

CRUISE REPORT "DR. FRIDTJOF NANSEN"



SURVEYS OF THE FISH RESOURCES OF NAMIBIA

Preliminary Cruise Report No 2

May 27 - June 20 1990

Directorate of Fisheries

Namibia

Institute of Marine Research

Norway, Bergen

The "DR. FRIDTJOF NANSEN" Research Programme is sponsored by the Norwegian Agency for Development Assistance NORAD, the Food and Agriculture Organization of the United Nations FAO, and the United Nations Development Programme UNDP. The programme in Namibia is being conducted and planned under agreements between UNDP, Namibian authorities and the Institute of Marine Research, Norway. Its execution is the responsibility of the Institute of Marine Research, Bergen in cooperation with the Directorate of Fisheries of Namibia.

The programme will comprise several surveys, the timing of which is foreseen as follows:

Survey	1	8 weeks,	January 25 to March 19
"	2	4 "	appr. May 20 - June 17
"	3	4 "	September

This cruise report describes the work and some of the findings of the second survey. A full report will be issued after the completion of the programme.

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CHAPTER 1 INTRODUCTION

1.1 GENERAL OBJECTIVES

Following an offer from NORAD extended through FAO and UNDP, an agreement was reached in Windhoek in January 1990 between the UNDP Resident Representative and Namibian authorities for the execution of a programme of surveys of the fish resources of the Namibian shelf waters during 1990 with the R/V "DR. FRIDTJOF NANSEN".

The purpose of the programme was agreed as follows:

The main objectives are descriptions of the distribution, composition and abundance of the most important resources of fish. The small pelagic fish species, horse mackerel, pilchard and anchovy, will be investigated by the acoustic integration method combined with sampling by mid-water and bottom trawls. A swept area trawl survey programme will be used for the demersal stocks. All catches will be sampled to species by weight and numbers and biological sampling will be made of the commercially important stocks. Possible taxonomic problems will be studied by sampling and examination by experts in cooperation with FAO's Fisheries Department.

Environmental studies will include recording of surface temperature on a continuous basis and a description of the water profile with a series of hydrographic stations as well as studies of bottom type by grab samples and the ROXANN bottom discrimination system.

1.2 SPECIFIC OBJECTIVES OF SECOND SURVEY

1. To produce a biomass estimate for the three commercially important pelagic fish species; pilchard *Sardinops ocellata*, anchovy *Engraulis capensis* and horse mackerel *Trachurus capensis*.
2. To obtain environmental data to enable correlations between fish distribution and the environment.
3. To provide training for Namibian scientific and technical staff.

1.3 PARTICIPATION

The scientific staff from Namibia on the "DR. FRIDTJOF NANSEN" from May 27th to June 4th were:

Bruce Tomalin, Dierdricht Bessinger, Helen Boyer, Willem Nauseb,
Malakia Shimhanda and Marianna Tomalin.

From 4th to June 20th :

David Boyer, Bernatitus Birisameb, David Gaweseb, Sielfried Gowaseb and Riaan Naude.

The scientific staff from the Institute of Marine Research were:

Johannes Hamre, Oddgeir Alvheim, Terje Haugland and Erling Molvaer.

CHAPTER 2 METHODS

From the general knowledge of pelagic fish distribution and from reports of commercial fishing vessels, the survey area was limited to the area from Dolphin Head ($26^{\circ}00'S$) to the Cunene River ($17^{\circ}15'S$) and from the shore to the 400 m bathymetric line. The southern limit was formed by the cold and oxygen deficient upwelling region centred around Lüderitz and the northern boundary by Namibia's border with Angola. To allow comparison with the previous "DR. FRIDTJOF NANSEN" survey, the region was divided into two areas;

- 1 $26^{\circ}00'$ to $21^{\circ}00'S$ Dolphin Head to Ambrose Bay
- 2 $21^{\circ}00'$ to $17^{\circ}00'S$ Ambrose Bay to Cunene River

The "DR. FRIDTJOF NANSEN" left Walvis Bay at 1800 hrs on May 27th and surveyed the area south of Walvis Bay returning to Walvis to exchange Namibian scientific staff at 0900 hrs on June 4th. She departed at 1800 hrs on the same day, surveyed the northern region and returned on June 20th at 0800 hrs. Five thousand nautical miles were steamed and 97 trawl stations worked. Nine hydrographic profiles were made.

Three purse seiners assisted with mapping the distributions of pelagic fish and carried out non-quantitative surveys of shallow waters. These were "HODDEVIK" (May 30th to June), "ATLANTIC LEADER" (June 4-9) and "EMERALD ISLE" (June 9-12). The Namibian scientific staff on these vessels were Serubabel Kahiha, Quinton Hammond and Malakia Shimhanda

The course track with the fishing and hydrographical stations from Dolphin Head ($26^{\circ}00'S$) to Ambrose Bay ($21^{\circ}00'S$) are shown in Figure 1a. The northward and southward coverage from Ambrose Bay to Cunene River ($17^{\circ}15'S$) are shown in Figures 1b and 1c respectively. As suggested in the previous cruise report, sampling intensity was increased in areas of high fish density, and special sampling efforts were made during darkness in the shallow inshore areas, when fish tend to move offshore and thus become more available for abundance estimates.

All catches were sampled for composition by weight and numbers of each species and the size distribution of commercially important species, using total length, was

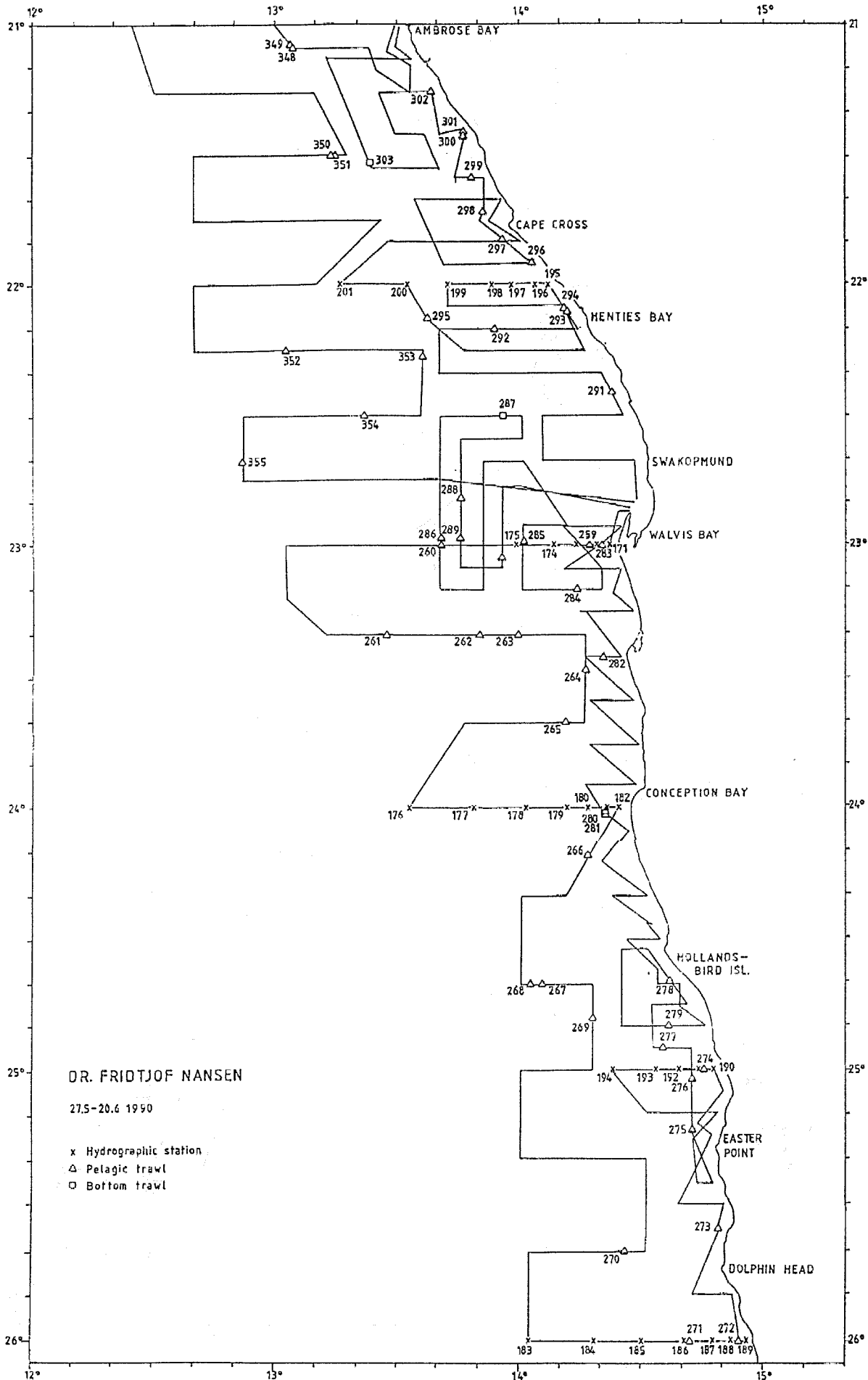


Figure 1. Course track, fishing stations and hydrographic profiles, a: Dolphin Head to Ambrose Bay

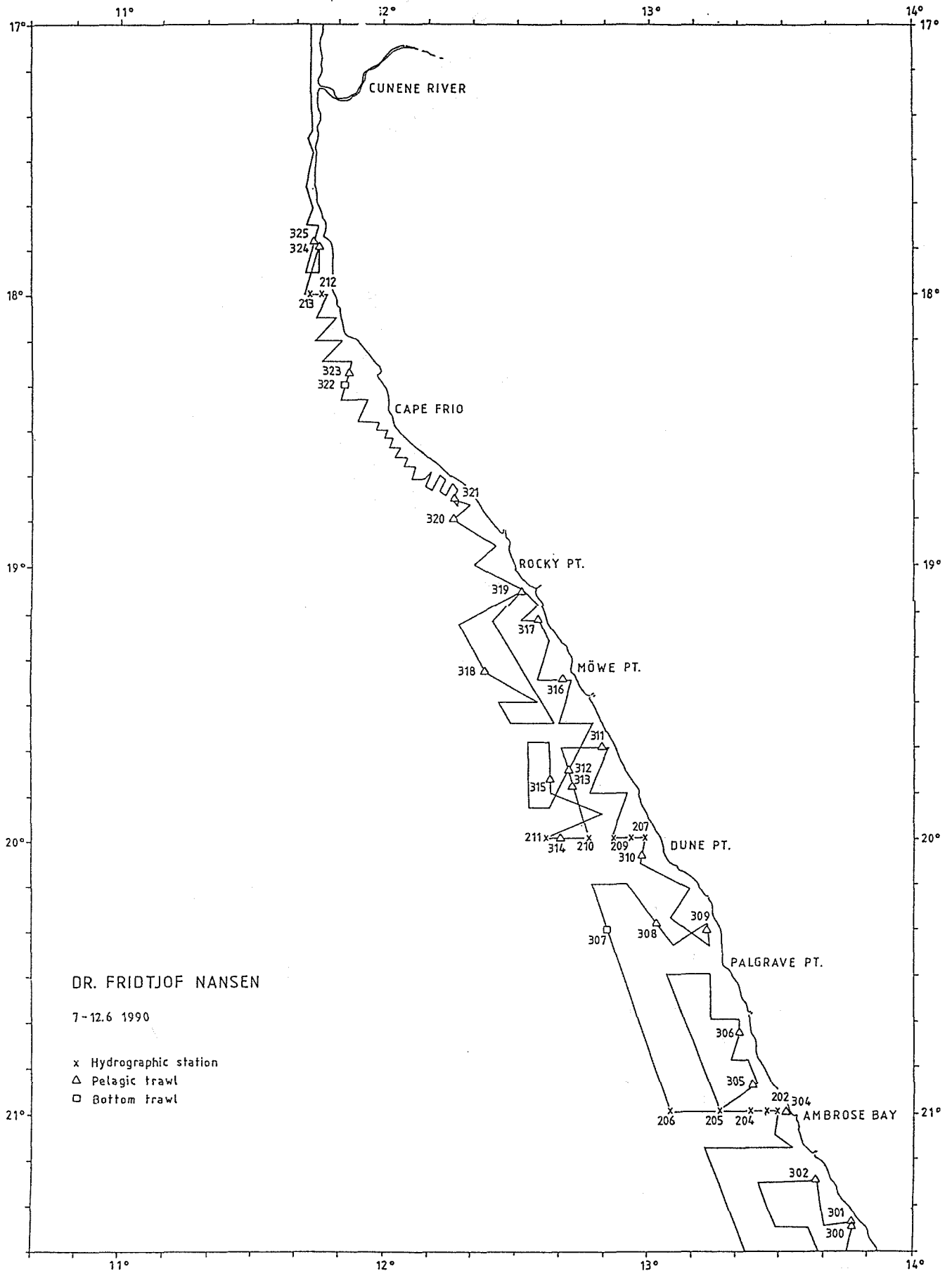


Figure 1b: Ambrose Bay to Cunene River (northwards coverage).

