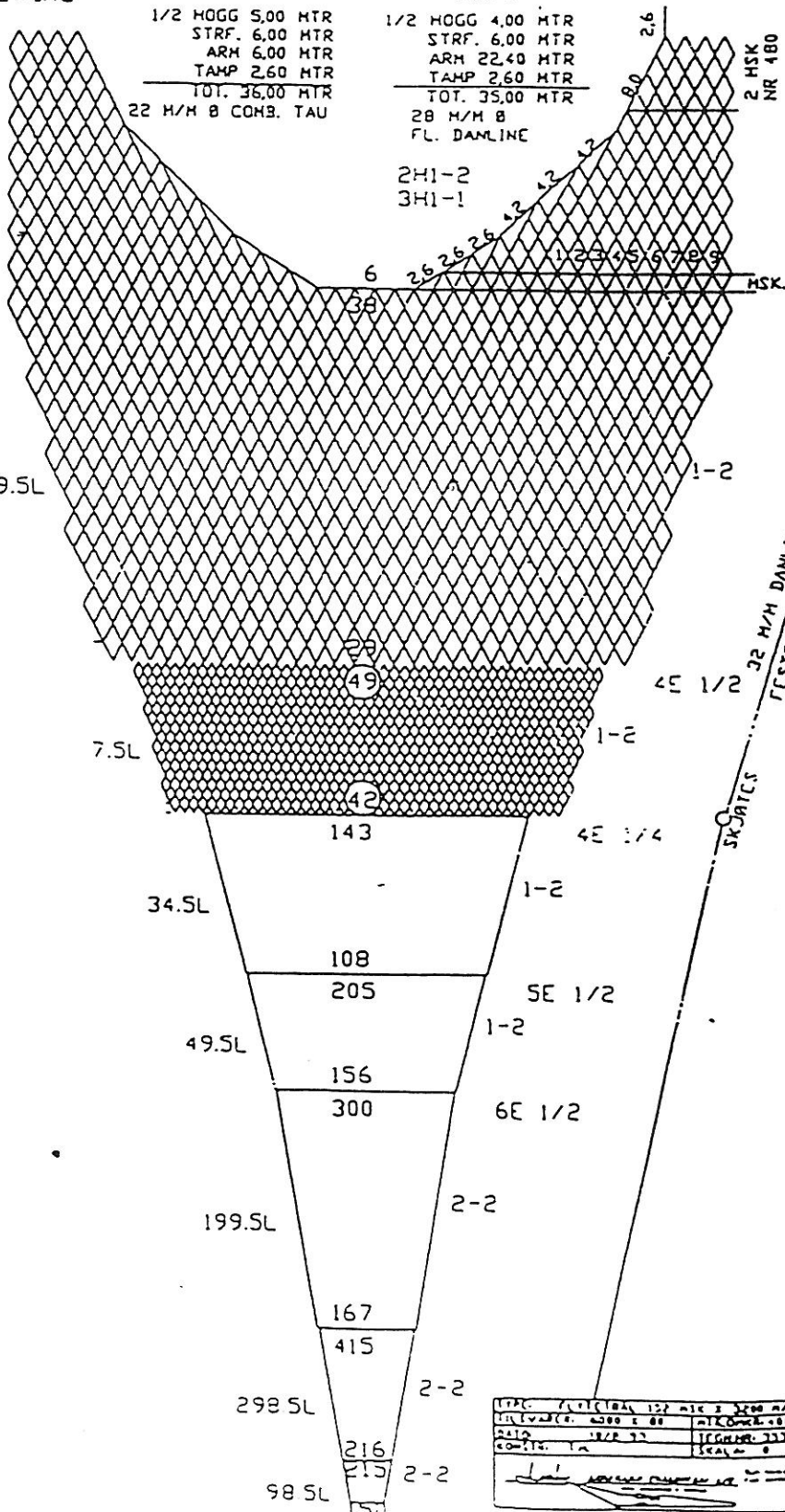
400.0 48 14.0 4

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: 7.1 (18A) 122 M/M 3 3200 M/M	
IN (VALG): 4000 E 00	M/CORNER: 4000
DATE: 18/12 97	REGNR: 73307
COM: 1A	SCALE: 0

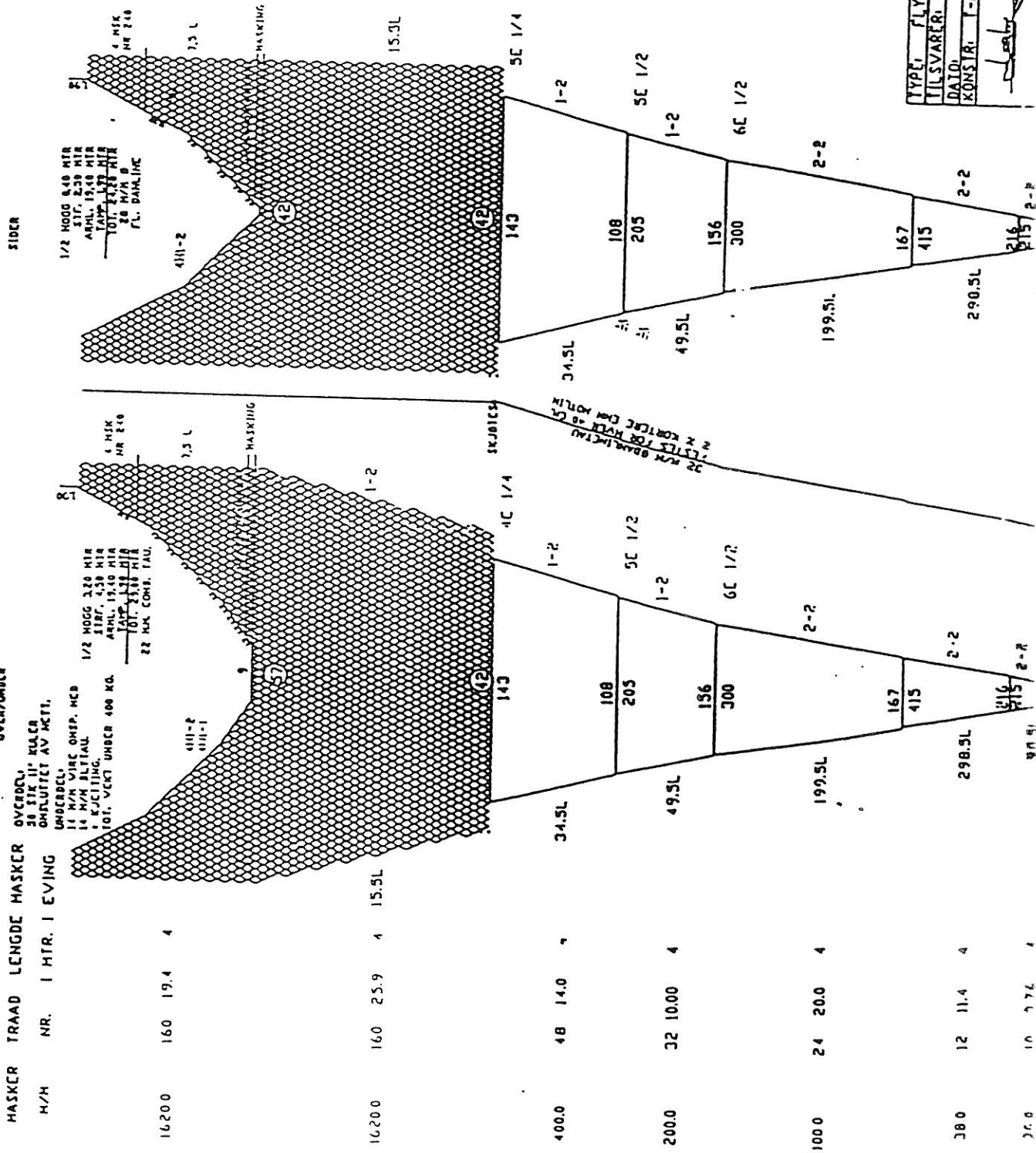
F/F Dr. Fridtjof Nansen

HASKER TRAAD LENGDE HASKER
M/H NR. I MTR. I EVING

OVERRAMBER
OVERBROD
34 STR. 11. KULLER
SØLUSSET AV METT.
UNDERBEL:

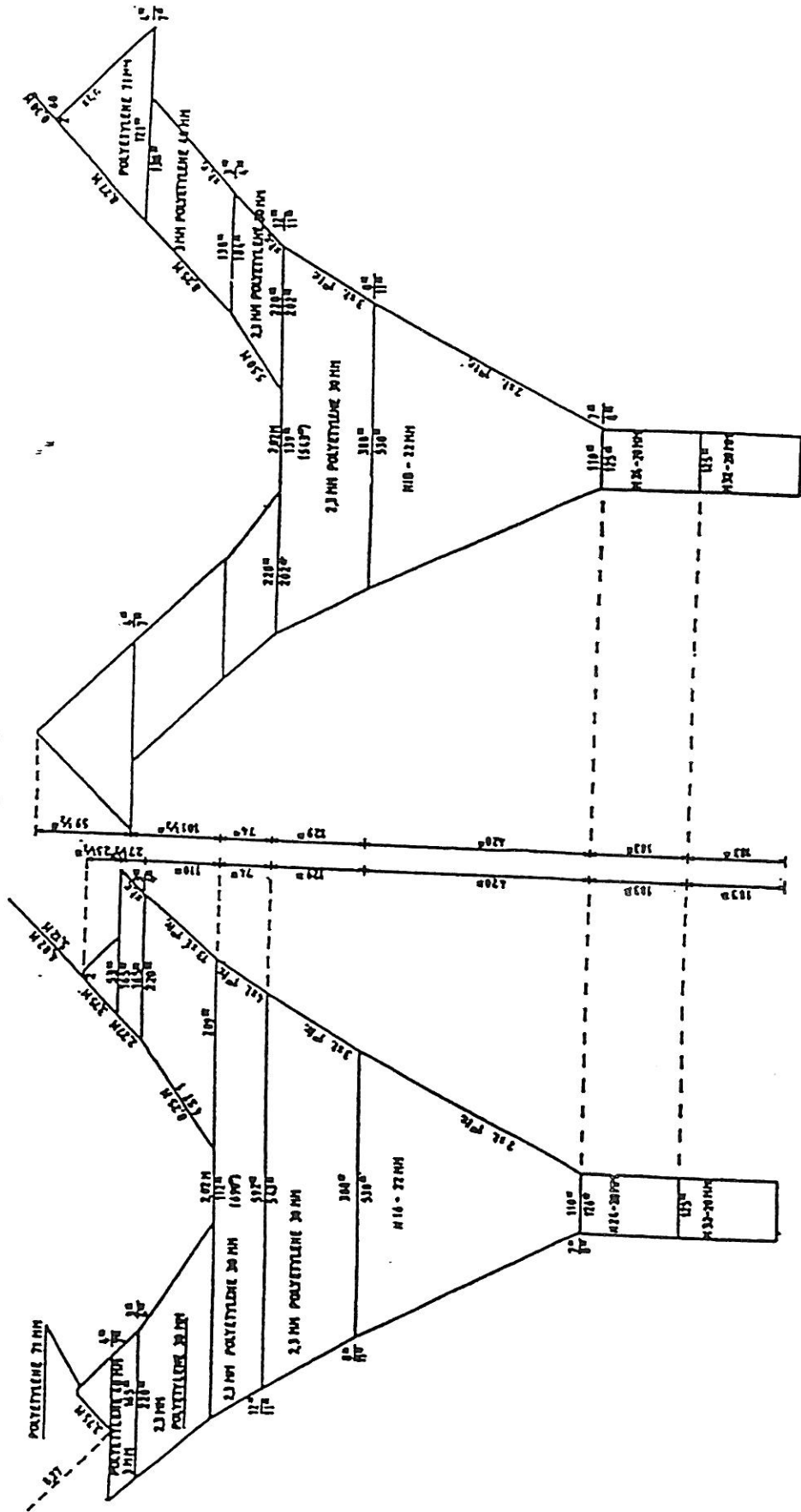
1/2 MOGG 320 MTR
STR. 230 MTR
ARHL. 15.40 MTR
TAMP. 1.70 MTR
TOT. VEKT UNDER 400 KG.
22 M/K CONE. TAU.

1/2 MOGG 840 MTR
STR. 230 MTR
ARHL. 15.40 MTR
TAMP. 1.70 MTR
TOT. VEKT 1.70 MTR
28 M/H B
FL. DANLINE



TYPE:	FLYTETRAL 190 HSK X 1620 H/H
TILSVARER:	4010 X 80 HTR.OMKR.320
DATE:	23.06.93
KONSTR.:	T-H
SKAL AI:	0

Bottom trawl: High opening shrimp and fish trawl with net headline 31m (Donline), foot-rope 47m, gear with 12 cm diameter roller disks, 40 m sweeps, estimated headline height 6m and distance between wings during towing 18-20m.



ANNEX II GONAD MATURITY STAGES

The following seven stage scale was applied to determine reproductive stage of the horse mackerel (Hecht (1976), modified in 1997).

JUVENILE/ADOLESCENTS

0 UNKNOWN

Damaged fish; decayed.

1 JUVENILE

Not able to distinguish between male or female. Length approximately 0.1 - 14 cm.

2 IMMATURE

Gonads are very small, less than half the body cavity length, and flattened or tubular i.e. thin and thread-like. The colour of the gonads is translucent. Sexes easy to distinguish.

Approximately: 14 - 20 cm fish.

Ovaries: Light orange gelatinous mass. Cannot see eggs with the naked eye.

Testis: Translucent-white; thin, elongate balloon-like.

ADULTS

3 RECOVERING\INACTIVE

Gonads are slightly larger than stage 2, approximately half of body cavity length, but still generally flat. Colour more pronounced.

Ovaries: Pale reddish tint back to orange colour.

Testis: Creamy-white colour and very flat (lobe like) with sharp edges.

4 MATURING

Gonads longer than half body cavity length and becoming cylindrical.

Ovaries: Individual eggs clearly visible. Colour orange. Blood vessels marked. Spindle shaped.

Testis: White to cream/testes more swollen. Spindle shaped.

5 RIPE

Gonads very large, virtually filling body cavity, even causing distension of abdomen.

Ovaries: Individual eggs almost 0.5 mm or larger and lightly elongated. Ovary sac breaks realising eggs. Colour is a dark orange.

Testis: Cream, releases milt when punctured.

6 SPAWNING\ RUNNING

Eggs or milt released through vent during handling i.e. running.

Ovaries: Ovary is dark orange and greatly swollen. Could also be partly spent.

Testis: External appearance changes from smooth structure to white and knob-like. Swollen to partly spent.

7 SPENT

Ovaries: Gonads flattened, but still elongated. Very blood-shot (dark red). Few eggs remaining appear grey\brown.

Testis: The testis are deflated and grey in colour.

ANNEX III ECHOSOUNDER AND INTEGRATOR SYSTEM

The Simrad EK 500/38 kHz scientific echo sounder, was used during the survey. Raw data were scrutinized using the Bergen Echo Integrator (BEI). Backup of all raw data and processed data was stored on tape. The settings of the echosounder 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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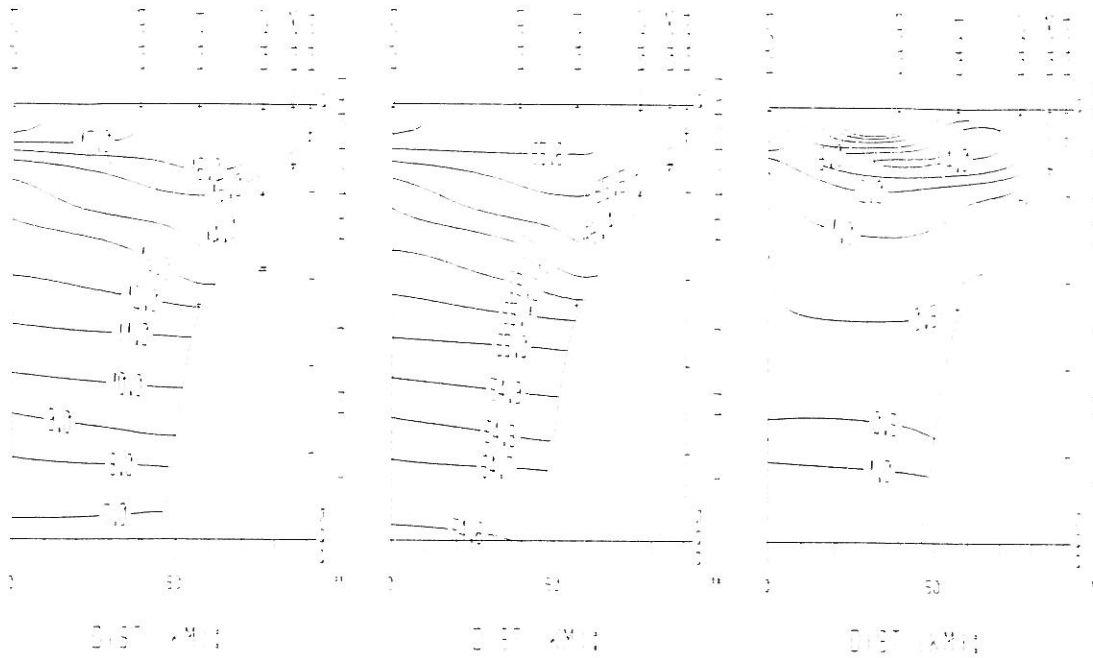
ANNEX IV HYDROGRAPHIC PROFILES

17°15' S, 7.6.98

Temperature (°C)

Salinity (psu)

Oxygen (%)

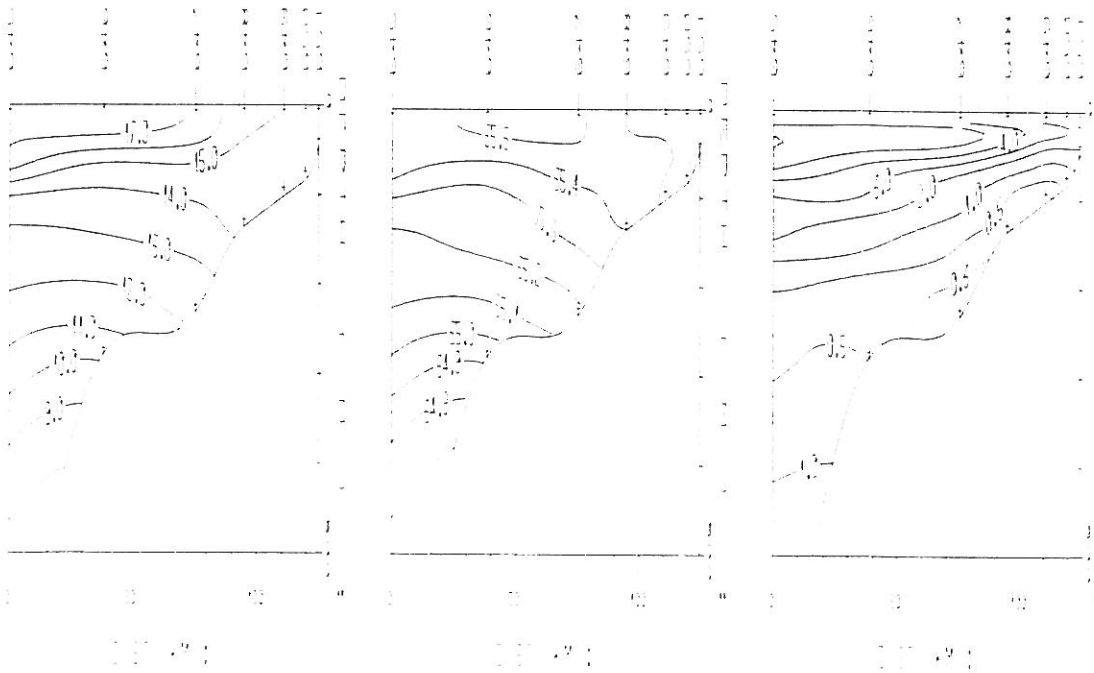


19°00' S, 4.6.98

Temperature (°C)