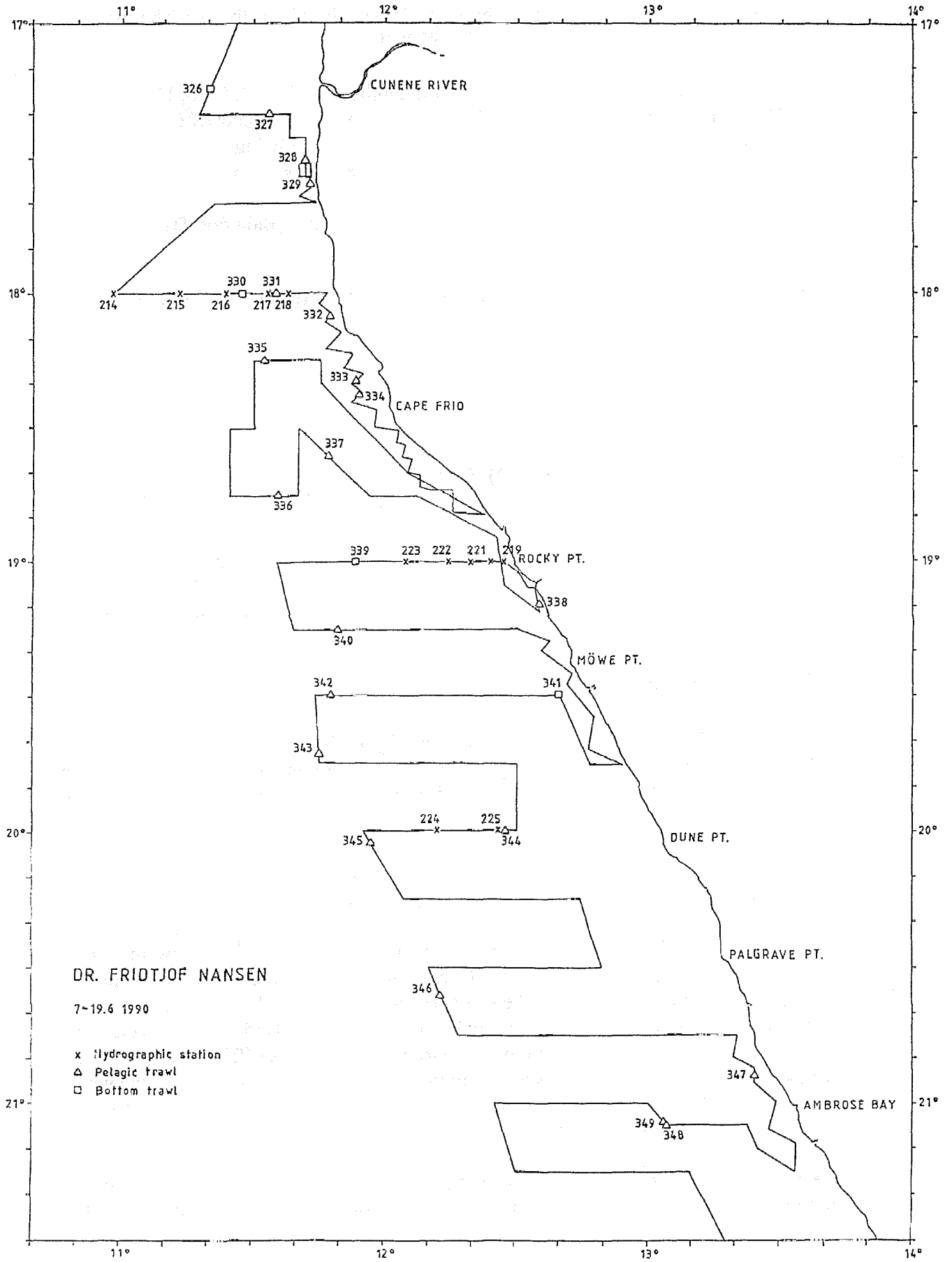


Figure 1c: Ambrose Bay to Cunene River (southwards coverage).

determined. The length frequencies of these species are given in ANNEX I. The complete records of fishing stations are shown in ANNEX II.

Hydrographical data were collected to standard depths at stations 2, 5, 10, 15 and 25 nm from the coast on all full degree lines of latitude between 26°00'S and 18°00'S. On even degree lines further stations were sampled at 35 and 50 nm. Owing to the failure of the thermograph, a continuous record of sea surface temperatures was not obtained.

The acoustic instruments were calibrated in an experiment in Baia dos Tigres, Angola on June 12th.

ANNEX III gives a description of the instruments and the fishing gear used, including the results of the calibration experiment.

CHAPTER 3 THE ENVIRONMENT

3.1 BATHYMETRY

A brief description of the bathymetry of the Namibian continental shelf is given in the first "DR. FRIDTJOF NANSEN" cruise report.

3.2 HYDROGRAPHY

Figures 2a and 2b show the temperature, salinity and oxygen profiles of the nine hydrographic transects worked. The position of the transects are shown in Figures 1a and 1b. The period of hydrographic observations cover almost a month and the data are therefore not synoptic.

The hydrography of the Namibian near-shore region of the continental shelf during this cruise was characterised by its uniformity along the entire coastline.

The sections between Dolphin Head (26°S) and Walvis Bay (23°S) show moderate upwelling from a depth of about 200 m. Temperatures were low close to the shoreline, about 13°C, while further offshore they rose to only 15 or 16°C. The water column was moderately layered, but no strong thermocline occurred. Dissolved oxygen levels were low inshore and near the ocean bed, but rose to 6 ml/l and more offshore. Low oxygen waters were apparently being transported up from 200 m, thus the entire shelf had water with a dissolved oxygen content of below 1 ml/l. Near the surface, water with an oxygen content of more than 5 ml/l extended down to a depth of 50 m.

The section at 22°S showed little indication of upwelling, surface temperatures being relatively high at 16 to 17°C, while at a depth of almost 200 m the temperature was still above 12°C.

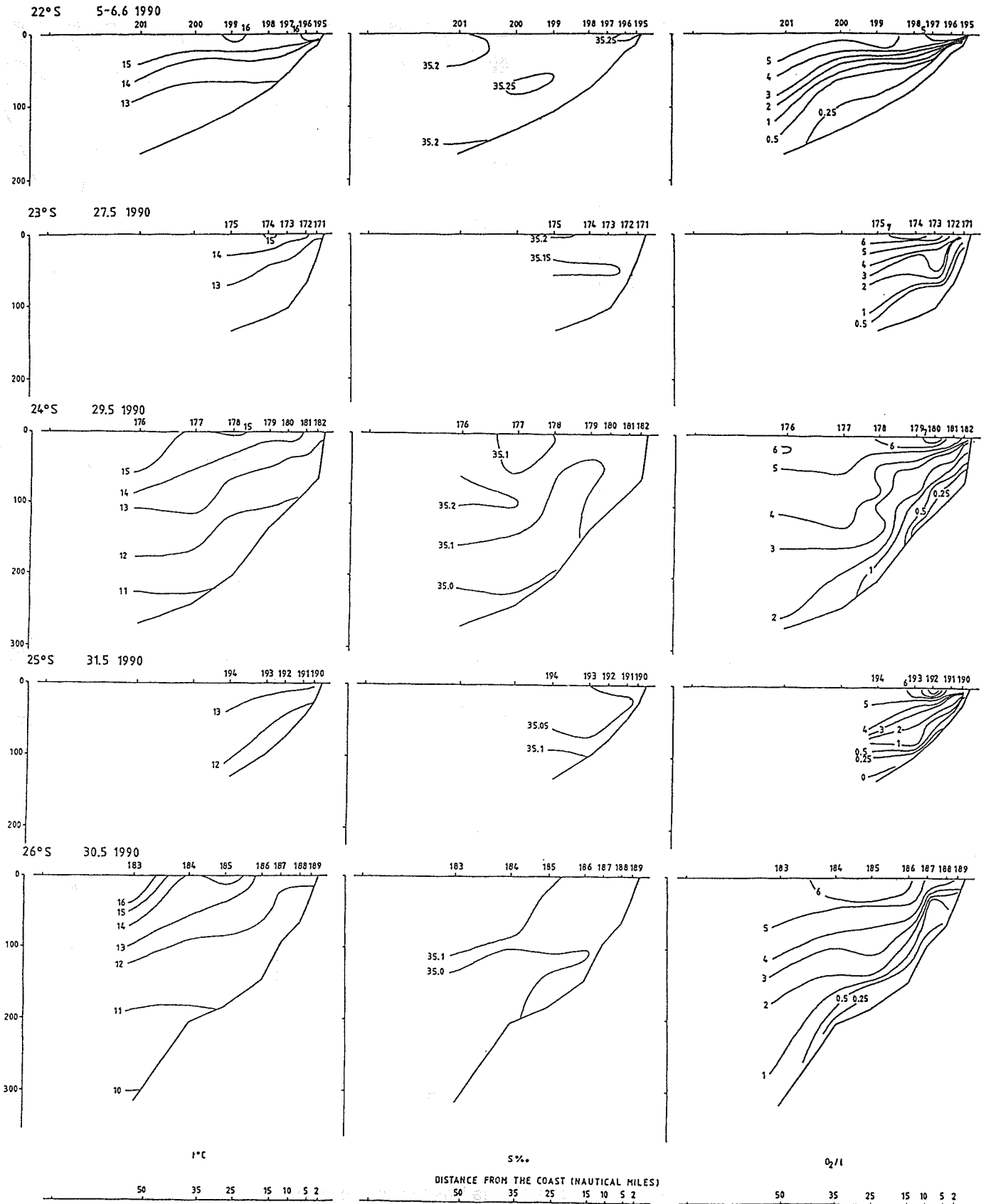


Figure 2. Hydrographic profiles. a: Dolphin Head to Henties Bay.

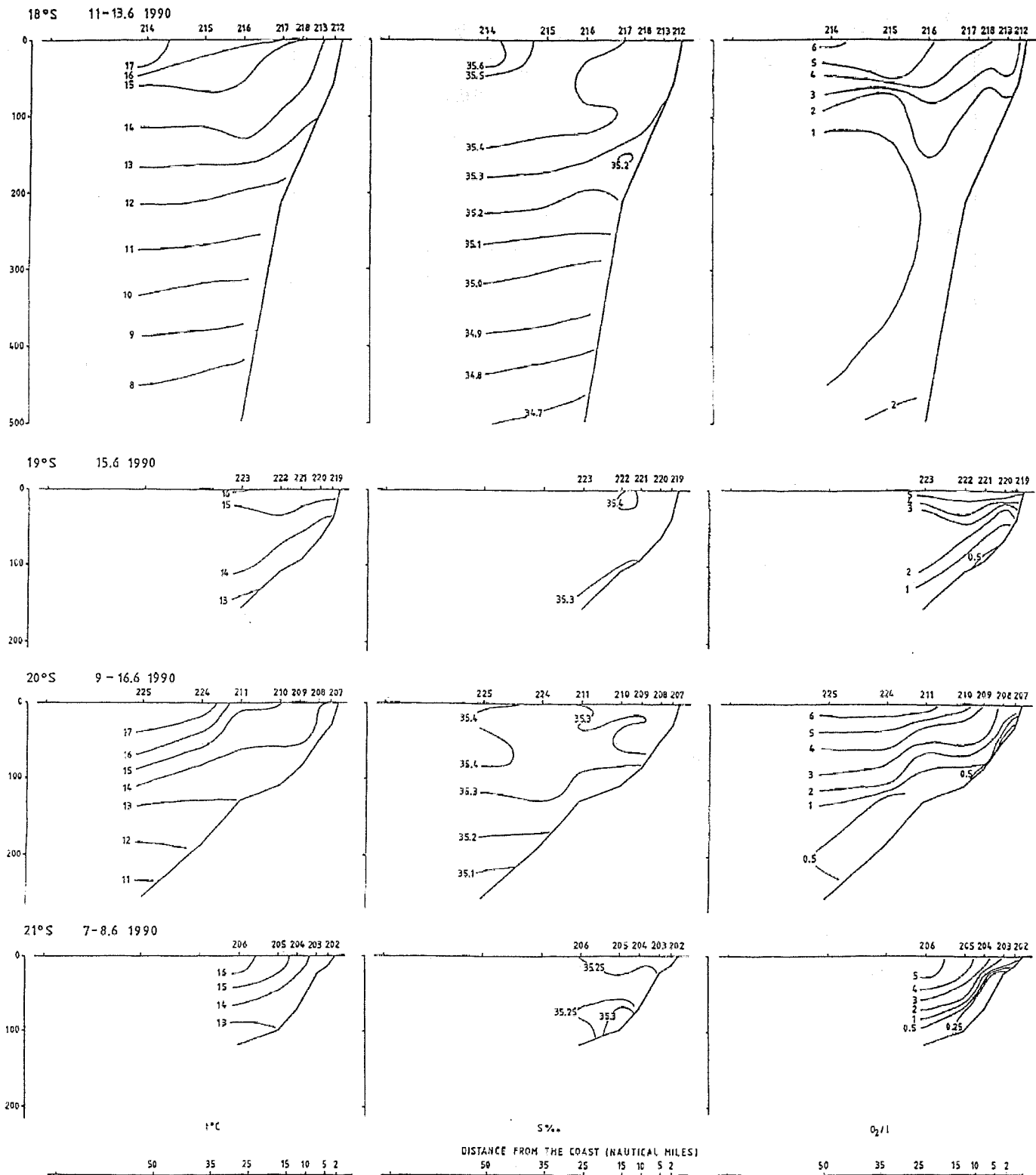


Figure 2b: Ambrose Bay to Cunene River.