Salinity (psu)

Oxygen (%)

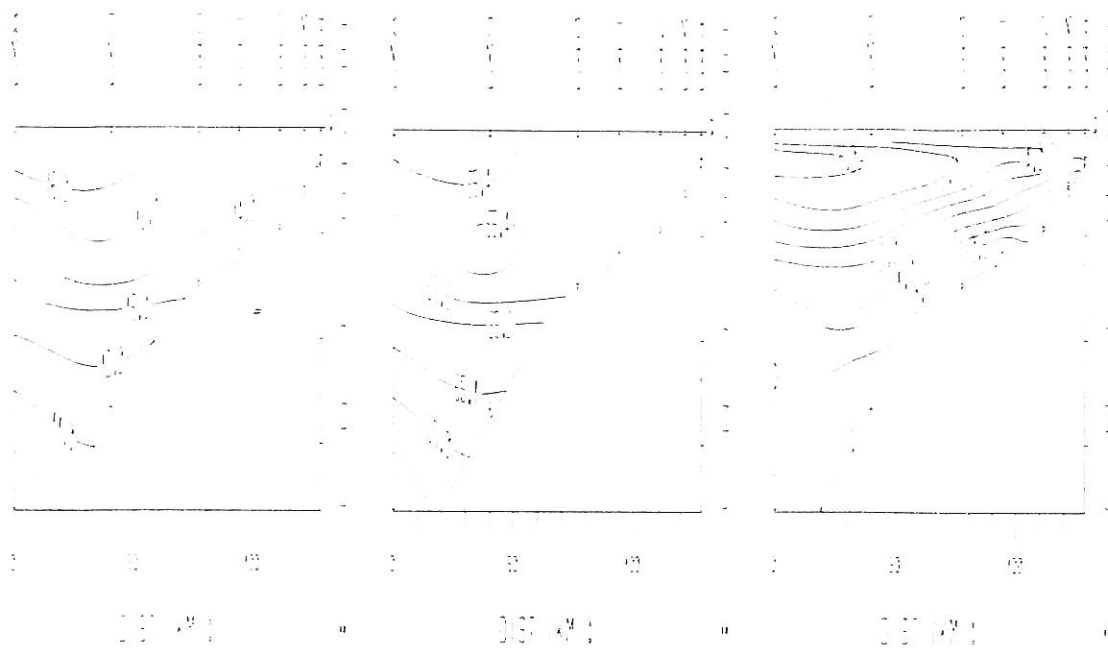


20°00' S, 2.6.98

Temperature (°C)

Salinity (psu)

Oxygen (%)

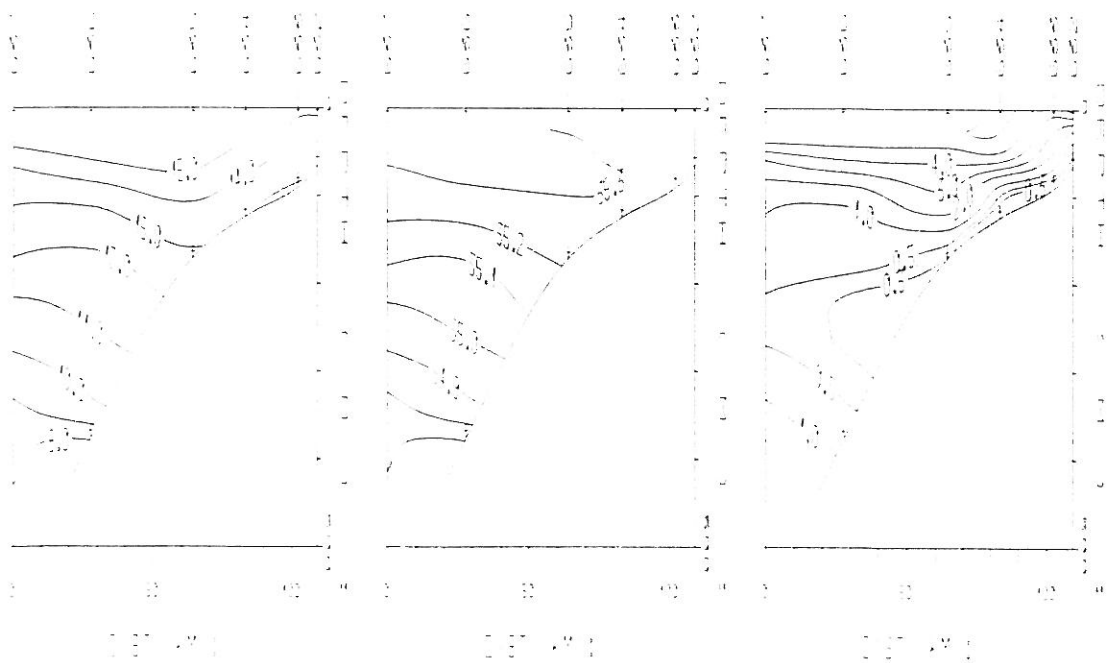


21°00' S, 31.5.98

Temperature (°C)

Salinity (psu)

Oxygen (%)

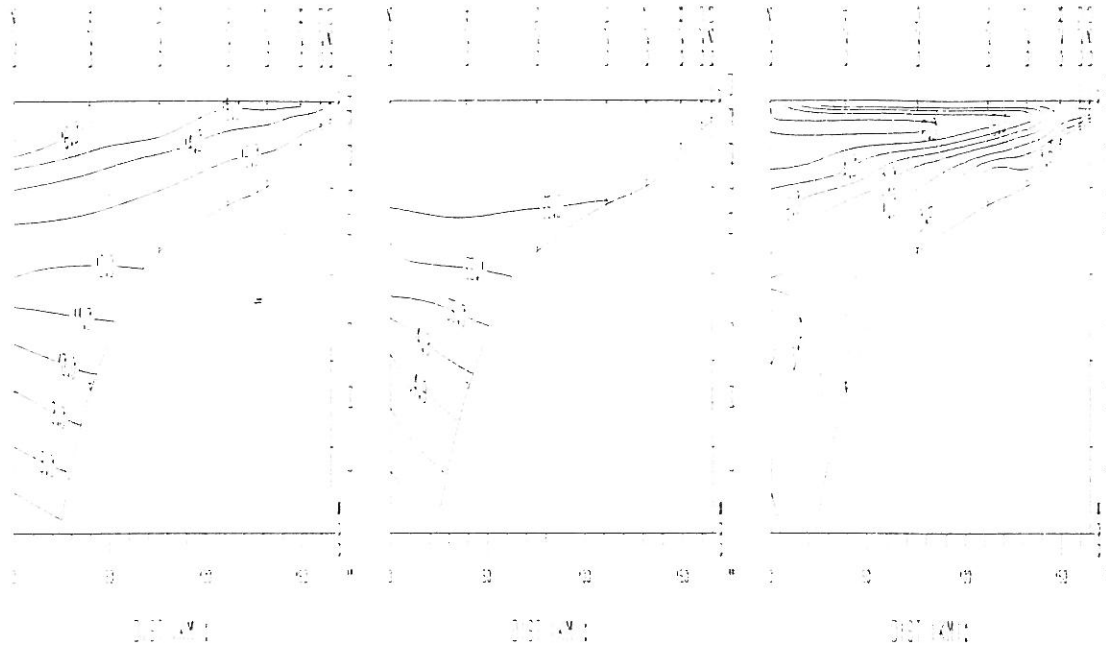


22°00' S, 29.5.98

Temperature (°C)

Salinity (psu)

Oxygen (%)

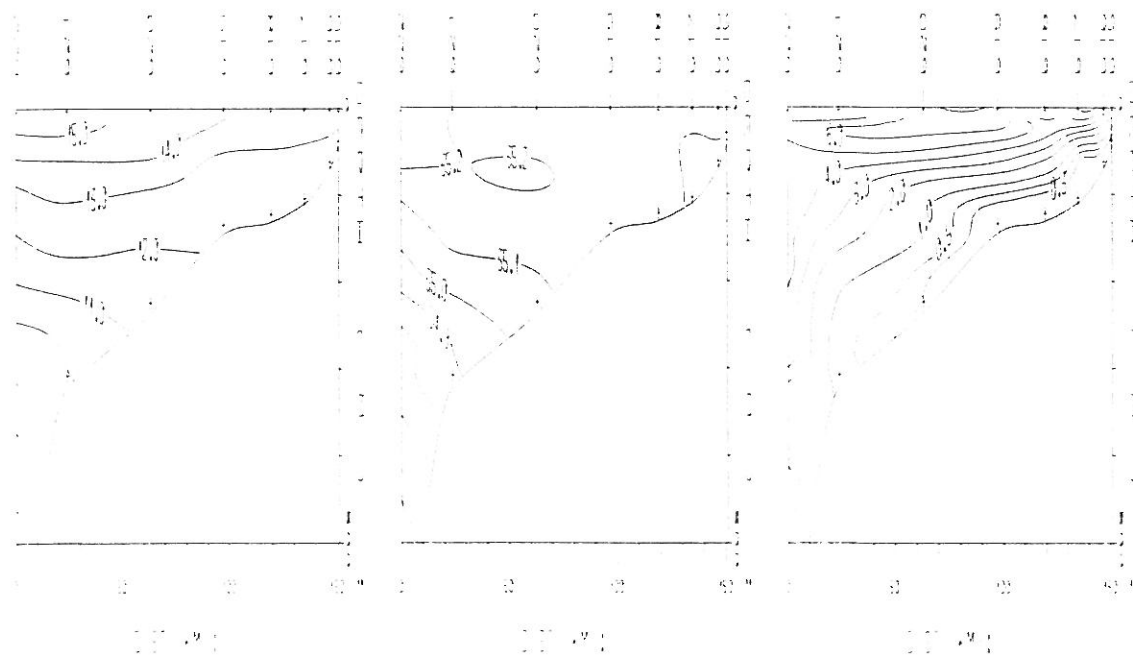


23°00' S, 25.5.98

Temperature (°C)

Salinity (psu)

Oxygen (%)

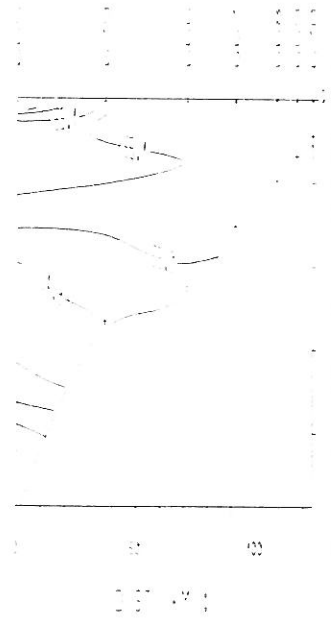


24°00' S, 12.6.98

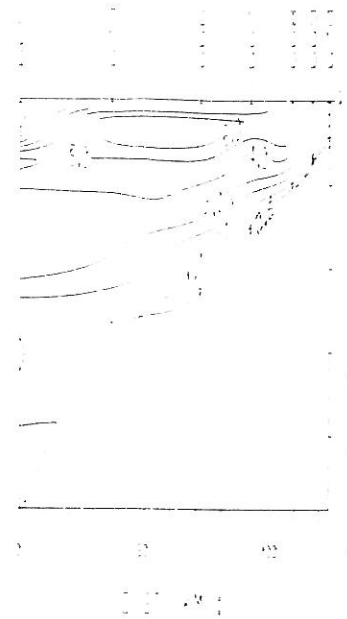
Temperature (°C)



Salinity (psu)

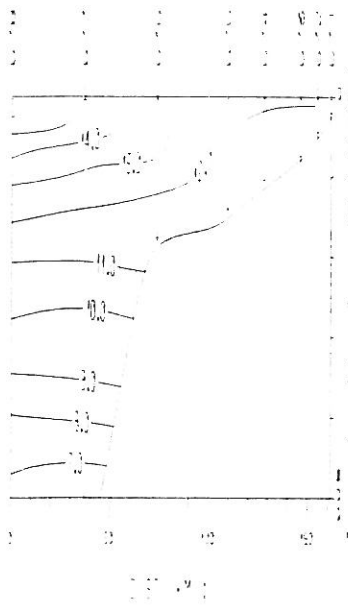


Oxygen (%)

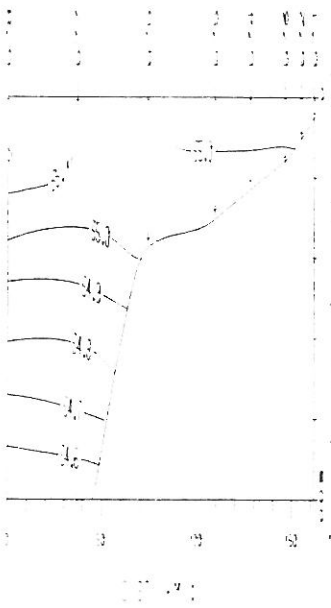


25°00' S, 13.6.98

Temperature (°C)



Salinity (psu)



Oxygen (%)



ANNEX V SUMMARY OF TRAWL STATIONS

Trawl number	Latitude (°S)	Longitude (°E)	Bottom depth (m)	Fishing depth (m)	Catch by species (% of total catch)					Total catch (kg)
					<i>Trach. c.</i>	<i>Sardin. o.</i>	<i>Engrau. c.</i>	<i>Eirum w.</i>	<i>Merluc. c.</i>	
2506	23.02	13.26	301	301	0,1				80,2	1317,9
2507	23.03	13.20	355	200						34,5
2508	22.40	14.09	104	50	63,4			1,0		417,7
2509	22.20	12.56	300	150	4,7				1,5	12,3
2510	22.20	12.56	302	302	0,4				39,6	283,0
2511	22.50	13.12	317	200	11,7					26,0
2512	22.50	13.07	298	298	50,2				14,4	963,5
2513	22.50	12.55	487	200						18,1
2514	23.10	13.11	392	200	2,7					18,3
2515	23.06	13.17	368	200						126,2
2516	22.10	12.47	389	150						29,2
2517	21.59	12.50	339	170						31,8
2518	21.59	13.18	172	172	93,1				6,3	712,4
2519	21.60	13.28	145	50	100,0					2664,0
2520	21.59	13.55	75	50	1,7			0,1		40,9
2521	21.20	12.59	244	150	99,4				0,6	1942,6
2522	21.20	13.20	115	30	100,0	0,0	0,0	0,0		1000,0
2523	21.30	13.19	134	50	13,7	0,0	0,0	0,0	86,3	6,1
2524	21.10	13.06	131	0	11,2	88,8	0,0	0,0	0,0	15000,0
2525	21.10	13.19	108	0	95,7	0,0	0,0	4,3		6,6
2526	21,00	13,15	120	20	68,1	0,0	0,0	0,0		63,0
2527	21,00	12,22	574	250	0,0	0,0	0,0	0,0	0,0	110,5
2528	21,20	13,25	110	0	95,9	0,6	0,0	3,5		34,6
2529	21,20	12,55	287	0					0,0	7,9
2530	21,11	12,38	378	10	0,2	0,0	0,0	0,0		110,9
2531	20,40	12,43	277	100	24,5	71,9	0,0	1,0		395,5
2532	20,39	12,54	149	149	85,1	1,1	0,0	1,0	13,0	29,3
2533	20,20	13,06	80	30	66,7	13,6	1,1	18,6		4500,0
2534	20,20	12,44	134	0	39,1	0,0	0,0	60,5	0,4	11,1
2535	20,20	12,26	271	0	0,0	0,0	0,0	0,0		0,3
2536	20,00	12,47	112	30	100,0	0,0	0,0	0,0	0,0	257,0
2537	19,45	12,30	134	20						0,0
2538	19,45	12,00	323	100	91,9				8,1	50,7
2539	19,45	11,40	437	50						68,0
2540	19,30	11,59	301	150	15,2				84,1	560,4
2541	19,30	12,16	181	100	100,0					1574,7
2542	19,15	12,29	94	60	79,3			20,7		1636,6
2543	19,15	12,04	241	60	63,0				34,0	73,7
2544	18,60	11,49	279	100	2,9				97,1	151,5
2545	19,00	12,15	110	110	82,3				17,3	167,1
2546	19,00	12,18	100	50	98,8	0,0	0,0			170,7
2547	18,44	12,04	96	96						
2548	18,45	11,41	260	100	79,6				18,6	392,2
2549	no station									
2550	18,30	11,20	715	130	29,7				38,5	198,4
2551	18,30	11,32	229	150	32,3				63,1	244,0
2552	18,29	11,49	141	141	84,2				9,4	217,5
2553	18,14	11,40	147	100	94,1			2,2	2,5	342,5
2554	18,15	11,24	516	100	41,8					279,0
2555	17,15	11,29	149	149	0,6				12,8	125,2
2556	17,18	11,41	69	69	93,2				0,4	3999,8
2557	17,29	11,35	120	120	19,1				2,2	3499,0
2558	17,30	11,20	230	463	50,8				49,2	996,3
2559	17,30	10,42	100	1750	100,0					754,8
2560	17,45	11,16	516	100	10,3				64,7	298,4
2561	17,44	11,32	177	150	99,9					995,9
2562	17,60	11,38	131	80	99,2				0,5	1470,4
2563	17,59	11,33	207	150	99,4					8051,3
2564	18,00	11,25	330	150	66,0				24,1	812,1
2565	18,00	11,06		250						46,1
2566	18,15	11,17	569	100	32,2					176,0
2567	20,00	11,38	620	150						245,0
2568	20,02	11,55	375	250	5,9				0,7	24,3
2569	23,19	13,41	159	100	12,0					0,2
2570	23,18	13,41	158	158	0,1				99,5	223,0
2571	23,02	14,08	127	40				78,7		2070,0
2572	23,20	14,18	91	50	0,0				0,0	304,2
2573	23,40	13,58	172	125	3,4				93,5	148,1
2574	23,41	13,15	332	200	92,3				5,9	739,0
2575	24,00	13,27	285	200	1,0					182,5
2576	24,00	13,52	236	180						9,5
2577	24,20	14,03	158	158	1,1				98,1	303,7
2578	24,59	14,20	143	100						632,1
2579	24,60	13,52	203	203	59,3				38,7	529,6
2580	23,48	13,33	253	253	45,4				41,8	201,7

ANNEX VI RECORD OF CATCH RATES

2506

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STA
 DATE: 25/ 5/98 GEAR TYPE: BT No: 1 POSITION: Lat S 2302
 start stop duration Long E 1326
 TIME :19:24:19 19:54:24 30 (min) Purpose code: 1
 LOG :5715.37 5716.37 1.18 Area code : 2
 FDEPTH: 301 301 GearCond.code: 1
 BDEPTH: 301 301 Validity code: 1
 Towing dir: 130° Wire out: 900 m Speed: 30 kn*10
 Sorted: 118 Kg Total catch: 1317.95 CATCH/HOUR: 2635.90

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Merluccius capensis	2114.10	12366	80.20	8607
Coelorinchus coelorhinc. polli	270.00	4296	10.24	
Lophius vomerinus	119.40	280	4.53	
Chlorophthalmus atlanticus	79.92	1186	3.03	
Austroglossus microlepis	21.30	28	0.80	
Chelidonichthys capensis	12.42	108	0.47	
Bathynectes piperitus	5.40	108	0.20	
Helicolenus dactylopterus	5.40	324	0.20	
Trachurus capensis	2.86	14	0.11	8608
Solenocera africana	2.70	432	0.10	
Squilla sp.	2.70	54	0.10	
Total	2635.90		99.98	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2507
 DATE: 25/ 5/98 GEAR TYPE: PT No: 1 POSITION: Lat S 2303
 start stop duration Long E 1320
 TIME :21:52:45 21:59:06 6 (min) Purpose code: 1
 LOG :5730.56 5730.90 0.34 Area code : 2
 FDEPTH: 200 200 GearCond.code: 3
 BDEPTH: 355 352 Validity code: 4
 Towing dir: 100° Wire out: 600 m Speed: 15 kn*10
 Sorted: 34 Kg Total catch: 14.50 CATCH/HOUR: 145.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Lampanyctodes hectoris	276.00	106270	80.00	
Brama brama	49.50	60	14.35	
MYCTOPHIDAE	12.00	5100	3.48	
Todarodes sagittatus	6.40	30	1.86	
Seryx splendens	1.10	10	0.32	
Total	345.00		100.01	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2508
 DATE: 25/ 5/98 GEAR TYPE: PT No: 1 POSITION: Lat S 2240
 start stop duration Long E 1409
 TIME :07:28:24 07:49:56 22 (min) Purpose code: 1
 LOG :5821.40 5842.43 9.33 Area code : 2
 FDEPTH: 50 70 GearCond.code: 1
 BDEPTH: 104 107 Validity code: 2
 Towing dir: 270° Wire out: 250 m Speed: 35 kn*10
 Sorted: 33 Kg Total catch: 417.75 CATCH/HOUR: 1139.32