The sections from 21°S to 18°S showed slight upwelling with temperatures and oxygen values being very similar to the southern sections.

Salinity levels were, in general, higher in the north rising from 35.0‰ in the southern sections to 35.6‰ at 18°. Within each section the salinity level was virtually homogeneous throughout the water column.

A comparison with the hydrography of the same area taken during the previous cruise, in the summer period, shows that upwelling is now weaker. Surface temperatures are considerably lower, although temperatures below the 100 m isoline are similar. Thus the thermocline is much less at present. Upwelling is usually stronger during the winter period as a result of strong and continuous south-westerly winds. The Namibian coastal region had strong easterly winds prior to, and during, the survey. Hence a reduction in upwelling may have occurred.

CHAPTER 4 DISTRIBUTION AND ABUNDANCE OF PELAGIC FISH

4.1 DISTRIBUTION

The acoustic integration system provided observations of fish densities averaged, usually, over 5nm distances, but in areas of high fish concentrations over 1nm. The unit of acoustic reflection used was 0.1 x m/nm reflecting surface. The integrator values from fish targets were allocated to the following groups on the basis of trawl sampling and characteristic behaviour recognised from the echo recordings:

Pelagic fish type 1: Clupeidae (pilchard and round herring) and Engraulidae (anchovy).

Pelagic fish type 2: Carangidae (horse mackerel).

Non-commercial pelagic fish: myctophids and gobies.

Apart from a moderate swell causing some acoustical interference while surveying pilchard stocks near Cape Frio, the weather was favourable to hydroacoustical surveying. In general the pelagic fish were fairly dispersed, with the exception of some extremely dense shoals of pilchard. There was also some evidence of horse mackerel shoals rising to above the transducer level during night-time. According to observations made by purse seiners, concentrations of fish in waters of less than 15 m deep moved to deeper waters during night-time, thus allowing an acoustical survey to be completed. Sampling of fish was generally successful except for some hauls in the south which were disrupted by high concentrations of jellyfish, while some hauls on pilchard shoals made in daylight resulted in few specimens being caught.

The distribution of clupeids and engraulids are shown in Figure 3, and the distribution of carangids and non-commercial fish species are shown in Figures 4 and 5 respectively. An additional map of pilchard distribution is also given in Figures 6a and 6b. An arbitrary scale was used in the distribution charts to illustrate different levels of concentration.

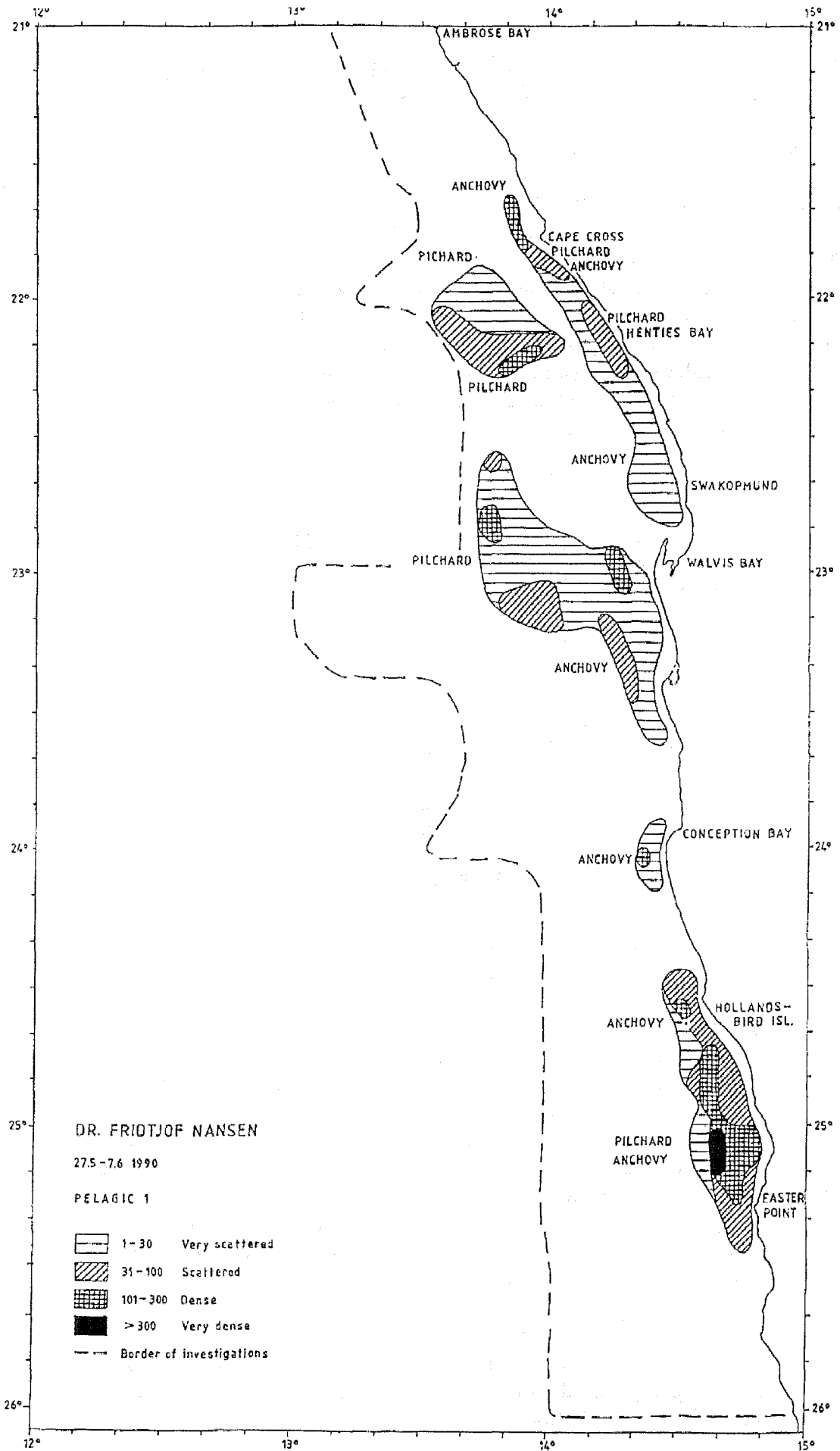


Figure 3. Distribution of pelagic fish type 1, clupeids and anchovy.
a: Dolphin Head to Ambrose Bay.

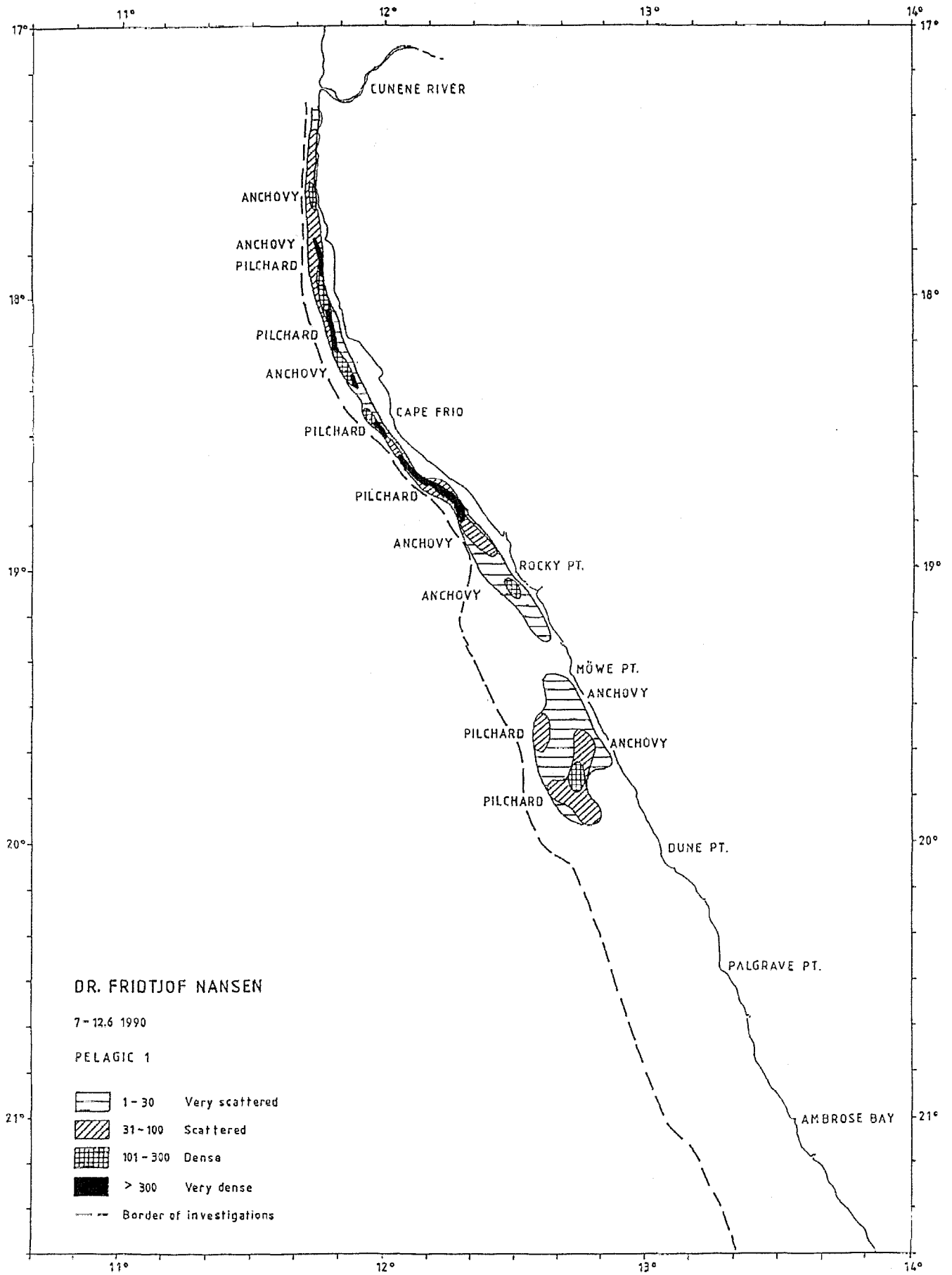


Figure 3b: Ambrose Bay to Cunene River.