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus, juveniles	722.05	26899	63.38	8609
Sufflogobius bibarbatus	405.82	131337	35.62	
Etrumeus whiteheadi	11.45	532	1.00	
Chrysaora sp.	0.00	205		
Aequorea aequorea	0.00	1636		
Total	1139.32		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2509
 DATE: 26/ 5/98 GEAR TYPE: PT No: 2 POSITION: Lat S 2220
 start stop duration Long E 1256
 TIME :19:46:55 20:18:38 32 (min) Purpose code: 1
 LOG :5948.37 5950.19 1.80 Area code : 3
 FDEPTH: 150 150 GearCond.code: 3
 BDEPTH: 300 286 Validity code: 2
 Towing dir: 90° Wire out: 500 m Speed: 35 kn*10
 Sorted: 4 Kg Total catch: 12.32 CATCH/HOUR: 23.10

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
MYCTOPHIDAE	17.44	5231	75.50	
Todarodes sagittatus	2.79	6	12.38	
Trachurus capensis	1.09	2	4.72	
Krill	0.32	964	3.98	
Merluccius capensis, juveniles	3.34	19	1.47	8610
Synagrops microlepis	0.26	23	1.13	
Solenocera africana	0.19	58	0.32	
Lophius vomerinus	0.08	6	0.35	
Total	23.11		100.05	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2505
 DATE: 26/ 5/98 GEAR TYPE: BT No: 3 POSITION: Lat S 2250
 start stop duration Long E 1320
 TIME :20:00:51 21:41:38 31 (min) Purpose code: 1
 LOG :5953.90 5955.47 1.59 Area code : 2
 FDEPTH: 302 302 GearCond.code: 1
 BDEPTH: 302 302 Validity code: 2
 Towing dir: 270° Wire out: 950 m Speed: 30 kn*10
 Sorted: 31 Kg Total catch: 281.01 CATCH/HOUR: 547.76

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Merluccius capensis	216.87	557	19.59	8611
Chlorophthalmus atlanticus	148.94	6310	27.19	
Coelorinchus coelorhinc. polli	100.16	3294	18.29	
Lophius vomerinus	55.39	139	10.11	
Solenocera africana	14.11	2714	2.58	
Helicolenus dactylopterus	4.01	610	0.73	
Squalus megalops	3.83	35	0.70	
Trachurus capensis	2.01	8	0.37	8612
MYCTOPHIDAE	1.57	645	0.29	
CONGRIDAE	0.87	17	0.16	
Total	547.76		100.01	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2511
 DATE: 27/ 5/98 GEAR TYPE: PT No: 2 POSITION: Lat S 2250
 start stop duration Long E 1312
 TIME :08:02:36 08:17:21 15 (min) Purpose code: 1
 LOG :6055.73 6056.51 0.77 Area code : 2
 FDEPTH: 200 250 GearCond.code: 1
 BDEPTH: 317 322 Validity code: 2
 Towing dir: 90° Wire out: 700 m Speed: 35 kn*10
 Sorted: 25 Kg Total catch: 25.95 CATCH/HOUR: 103.80

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Diaphus sp.	65.60	12160	61.20	
MYCTOPHIDAE	16.40	20676	15.80	
Trachurus capensis	12.12	20	11.68	8613
Todarodes sagittatus	9.68	28	9.33	
Total	103.80		100.01	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2512
 DATE: 27/ 5/98 GEAR TYPE: BT No: 3 POSITION: Lat S 2250
 start stop duration Long E 1307
 TIME :07:27:36 09:36:00 32 (min) Purpose code: 1
 LOG :6065.54 6067.17 1.60 Area code : 2
 FDEPTH: 298 304 GearCond.code: 1
 BDEPTH: 298 304 Validity code: 2
 Towing dir: 90° Wire out: 900 m Speed: 30 kn*10
 Sorted: 71 Kg Total catch: 963.54 CATCH/HOUR: 1306.64

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis	907.31	2657	50.22	8615
Merluccius capensis	260.72	936	14.43	8614
Chlorophthalmus atlanticus	248.57	8513	13.76	
Brama brama	182.25	1266	10.09	
Helicolenus dactylopterus	72.90	1823	4.04	
Coelorinchus sp.	43.78	1037	2.42	
Squalus megalops	42.53	709	2.35	
Lepidopus caudatus	21.51	24	1.19	
Todarodes sagittatus	12.66	24	0.70	
Symbolophorus boops	11.64	3113	0.64	
Epigonus denticulatus	2.27	101	0.13	
Maurolicus muelleri	0.51	24	0.03	
Total	1306.55		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2513
 DATE: 27/ 5/98 GEAR TYPE: PT No: 1 POSITION: Lat S 2250
 start stop duration Long E 1255
 TIME :12:56:31 13:11:49 15 (min) Purpose code: 1
 LOG :6086.66 6087.76 1.09 Area code : 2
 FDEPTH: 200 180 GearCond.code: 1
 BDEPTH: 487 439 Validity code: 2
 Towing dir: 90° Wire out: 900 m Speed: 45 kn*10
 Sorted: 18 Kg Total catch: 18.12 CATCH/HOUR: 72.48

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Maurolicus muelleri	71.20	7492	98.23	
Sufflogobius bibarbatus	1.28	484	1.77	
Total	72.48		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2514
 DATE: 27/ 5/98 GEAR TYPE: PT No: 1 POSITION: Lat S 2310 Long E 1311
 start stop duration
 TIME :18:47:13 19:22:44 36 (min) Purpose code: 1
 LOG :6133.47 6135.72 2.21 Area code : 2
 FDEPTH: 200 200 GearCond.code: 1
 BDEPTH: 192 401 Validity code: 2
 Towing dir: 270° Wire out: 900 m Speed: 37 kn*10

Sorted: 18 Kg Total catch: 18.26 CATCH/HOUR: 10.43

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Symbolophorus boops	21.17	4612	69.57	
Maurollicus muelleri	3.57	3370	11.73	
Photichthys sp.	1.93	210	6.34	
Beryx splendens	1.08	7	3.55	
Todarodes sagittatus	1.03	3	3.18	
Trachurus capensis	0.82	2	2.69	
Yareella blackfordi	0.55	37	1.81	
Krill	0.28	1728	0.92	
Total	10.43		99.99	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2515
 DATE: 28/ 5/98 GEAR TYPE: PT No: 1 POSITION: Lat S 2306 Long E 1317
 start stop duration
 TIME :09:26:42 10:07:58 41 (min) Purpose code: 1
 LOG :6261.55 6264.37 2.80 Area code : 2
 FDEPTH: 200 200 GearCond.code: 1
 BDEPTH: 168 366 Validity code: 2
 Towing dir: 360° Wire out: 900 m Speed: 40 kn*10

Sorted: 126 Kg Total catch: 126.20 CATCH/HOUR: 184.68

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brama brama	118.24	105	64.02	
Maurollicus muelleri	66.44	83049	35.98	
Total	184.68		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2516
 DATE: 28/ 5/98 GEAR TYPE: PT No: 2 POSITION: Lat S 2210 Long E 1247
 start stop duration
 TIME :18:56:15 19:10:13 14 (min) Purpose code: 1
 LOG :6348.92 6349.90 0.96 Area code : 2
 FDEPTH: 150 150 GearCond.code: 3
 BDEPTH: 189 168 Validity code: 2
 Towing dir: 90° Wire out: 750 m Speed: 41 kn*10

Sorted: 29 Kg Total catch: 29.22 CATCH/HOUR: 125.23

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Symbolophorus boops	70.29	41344	56.13	
Beryx splendens	20.23	90	16.15	
Deania quadrispinosum	18.43	4	14.72	
Brama brama	12.34	9	9.85	
Todarodes sagittatus	3.94	13	3.15	
Total	125.23		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2517
 DATE: 29/ 5/98 GEAR TYPE: PT No: 2 POSITION: Lat S 2159 Long E 1250
 start stop duration
 TIME :02:11:54 02:56:57 25 (min) Purpose code: 1
 LOG :6403.62 6405.38 1.74 Area code : 2
 FDEPTH: 170 160 GearCond.code: 1
 BDEPTH: 139 136 Validity code: 2
 Towing dir: 160° Wire out: 750 m Speed: 40 kn*10

Sorted: 118 Kg Total catch: 31.80 CATCH/HOUR: 76.32

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Diaphus sp.	52.32	16114	68.55	
Brama brama	6.84	7	8.96	
Trachipterus jacksonensis	6.60	2	8.65	
Lepidopus caudatus	6.12	5	8.02	
Todarodes sagittatus	4.20	12	5.50	
Krill	0.24	420	0.31	
Total	76.32		99.99	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2518
 DATE: 29/ 5/98 GEAR TYPE: PT No: 3 POSITION: Lat S 2159 Long E 1318
 start stop duration
 TIME :07:28:26 07:29:49 10 (min) Purpose code: 1
 LOG :6443.67 6444.16 0.51 Area code : 2
 FDEPTH: 171 171 GearCond.code: 1
 BDEPTH: 171 171 Validity code: 2
 Towing dir: 190° Wire out: 600 m Speed: 30 kn*10

Sorted: 103 Kg Total catch: 712.41 CATCH/HOUR: 4274.46

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis	1978.60	12676	91.08	8617
Merluccius capensis	268.50	1662	6.28	8616
Umbrella canariensis	20.52	114	0.48	
Todarodes sagittatus	5.70	114	0.13	
Sufflogobius bibarbatus	1.14	456	0.03	
Chrysaora sp.	0.00	432		
Aequorea aequorea	0.00	39600		
Total	4274.46		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2519
 DATE: 29/ 5/98 GEAR TYPE: PT No: 1 POSITION: Lat S 2159 Long E 1329
 start stop duration
 TIME :10:09:25 10:24:55 16 (min) Purpose code: 1
 LOG :6457.11 6458.06 0.93 Area code : 2
 FDEPTH: 50 50 GearCond.code: 1
 BDEPTH: 145 148 Validity code: 1
 Towing dir: 270° Wire out: 250 m Speed: 35 kn*10

Sorted: 12 Kg Total catch: 2664.00 CATCH/HOUR: 9990.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis, juvenile	9990.00	108	100.00	3618
Chrysaora sp.	0.00	80025		
Aequorea aequorea	0.00	9604		
Total	9990.00		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2520
 DATE: 29/ 5/98 GEAR TYPE: PT No: 1 POSITION: Lat S 2140 Long E 1356
 start stop duration
 TIME :14:01:20 14:01:20 15 (min) Purpose code: 1
 LOG :6488.90 6489.90 0.65 Area code : 2
 FDEPTH: 50 50 GearCond.code: 1
 BDEPTH: 69 74 Validity code: 2
 Towing dir: 270° Wire out: 125 m Speed: 40 kn*10

Sorted: 31 Kg Total catch: 40.93 CATCH/HOUR: 163.72

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sufflogobius bibarbatus	160.80	50248	98.22	
Trachurus capensis, juvenile	2.80	152	1.71	8619
Etrumeus whiteheadi	0.12	20	0.07	8620
Chrysaora sp.	0.00	196		
Total	163.72		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2521
 DATE: 10/ 5/98 GEAR TYPE: PT No: 2 POSITION: Lat S 2120 Long E 1259
 start stop duration
 TIME :08:00:36 08:01:36 34 (min) Purpose code: 1
 LOG :6658.73 6660.68 1.89 Area code : 2
 FDEPTH: 150 170 GearCond.code: 1
 BDEPTH: 144 268 Validity code: 2
 Towing dir: 270° Wire out: 600 m Speed: 35 kn*10

Sorted: 44 Kg Total catch: 1942.60 CATCH/HOUR: 3428.12

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis	1405.88	36771	99.35	8621
Merluccius capensis	22.24	99	0.65	8622
Aequorea aequorea	0.00			
Chrysaora sp.	0.00			
Total	1428.12		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2522
 DATE: 10/ 5/98 GEAR TYPE: PT No: 1 POSITION: Lat S 2120 Long E 1328
 start stop duration
 TIME :00:00:01 00:00:58 4 (min) Purpose code: 1
 LOG :6686.67 6686.91 0.25 Area code : 2
 FDEPTH: 100 10 GearCond.code: 1
 BDEPTH: 115 117 Validity code: 2
 Towing dir: 270° Wire out: 150 m Speed: 40 kn*10

Sorted: 74 Kg Total catch: 1000.00 CATCH/HOUR: 15000.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis, juvenile	15000.00	1200000	100.00	8623
Aequorea aequorea	0.00	480000		
Chrysaora sp.	0.00	3600		
Total	15000.00		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2523
 DATE: 10/ 5/98 GEAR TYPE: PT No: 2 POSITION: Lat S 2130 Long E 1319
 start stop duration
 TIME :17:53:19 18:00:47 7 (min) Purpose code: 1
 LOG :6746.31 6746.74 0.44 Area code : 2
 FDEPTH: 50 50 GearCond.code: 1
 BDEPTH: 134 134 Validity code: 2
 Towing dir: 270° Wire out: 150 m Speed: 35 kn*10

Sorted: 6 Kg Total catch: 6.13 CATCH/HOUR: 52.54

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Merluccius capensis	45.34	566	86.30	8625
Trachurus capensis, juvenile	7.20	163	13.70	8626
Aequorea aequorea	0.00	68574		
Chrysaora sp.	0.00	5143		
Total	52.54		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2524
 DATE: 10/ 5/98 GEAR TYPE: PT No: 1 POSITION: Lat S 2111 Long E 1322
 start stop duration
 TIME :20:51:51 21:03:02 9 (min) Purpose code: 1
 LOG :6774.03 6774.55 0.51 Area code : 2
 FDEPTH: 0 0 GearCond.code: 1
 BDEPTH: 111 133 Validity code: 2
 Towing dir: 270° Wire out: 150 m Speed: 35 kn*10

Sorted: 106 Kg Total catch: 15000.00 CATCH/HOUR: 100000.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinops ocellatus	88800.00	945127	98.30	
Trachurus capensis, juvenile	11200.00	524671	11.20	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2525
 DATE: 10/ 5/98 GEAR TYPE: PT No: 1 POSITION: Lat S 2110 Long E 1319
 start stop duration Purpose code: 1
 TIME : 21:07:41 23:13:13 5 (min) Area code : 2
 LOG : 6789.40 6799.69 0.28 GearCond.code: 1
 FDEPTH: 0 0 Validity code: 2
 BDEPTH: 108 107
 Towing dir: 90° Wire out: 150 m Speed: 40 kn*10

Sorted: 6 Kg Total catch: 6.55 CATCH/HOUR: 55.50

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis, juvenile	62.70	4540	95.71	8629
Etrumeus whiteheadi	2.30	80	4.27	8629
Total	55.50		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2526
 DATE: 11/ 5/98 GEAR TYPE: PT No: 1 POSITION: Lat S 2100 Long E 1315
 start stop duration Purpose code: 1
 TIME : 03:14:29 03:39:14 5 (min) Area code : 2
 LOG : 6827.31 6828.11 0.01 GearCond.code: 1
 FDEPTH: 20 20 Validity code: 2
 BDEPTH: 120 118
 Towing dir: 90° Wire out: 150 m Speed: 40 kn*10

Sorted: 13 Kg Total catch: 62.99 CATCH/HOUR: 755.38

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis, juvenile	514.80	31008	68.11	8630
Sufflogobius bibarbatus	200.38	35244	26.58	
Chelidonichthys capensis	40.20	24	5.32	
Aequorea aequorea	0.00	17496		
Chrysaora sp.	0.00	2100		
Total	755.88		100.01	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2527
 DATE: 11/ 5/98 GEAR TYPE: PT No: 2 POSITION: Lat S 2100 Long E 1222
 start stop duration Purpose code: 1
 TIME : 08:20:12 10:01:12 26 (min) Area code : 2
 LOG : 6882.38 6884.10 1.69 GearCond.code: 1
 FDEPTH: 250 250 Validity code: 2
 BDEPTH: 574 540
 Towing dir: 90° Wire out: 1000 m Speed: 44 kn*10

Sorted: 34 Kg Total catch: 110.45 CATCH/HOUR: 254.38

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Diaphus sp.	219.54	281808	93.98	
Brama brama	15.35	12	6.02	
Total	254.89		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2528
 DATE: 11/ 5/98 GEAR TYPE: PT No: 2 POSITION: Lat S 2120 Long E 1325
 start stop duration Purpose code: 1
 TIME : 19:46:51 19:51:43 5 (min) Area code : 2
 LOG : 6983.25 6983.55 0.29 GearCond.code: 1
 FDEPTH: 0 0 Validity code: 2
 BDEPTH: 110 110
 Towing dir: 270° Wire out: 170 m Speed: 35 kn*10

Sorted: 17 Kg Total catch: 34.62 CATCH/HOUR: 415.44

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis, juvenile	398.40	34524	95.90	8631
Etrumeus whiteheadi	14.40	528	1.47	8632
Sardinops ocellatus	2.54	72	0.64	
Chrysaora sp.	0.00	864		
Aequorea aequorea	0.00	8004		
Total	415.44		100.01	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2529
 DATE: 11/ 5/98 GEAR TYPE: PT No: 1 POSITION: Lat S 2120 Long E 1255
 start stop duration Purpose code: 1
 TIME : 22:47:38 23:00:06 13 (min) Area code : 2
 LOG : 7011.11 7011.91 0.78 GearCond.code: 1
 FDEPTH: 0 0 Validity code: 2
 BDEPTH: 287 293
 Towing dir: 270° Wire out: 170 m Speed: 35 kn*10

Sorted: 7 Kg Total catch: 7.37 CATCH/HOUR: 36.32

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Thyrssites atun	27.23	60	74.97	
Diaphus sp.	3.09	1680	25.01	
Aequorea aequorea	0.00	2843		
Total	36.32		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2530
 DATE: 1/ 6/98 GEAR TYPE: PT No: 4 POSITION: Lat S 2111 Long E 1238
 start stop duration Purpose code: 1
 TIME : 01:22:15 31:46:01 24 (min) Area code : 2
 LOG : 7033.66 7035.37 1.40 GearCond.code: 1
 FDEPTH: 20 20 Validity code: 2
 BDEPTH: 178 171
 Towing dir: 145° Wire out: 170 m Speed: 40 kn*10

Sorted: 110 Kg Total catch: 110.98 CATCH/HOUR: 277.20

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Diaphus sp.	191.38	127583	69.04	
Brama brama	45.75	43	16.50	
Ruvettus pretiosus	12.38	5	11.68	
Thyrssites atun	4.20	10	1.52	
Todarodes sagittatus	2.88	13	1.04	
Trachurus capensis	0.60	3	0.22	8633
Total	277.19		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2531
 DATE: 1/ 6/98 GEAR TYPE: PT No: 2 POSITION: Lat S 2040 Long E 1243
 start stop duration Purpose code: 1
 TIME : 08:15:40 08:34:45 19 (min) Area code : 2
 LOG : 7101.82 7103.10 1.27 GearCond.code: 1
 FDEPTH: 100 100 Validity code: 2
 BDEPTH: 277 286
 Towing dir: 270° Wire out: 550 m Speed: 45 kn*10

Sorted: 74 Kg Total catch: 395.53 CATCH/HOUR: 1249.04

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinops ocellatus	898.11	10440	71.90	8635
Trachurus capensis, juvenile	306.00	5454	24.50	8634
Brama brama	32.05	19	2.57	
Etrumeus whiteheadi	12.88	171	1.03	
Chrysaora sp.	0.00	4263		
Aequorea aequorea	0.00	15789		
Total	1249.04		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2532
 DATE: 1/ 6/98 GEAR TYPE: BT No: 1 POSITION: Lat S 2039 Long E 1255
 start stop duration Purpose code: 1
 TIME : 09:00:00 10:01:20 1 (min) Area code : 2
 LOG : 7119.10 7119.30 0.20 GearCond.code: 1
 FDEPTH: 149 149 Validity code: 2
 BDEPTH: 149 149
 Towing dir: 270° Wire out: 450 m Speed: 35 kn*10

Sorted: 20 Kg Total catch: 29.26 CATCH/HOUR: 585.20

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis, juvenile	498.00	8580	85.10	8636
Merluccius capensis	75.20	800	12.85	8637
Sardinops ocellatus	6.20	60	1.06	8638
Etrumeus whiteheadi	5.80	80	0.99	8639
Aequorea aequorea	0.00	10540		
Total	585.20		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2533
 DATE: 1/ 6/98 GEAR TYPE: PT No: 1 POSITION: Lat S 2020 Long E 1306
 start stop duration Purpose code: 1
 TIME : 15:27:37 15:28:28 1 (min) Area code : 2
 LOG : 7165.27 7165.31 0.04 GearCond.code: 1
 FDEPTH: 30 30 Validity code: 2
 BDEPTH: 80 80
 Towing dir: 270° Wire out: 125 m Speed: 40 kn*10

Sorted: 136 Kg Total catch: 4500.00 CATCH/HOUR: 90000.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis, juvenile	60015.40	1907820	66.68	8640
Etrumeus whiteheadi	16727.80	871240	18.59	8641
Sardinops ocellatus	12265.00	411660	13.63	
Engraulis capensis	991.80	12400	1.10	
Total	90000.00		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2534
 DATE: 1/ 6/98 GEAR TYPE: PT No: 1 POSITION: Lat S 2020 Long E 1244
 start stop duration Purpose code: 1
 TIME : 17:47:22 17:52:48 5 (min) Area code : 2
 LOG : 7136.27 7136.56 0.27 GearCond.code: 1
 FDEPTH: 0 0 Validity code: 2
 BDEPTH: 134 124
 Towing dir: 270° Wire out: 170 m Speed: 35 kn*10

Sorted: 11 Kg Total catch: 11.12 CATCH/HOUR: 131.44

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Etrumeus whiteheadi	80.76	1260	60.52	
Trachurus capensis, juvenile	52.20	2424	39.12	8642
Merluccius capensis, juveniles	0.48	16	0.16	8643
Aequorea aequorea	0.00	28800		
Chrysaora sp.	0.00	2150		
Total	131.44		100.00	

DR. FRIDTJOF NANSEN PROJECT:N1 PROJECT STATION:2515
 DATE: 1/ 6/98 GEAR TYPE: PT No: 1 POSITION:Lat S 2020 Long E 1226
 start stop duration
 TIME :19:49:58 20:10:17 21 (min) Purpose code: 1
 LOG :7201.55 7204.70 1.15 Area code : 2
 FDEPTH: 0 0 GearCond.code: 1
 BDEPTH: 271 274 Validity code: 2
 Towing dir: 270° Wire out: 170 m Speed: 35 kn*10
 Sorted: 1 Kg Total catch: 0.25 CATCH/HOUR: 0.71

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Argonauta argo	0.71	3	100.00	
Aequorea aequorea	0.00	1429		
Chrysaora sp.	0.00	69		
Total	0.71		100.00	

DR. FRIDTJOF NANSEN PROJECT:N1 PROJECT STATION:2540
 DATE: 1/ 6/98 GEAR TYPE: PT No: 2 POSITION:Lat S 1930 Long E 1159
 start stop duration
 TIME :05:47:19 06:00:12 11 (min) Purpose code: 1
 LOG :7480.22 7480.97 0.75 Area code : 3
 FDEPTH: 150 130 GearCond.code: 1
 BDEPTH: 301 304 Validity code: 2
 Towing dir: 270° Wire out: 600 m Speed: 40 kn*10
 Sorted: 105 KG Total catch: 560.44 CATCH/HOUR: 2536.55

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Merluccius capensis	2174.72	20154	84.07	8647
Trachurus capensis	192.54	2446	15.18	8648
Taractes sp.	19.38	9	0.75	
Total	2586.54		100.00	

DR. FRIDTJOF NANSEN PROJECT:N1 PROJECT STATION:2516
 DATE: 2/ 6/98 GEAR TYPE: PT No: 1 POSITION:Lat S 2000 Long E 1247
 start stop duration
 TIME :09:30:57 09:41:48 11 (min) Purpose code: 1
 LOG :7309.61 7310.38 0.77 Area code : 3
 FDEPTH: 30 20 GearCond.code: 1
 BDEPTH: 112 114 Validity code: 2
 Towing dir: 270° Wire out: 130 m Speed: 40 kn*10
 Sorted: 26 Kg Total catch: 257.00 CATCH/HOUR: 1401.82

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis, juvenile	1401.82	102327	100.00	8644
Chrysaora sp.	0.00	93		
Aequorea aequorea	0.00	327		
Total	1401.82		100.00	

DR. FRIDTJOF NANSEN PROJECT:N1 PROJECT STATION:2541
 DATE: 1/ 6/98 GEAR TYPE: PT No: 2 POSITION:Lat S 1930 Long E 1216
 start stop duration
 TIME :08:27:27 08:38:25 11 (min) Purpose code: 1
 LOG :7501.73 7502.39 0.66 Area code : 3
 FDEPTH: 100 100 GearCond.code: 1
 BDEPTH: 181 187 Validity code: 2
 Towing dir: 270° Wire out: 400 m Speed: 40 kn*10
 Sorted: 54 Kg Total catch: 1574.70 CATCH/HOUR: 3539.27

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis	8589.27	130495	100.00	8707
Total	8589.27		100.00	

DR. FRIDTJOF NANSEN PROJECT:N1 PROJECT STATION:2517
 DATE: 2/ 6/98 GEAR TYPE: PT No: 1 POSITION:Lat S 1945 Long E 1230
 start stop duration
 TIME :15:25:59 15:27:42 2 (min) Purpose code: 1
 LOG :7362.85 7362.87 0.02 Area code : 3
 FDEPTH: 20 20 GearCond.code: 3
 BDEPTH: 134 134 Validity code: 2
 Towing dir: 270° Wire out: 150 m Speed: 30 kn*10
 Sorted: Kg Total catch: CATCH/HOUR:

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chrysaora sp.	0.00	150		
Aequorea aequorea	0.00	1200		
Total				

DR. FRIDTJOF NANSEN PROJECT:N1 PROJECT STATION:2542
 DATE: 1/ 6/98 GEAR TYPE: PT No: 1 POSITION:Lat S 1915 Long E 1224
 start stop duration
 TIME :11:56:25 14:05:25 9 (min) Purpose code: 1
 LOG :7555.29 7555.85 0.56 Area code : 3
 FDEPTH: 60 60 GearCond.code: 1
 BDEPTH: 98 94 Validity code: 2
 Towing dir: 270° Wire out: 300 m Speed: 40 kn*10
 Sorted: 65 Kg Total catch: 1616.61 CATCH/HOUR: 10910.75

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis, juvenile	8656.53	202847	79.14	8645
Etrumeus whiteheadi	2254.20	737120	20.66	8646
Chrysaora sp.	0.00	1453		
Total	10910.73		100.00	

DR. FRIDTJOF NANSEN PROJECT:N1 PROJECT STATION:2538
 DATE: 2/ 6/98 GEAR TYPE: PT No: 1 POSITION:Lat S 1945 Long E 1160
 start stop duration
 TIME :18:51:59 19:01:51 10 (min) Purpose code: 1
 LOG :7394.20 7394.96 0.74 Area code : 3
 FDEPTH: 100 100 GearCond.code: 1
 BDEPTH: 323 320 Validity code: 2
 Towing dir: 90° Wire out: 450 m Speed: 45 kn*10
 Sorted: Kg Total catch: 50.65 CATCH/HOUR: 303.90

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis	279.30	3408	91.91	8645
Merluccius capensis	24.60	108	8.09	8646
Total	303.90		100.00	

DR. FRIDTJOF NANSEN PROJECT:N1 PROJECT STATION:2543
 DATE: 1/ 6/98 GEAR TYPE: PT No: 2 POSITION:Lat S 1915 Long E 1224
 start stop duration
 TIME :18:43:50 18:51:11 7 (min) Purpose code: 1
 LOG :7601.87 7602.35 0.48 Area code : 3
 FDEPTH: 60 60 GearCond.code: 1
 BDEPTH: 241 241 Validity code: 2
 Towing dir: 270° Wire out: 300 m Speed: 43 kn*10
 Sorted: Kg Total catch: 71.72 CATCH/HOUR: 611.39

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis	398.14	5563	63.01	8645
Merluccius capensis	214.71	2589	33.98	8646
Thyrssites atun	13.46	17	2.13	
Todaropsis eblanae	5.57	77	0.88	
Total	631.88		100.00	

DR. FRIDTJOF NANSEN PROJECT:N1 PROJECT STATION:2539
 DATE: 2/ 6/98 GEAR TYPE: PT No: 2 POSITION:Lat S 1945 Long E 1140
 start stop duration
 TIME :21:41:13 21:55:31 14 (min) Purpose code: 1
 LOG :7417.97 7418.98 0.99 Area code : 3
 FDEPTH: 50 30 GearCond.code: 1
 BDEPTH: 437 437 Validity code: 2
 Towing dir: 90° Wire out: 200 m Speed: 45 kn*10
 Sorted: 1 Kg Total catch: 67.95 CATCH/HOUR: 291.21

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Diaphus sp.	261.60	174373	89.83	
Krill	15.81	25697	5.43	
PARALEPIDIDAE	9.36	99	3.39	
PENAEIDAE	1.97	43	0.68	
Todaropsis eblanae.	1.97	296	0.68	
Total	291.21		100.00	

DR. FRIDTJOF NANSEN PROJECT:N1 PROJECT STATION:2544
 DATE: 4/ 6/98 GEAR TYPE: PT No: 2 POSITION:Lat S 18° Long E 11°
 start stop duration
 TIME :04:49:50 05:05:11 16 (min) Purpose code: 1
 LOG :7690.13 7691.13 0.98 Area code : 3
 FDEPTH: 100 100 GearCond.code: 1
 BDEPTH: 279 279 Validity code: 2
 Towing dir: 90° Wire out: 400 m Speed: 40 kn*10
 Sorted: Kg Total catch: 151.47 CATCH/HOUR: 568.01

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Merluccius capensis	551.91	4845	97.15	8645
Trachurus capensis	16.20	79	2.85	8646
Total	568.01		100.00	

DR. FRIDTJOF NANSEN PROJECT:N1 PROJECT STATION:2545
 DATE: 4/ 6/98 GEAR TYPE: BT No: 3 POSITION:Lat S 1900 Long E 1215
 start stop duration
 TIME :08:00:48 08:00:48 20 (min) Purpose code: 1
 LOG :7717.63 7718.63 0.99 Area code : 3
 FDEPTH: 110 114 GearCond.code: 1
 BDEPTH: 110 114 Validity code: 2
 Towing dir: 270° Wire out: 350 m Speed: 10 kn*10
 Sorted: 47 Kg Total catch: 167.06 CATCH/HOUR: 501.18

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis	412.65	9336	82.34	8655
Merluccius capensis	36.64	1020	17.29	8656
Sufflogobius bibarbatus	1.39	327	0.38	
Chrysaora sp.	0.00	180		
Total	501.18		100.01	

DR. FRIDTJOF NANSEN PROJECT:N1 PROJECT STATION:2546
 DATE: 4/ 6/98 GEAR TYPE: PT No: 1 POSITION:Lat S 1900 Long E 1213
 start stop duration
 TIME :10:09:14 10:15:58 7 (min) Purpose code: 1
 LOG :7725.62 7726.07 0.46 Area code : 3
 FDEPTH: 50 45 GearCond.code: 1
 BDEPTH: 100 102 Validity code: 2
 Towing dir: 90° Wire out: 200 m Speed: 40 kn*10
 Sorted: 24 Kg Total catch: 170.68 CATCH/HOUR: 1462.97

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis, juvenile	1446.00	73877	98.84	8657
Galeus polli	8.23	9	0.56	
Trigla lyra	6.94	9	0.47	
Zenopsis conchifer	1.46	9	0.10	
Etrumeus whiteheadi	0.17	9	0.01	
Engraulis capensis	0.09	9	0.01	
Aequorea sequorea	0.00	2400		
Chrysaora sp.	0.00	103		
Total	1462.89		99.99	

DR. FRIDTJOF NANSEN PROJECT:N1 PROJECT STATION:2547
 DATE: 4/ 6/98 GEAR TYPE: BT No: 3 POSITION:Lat S 1844 Long E 1204
 start stop duration
 TIME :14:29:42 14:36:00 6 (min) Purpose code: 1
 LOG :7764.49 7764.81 0.30 Area code : 3
 FDEPTH: 96 97 GearCond.code: 1
 BDEPTH: 96 97 Validity code: 2
 Towing dir: 270° Wire out: 400 m Speed: 10 kn*10
 Sorted: 49 Kg Total catch: 718.16 CATCH/HOUR: 7181.60

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis, juvenile	6679.50	148920	91.01	8658
Merluccius capensis	251.10	2630	3.50	8659
Etrumeus whiteheadi	202.90	4530	2.83	8660
Chelidonichthys capensis	29.20	150	0.41	
Sardinops ocellatus	13.10	150	0.18	8661
Sufflogobius bibarbatus	5.80	150	0.08	
Chrysaora sp.	0.00	4700		
Total	7181.60		100.01	

DR. FRIDTJOF NANSEN PROJECT:N1 PROJECT STATION:2548
 DATE: 4/ 6/98 GEAR TYPE: PT No: 2 POSITION:Lat S 1845 Long E 1141
 start stop duration
 TIME :17:00:46 17:26:09 119 (min) Purpose code: 1
 LOG :7786.61 7788.23 1.62 Area code : 3
 FDEPTH: 100 100 GearCond.code: 1
 BDEPTH: 260 260 Validity code: 2
 Towing dir: 270° Wire out: 550 m Speed: 4 kn*10
 Sorted: 45 Kg Total catch: 192.23 CATCH/HOUR: 197.76

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis	157.50	1500	79.64	8662
Merluccius capensis	36.86	296	18.64	8663
Taractes sp.	1.40	1	1.72	
Aequorea sequorea	0.00	504		
Total	197.76		100.00	

DR. FRIDTJOF NANSEN PROJECT:N1 PROJECT STATION:2553
 DATE: 5/ 6/98 GEAR TYPE: PT No: 2 POSITION:Lat S 1830 Long E 1120
 start stop duration
 TIME :04:44:01 05:09:44 26 (min) Purpose code: 1
 LOG :7882.06 7883.63 1.55 Area code : 3
 FDEPTH: 130 150 GearCond.code: 1
 BDEPTH: 715 605 Validity code: 2
 Towing dir: 90° Wire out: 700 m Speed: 40 kn*10
 Sorted: 5 Kg Total catch: 198.38 CATCH/HOUR: 457.80

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Merluccius capensis	176.08	932	38.46	8665
Trachurus capensis	136.04	1082	29.72	8664
Krill	51.35	35569	11.22	
Hoplostethus cadonati	48.97	5502	10.70	
Diaphus sp.	23.28	9316	5.09	
Squalus megalops	9.23	5	2.02	
Deania quadrispinosa	7.15	2	1.56	
Yarella blackfordi	4.04	475	0.88	
Synagrops microlepis	1.66	143	0.36	
Total	457.80		100.01	

DR. FRIDTJOF NANSEN PROJECT:N1 PROJECT STATION:2551
 DATE: 5/ 6/98 GEAR TYPE: PT No: 2 POSITION:Lat S 1830 Long E 1132
 start stop duration
 TIME :07:13:01 07:29:35 17 (min) Purpose code: 1
 LOG :7896.66 7897.64 0.96 Area code : 3
 FDEPTH: 150 160 GearCond.code: 1
 BDEPTH: 229 241 Validity code: 2
 Towing dir: 270° Wire out: 600 m Speed: 40 kn*10
 Sorted: 48 Kg Total catch: 243.97 CATCH/HOUR: 361.07

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Merluccius capensis	543.53	3960	63.12	8667
Trachurus capensis	277.94	2824	32.28	8668
Todarodes sagittatus	15.88	71	1.84	
Dentex macrophthalmus	10.24	53	1.19	
Squalus megalops	8.01	11	0.93	
Diaphus sp.	5.47	3529	0.64	
Total	861.07		100.00	

DR. FRIDTJOF NANSEN PROJECT:N1 PROJECT STATION:2552
 DATE: 5/ 6/98 GEAR TYPE: BT No: 3 POSITION:Lat S 1829 Long E 1149
 start stop duration
 TIME :09:51:18 10:05:50 15 (min) Purpose code: 1
 LOG :7916.13 7916.80 0.66 Area code : 3
 FDEPTH: 141 132 GearCond.code: 1
 BDEPTH: 141 132 Validity code: 2
 Towing dir: 90° Wire out: 450 m Speed: 10 kn*10
 Sorted: 70 Kg Total catch: 217.51 CATCH/HOUR: 870.06

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis, juvenile	733.00	11684	84.25	8669
Merluccius capensis	82.20	788	9.45	8669
Galeus polli	28.44	68	3.27	
Squalus megalops	26.20	12	3.01	
Perulibatrachus rosignoli	0.20	4	0.02	
JELCH00	0.00	720		
Total	870.04		100.00	

DR. FRIDTJOF NANSEN PROJECT:N1 PROJECT STATION:2553
 DATE: 5/ 6/98 GEAR TYPE: PT No: 1 POSITION:Lat S 1814 Long E 1140
 start stop duration
 TIME :14:17:52 14:27:02 9 (min) Purpose code: 1
 LOG :7956.85 7957.37 0.51 Area code : 3
 FDEPTH: 100 100 GearCond.code: 1
 BDEPTH: 147 141 Validity code: 2
 Towing dir: 90° Wire out: 400 m Speed: 40 kn*10
 Sorted: 92 Kg Total catch: 342.53 CATCH/HOUR: 2283.53

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis, juvenile	2149.33	45433	94.12	8670
Todarodes sagittatus	56.13	247	2.46	
Etrumeus whiteheadi	50.20	247	2.30	8672
Perulibatrachus rosignoli	20.27	27	0.89	
Merluccius capensis	7.67	100	0.34	8671
Chrysaora sp.	0.00	227		
Total	2283.60		100.01	

DR. FRIDTJOF NANSEN PROJECT:N1 PROJECT STATION:2554
 DATE: 5/ 6/98 GEAR TYPE: BT No: 2 POSITION:Lat S 1815
 start stop duration Long E 1124
 TIME :17:08:25 17:32:09 24 (min) Purpose code: 1
 LOG :7977.58 7978.95 1.34 Area code : 3
 FDEPTH: 100 150 GearCond.code: 1
 BDEPTH: 516 440 Validity code: 2
 Towing dir: 90° Wire out: 420 m Speed: 42 kn*10
 Sorted: 46 Kg Total catch: 279.02 CATCH/HOUR: 697.55

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Diaphus sp.	375.00	144230	53.76	
Trachurus capensis	291.25	2271	42.75	8673
Squalus megalops	14.88	20	2.13	
TRACHTERIDAE	11.88	10	1.70	
Stomopterus sp.	2.08	3	0.30	
Centrolophus niger	1.48	1	0.21	
Macroparalepis macrogenion	1.00	5	0.14	
Total	697.57		99.99	