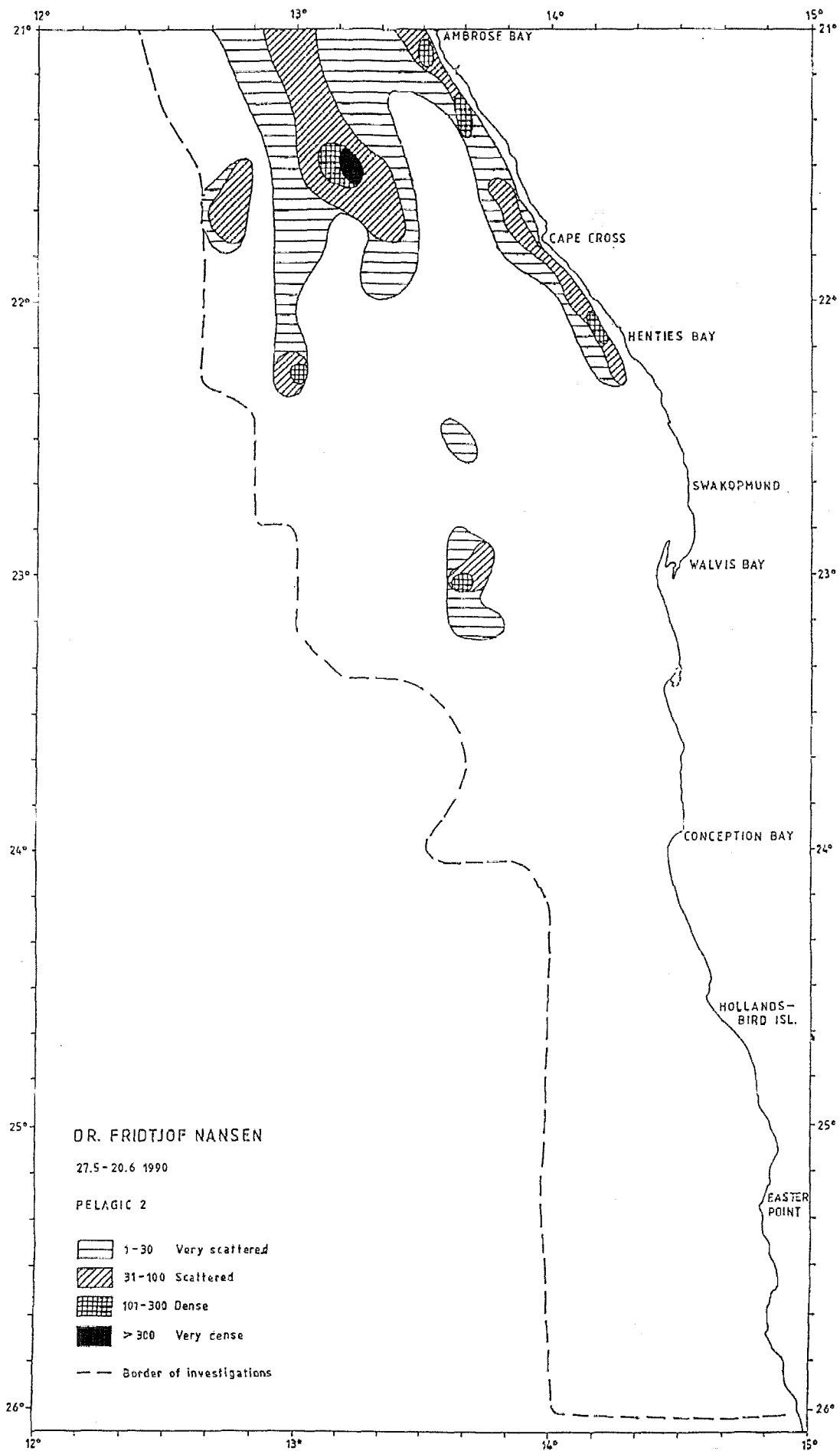


Figure 4. Distribution of pelagic fish type 2, horse mackerel.
a: Dolphin Head to Ambrose Bay

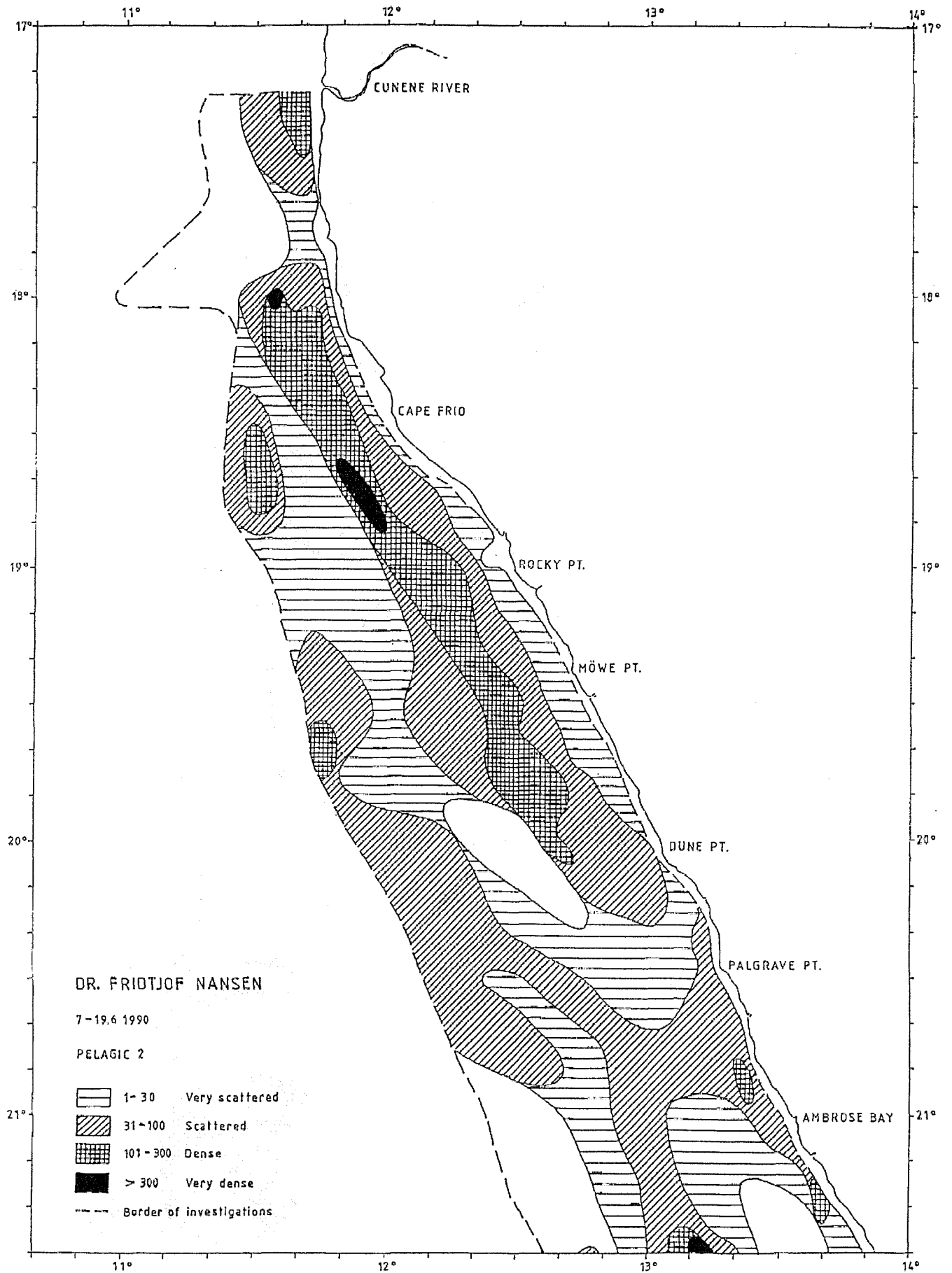


Figure 4b: Ambrose Bay to Cunene River.

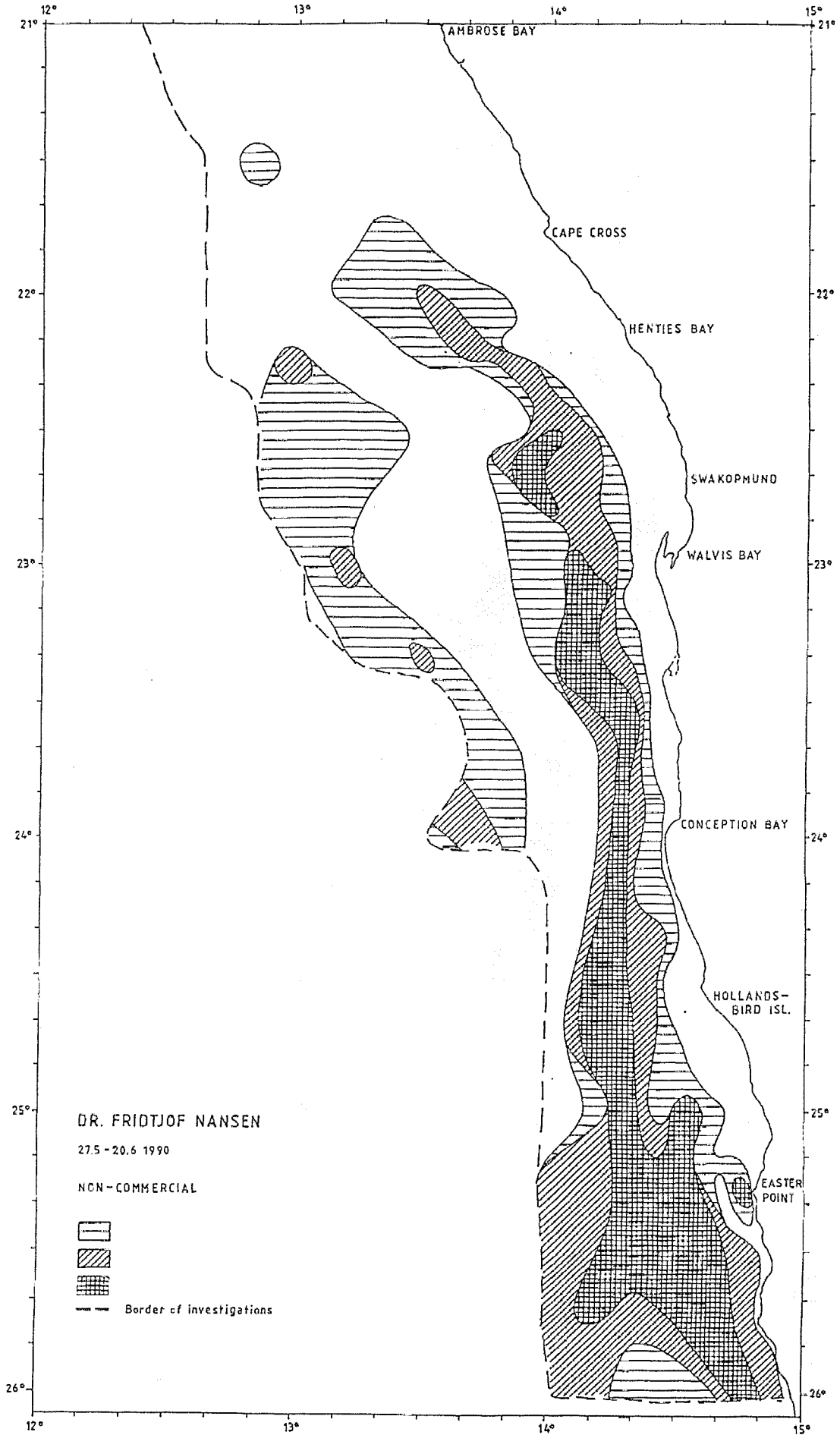


Figure 5. Distribution of non-commercial fish, myctophids and gobies.
 a: Dolphin Head to Ambrose Bay.