DR. FRIDTJOF NANSEN PROJECT:N1 PROJECT STATION:2555
 DATE: 7/ 6/98 GEAR TYPE: BT No: 2 POSITION:Lat S 1715
 start stop duration Long E 1129
 TIME :08:32:46 08:39:59 7 (min) Purpose code: 1
 LOG :8281.33 8281.76 0.42 Area code : 3
 FDEPTH: 149 154 GearCond.code: 1
 BDEPTH: 149 154 Validity code: 2
 Towing dir: 270° Wire out: 500 m Speed: 30 kn*10
 Sorted: 125 Kg Total catch: 125.24 CATCH/HOUR: 1073.49

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex macrophthalmus	875.14	7414	81.52	
Merluccius capensis	136.89	643	12.75	8675
Trachurus capensis	59.14	626	5.51	8674
Pterothrissus belloni	2.14	17	0.20	
Synagrops microlepis	0.17	34	0.02	
Total	1073.48		100.00	

DR. FRIDTJOF NANSEN PROJECT:N1 PROJECT STATION:2556
 DATE: 7/ 6/98 GEAR TYPE: BT No: 3 POSITION:Lat S 1718
 start stop duration Long E 1141
 TIME :11:16:01 11:21:55 6 (min) Purpose code: 1
 LOG :8300.26 8300.55 0.29 Area code : 3
 FDEPTH: 69 72 GearCond.code: 1
 BDEPTH: 69 72 Validity code: 2
 Towing dir: 220° Wire out: 270 m Speed: 30 kn*10
 Sorted: 63 Kg Total catch: 3999.75 CATCH/HOUR: 39997.50

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis, juvenile	37258.10	500830	93.15	8677
Atractoscion aequidens	1388.50	6280	1.47	
COCCOOL	735.10	630	1.84	
Galeichthys feliceps	270.20	630	0.68	
Chelidonichthys capensis	194.80	630	0.49	
Merluccius capensis	150.80	1250	0.38	8676
Total	39997.50		100.01	

DR. FRIDTJOF NANSEN PROJECT:N1 PROJECT STATION:2557
 DATE: 7/ 6/98 GEAR TYPE: BT No: 3 POSITION:Lat S 1729
 start stop duration Long E 1135
 TIME :13:32:16 13:36:21 4 (min) Purpose code: 1
 LOG :8318.31 8318.56 0.25 Area code : 3
 FDEPTH: 120 122 GearCond.code: 1
 BDEPTH: 120 122 Validity code: 2
 Towing dir: 270° Wire out: 500 m Speed: 30 kn*10
 Sorted: 93 Kg Total catch: 3499.66 CATCH/HOUR: 52494.90

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex macrophthalmus	40378.65	323025	76.92	
Trachurus capensis, juvenile	10045.65	251130	19.14	8679
Merluccius capensis	1175.25	5595	2.24	8678
Argyrosomus hololepidotus	727.50	1680	1.39	
Umbina canariensis	167.85	555	0.32	
Total	52494.90		100.01	

DR. FRIDTJOF NANSEN PROJECT:N1 PROJECT STATION:2558
 DATE: 7/ 6/98 GEAR TYPE: PT No: 2 POSITION:Lat S 1730
 start stop duration Long E 1120
 TIME :15:27:41 15:47:40 20 (min) Purpose code: 1
 LOG :8333.76 8335.09 1.32 Area code : 3
 FDEPTH: 230 230 GearCond.code: 1
 BDEPTH: 463 535 Validity code: 2
 Towing dir: 268° Wire out: 900 m Speed: 40 kn*10
 Sorted: 96 Kg Total catch: 996.13 CATCH/HOUR: 2988.39

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis	1518.51	12639	50.81	8681
Merluccius capensis	1469.40	3814	49.17	3680
Total	2987.91		99.98	

DR. FRIDTJOF NANSEN PROJECT:N1 PROJECT STATION:2559
 DATE: 7/ 6/98 GEAR TYPE: PT No: 2 POSITION:Lat S 1710
 start stop duration Long E 1042
 TIME :20:52:14 21:11:26 19 (min) Purpose code: 1
 LOG :8380.33 8381.53 1.18 Area code : 3
 FDEPTH: 100 100 GearCond.code: 1
 BDEPTH: 1750 1750 Validity code: 2
 Towing dir: 90° Wire out: 450 m Speed: 45 kn*10
 Sorted: 63 Kg Total catch: 754.80 CATCH/HOUR: 2381.58

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis	2383.58	12947	100.00	8682
Total	2383.58		100.00	

DR. FRIDTJOF NANSEN PROJECT:N1 PROJECT STATION:2560
 DATE: 8/ 6/98 GEAR TYPE: PT No: 2 POSITION:Lat S 1745
 start stop duration Long E 1116
 TIME :03:51:44 04:11:57 20 (min) Purpose code: 1
 LOG :8442.17 8443.55 1.36 Area code : 3
 FDEPTH: 100 100 GearCond.code: 1
 BDEPTH: 516 869 Validity code: 2
 Towing dir: 90° Wire out: 400 m Speed: 40 kn*10
 Sorted: 112 Kg Total catch: 298.41 CATCH/HOUR: 335.23

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Merluccius capensis	579.33	3465	64.71	8684
Trachurus capensis	92.55	841	10.34	8683
OCTOPODIDAE	85.38	78	9.54	
Diaphus sp.	51.06	12765	5.70	
Schedophilus huttoni	38.28	30	4.28	
Trachipterus jacksonensis	37.08	54	4.14	
Centrolophus niger	11.55	15	1.29	
Squalus megalops	0.00			
Total	895.23		100.00	

DR. FRIDTJOF NANSEN PROJECT:N1 PROJECT STATION:2561
 DATE: 8/ 6/98 GEAR TYPE: PT No: 2 POSITION:Lat S 174
 start stop duration Long E 1117
 TIME :06:07:13 06:14:16 7 (min) Purpose code: 1
 LOG :8457.80 8458.22 0.41 Area code : 3
 FDEPTH: 150 150 GearCond.code: 1
 BDEPTH: 177 175 Validity code: 2
 Towing dir: 90° Wire out: 600 m Speed: 45 kn*10
 Sorted: 60 Kg Total catch: 995.92 CATCH/HOUR: 8536.45

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis, juvenile	8528.14	162111	99.90	8685
Todarodes sagittatus	8.31	26	0.10	
Total	8536.45		100.00	

DR. FRIDTJOF NANSEN PROJECT:N1 PROJECT STATION:2562
 DATE: 8/ 6/98 GEAR TYPE: PT No: 2 POSITION:Lat S 1750
 start stop duration Long E 1136
 TIME :08:42:08 08:52:51 11 (min) Purpose code: 1
 LOG :8477.95 8478.61 0.65 Area code : 3
 FDEPTH: 80 80 GearCond.code: 1
 BDEPTH: 131 131 Validity code: 2
 Towing dir: 345° Wire out: 400 m Speed: 45 kn*10
 Sorted: 64 Kg Total catch: 1470.35 CATCH/HOUR: 8020.09

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis, juvenile	7958.84	168098	99.24	8686
Merluccius capensis	36.44	207	0.45	8687
Chelidonichthys capensis	10.42	33	0.13	
Squalus megalops	5.45	11	0.07	
Galeichthys feliceps	5.07	11	0.06	
Dentex macrophthalmus	1.96	5	0.02	
Todarodes sagittatus	1.91	5	0.02	
Total	8020.09		99.99	

DR. FRIDTJOF NANSEN PROJECT:N1 PROJECT STATION:2563
 DATE: 8/ 6/98 GEAR TYPE: PT No: 2 POSITION:Lat S 1759
 start stop duration Long E 1133
 TIME :10:08:03 10:18:32 10 (min) Purpose code: 1
 LOG :8486.48 8487.10 0.60 Area code : 3
 FDEPTH: 150 150 GearCond.code: 1
 BDEPTH: 207 196 Validity code: 2
 Towing dir: 90° Wire out: 600 m Speed: 40 kn*10
 Sorted: Kg Total catch: 8051.33 CATCH/HOUR: 48307.99

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis	48000.00	643152	99.36	8688
Isurus oxyrinchus	300.00	6	0.62	
Chelidonichthys capensis	7.98	12	0.32	
Total	48307.98		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2564
 DATE: 8/ 6/98 GEAR TYPE: PT No: 2 POSITION: Lat S 1300
 start stop duration Long E 1125
 TIME :12:10:03 12:35:32 25 (min) Purpose code: 1
 LOG :8500.47 8502.02 1.53 Area code : 3
 FDEPTH: 150 150 GearCond.code: 1
 BDEPTH: 130 286 Validity code: 2
 Towing dir: 90° Wire out: 600 m Speed: 40 kn*10

Sorted: 97 Kg Total catch: 812.07 CATCH/HOUR: 1948.97

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis	1286.47	15571	66.01	8689
Merluccius capensis	468.79	2678	24.05	8690
Diapnus sp.	151.71	46778	8.40	
Squalus megalops	29.98	41	1.54	
Total	1948.97		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2569
 DATE: 11/ 6/98 GEAR TYPE: PT No: 2 POSITION: Lat S 2119
 start stop duration Long E 1141
 TIME :06:17:05 06:22:14 5 (min) Purpose code: 1
 LOG :9051.85 9052.13 0.33 Area code : 3
 FDEPTH: 100 100 GearCond.code: 3
 BDEPTH: 159 159 Validity code: 2
 Towing dir: 300° Wire out: 150 m Speed: 40 kn*10

Sorted: Kg Total catch: 0.22 CATCH/HOUR: 2.64

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chelidonichthys capensis	2.38	12	86.36	
Trachurus capensis, juvenile	0.36	12	13.64	
Aequorea aequorea	0.00	18000		
Chrysaora sp.	0.00	5400		
Total	2.64		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2565
 DATE: 8/ 6/98 GEAR TYPE: PT No: 2 POSITION: Lat S 1300
 start stop duration Long E 1106
 TIME :15:14:02 15:35:11 21 (min) Purpose code: 1
 LOG :8523.60 8524.91 1.29 Area code : 3
 FDEPTH: 250 250 GearCond.code: 1
 BDEPTH: Validity code: 2
 Towing dir: 270° Wire out: 1000 m Speed: 40 kn*10

Sorted: 4 Kg Total catch: 45.90 CATCH/HOUR: 111.14

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Symbolophorus boops	55.77	8994	42.53	
TRACHTERIDAE	47.43	23	36.17	
Yarella blackfordi	11.89	474	9.07	
PENAEIDAE	10.74	6714	8.19	
Lampadena sp.	5.03	349	3.84	
PARALEPIDIDAE	0.29	3	0.22	
Total	131.15		100.02	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2570
 DATE: 11/ 6/98 GEAR TYPE: PT No: 2 POSITION: Lat S 2123
 start stop duration Long E 1141
 TIME :07:51:13 08:03:02 12 (min) Purpose code: 1
 LOG :9056.29 9056.87 0.57 Area code : 3
 FDEPTH: 158 158 GearCond.code: 1
 BDEPTH: 158 158 Validity code: 2
 Towing dir: 335° Wire out: 500 m Speed: 30 kn*10

Sorted: 24 Kg Total catch: 223.02 CATCH/HOUR: 1115.10

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Merluccius capensis	1109.25	10680	99.48	8694
Sufflogobius bibarbatu	4.95	1170	0.44	
Trachurus capensis, juvenile	0.90	45	0.08	
Aequorea aequorea	0.00	750		
Chrysaora sp.	0.00	225		
Total	1115.10		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2566
 DATE: 8/ 6/98 GEAR TYPE: PT No: 2 POSITION: Lat S 1815
 start stop duration Long E 1117
 TIME :18:41:29 19:21:20 40 (min) Purpose code: 1
 LOG :8550.12 8552.79 2.63 Area code : 3
 FDEPTH: 100 90 GearCond.code: 1
 BDEPTH: 569 974 Validity code: 2
 Towing dir: 90° Wire out: 500 m Speed: 45 kn*10

Sorted: 1 Kg Total catch: 169.00 CATCH/HOUR: 253.50

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis	84.90	510	33.49	8691
Yarella blackfordi	42.00	3894	16.57	
Lampadena sp.	11.50	10001	12.43	
PENAEIDAE	27.00	38583	10.65	
PARALEPIDIDAE	25.50	4160	10.06	
Trachipterus jacksonensis	22.20	36	8.76	
Squalus megalops	9.98	15	3.94	
Taractes sp.	7.65	2	3.02	
Stenopterus sp.	2.07	12	0.82	
Lepidopus caudatus	0.03	2	0.01	
Total	252.33		99.75	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2571
 DATE: 11/ 6/98 GEAR TYPE: PT No: 1 POSITION: Lat S 2120
 start stop duration Long E 1408
 TIME :11:25:13 11:33:02 8 (min) Purpose code: 1
 LOG :9086.66 9087.15 0.49 Area code : 3
 FDEPTH: 40 50 GearCond.code: 1
 BDEPTH: 127 129 Validity code: 2
 Towing dir: 270° Wire out: 230 m Speed: 40 kn*10

Sorted: 41 Kg Total catch: 2070.00 CATCH/HOUR: 15525.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Etrumeus whiteheadi	12225.00	508973	78.74	8696
Sardinops ocellatus	3300.00	44625	21.26	8695
Aequorea aequorea	0.00	4545		
Chrysaora sp.	0.00	38		
Total	15525.00		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2572
 DATE: 11/ 6/98 GEAR TYPE: PT No: 1 POSITION: Lat S 2120
 start stop duration Long E 1413
 TIME :13:21:44 13:27:48 6 (min) Purpose code: 1
 LOG :9098.48 9098.70 0.30 Area code : 3
 FDEPTH: 50 50 GearCond.code: 1
 BDEPTH: 91 89 Validity code: 2
 Towing dir: 91° Wire out: 200 m Speed: 40 kn*10

Sorted: 1 Kg Total catch: 304.22 CATCH/HOUR: 3042.20

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sufflogobius bibarbatu	2898.70	1932460	95.28	
Chelidonichthys capensis	142.00	870	4.67	
Merluccius capensis, juveniles	0.90	20	0.03	8698
Trachurus capensis, juvenile	0.50	30	0.02	8697
Aequorea aequorea	0.00	100000		
JRLC00	0.00	18000		
Total	3042.20		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2567
 DATE: 9/ 6/98 GEAR TYPE: PT No: 2 POSITION: Lat S 2000
 start stop duration Long E 1138
 TIME :07:00:47 07:01:23 16 (min) Purpose code: 1
 LOG :8677.85 8678.84 0.98 Area code : 3
 FDEPTH: 150 150 GearCond.code: 3
 BDEPTH: 620 639 Validity code: 2
 Towing dir: 270° Wire out: 600 m Speed: 45 kn*10

Sorted: 1 Kg Total catch: 245.00 CATCH/HOUR: 918.75

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
MYCTOPHIDAE	910.88	614775	99.14	
Macroparalepis macrogenae	7.88	1575	0.86	
Total	918.76		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2568
 DATE: 9/ 6/98 GEAR TYPE: PT No: 2 POSITION: Lat S 2002
 start stop duration Long E 1155
 TIME :10:22:40 10:39:40 17 (min) Purpose code: 1
 LOG :8697.76 8698.70 0.93 Area code : 3
 FDEPTH: 250 200 GearCond.code: 1
 BDEPTH: 375 374 Validity code: 2
 Towing dir: 160° Wire out: 500 m Speed: 30 kn*10

Sorted: Kg Total catch: 24.34 CATCH/HOUR: 35.91

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
MYCTOPHIDAE	66.53	40581	77.44	
Brama brama	10.41	7	12.12	
Trachurus capensis	5.12	18	5.36	8693
Merluccius capensis	2.47	4	2.88	8692
Merluccius muelleri	0.56	512	0.65	
Yarella blackfordi	0.49	32	0.57	
PARALEPIDIDAE	0.32	67	0.37	
Total	35.30		99.39	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2573
 DATE: 11/ 6/98 GEAR TYPE: PT No: 2 POSITION: Lat S 2147
 start stop duration Long E 1159
 TIME :20:04:42 20:14:34 10 (min) Purpose code: 1
 LOG :9161.82 9162.40 0.58 Area code : 3
 FDEPTH: 125 130 GearCond.code: 1
 BDEPTH: 172 172 Validity code: 2
 Towing dir: 270° Wire out: 450 m Speed: 15 kn*10

Sorted: 14 Kg Total catch: 148.13 CATCH/HOUR: 388.79

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Merluccius capensis	811.00	9060	91.50	870
Trachurus capensis	10.60	118	1.44	8694
Chelidonichthys capensis	19.26	54	2.17	
Lophius vomerinus	6.24	18	0.70	
Lepidopus caudatus	1.68	36	0.19	
Aequorea aequorea	0.00	24000		
Chrysaora sp.	0.00	1080		
Total	388.79		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2574
 DATE: 12/ 6/98 GEAR TYPE: PT No: 2 POSITION: Lat S 2341
 start stop duration Long E 1315
 TIME :00:47:53 30:58:56 11 (min) Purpose code: 1
 LOG :9205.02 9205.74 0.71 Area code : 3
 FDEPTH: 200 200 GearCond.code: 1
 BDEPTH: 132 325 Validity code: 2
 Towing dir: 90° Wire out: 850 m Speed: 40 kn*10
 Sorted: 81 Kg Total catch: 739.01 CATCH/HOUR: 4030.96

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis	3718.64	10407	92.25	8702
Merluccius capensis	238.09	442	5.91	8701
Diaphus sp.	34.85	10604	0.86	
Regalecus glesne	29.13	11	0.72	
Lepidopus caudatus	10.20	16	0.25	
Total	4030.96		99.99	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2575
 DATE: 12/ 6/98 GEAR TYPE: PT No: 2 POSITION: Lat S 2400
 start stop duration Long E 1327
 TIME :07:20:53 07:30:40 10 (min) Purpose code: 1
 LOG :9256.57 9257.21 0.51 Area code : 3
 FDEPTH: 200 270 GearCond.code: 1
 BDEPTH: 285 294 Validity code: 2
 Towing dir: 90° Wire out: 850 m Speed: 35 kn*10
 Sorted: Kg Total catch: 182.50 CATCH/HOUR: 1095.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brama brama	958.80	816	87.56	
Centrolophus niger	65.40	18	5.97	
Maurollicus muelleri	60.00	49998	5.48	
Trachurus capensis	10.80	18	0.99	8703
Aequorea aequorea	0.00	36000		
Total	1095.00		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2576
 DATE: 12/ 6/98 GEAR TYPE: PT No: 2 POSITION: Lat S 2360
 start stop duration Long E 1352
 TIME :10:28:33 10:45:43 17 (min) Purpose code: 1
 LOG :9282.19 9283.27 1.08 Area code : 3
 FDEPTH: 180 180 GearCond.code: 1
 BDEPTH: 236 238 Validity code: 2
 Towing dir: 270° Wire out: 850 m Speed: 45 kn*10
 Sorted: Kg Total catch: 9.50 CATCH/HOUR: 33.53

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brama brama	27.18	21	81.06	
Maurollicus muelleri	6.35	2859	18.94	
Chrysaora sp.	0.00	13504		
Total	33.53		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2577
 DATE: 12/ 6/98 GEAR TYPE: BT No: 2 POSITION: Lat S 2420
 start stop duration Long E 1403
 TIME :20:01:37 20:06:11 5 (min) Purpose code: 1
 LOG :9364.92 9365.19 0.26 Area code : 3
 FDEPTH: 158 156 GearCond.code: 1
 BDEPTH: 158 156 Validity code: 2
 Towing dir: 90° Wire out: 550 m Speed: 30 kn*10
 Sorted: Kg Total catch: 303.66 CATCH/HOUR: 3643.92

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Merluccius capensis	3576.00	27792	98.14	8706
Trachurus capensis	41.28	156	1.13	8705
Chelidonichthys capensis	20.40	48	0.56	
Thyrssites atun	1.60	12	0.10	
Lepidopus caudatus	2.64	24	0.07	
Aequorea aequorea	0.00	72000		
Chrysaora sp.	0.00	1440		
Total	3643.92		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2578
 DATE: 11/ 6/98 GEAR TYPE: PT No: 2 POSITION: Lat S 2459
 start stop duration Long E 1420
 TIME :14:34:00 14:47:00 16 (min) Purpose code: 1
 LOG :9547.30 9548.40 1.10 Area code : 2
 FDEPTH: 100 100 GearCond.code: 1
 BDEPTH: 143 146 Validity code: 2
 Towing dir: 270° Wire out: 350 m Speed: 40 kn*10
 Sorted: 21 Kg Total catch: 612.10 CATCH/HOUR: 2370.38

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sufflogobius bibarbatatus	2370.38	1128750	100.00	
Chrysaora sp.	0.00	210		
Aequorea aequorea	0.30	13618		
Total	2370.38		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2579
 DATE: 11/ 6/98 GEAR TYPE: BT No: 3 POSITION: Lat S 2460
 start stop duration Long E 1352
 TIME :18:16:17 18:25:07 9 (min) Purpose code: 1
 LOG :9577.46 9577.92 0.45 Area code : 2
 FDEPTH: 203 208 GearCond.code: 1
 BDEPTH: 203 208 Validity code: 2
 Towing dir: 270° Wire out: 700 m Speed: 30 kn*10
 Sorted: 69 Kg Total catch: 529.62 CATCH/HOUR: 1530.80

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis	2091.73	8833	59.30	8704
Merluccius capensis	1366.07	3680	38.69	8705
Sufflogobius bibarbatatus	71.00	787	2.01	
Chrysaora sp.	0.00	500		
Aequorea aequorea	0.00	26657		
Total	3530.80		100.00	

DR. FRIDTJOF NANSEN PROJECT: N1 PROJECT STATION: 2580
 DATE: 14/ 6/98 GEAR TYPE: BT No: 3 POSITION: Lat S 2348
 start stop duration Long E 1333
 TIME :07:52:53 07:58:44 6 (min) Purpose code: 1
 LOG :9704.79 9705.09 0.28 Area code : 3
 FDEPTH: 253 254 GearCond.code: 1
 BDEPTH: 253 254 Validity code: 2
 Towing dir: 360° Wire out: 900 m Speed: 30 kn*10
 Sorted: 100 Kg Total catch: 201.68 CATCH/HOUR: 2016.80

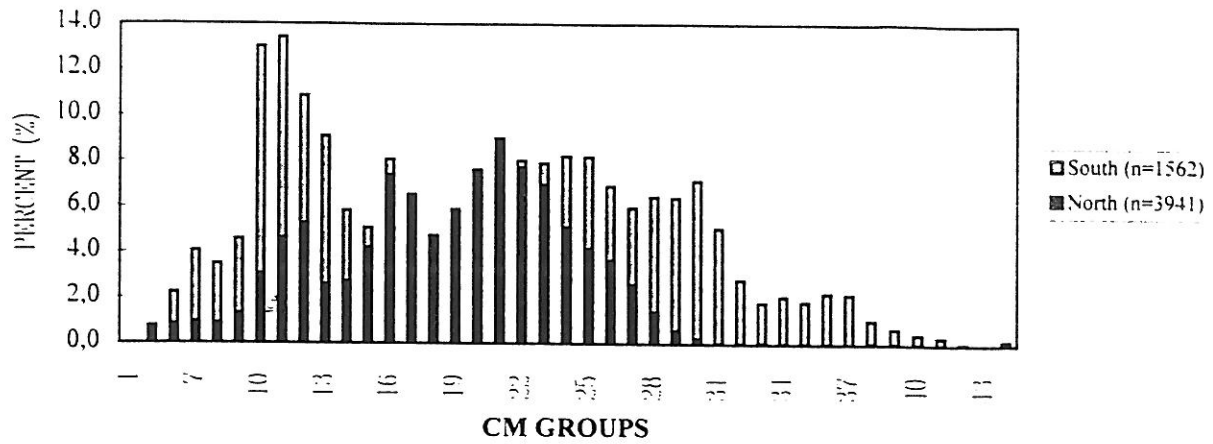
SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis	916.00	2820	45.42	8710
Merluccius capensis	844.00	2540	41.85	8711
Coelorinchus fasciatus	133.00	770	6.59	
Lophius vomerinus	78.00	20	3.87	
Sufflogobius bibarbatatus	21.40	120	1.06	
Todarodes sagittatus	12.20	20	0.60	
Helicolenus dactylopterus	6.60	120	0.33	
Lepidopus caudatus	5.20	20	0.26	
Trachurus capensis, juvenile	0.40	100	0.02	8712
Aequorea aequorea	0.00	80000		
Chrysaora sp.	0.00	7200		
Total	2016.80		100.00	

ANNEX VII LENGTH FREQUENCY DISTRIBUTIONS OF

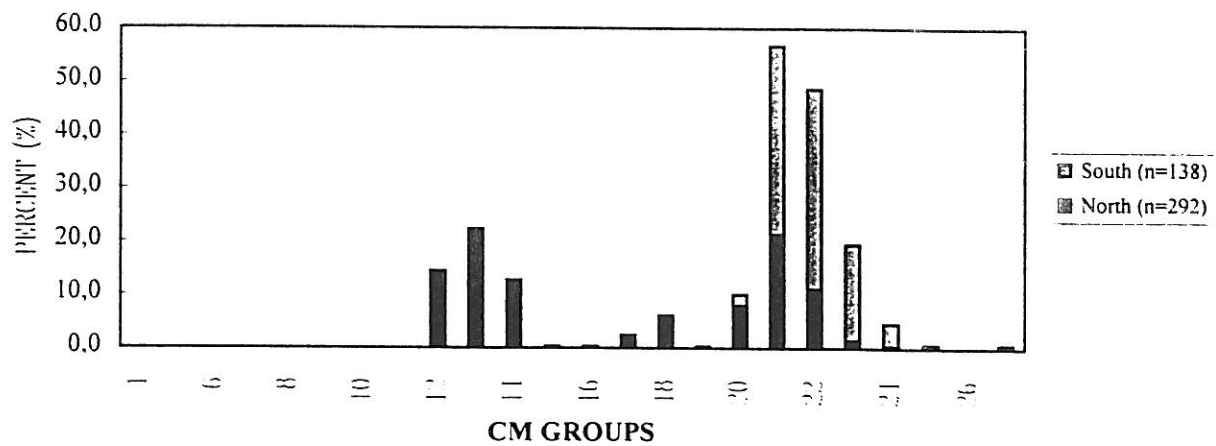
HORSE MACKEREL, PILCHARD AND HAKE

NORTH AND SOUTH OF 21°00' S

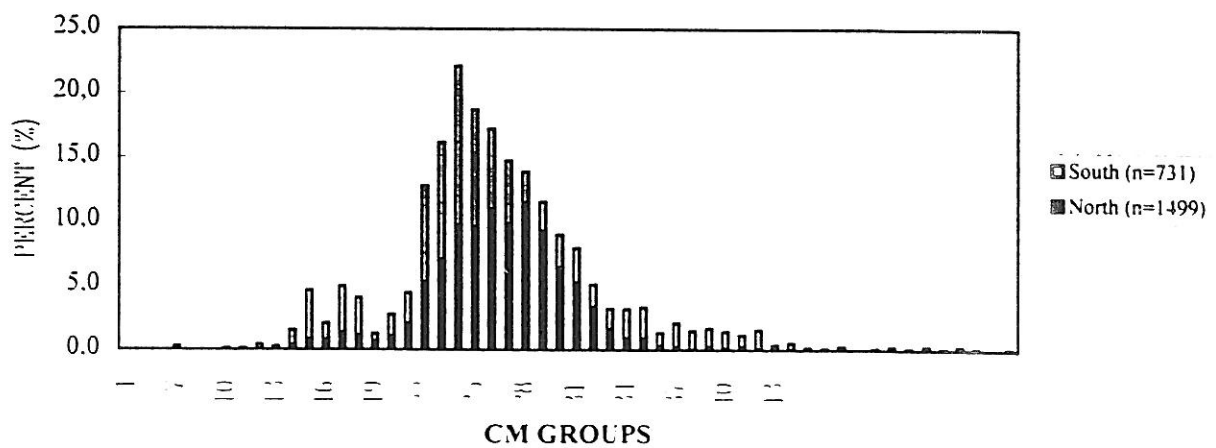
Length frequency distribution of Cape horse mackerel



Length frequency distribution of pilchard

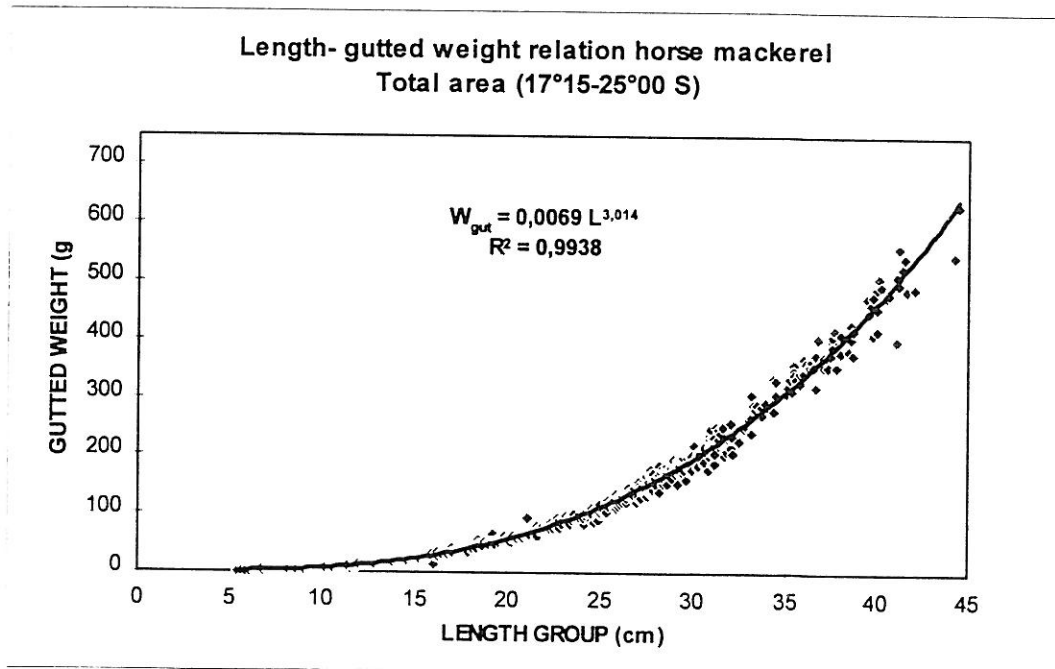
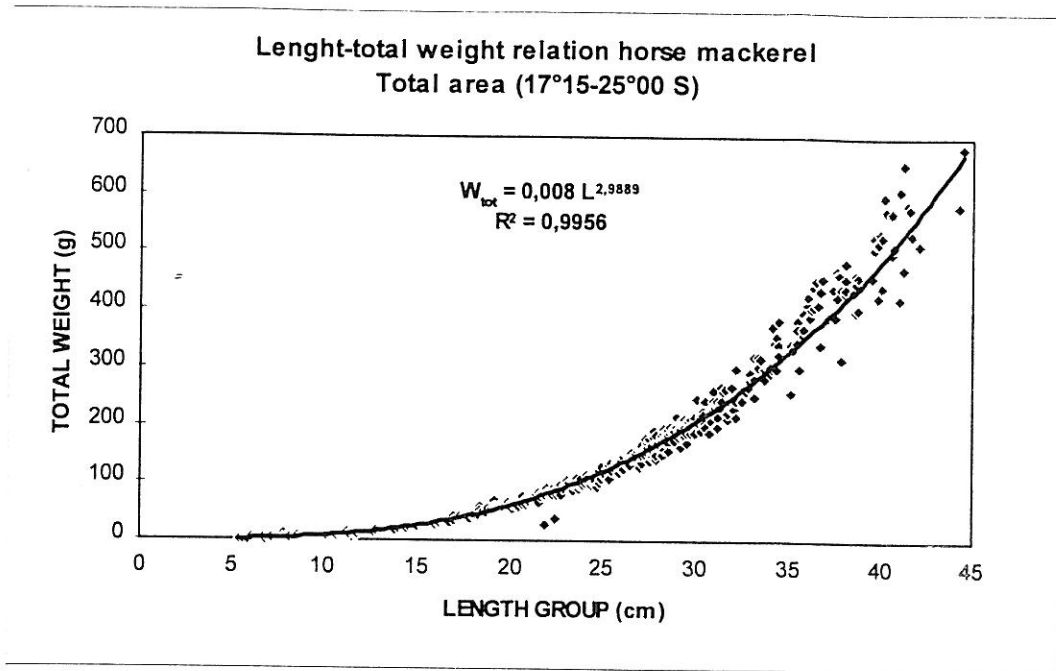


Length frequency distribution of Cape hake



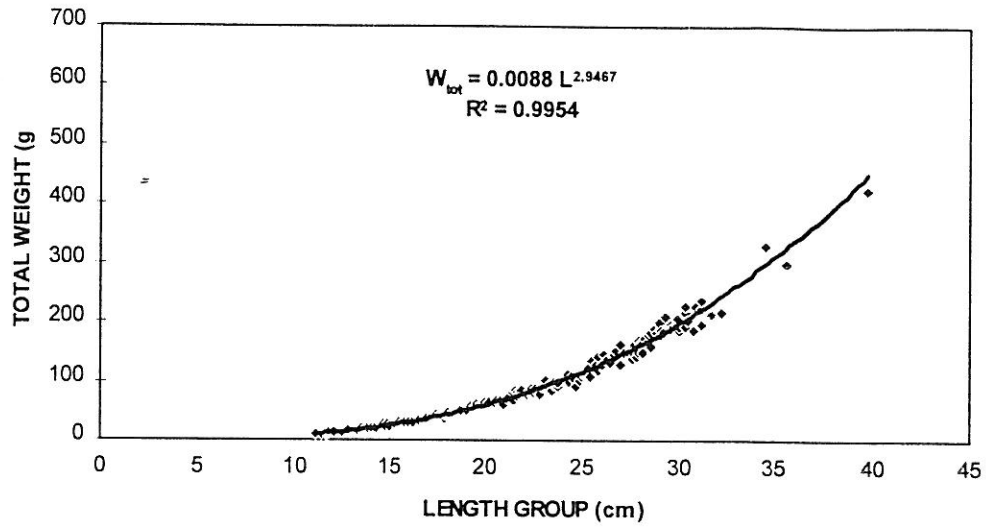
ANNEX VIII LENGTH- WEIGHT RELATIONSHIP

TOTAL AREA (17°15' - 25°00' S)