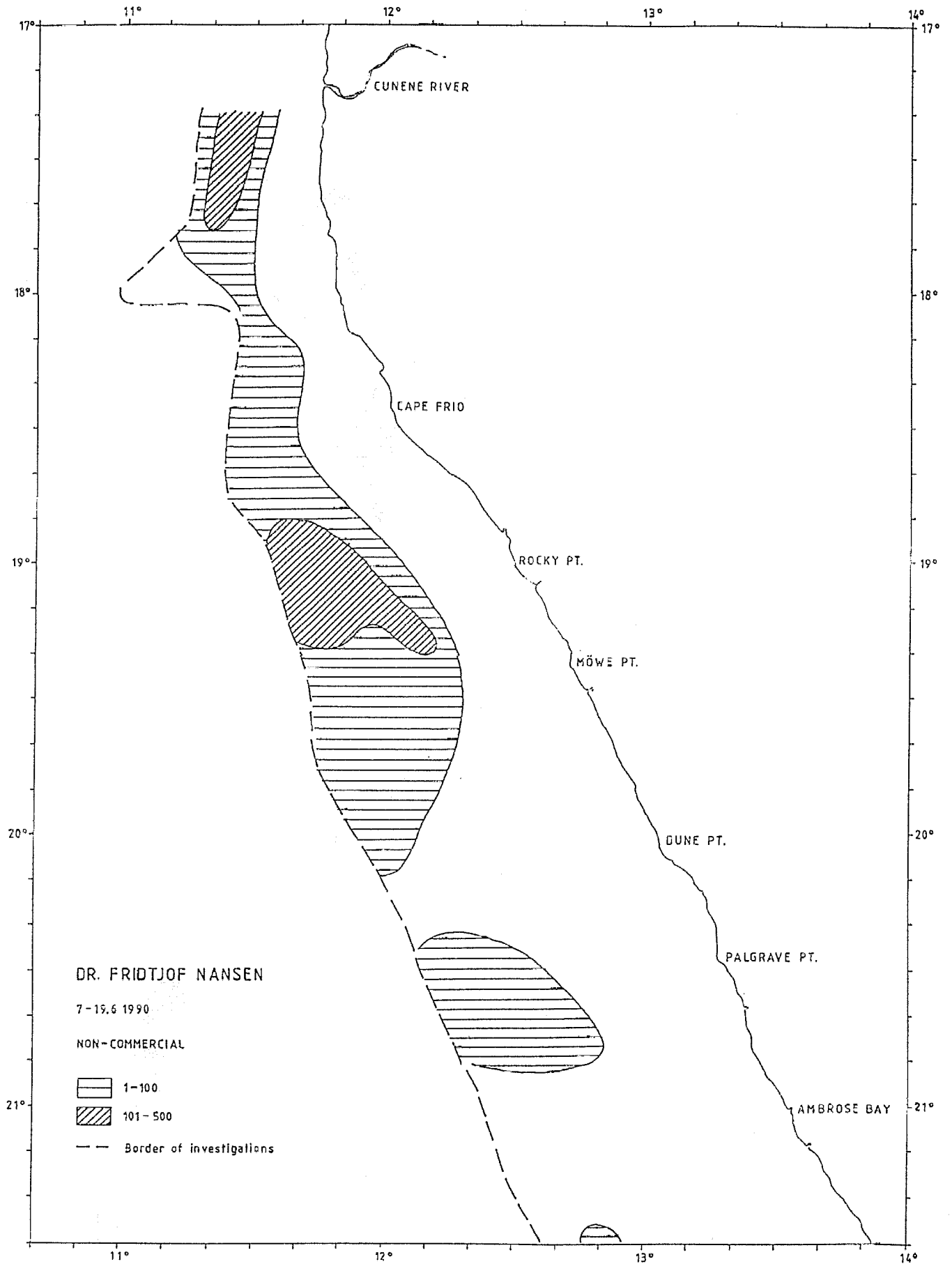


Figure 5b: Ambrose Bay to Cunene River.

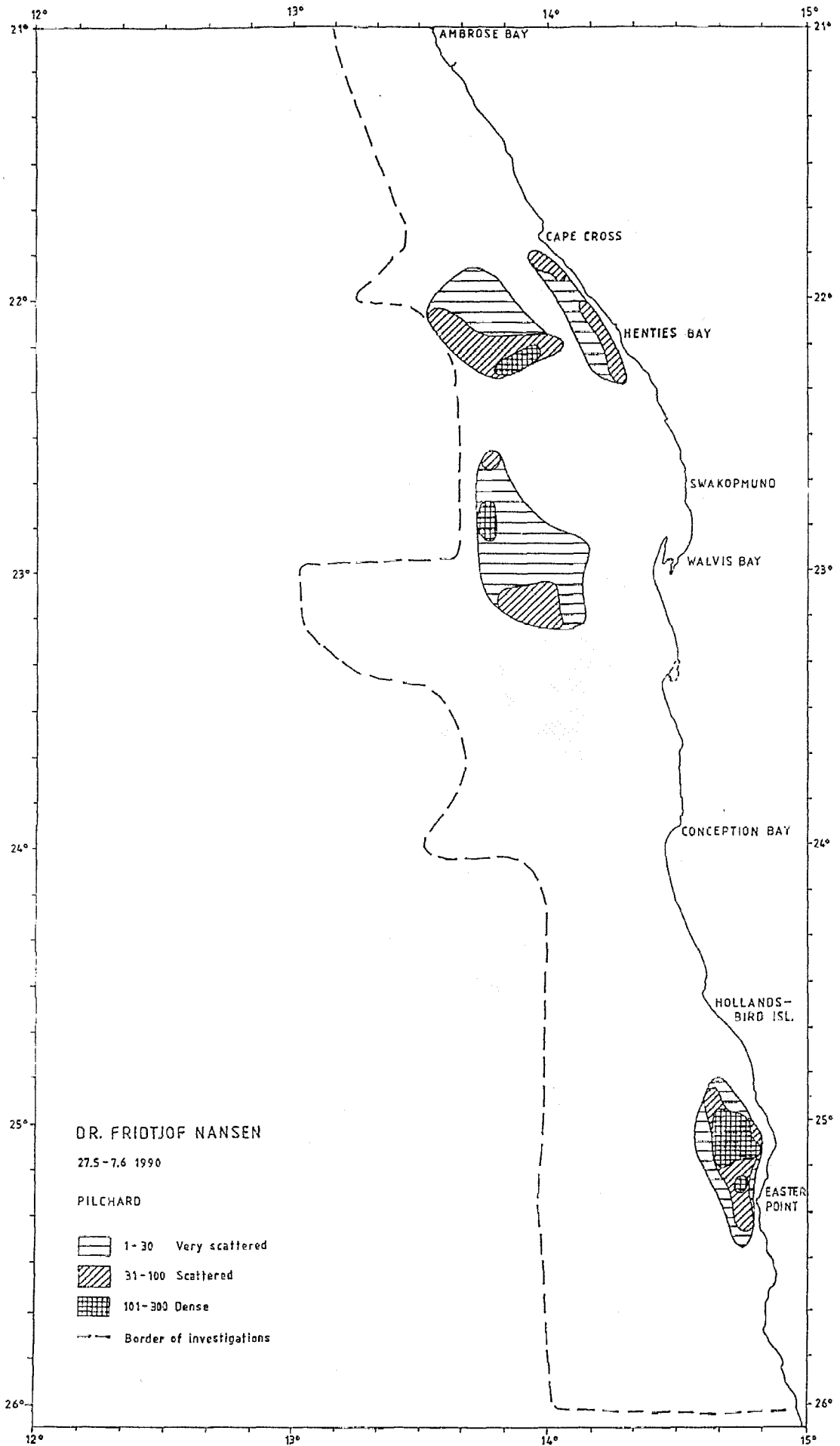


Figure 6: Distribution of pilchard. a: Dolphin Head to Ambrose Bay.

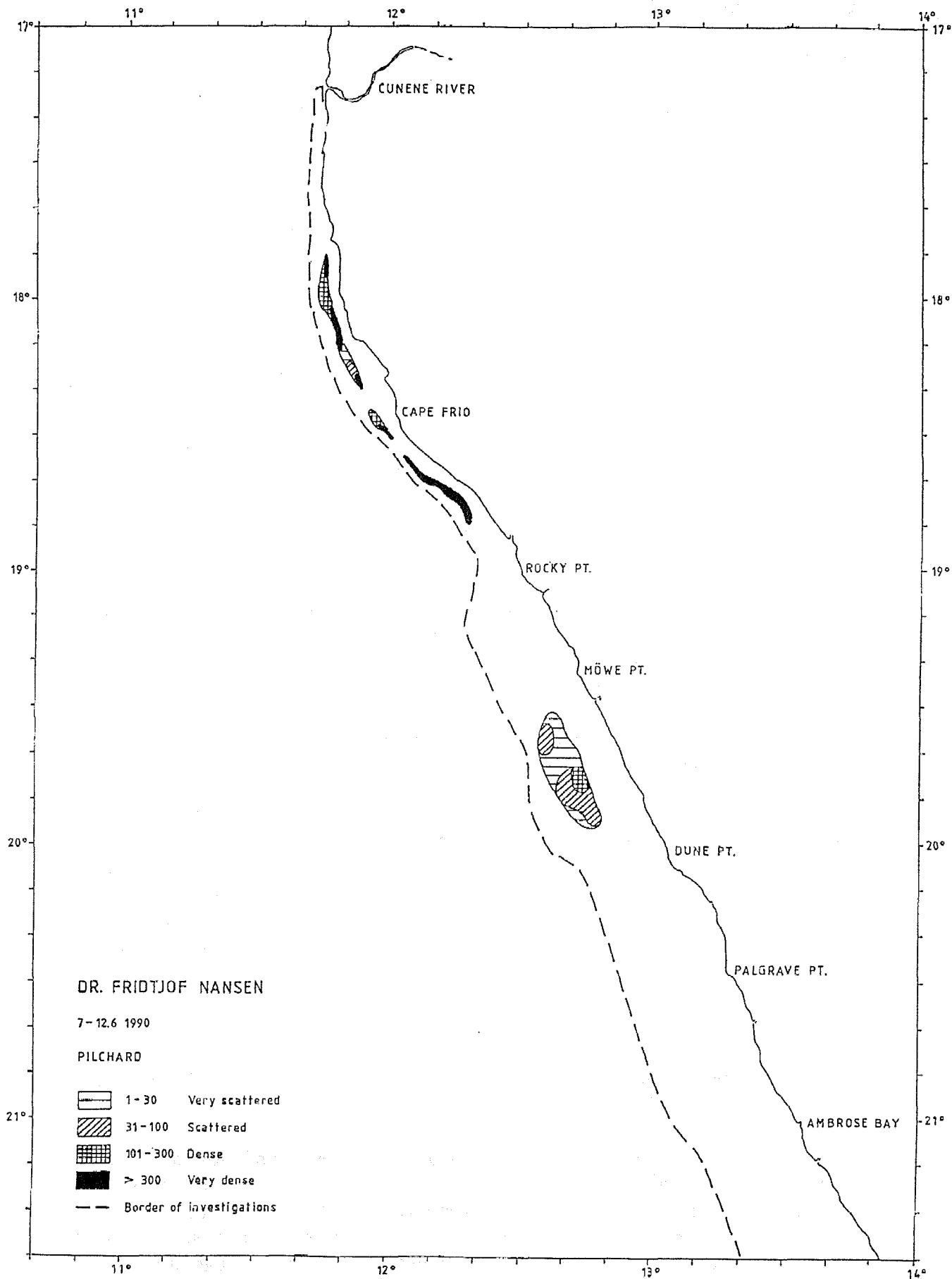


Figure 6b: Ambrose Bay to Cunene River.

4.1.1 Dolphin head to Ambrose Bay

Dolphin Head to Walvis Bay

The inshore area (100 m) was surveyed when steaming northwards, the offshore area (100 m to 400 m) on the way south.

Between 24°25'S and 25°25'S scattered, mixed shoals of pilchard, anchovy and round herring were found from the coast out to a depth of 80 m. While these shoals proved to be almost ideal for acoustic surveying, large concentrations of jellyfish, particularly south of 24°55'S, made the determination of species composition by trawling extremely difficult.

In the southern part of this area fish were, therefore, identified mainly from their acoustical appearances. About 70% of the fish, by integrator values, were in large and dense surface shoals, these were credited to pilchard. The only sample of pilchard collected in this area had a bimodal length frequency distribution, with modal peaks at 11 cm and 18 cm. Fewer jellyfish occurred north of 25°00'S and the fish in this area were identified, according to trawled samples, as round herring and anchovy.

A small concentration of fish, mainly represented by one dense shoal of anchovy, occurred off Conception Bay.

South of 23°30'S few pelagic fish were found in waters deeper than 60 m, although a very small concentration of anchovy juveniles, with a modal size 6 cm, occurred offshore of Conception Bay. Some horse mackerel were found in deep waters off Pelican Point. These were relatively large with a modal size range from 20 to 27 cm.

Mixed shoals of anchovy and round herring were found in an extensive area inshore of the 60 m bottom depth from 23°40'S to north of Walvis Bay.

Offshore of Walvis Bay and Swakopmund, in waters of 120 m to 150m deep, scattered shoals of pilchard occurred. These shoals tended to become more dispersed during the night period. The acoustic assessments made during this period, were considered more reliable than those made in the daytime and were, therefore, used for the abundance estimate. Once again, large amounts of jellyfish made sampling difficult, although not to such an extent as farther south. The length frequency distribution showed 90% of the pilchard, by number, being between 21 and 23 cm long.