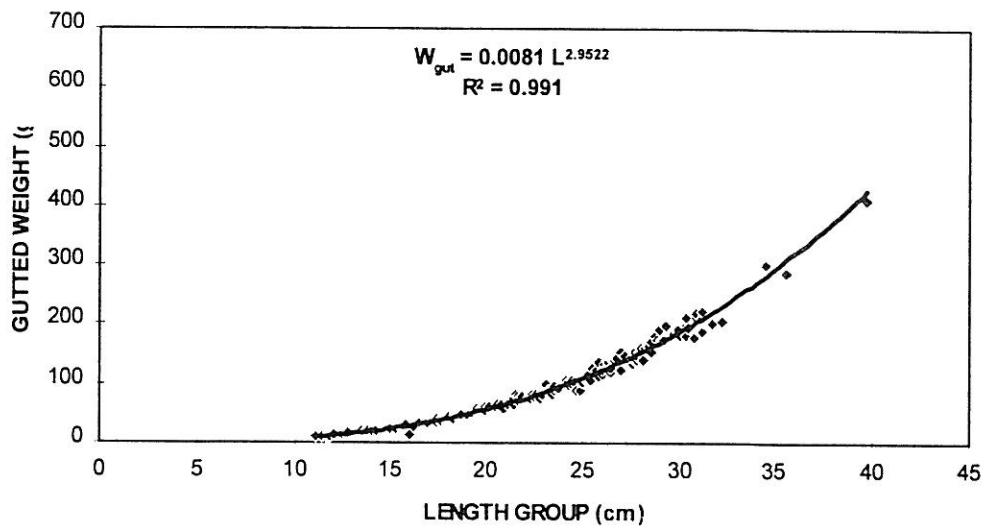


AREA 17°15' - 19°00' S

Length- total weight relation horse mackerel
Area 17°15' - 19°00' S

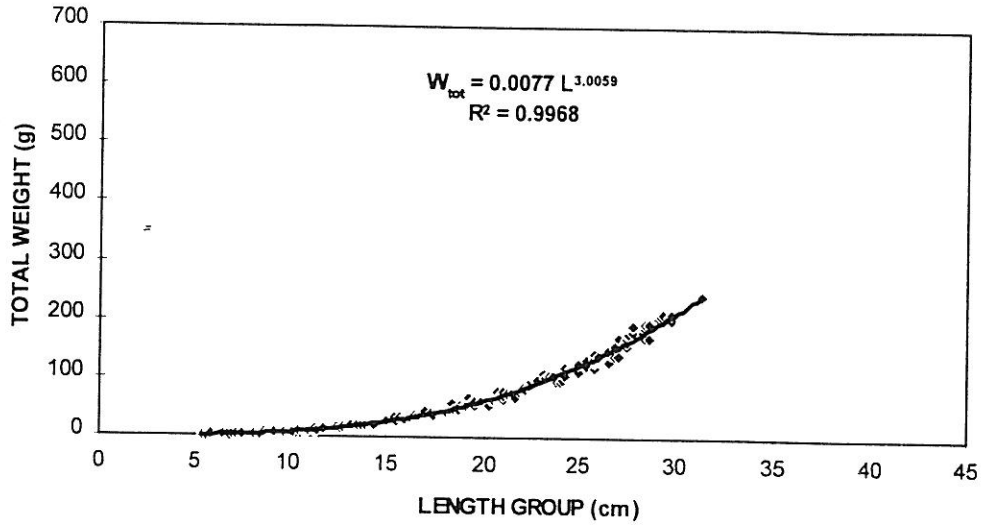


Length- gutted weight relation horse mackerel
Area 17°15' - 19°00' S

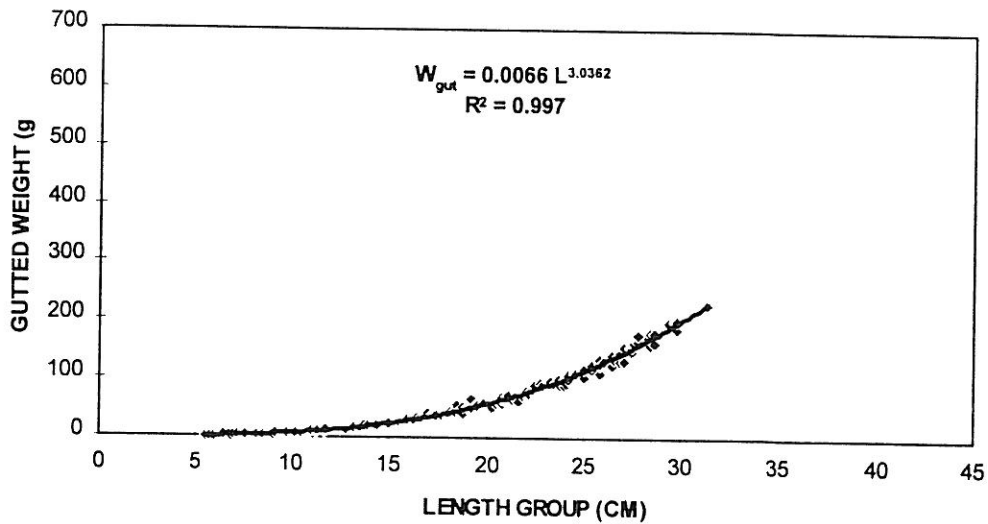


AREA 19°00' - 21°00' S

Length- total weight relation horse mackerel
Area 19°00' - 21°00' S

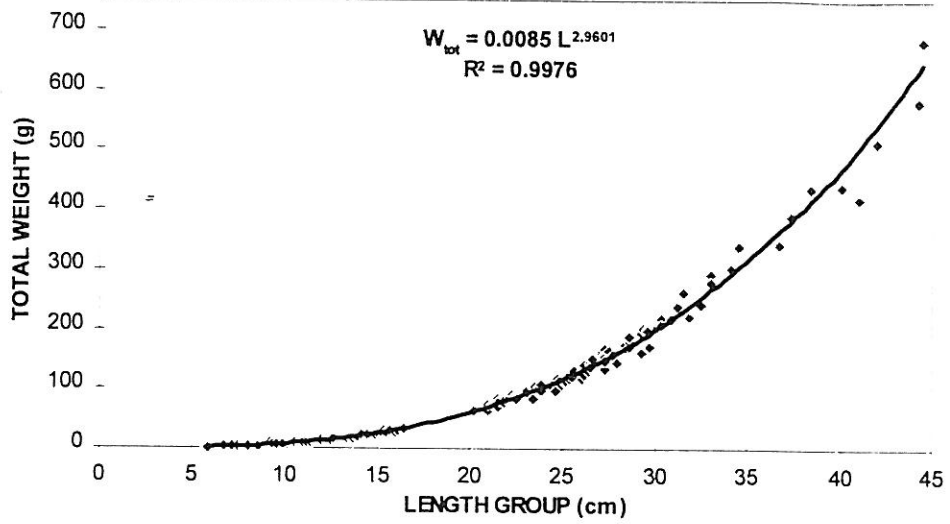


Length- gutted weight relation horse mackerel
Area 19°00' - 21°00' S

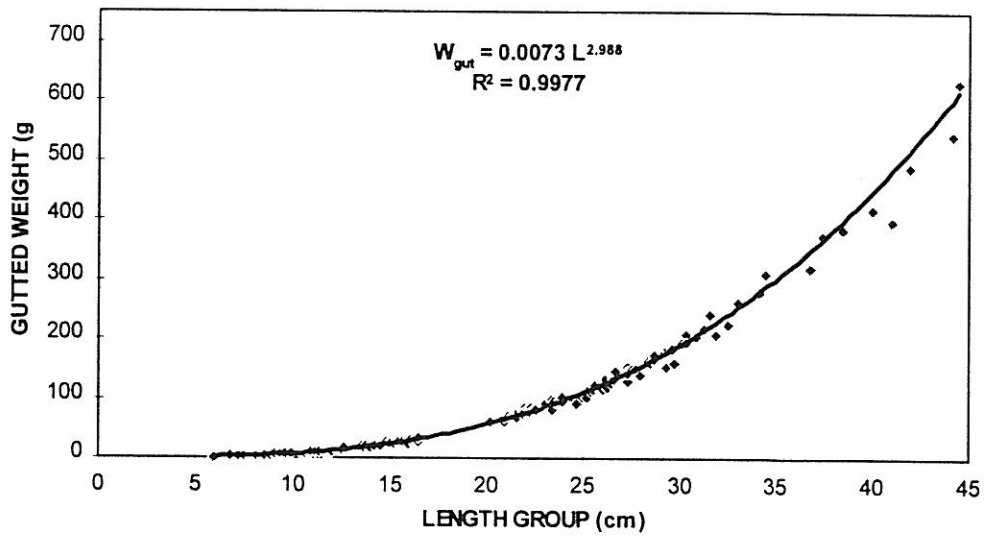


AREA 21°00' - 23°00' S

Length- total weight relation horse mackerel
Area 21°00' - 23°00' S

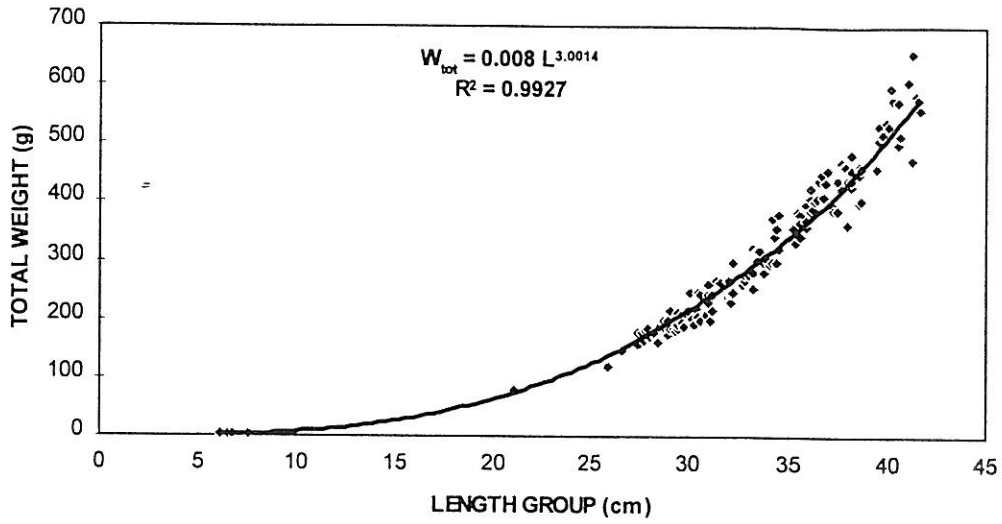


Length- gutted weight relation horse mackerel
Area 21°00' - 23°00' S

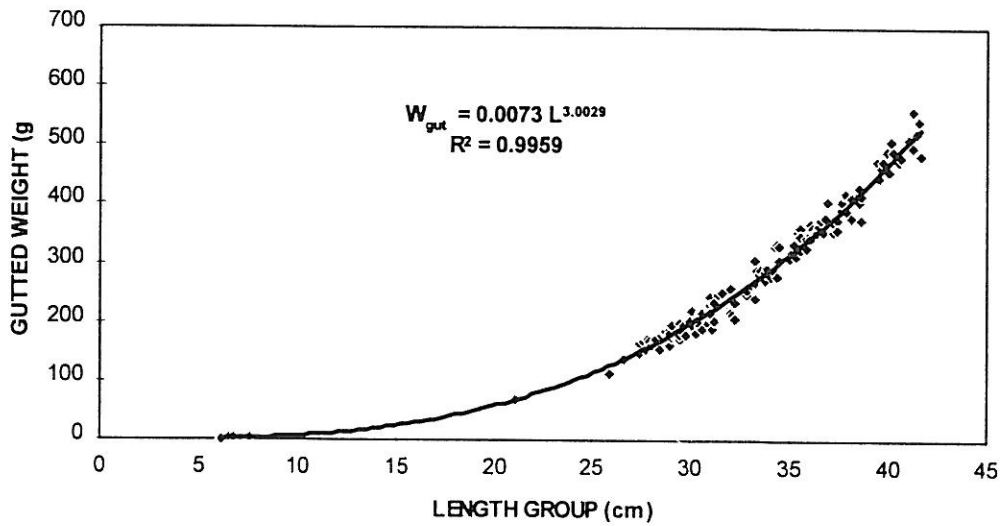


AREA 23°00' - 25°00' S

Lenght-total weight relation horse mackerel
Area 23°00-25°00 S



Lenght-gutted weight relation horse mackerel
Area 23°00-25°00 S



**ANNEX IX ESTIMATED WEIGHT AND CONDITION FACTOR FOR
ALL LENGTH GROUPS**

TOTAL AREA (17°15' - 25°00' S)

Length (cm)	No. of fish sampled	Total weight (g)	Gutted weight (g)	Condition factor total weight	Condition factor gutted weight
5	6	0,13	1,18	0,1045	0,9406
6	19	0,22	1,95	0,0996	0,9006
7	22	0,33	2,99	0,0962	0,8730
8	20	0,48	4,37	0,0937	0,8528
9	20	0,67	6,11	0,0918	0,8375
10	22	0,90	8,25	0,0902	0,8255
11	28	1,18	10,86	0,0890	0,8159
12	27	1,52	13,96	0,0879	0,8080
13	30	1,91	17,61	0,0870	0,8014
14	31	2,37	21,84	0,0863	0,7958
15	30	2,89	26,70	0,0856	0,7911
16	27	3,48	32,24	0,0850	0,7870
17	24	4,15	38,49	0,0845	0,7835
18	19	4,90	45,51	0,0841	0,7803
19	20	5,74	53,34	0,0837	0,7776
20	23	6,66	62,01	0,0833	0,7751
21	31	7,68	71,58	0,0830	0,7730
22	30	8,80	82,10	0,0827	0,7710
23	28	10,02	93,59	0,0824	0,7692
24	28	11,35	106,12	0,0821	0,7676
25	29	12,80	119,72	0,0819	0,7662
26	32	14,36	134,43	0,0817	0,7649
27	38	16,04	150,31	0,0815	0,7637
28	38	17,84	167,40	0,0813	0,7626
29	35	19,78	185,73	0,0811	0,7616
30	26	21,85	205,37	0,0809	0,7606
31	26	24,07	226,34	0,0808	0,7598
32	13	26,42	248,69	0,0806	0,7590
33	13	28,93	272,48	0,0805	0,7582
34	11	31,58	297,74	0,0804	0,7575
35	12	34,40	324,52	0,0802	0,7569
36	12	37,38	352,86	0,0801	0,7563
37	12	40,52	382,81	0,0800	0,7557
38	11	43,84	414,41	0,0799	0,7552
39	7	47,33	447,71	0,0798	0,7547
40	7	51,00	482,75	0,0797	0,7543
41	7	54,86	519,57	0,0796	0,7539
42	1	58,91	558,23	0,0795	0,7535
43	0	63,15	598,76	0,0794	0,7531
44	2	67,59	641,22	0,0793	0,7527
45	0	72,23	685,64	0,0793	0,7524

AREA 17°15' - 19°00' S

Length (cm)	No. of fish sampled	Total weight (g)	Gutted weight (g)	Condition factor total weight	Condition factor gutted weight
5	0	1,33	1,22	1,0673	0,9764
6	3	2,20	2,02	1,0198	0,9332
7	2	3,38	3,10	0,9867	0,9031
8	0	4,93	4,51	0,9624	0,8811
9	0	6,88	6,30	0,9438	0,8642
10	0	9,29	8,51	0,9292	0,8508
11	0	12,21	11,18	0,9173	0,8401
12	0	15,68	14,36	0,9074	0,8312
13	0	19,75	18,10	0,8992	0,8237
14	0	24,48	22,43	0,8921	0,8174
15	0	29,91	27,40	0,8861	0,8119
16	0	36,08	33,06	0,8808	0,8071
17	0	43,05	39,45	0,8762	0,8030
18	0	50,86	46,61	0,8721	0,7993
19	0	59,57	54,60	0,8684	0,7960
20	0	69,21	63,44	0,8652	0,7930
21	1	79,85	73,20	0,8622	0,7904
22	0	91,52	83,91	0,8595	0,7880
23	0	104,28	95,61	0,8571	0,7858
24	0	118,18	108,36	0,8549	0,7838
25	1	133,25	122,19	0,8528	0,7820
26	2	149,56	137,15	0,8509	0,7803
27	7	167,15	153,28	0,8492	0,7788
28	13	186,06	170,64	0,8476	0,7773
29	11	206,35	189,26	0,8461	0,7760
30	12	228,07	209,18	0,8447	0,7748
31	15	251,26	230,46	0,8434	0,7736
32	11	275,97	253,14	0,8422	0,7725
33	11	302,25	277,26	0,8410	0,7715
34	8	330,14	302,86	0,8400	0,7706
35	11	359,70	329,99	0,8390	0,7697
36	11	390,98	358,70	0,8380	0,7688
37	11	424,02	389,03	0,8371	0,7680
38	10	458,87	421,02	0,8363	0,7673
39	6	495,58	454,72	0,8355	0,7666
40	6	534,20	490,17	0,8347	0,7659
41	6	574,78	527,42	0,8340	0,7653
42	0	617,36	566,52	0,8333	0,7647
43	0	661,99	607,49	0,8326	0,7641
44	0	708,72	650,40	0,8320	0,7635
45	0	757,61	695,29	0,8314	0,7630

AREA 19°00' - 21°00' S

Length (cm)	No. of fish sampled	Total weight (g)	Gutted weight (g)	Condition factor total weight	Condition factor gutted weight
5	1	1,32	1,19	1,0570	0,9520
6	7	2,17	1,96	1,0029	0,9075
7	10	3,31	3,01	0,9647	0,8764
8	10	4,79	4,37	0,9361	0,8534
9	10	6,66	6,09	0,9138	0,8357
10	12	8,96	8,22	0,8959	0,8216
11	10	11,73	10,78	0,8811	0,8100
12	11	15,01	13,83	0,8686	0,8005
13	10	18,85	17,41	0,8580	0,7924
14	10	23,29	21,55	0,8488	0,7854
15	10	28,37	26,30	0,8407	0,7794
16	10	34,14	31,71	0,8336	0,7741
17	0	40,64	37,80	0,8272	0,7694
18	0	47,90	44,63	0,8214	0,7653
19	0	55,98	52,23	0,8162	0,7615
20	2	64,91	60,65	0,8114	0,7581
21	10	74,74	69,93	0,8071	0,7551
22	9	85,51	80,10	0,8031	0,7523
23	10	97,26	91,22	0,7993	0,7497
24	9	110,02	103,31	0,7959	0,7473
25	8	123,86	116,43	0,7927	0,7452
26	10	138,79	130,61	0,7897	0,7431
27	11	154,88	145,90	0,7869	0,7412
28	6	172,15	162,33	0,7842	0,7395
29	8	190,65	179,95	0,7817	0,7378
30	4	210,42	198,80	0,7793	0,7363
31	3	231,51	218,91	0,7771	0,7348
32	1	253,95	240,34	0,7750	0,7335
33	2	277,78	263,12	0,7730	0,7322
34	2	303,05	287,29	0,7710	0,7310
35	0	329,80	312,90	0,7692	0,7298
36	1	358,07	339,98	0,7675	0,7287
37	1	387,89	368,58	0,7658	0,7277
38	1	419,32	398,73	0,7642	0,7267
39	0	452,38	430,48	0,7626	0,7257
40	1	487,13	463,87	0,7611	0,7248
41	1	523,60	498,94	0,7597	0,7239
42	1	561,84	535,73	0,7583	0,7231
43	0	601,88	574,29	0,7570	0,7223
44	2	643,77	614,64	0,7557	0,7215
45	0	687,54	656,84	0,7545	0,7208

AREA 21°00' - 23°00' S

Length (cm)	No. of fish sampled	Total weight (g)	Gutted weight (g)	Condition factor total weight	Condition factor gutted weight
5	5	1,29	1,17	1,0352	0,9344
6	9	2,14	1,94	0,9899	0,8980
7	10	3,29	3,00	0,9584	0,8732
8	10	4,79	4,38	0,9353	0,8554
9	10	6,69	6,14	0,9177	0,8421
10	10	9,04	8,32	0,9038	0,8319
11	10	11,88	10,97	0,8926	0,8239
12	10	15,26	14,12	0,8834	0,8174
13	10	19,24	17,84	0,8757	0,8121
14	7	23,85	22,17	0,8691	0,8078
15	10	29,14	27,14	0,8634	0,8042
16	10	35,17	32,81	0,8586	0,8011
17	11	41,97	39,23	0,8543	0,7986
18	9	49,60	46,44	0,8505	0,7964
19	10	58,10	54,49	0,8471	0,7945
20	10	67,53	63,43	0,8441	0,7929
21	9	77,92	73,30	0,8414	0,7915
22	10	89,33	84,15	0,8390	0,7903
23	8	101,81	96,02	0,8368	0,7892
24	8	115,39	108,98	0,8347	0,7883
25	9	130,14	123,05	0,8329	0,7875
26	7	146,09	138,29	0,8312	0,7868
27	10	163,30	154,76	0,8296	0,7862
28	6	181,81	172,48	0,8282	0,7857
29	6	201,66	191,52	0,8269	0,7853
30		222,92	211,92	0,8256	0,7849
31	1	245,62	233,73	0,8245	0,7846
32		269,81	256,99	0,8234	0,7843
33		295,54	281,76	0,8224	0,7840
34		322,87	308,08	0,8215	0,7839
35		351,82	336,01	0,8206	0,7837
36		382,46	365,58	0,8197	0,7836
37		414,83	396,84	0,8190	0,7835
38		448,98	429,85	0,8182	0,7834
39		484,96	464,66	0,8175	0,7833
40		522,81	501,30	0,8169	0,7833
41		562,58	539,84	0,8163	0,7833
42		604,32	580,31	0,8157	0,7833
43		648,08	622,77	0,8151	0,7833
44		693,90	667,26	0,8146	0,7833
45		741,83	713,84	0,8141	0,7834

AREA 23°00' - 25°00' S

Length (cm)	No. of fish sampled	Total weight (g)	Gutted weight (g)	Condition factor total weight	Condition factor gutted weight
5		1.34	1.24	1.0695	0.9937
6		2.19	2.03	1.0126	0.9417
7		3.33	3.10	0.9721	0.9048
8		4.82	4.49	0.9417	0.8771
9		6.69	6.24	0.9179	0.8554
10		8.99	8.38	0.8987	0.8380
11	8	11.75	10.96	0.8828	0.8236
12	6	15.02	14.02	0.8694	0.8114
13	10	18.85	17.60	0.8578	0.8010
14	14	23.26	21.73	0.8478	0.7919
15	10	28.32	26.46	0.8390	0.7840
16	7	34.04	31.82	0.8312	0.7769
17	13	40.49	37.86	0.8241	0.7706
18	10	47.69	44.61	0.8178	0.7649
19	10	55.70	52.11	0.8120	0.7597
20	11	64.54	60.40	0.8067	0.7550
21	10	74.26	69.52	0.8019	0.7507
22	10	84.91	79.51	0.7974	0.7467
23	10	96.52	90.40	0.7933	0.7430
24	10	109.13	102.23	0.7894	0.7395
25	11	122.78	115.05	0.7858	0.7363
26	13	137.52	128.88	0.7824	0.7333
27	10	153.38	143.77	0.7792	0.7305
28	13	170.40	159.76	0.7762	0.7278
29	10	188.63	176.89	0.7734	0.7253
30	10	208.10	195.18	0.7707	0.7229
31	5	228.85	214.68	0.7682	0.7206
32	1	250.93	235.43	0.7658	0.7185
33		274.37	257.47	0.7635	0.7164
34	1	299.21	280.82	0.7613	0.7145
35	1	325.49	305.54	0.7592	0.7126
36		353.26	331.65	0.7572	0.7109
37		382.54	359.20	0.7552	0.7091
38		413.39	388.22	0.7534	0.7075
39	1	445.84	418.75	0.7516	0.7059
40		479.92	450.83	0.7499	0.7044
41		515.69	484.49	0.7482	0.7030
42		553.17	519.77	0.7466	0.7016
43		592.41	556.72	0.7451	0.7002
44		633.44	595.35	0.7436	0.6989
45		676.31	635.72	0.7422	0.6976

ANNEX X REPRODUCTIVE STATUS

TOTAL AREA (17°15' - 25°00' S)