Walvis Bay to Ambrose Bay

The inshore area was surveyed on the way north and the offshore region when returning south one week later.

Small amounts of pilchard, anchovy and round herring were found close to the shore from south of Swakopmund to north of Cape Cross, the northern part of this fish becoming quite dense. Dispersed horse mackerel were found along the entire coast north of 22°15'S to Ambrose Bay, also becoming denser in the north. These shoals moved offshore to between 20 m and 30 m during the night period, thus enabling good acoustical records to be made.

Dispersed fish and a few dense shoals were recorded between Henties Bay and Cape Cross in 60 m to 100 m depths. The dispersed fish was identified as horse mackerel, the shoals as pilchard. The pilchard had a similar length frequency distribution to those sampled in similar water depths off Walvis Bay suggesting that these two areas may have formed a continuous distribution. Owing to the scattered nature of the pilchard shoals several transects may have failed to detect any shoals giving the impression of a break in distribution between these two areas. On the return, one week later, the outer parts of this area was surveyed again and pilchard were found here. This may, however, have been fish which had moved into the area in the meantime (Figures 3a and 4a).

Large amounts of the pelagic goby was found throughout the entire area as far north as Cape Cross, mainly in water depths of 50 m to 150 m. Lantern fish were found in waters deeper than 250 m (Figure 5a).

4.1.2 Ambrose Bay to Cunene River

The distribution of pelagic fish in this area is shown in Figures 3b, 4b and 5b. The offshore area was surveyed while returning south, whereas the inshore area was covered continuously on the way north and partly repeated on the return.

During the northwards survey a large gap in the distribution of clupeids and anchovy occurred between 21°40'S and 20°00'S. North of Dune Point pelagic shoals were found in waters shallower than 40 m forming an almost continuous band to the Cunene River. Shoals with a mixed species composition were found close to the shore between Dune Point and Möwe Bay, while further offshore the shoals were solely pilchard. Some anchovy was found near Rocky Point. Scattered shoals of anchovy were found from 18°00' northwards, almost to the Cunene.

Very dense shoals of pilchard occurred north of Rocky Point from 18°50'S to 18°25'S in a continuous narrow belt from the 20 m water depth to about 40 m (Figure 6b). In addition to being very dense, these shoals often extended from the surface to the seabed and covered an area sometimes more than 1 nm in width.

The pilchard distribution continued along the coast, but shoals were much smaller further north, although several dense and large shoals were found near 18°00'S. The area between 18°25'S and 18°00'S was surveyed during the day, while the area 18°25'S to 18°50'S was covered during darkness. Following the calibration exercise in Angola, this region was surveyed for a second time, when the entire area was surveyed at night - (see Figure 1c). The shoals in the north were successfully surveyed, but further south no fish were found, despite searching as far south as Möwe Bay. Several days later purse seiners reported finding large amounts of pilchard inside the reef at Cape Frio, even during the night period. Therefore it is assumed that the second survey of this area was not successful due to the distribution of fish being in shallow waters and thus outside the range of the survey.

All the pilchard shoals sampled in this region had bimodal length frequency distributions, with modal peaks at 17-18 cm and 22-23 cm. The frequency of larger fish increased towards the north.

An extensive layer of horse mackerel was found west of the 60 m bottom depth (Figure 4b). These fish exhibited a marked behaviour of rising to the surface at sunset and returning to the seabed the following daybreak. The horse mackerel became particularly dense north of Dune Point to 18°00'S between bottom depths of 100 and 200 m. The size distribution of horse mackerel tended to be larger in deeper waters than inshore. In waters less than 100 m deep the horse mackerel had a bimodal size distribution with a small number of fish in the 9 to 11 cm range and most being 13 to 16 cm long. Samples collected in waters of 100 to 200 m deep had a single modal peak between 14 and 16 cm. In the offshore waters, more than 200 m deep, the horse mackerel had a bimodal length frequency. Again the 15 to 17 cm range was dominant, but a second modal peak between 19 and 21 cm also occurred.

Lantern fish were found in an extensive area in waters deeper than 250 m. Pelagic goby were not found in any large concentration north of Cape Cross (Figure 5b).

4.2 ABUNDANCE

The estimates are based on the acoustic integration technique, similar to that used in previous assessments of the same stocks. The survey coverage was assessed as being ample with increased sampling in areas of high density. The North Sea herring target strength ($TS=20 \log L-71.2$) was used for pilchard, anchovy and round herring. The target strength used for the horse mackerel estimate is discussed below.

The biomass estimates for the clupeids and anchovy are shown in Table 1, while the estimates for horse mackerel are in Table 2. The estimate for the clupeids and anchovy are based on the northwards coverage only.

4.2.1 Pilchard

The "DR. FRIDTJOF NANSEN" survey undertaken earlier this year reported a pilchard biomass of 235 000 t. The present increased biomass figure of 750 000 t is thought to be due to the inclusion of the large amount of pilchard in the area around Cape Frio. This concentration has largely been absent from earlier surveys, probably due to its behaviour of shoaling very densely in shallow waters and thus avoiding detection as was the case when this area was surveyed for the second time during this cruise. The increase in the biomass estimate compared to previous estimates is, therefore, not regarded as a recovery of the stock, but merely as an improved survey coverage of pilchard distribution, especially between 18°00'S and 19°00'S where some 60% of the total pilchard stock biomass was found.

	Dolphin Head- Ambrose Bay	Ambrose Bay- Cunene River	Total
Pilchard	265 000	485 000	750 000
Mixed	115 000	70 000	185 000

4.2.2 Anchovy and round herring

Owing to the mixed shoaling behaviour of these two species it is not possible to report their biomasses separately. The anchovy stock was estimated as being 215 000 t during the first "DR. FRIDTJOF NANSEN" survey, also including some round herring. Thus the present findings of 185 000 t agrees well with this figure, lying within the limits of the accuracy of acoustic biomass estimates.

4.2.3 Horse mackerel

Owing to the uncertainty of the most appropriate horse mackerel target strength to be used during acoustic biomass estimation, a biomass range is presented. This range corresponds to the values of target strength for the North Sea Herring and the TS proposed by Svellingen for horse mackerel. See previous cruise report. Table 2 shows the estimates by areas.

The previous biomass estimate made by the "DR. FRIDTJOF NANSEN" indicated a total biomass of 1.40 to 2.70 million tonnes depending on which TS-value is used. The present survey estimate for the southern region (Dolphin Head to Ambrose Bay) of 0.40 - 0.75 million tonnes is slightly lower than the previous one (0.66 - 1.20 million tonnes), whereas the estimate for the northern region of 1.60 - 3.00 million tonnes is double the previous stock estimate (0.78 - 1.5 million tonnes). This increase is partly due to the coverage of a larger part of the distribution area of horse mackerel during the present survey. It may also indicate a slight increase in the stock size, particularly as small number of recruits were caught during the present survey, which were absent earlier in the year. It should be noted that neither survey has extended to the western border of the horse mackerel distribution.

Table 2. Biomass estimates of Cape horse mackerel. Range corresponds to different assumptions regarding target strength (million tonnes).		
Dolphin Head- Ambrose Bay	Ambrose Bay- Cunene River	Total
0.40 - 0.75	1.60 - 3.00	2.0 - 3.75

CHAPTER 5 CONCLUDING REMARKS

In general, the pelagic fish stocks in Namibian waters are suited to biomass determination by acoustic methods. Some difficulties were, however, encountered during the present survey which may have affected the results presented above.

In the southern region large concentrations of jellyfish hampered determination of species composition by trawl catches, and the allocation of the integrator values had to

be based on characteristics in shoaling behaviour. This problem may have caused errors in the determination of species composition of mixed shoals of small pilchard, anchovy and round herring. Shoals of large pilchard, however, which counted for the main biomass contribution in the southern region, have a very characteristic acoustic appearance and their identification is thus regarded as reliable.

Areas with a few, large and widely scattered shoals, such as the pilchard distribution offshore of Walvis Bay and Henties Bay, require a narrow-spaced grid in order to be properly surveyed. Because of time constraints this was not always possible, but the observations of the commercial purse seiners helped in producing the stock distribution map of these areas. In general, commercial fishing boats are ideally equipped for distribution mapping of shoaling fish.

Large concentrations of fish may occur in waters of less than 15 m depth. Purse seiners, with a shallower draught than the "DR. FRIDTJOF NANSEN", were used to map the fish distribution in these shallow waters, thus enabling the "DR. FRIDTJOF NANSEN" to survey the inshore area when the fish had moved to deeper waters. The advantage of an assisting fishing boat under such circumstances became particularly evident during the second survey of pilchard at Cape Frio when a large fraction of the stock was not found. From later reports of purse seiners, it became evident that these fish were in shallow waters on the shore side of a reef.

It is recommended that further pelagic surveys in this region should make full use of the local fishing vessels for distributional mapping and surveying shallow waters.

In general, the horse mackerel were well dispersed and ideally suited to biomass determination by acoustic methods. The identification of shoals of horse mackerel mixed with myctophids was occasionally difficult, thus some error may have been incurred. Also some horse mackerel were seen rising through the water column at sunset only to disappear shortly after. Horse mackerel were, moreover, recorded at the outer end of many of the survey lines in the north. Thus the biomass figures reported for pelagic horse mackerel should be considered as the lower limit.

Pilchard stocks were found in discrete areas. Shoals were very dense and, within these areas, were occasionally widely scattered.

The biomass estimate of 750 000 t is considerably higher than those reported from acoustic surveys in later years by the Sea Fisheries Institute of Cape Town, the highest of which was 200-250 000 t in June-July 1988. It is uncertain to which extent the higher level of the present estimate is caused by the special efforts made during this survey to cover inshore shallow water areas of pilchard distribution with the assistance of auxiliary vessels. It seems very likely that this is the main reason for the difference between the "DR. FRIDTJOF NANSEN" estimates of March and June this year.

Anyway the higher present biomass estimate implies that the current catch levels bears a reasonable relationship to the stock biomass.

Size sampling of the pilchard catches showed that adult fish of the age group 2+, the 1987/88 yearclass (and perhaps higher groups) dominated the present stock. The 1+ group could be identified especially between Ambrose Bay and Cunene, but this

yearclass (1988/89) is far less abundant. The relatively high abundance of the 1987/88 yearclass observed in this survey conforms with the experience of an unusual predominance of middle sized fish during the 1989 fishing season.

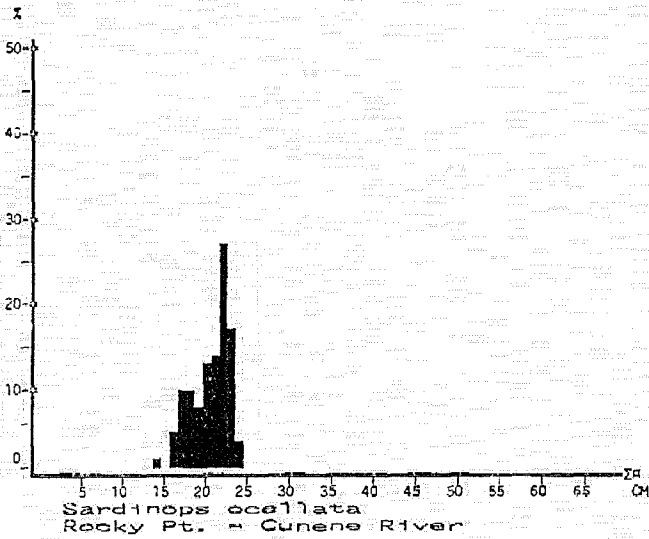
Juvenile 0-group fish was virtually absent from the samples of the present survey. This is a matter for concern, unless this seasons recruitment is delayed due to late spawning. The observations indicate that the 1988/89 yearclass is poor. The outlook for further growth of the stock in the next coming years is thus not good unless an abundant group is recruited later this season. It is therefore recommended that major policy changes regarding the management of the stock should not be taken until additional information on the state of the stock has been obtained.

Anchovy stocks were dispersed throughout the inshore region and were nowhere abundant. Few juvenile anchovy were found. In this situation it is recommended that fishing on anchovy should be limited as far as possible in order to preserve the spawning component of the stock.