Length class (cm)	No. of fish	Mean total weight (g)	Weight range		Mean gonad weight (g)	Percentage of fish per maturity stage							
			Min.	Max.		1	2	3	4	5	6	7	
5 - 5.9	6	1,6	1,3	1,8	1,43	100	0	0	0	0	0	0	0
6 - 6.9	19	2,4	1,5	3,1	2,11	100	0	0	0	0	0	0	0
7 - 7.9	22	3,6	2,7	8,9	3,01	100	0	0	0	0	0	0	0
8 - 8.9	20	4,5	3,7	5,5	3,93	100	0	0	0	0	0	0	0
9 - 9.9	20	7,1	5,3	8,5	6,49	100	0	0	0	0	0	0	0
10 - 10.9	22	9,0	7,3	10,6	8,22	100	0	0	0	0	0	0	0
11 - 11.9	28	11,8	9,9	13,4	10,83	100	0	0	0	0	0	0	0
12 - 12.9	27	14,8	12,4	16,8	13,73	96	4	0	0	0	0	0	0
13 - 13.9	30	18,8	16,8	21,3	17,67	83	17	0	0	0	0	0	0
14 - 14.9	31	22,6	19,6	27,8	21,32	74	26	0	0	0	0	0	0
15 - 15.9	30	29,0	24,9	33,0	27,18	0	100	0	0	0	0	0	0
16 - 16.9	27	33,8	26,2	40,3	31,23	0	100	0	0	0	0	0	0
17 - 17.9	24	40,6	36,3	45,6	38,16	0	92	4	4	0	0	0	0
18 - 18.9	19	49,1	43,7	59,3	45,98	0	63	37	0	0	0	0	0
19 - 19.9	20	59,2	51,5	69,1	55,25	0	35	40	0	0	5	20	0
20 - 20.9	23	64,9	56,5	77,5	61,14	0	17	61	0	17	0	4	0
21 - 21.9	31	76,8	28,9	131,5	73,41	0	16	71	0	3	6	3	0
22 - 22.9	30	85,0	36,7	98,3	105,62	0	10	60	0	20	3	7	0
23 - 23.9	28	98,7	84,2	109,3	92,94	0	4	64	4	14	0	14	0
24 - 24.9	28	115,0	93,0	283,8	107,64	0	0	57	11	18	4	11	0
25 - 25.9	29	122,9	106,9	144,3	115,77	0	0	72	7	3	0	17	0
26 - 26.9	32	139,3	118,1	157,5	131,70	0	0	59	9	0	0	31	0
27 - 27.9	38	160,9	130,5	191,5	150,78	0	0	63	3	3	3	29	0
28 - 28.9	38	177,0	148,9	199,8	166,69	0	0	53	3	5	0	29	0
29 - 29.9	35	196,1	162,5	217,4	183,73	0	0	57	3	3	3	31	0
30 - 30.9	26	212,2	188,0	248,4	198,34	0	0	62	0	0	0	38	0
31 - 31.9	26	240,6	196,7	370,6	221,96	0	0	31	8	4	8	46	0
32 - 32.9	13	251,9	216,8	299,9	230,89	0	0	38	8	0	8	46	0
33 - 33.9	13	295,0	252,3	321,4	275,32	0	0	31	8	8	8	46	0
34 - 34.9	11	330,7	293,7	381,8	301,51	0	0	45	0	9	9	45	0
35 - 35.9	12	348,1	257,2	397,0	312,93	0	0	17	8	8	8	58	0
36 - 36.9	12	413,5	341,6	456,2	359,92	0	0	67	17	0	0	17	0
37 - 37.9	12	417,1	318,6	471,6	377,56	0	0	50	8	25	0	17	0
38 - 38.9	11	444,2	402,0	483,2	405,84	0	0	55	9	9	0	27	0
39 - 39.9	7	499,9	426,2	537,2	458,00	0	0	29	29	0	0	43	0
40 - 40.9	7	533,0	440,8	598,6	471,54	0	0	43	14	0	29	14	0
41 - 41.9	7	481,6	421,2	655,0	502,37	0	0	14	14	14	14	43	0
42 - 42.9	1	515,8	515,8	515,8	489,40	0	0	100	0	0	0	0	0
43 - 43.9						0	0	0	0	0	0	0	0
44 - 44.9	2	632,6	581,6	683,5	587,65	0	0	50	0	0	0	50	0
45 - 45.9						0	0	0	0	0	0	0	0
Total	817												

AREA 17°15' - 19°00' S

Length class (cm)	No. of fish	Mean total weight (g)	Weight range		Mean gonad weight (g)	Percentage of fish per maturity stage							
			Min.	Max.		1	2	3	4	5	6	7	
5 - 5.9													
6 - 6.9	3	2.3	2.0	2.5	1.0	100	0	0	0	0	0	0	0
7 - 7.9	2	3.6	3.4	3.7	1.0	100	0	0	0	0	0	0	0
8 - 8.9													
9 - 9.9													
10 - 10.9													
11 - 11.9													
12 - 12.9													
13 - 13.9													
14 - 14.9													
15 - 15.9													
16 - 16.9													
17 - 17.9													
18 - 18.9													
19 - 19.9													
20 - 20.9													
21 - 21.9	1	78,0	78,0	78,0	3,0	0	0	100	0	0	0	0	0
22 - 22.9													
23 - 23.9													
24 - 24.9													
25 - 25.9	1	119,2	119,2	119,2	3,0	0	0	100	0	0	0	0	0
26 - 26.9	2	147,3	147,2	147,4	3,0	0	0	100	0	0	0	0	0
27 - 27.9	7	175,0	156,9	184,8	3,6	0	0	86	0	0	0	0	14
28 - 28.9	13	181,7	160,3	199,8	3,6	0	31	46	0	0	0	0	23
29 - 29.9	11	195,1	182,5	217,4	3,5	0	9	73	0	0	9	9	9
30 - 30.9	12	215,7	191,1	248,4	4,0	0	0	75	0	0	0	0	25
31 - 31.9	15	240,7	199,1	268,3	5,3	0	7	27	7	7	0	0	53
32 - 32.9	11	256,0	229,6	299,9	5,2	0	0	36	9	0	9	0	45
33 - 33.9	11	296,8	252,3	321,4	5,1	0	0	36	9	9	0	0	45
34 - 34.9	8	333,5	293,7	381,8	4,9	0	0	50	0	0	13	0	38
35 - 35.9	11	352,5	257,2	397,0	5,7	0	0	18	9	9	9	0	55
36 - 36.9	11	420,0	388,8	456,2	3,5	0	0	73	18	0	0	0	9
37 - 37.9	11	423,5	364,0	471,6	4,2	0	0	55	9	18	0	0	18
38 - 38.9	10	444,9	402,0	483,2	4,1	0	0	60	10	10	0	0	20
39 - 39.9	6	512,2	460,8	537,2	4,7	0	0	33	33	0	0	0	33
40 - 40.9	6	548,3	500,6	598,6	4,2	0	0	50	17	0	0	0	0
41 - 41.9	6	576,2	473,8	655,0	5,3	0	0	17	17	17	17	0	33
42 - 42.9													
43 - 43.9													
44 - 44.9													
45 - 45.9													
Total	158												

AREA 19°00' - 21°00' S

Length class (cm)	No. of fish	Mean total weight (g)	Weight range		Mean gonad weight (g)	Percentage of fish per maturity stage						
			Min	Max.		1	2	3	4	5	6	7
5 - 5.9	1	1,6	1,6	1,6	0,0	100	0	0	0	0	0	0
6 - 6.9	7	2,4	2,2	2,8	0,0	100	0	0	0	0	0	0
7 - 7.9	10	3,5	2,7	3,9	0,0	100	0	0	0	0	0	0
8 - 8.9	10	4,4	3,7	5,2	0,0	100	0	0	0	0	0	0
9 - 9.9	10	7,5	5,9	8,5	0,0	100	0	0	0	0	0	0
10 - 10.9	12	9,3	8,5	10,6	0,0	100	0	0	0	0	0	0
11 - 11.9	10	11,6	9,9	13,3	0,1	100	0	0	0	0	0	0
12 - 12.9	10	14,4	12,4	16,6	0,1	90	10	0	0	0	0	0
13 - 13.9	10	19,1	17,2	21,3	0,1	50	50	0	0	0	0	0
14 - 14.9	10	22,9	19,6	27,8	0,0	30	70	0	0	0	0	0
15 - 15.9	10	27,7	25,4	30,3	0,0	0	100	0	0	0	0	0
16 - 16.9	10	31,8	26,2	35,8	0,1	0	100	0	0	0	0	0
17 - 17.9												
18 - 18.9												
19 - 19.9												
20 - 20.9	2	63,4	62,1	64,7	0,4	0	50	50	0	0	0	0
21 - 21.9	10	76,4	65,1	87,1	0,4	0	50	50	0	0	0	0
22 - 22.9	9	87,2	83,0	90,7	0,4	0	22	78	0	0	0	0
23 - 23.9	10	98,2	84,2	107,6	0,6	0	10	90	0	0	0	0
24 - 24.9	9	109,4	96,3	116,8	0,6	0	0	78	0	22	0	0
25 - 25.9	8	118,5	106,9	130,0	0,6	0	0	88	13	0	0	0
26 - 26.9	10	136,0	118,1	151,9	0,8	0	0	60	10	0	0	30
27 - 27.9	11	153,5	135,8	166,7	1,3	0	0	82	0	0	0	18
28 - 28.9	5	176,6	167,6	187,9	1,3	0	0	80	0	0	0	20
29 - 29.9	8	189,9	162,5	201,9	1,8	0	0	63	13	0	0	25
30 - 30.9	4	213,0	205,6	219,8	1,9	0	0	50	0	0	0	50
31 - 31.9	3	240,8	221,7	261,3	2,1	0	0	67	0	0	33	0
32 - 32.9	1	242,8	242,8	242,8	1,2	0	0	100	0	0	0	0
33 - 33.9	2	284,7	278,1	291,3	1,5	0	0	0	0	0	50	50
34 - 34.9	2	320,6	301,4	339,8	3,9	0	0	50	0	0	0	50
35 - 35.9												
36 - 36.9	1	341,6	341,6	341,6	4,4	0	0	0	0	0	0	100
37 - 37.9	1	391,2	391,2	391,2	5,0	0	0	0	0	100	0	0
38 - 38.9	1	436,6	436,6	436,6	8,1	0	0	0	0	0	0	100
39 - 39.9												
40 - 40.9	1	440,8	440,8	440,8	6,4	0	0	0	0	0	0	100
41 - 41.9	1	421,2	421,2	421,2	5,6	0	0	0	0	0	0	100
42 - 42.9	1	515,8	515,8	515,8	7,0	0	0	100	0	0	0	0
43 - 43.9												
44 - 44.9	2	632,6	581,6	683,5	8,1	0	0	50	0	0	0	50
45 - 45.9												
Total	212											

AREA 21°00' - 23°00' S

Length class (cm)	No. of fish	Mean total weight (g)	Weight range		Mean gonad weight (g)	Percentage of fish per maturity stage						
			Min.	Max.		1	2	3	4	5	6	7
5 - 5.9	5	1,5	1,3	1,8	0,0	100	0	0	0	0	0	0
6 - 6.9	9	2,3	1,5	3,1	0,0	100	0	0	0	0	0	0
7 - 7.9	10	3,3	2,8	3,9	0,0	100	0	0	0	0	0	0
8 - 8.9	10	4,6	3,8	5,5	0,0	100	0	0	0	0	0	0
9 - 9.9	10	6,7	5,3	7,6	0,0	100	0	0	0	0	0	0
10 - 10.9	10	8,6	7,3	9,8	0,7	100	0	0	0	0	0	0
11 - 11.9	10	12,0	10,5	13,4	0,0	100	0	0	0	0	0	0
12 - 12.9	10	15,0	13,2	16,3	0,0	100	0	0	0	0	0	0
13 - 13.9	10	18,3	16,8	20,3	0,0	100	0	0	0	0	0	0
14 - 14.9	7	21,6	20,7	22,2	0,0	100	0	0	0	0	0	0
15 - 15.9	10	30,7	26,8	33,0	0,1	0	100	0	0	0	0	0
16 - 16.9	10	36,7	33,1	40,3	0,1	0	100	0	0	0	0	0
17 - 17.9	11	41,6	38,2	45,6	0,1	0	100	0	0	0	0	0
18 - 18.9	9	49,6	43,7	59,3	0,1	0	89	11	0	0	0	0
19 - 19.9	10	58,8	54,1	69,1	0,6	0	30	50	0	0	10	10
20 - 20.9	10	67,0	56,5	77,5	0,9	0	20	30	0	40	0	10
21 - 21.9	9	74,3	66,6	81,3	0,9	0	0	67	0	11	22	0
22 - 22.9	10	88,7	78,6	98,3	1,2	0	0	20	0	60	10	10
23 - 23.9	8	103,1	95,0	109,3	1,1	0	0	25	13	25	0	38
24 - 24.9	8	112,5	96,7	121,8	1,6	0	0	13	38	38	13	0
25 - 25.9	9	129,4	111,7	144,3	1,3	0	0	56	11	0	0	33
26 - 26.9	7	144,8	131,7	157,5	1,2	0	0	57	0	0	0	43
27 - 27.9	10	169,8	140,6	191,5	1,6	0	0	40	10	0	10	40
28 - 28.9	6	184,1	171,6	194,6	1,3	0	0	50	17	17	0	17
29 - 29.9	6	208,8	200,9	214,1	1,7	0	0	33	0	17	0	50
30 - 30.9	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
31 - 31.9	1	242,6	242,6	242,6	2,3	0	0	100	0	0	0	0
32 - 32.9												
33 - 33.9												
34 - 34.9												
35 - 35.9												
36 - 36.9												
37 - 37.9												
38 - 38.9												
39 - 39.9												
40 - 40.9												
41 - 41.9												
42 - 42.9												
43 - 43.9												
44 - 44.9												
45 - 45.9												
Total	225											

AREA 23°00' - 25°00' S

Length class (cm)	No. of fish	Mean total weight (g)	Weight range		Mean gonad weight (g)	Percentage of fish per maturity stage							
			Min.	Max.		1	2	3	4	5	6	7	
5 - 5.9													
6 - 6.9													
7 - 7.9													
8 - 8.9													
9 - 9.9													
10 - 10.9													
11 - 11.9	8	11,7	10,6	12,6	0,00	100	0	0	0	0	0	0	0
12 - 12.9	6	15,3	13,6	16,8	0,00	100	0	0	0	0	0	0	0
13 - 13.9	10	19,0	17,1	20,4	0,00	100	0	0	0	0	0	0	0
14 - 14.9	14	22,3	19,4	26,4	0,39	93	7	0	0	0	0	0	0
15 - 15.9	10	28,5	24,9	31,0	0,11	0	100	0	0	0	0	0	0
16 - 16.9	7	32,5	29,5	36,6	0,21	0	100	0	0	0	0	0	0
17 - 17.9	13	39,7	36,3	42,5	0,30	0	85	8	8	0	0	0	0
18 - 18.9	10	48,6	45,6	52,3	0,47	0	40	60	0	0	0	0	0
19 - 19.9	10	59,6	51,5	66,1	0,58	0	40	30	0	0	0	0	30
20 - 20.9	11	63,4	59,5	67,4	0,56	0	9	91	0	0	0	0	0
21 - 21.9	10	78,9	68,3	84,7	0,43	0	0	90	0	0	0	0	10
22 - 22.9	10	84,1	79,5	90,5	0,59	0	0	90	0	0	0	0	10
23 - 23.9	10	95,7	86,4	102,9	0,56	0	0	70	0	20	0	0	10
24 - 24.9	10	105,2	93,0	113,2	0,76	0	0	80	0	0	0	0	20
25 - 25.9	11	121,1	109,5	142,0	0,79	0	0	73	0	9	0	0	18
26 - 26.9	13	137,8	126,4	153,3	1,11	0	0	54	15	0	0	0	31
27 - 27.9	10	150,2	130,5	169,5	1,09	0	0	50	0	10	0	0	40
28 - 28.9	13	169,2	148,9	190,0	1,15	0	0	46	0	8	0	0	46
29 - 29.9	10	194,5	181,4	212,3	1,55	0	0	50	0	0	0	0	50
30 - 30.9	10	207,6	188,0	228,6	1,87	0	0	50	0	0	0	0	50
31 - 31.9	5	213,7	196,7	237,5	1,88	0	0	0	0	0	20	0	80
32 - 32.9	1	216,8	216,8	216,8	2,20	0	0	0	0	0	0	0	100
33 - 33.9													
34 - 34.9	1	328,6	328,6	328,6	15,50	0	0	0	0	100	0	0	0
35 - 35.9	1	300,2	300,2	300,2	4,10	0	0	0	0	0	0	0	100
36 - 36.9													
37 - 37.9													
38 - 38.9													
39 - 39.9	1	426,2	426,2	426,2	4,90	0	0	0	0	0	0	0	100
40 - 40.9													
41 - 41.9													
42 - 42.9													
43 - 43.9													
44 - 44.9													
45 - 45.9													
Total	215												

ANNEX XI BIOMASS IN WEIGHT AND NUMBER OF FISH

Stratum no	1	2	3a	3b	4a	4b	4c	4d	5a	5b	5c	5d	5e	5f	6	Total
Position on shelf *	Off	Off	Off	Off	In	In	In	In	In	Off	In	Off	In	Off	Far	
Northern boundary	24°15'	23°20'	22°05'	21°10'	21°50'	21°00'	18°55'	18°55'	19°00'	18°20'	19°00'	18°20'	17°15'	17°15'	17°15'	17°15'
Southern boundary	25°00'	23°55'	23°40'	22°05'	22°45'	21°50'	21°00'	21°00'	19°40'	19°00'	19°50'	19°00'	18°20'	18°20'	18°40'	25°00'
Size of area (NMF)	875	1529	1187	718	1086	1239	2041	670	364	533	777	594	909	716	1540	
Mean S _A value (m ² /NMF)	782	237	214	398	984	501	917	903	571	571	913	913	1538	1086	325	
Biomass juveniles (<21cm)	0.0	0.0	1.1	1.3	128.5	74.7	229.1	74.0	31.3	44.0	13.5	9.9	194.0	15.5	0.5	817.4
Biomass maturing (>21cm)	236.2	113.4	61.8	69.7	0.4	0.2	0.7	0.2	7.5	10.4	160.7	116.0	46.1	155.4	118.5	1097.1
Total biomass (1000 tonnes)	236.2	113.4	62.9	71.0	128.9	74.9	229.8	74.2	38.7	54.4	174.2	125.9	240.2	170.9	119.1	1914.6
No. of fish per length class (mill)	5				273	159	479	155								1066
	6				347	202	608	196								1353
	7				415	241	727	235								1619
	8				371	216	650	210								1446
	9				865	503	1516	490								3374
	10				2187	1271	3831	1237					5			8532
	11				1890	1099	3311	1069	23	34			56			7481
	12				1314	764	2301	743	51	75			120			5368
	13				898	522	1572	508	8	12			400			3920
	14				589	342	1032	333	12	17			500			2825
	15				340	198	596	193	45	65			682			2119
	16				309	180	542	175	93	137			999	3		2439
	17				96	56	168	54	118	173	1	1	1070	6		1744
	18				23	13	39	13	109	159	12	10	552	19		949
	19		5	6	12	7	21	7	119	174	48	37	433	84		953
	20		13	15	8	4	13	4	117	171	149	114	391	148	9	1155
	21		47	53	3	2	5	2	61	89	212	162	264	376	30	1307
	22		57	65					25	37	168	128	164	429	112	1185
	23		54	60	2	1	3	1	4	5	166	127	88	363	159	1032
	24		69	78					1	1	105	80	28	218	175	756
	25	3	80	90							172	132		89	181	747
	26	8	3	53	60						190	145	8	24	158	649
	27	15	34	31	35						168	129		16	92	518
	28	33	79	26	29						69	53			56	345
	29	75	102	12	13						42	32		24	16	315
	30	109	116	15	17						7	5		32	4	304
	31	107	71	5	6											189
	32	56	28	8	10											103
	33	50	8	2	2									8		71
	34	53	20	1	1									8		83
	35	53	8	1	1											63
	36	70	8	2	2											83
	37	70	6	1	1											78
	38	32	3													37
	39	22		1	1										2	24
	40	9		1	1											11
	41	8														8
	42			1	1											2
	43															
	44		2	2												4
	45															
	46															
	47															
	48															
	49															
Sum	770	489	488	550	9940	5778	17415	5625	786	1149	1510	1155	5761	1846	994	54258