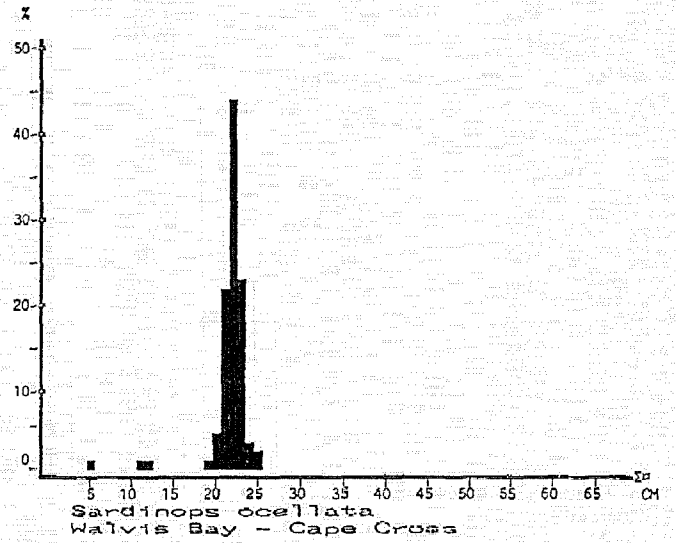
Pelagic horse mackerel stocks were, compared to pilchard and anchovy, very large. These stocks were widely distributed north of Walvis. Almost all the horse mackerel surveyed were of a single year-class (immature). No juvenile or mature adults were found. The state of this stock would allow substantial catches to be taken.

Large stocks of gobies were found from Cape Cross southwards, mainly inshore of 150 m deep. Lantern fish were found in waters deeper than 250 m, particularly north of Dune Point.

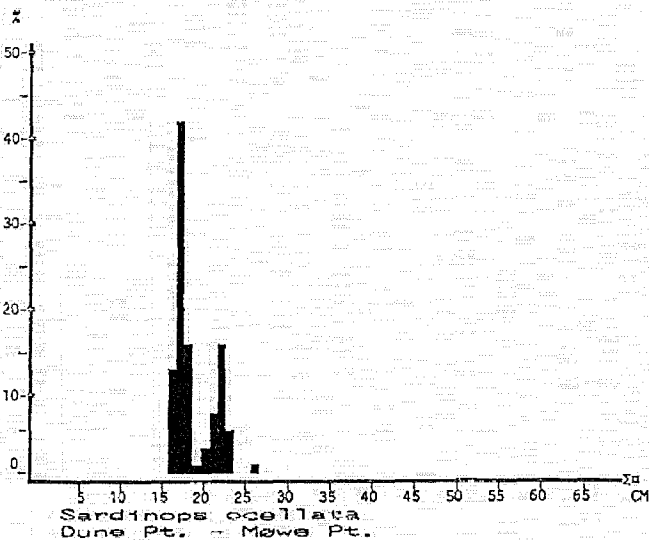
ANNEX I. SIZE COMPOSITIONS OF MAIN SPECIES



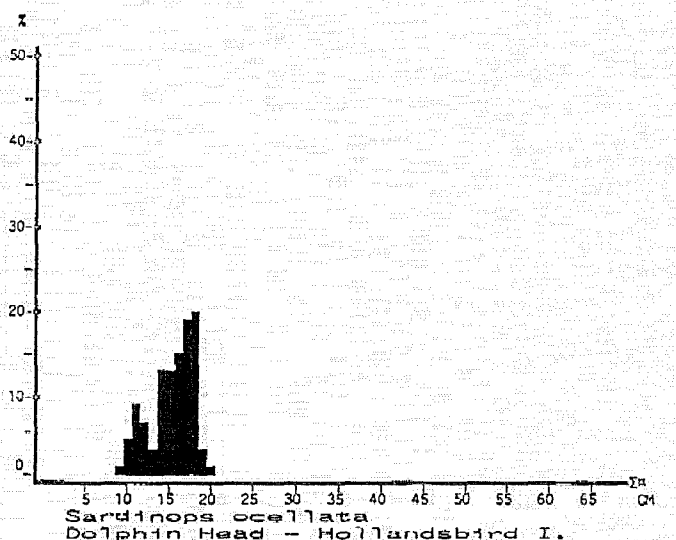
Pooled sample (simple adding)
MEAN LENGTH = 23.49cm N= 458
NUMBER OF SUBSAMPLES : 8



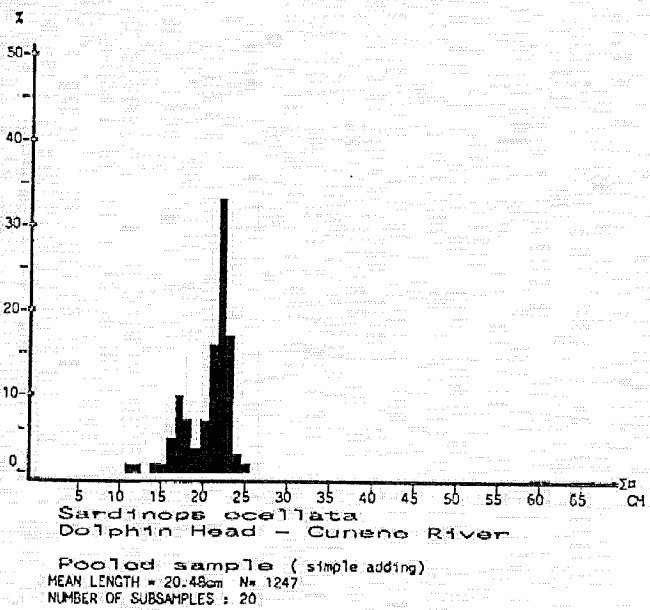
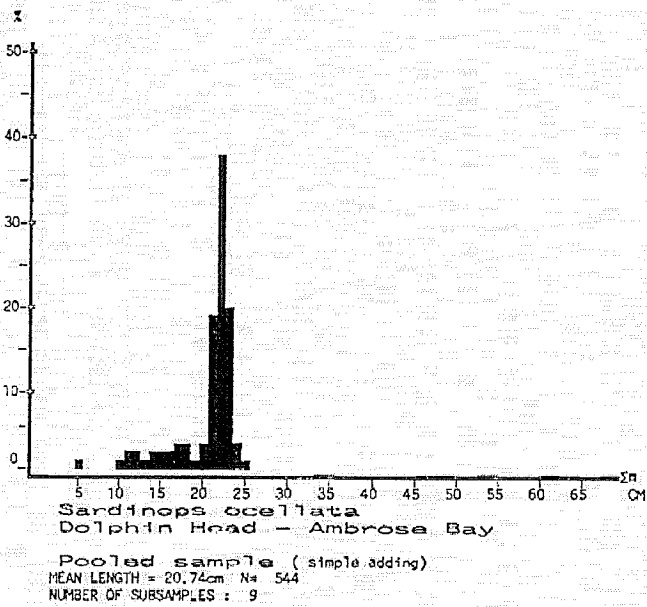
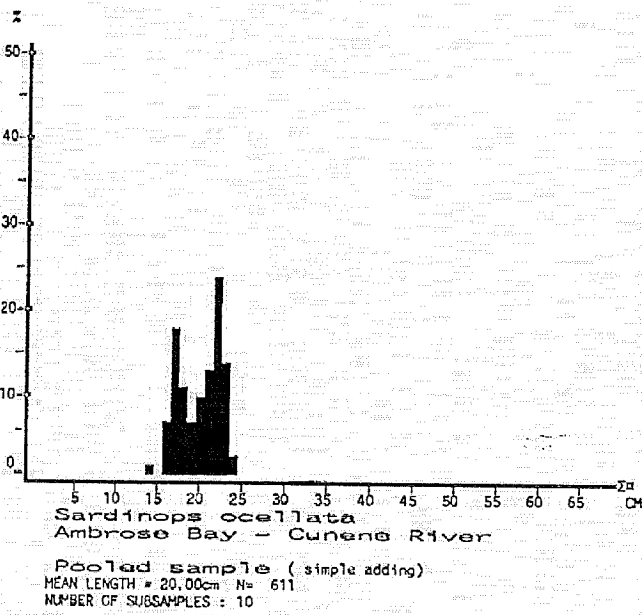
Pooled sample (simple adding)
MEAN LENGTH = 21.65cm N= 466
NUMBER OF SUBSAMPLES : 8

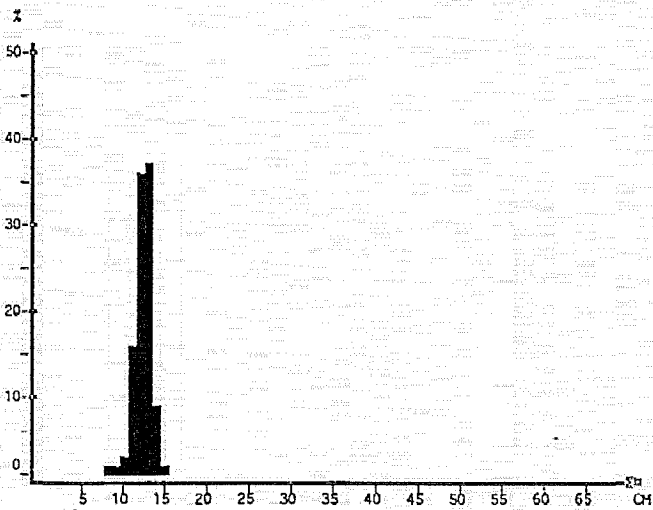


Pooled sample (simple adding)
MEAN LENGTH = 18.50cm N= 153
NUMBER OF SUBSAMPLES : 2

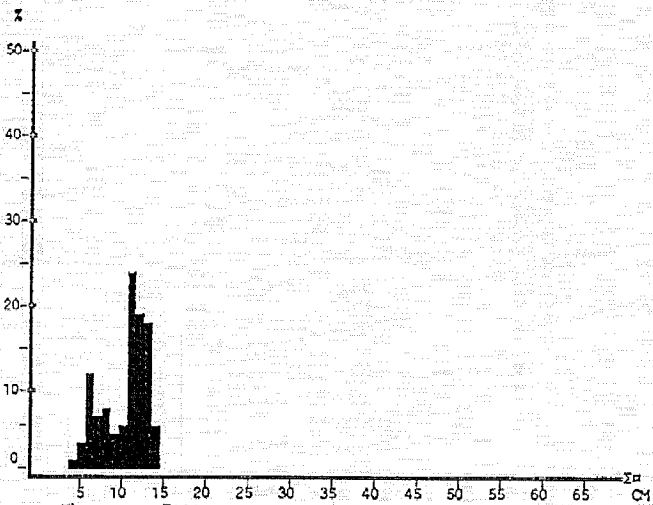


Pooled sample (simple adding)
MEAN LENGTH = 15.31cm N= 78
NUMBER OF SUBSAMPLES : 1

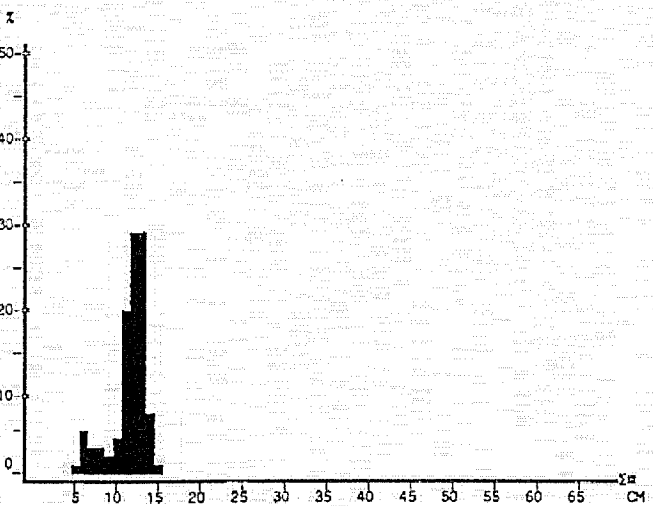




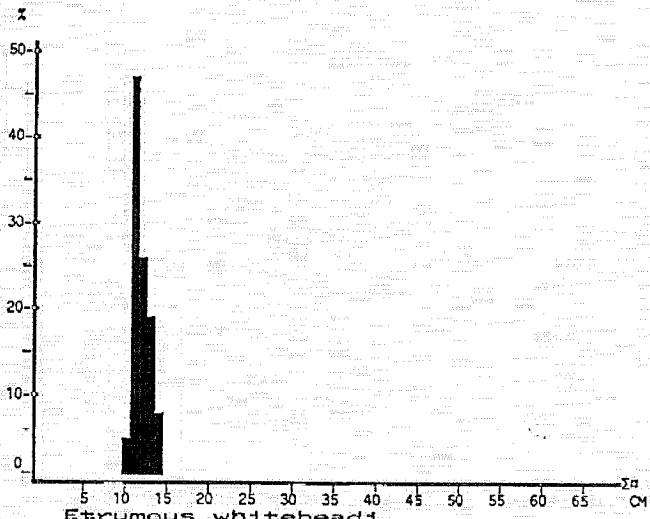
Pooled sample (simple adding)
MEAN LENGTH = 12.28cm N = 964
NUMBER OF SUBSAMPLES : 12



Pooled sample (simple adding)
MEAN LENGTH = 10.27cm N = 744
NUMBER OF SUBSAMPLES : 9

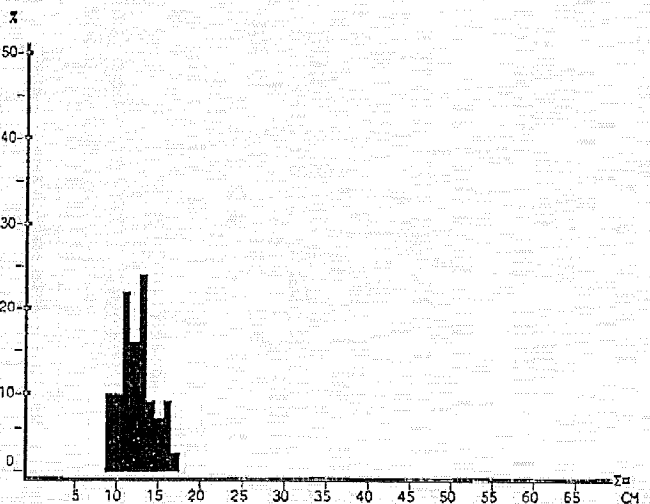


Pooled sample (simple adding)
MEAN LENGTH = 11.40cm N = 1708
NUMBER OF SUBSAMPLES : 21



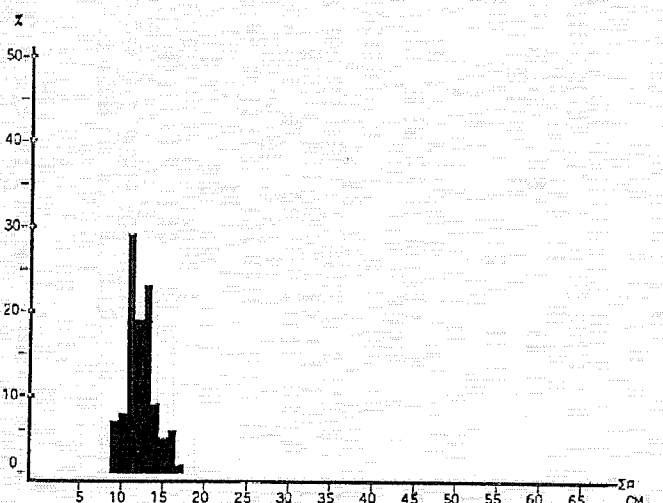
Etrumeus whiteheadi
Ambrose Bay - Cunene River

Pooled sample (simple adding)
MEAN LENGTH = 11.78cm N= 240
NUMBER OF SUBSAMPLES : 5



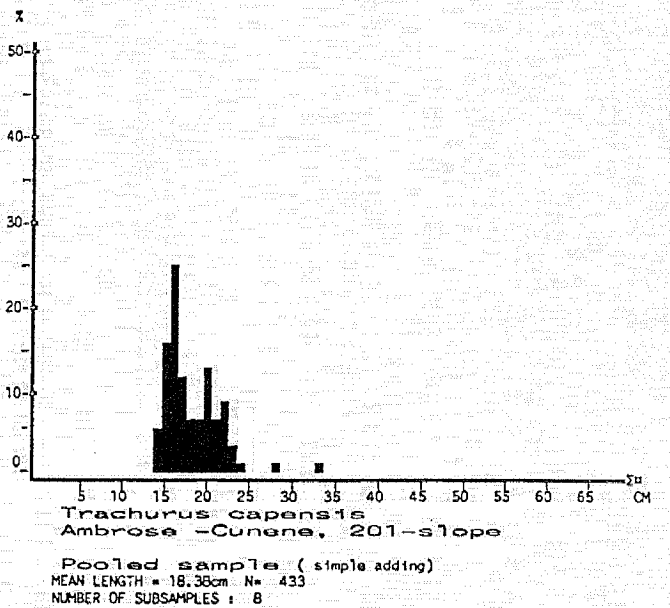
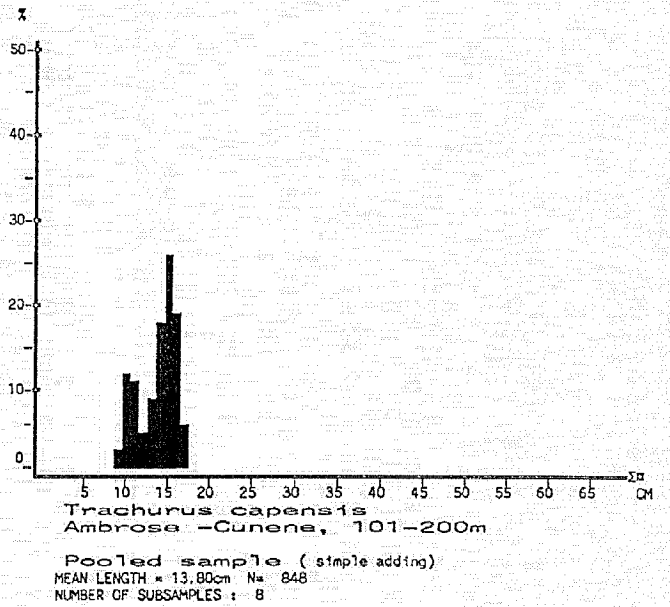
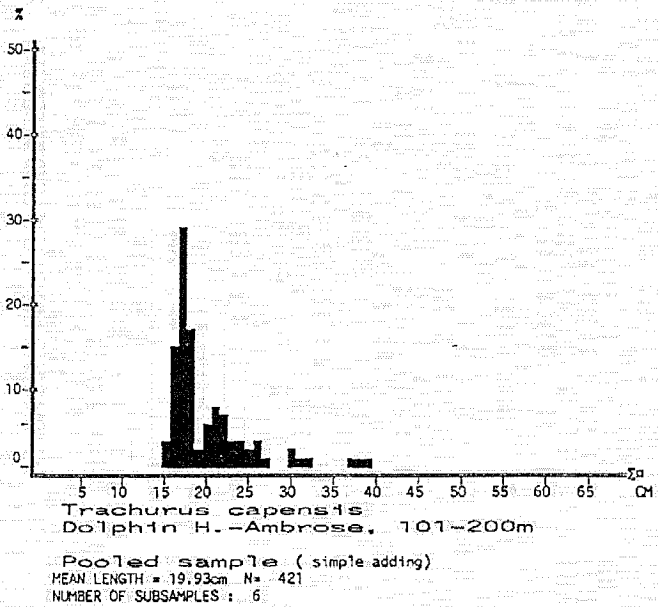
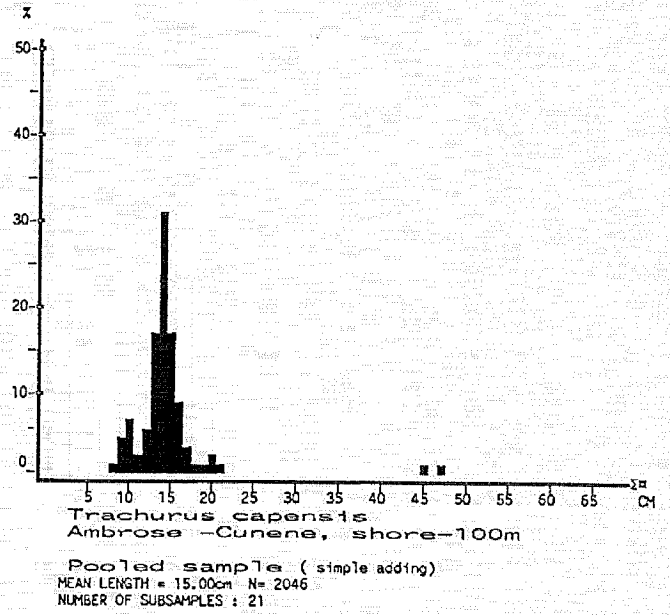
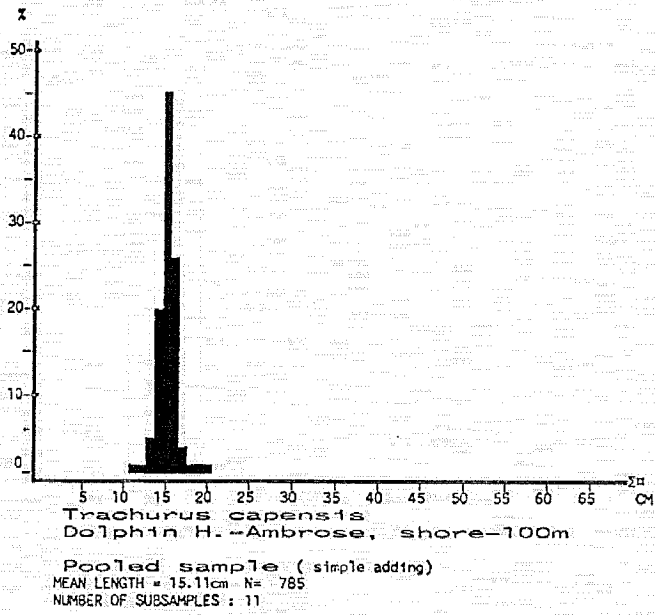
Etrumeus whiteheadi
Dolphin Head - Ambrose Bay

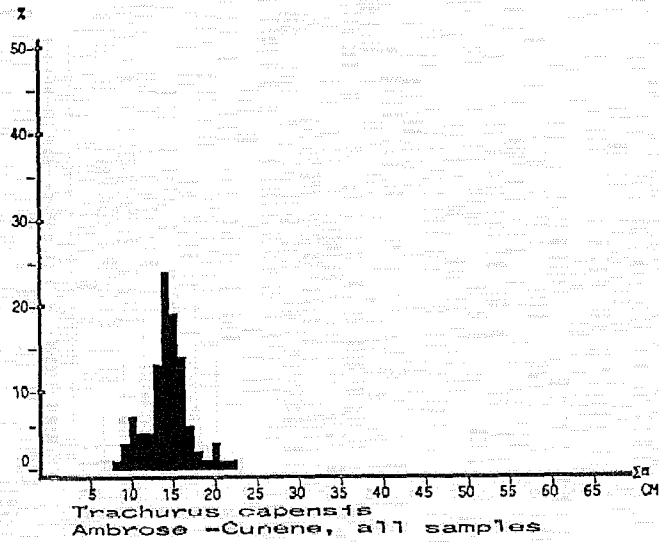
Pooled sample (simple adding)
MEAN LENGTH = 12.29cm N= 583
NUMBER OF SUBSAMPLES : 7



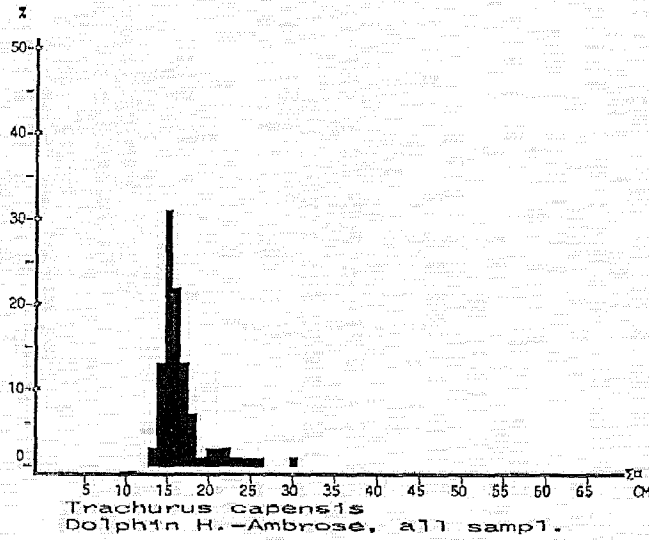
Etrumeus whiteheadi
Dolphin Head - Cunene River

Pooled sample (simple adding)
MEAN LENGTH = 12.14cm N= 823
NUMBER OF SUBSAMPLES : 12

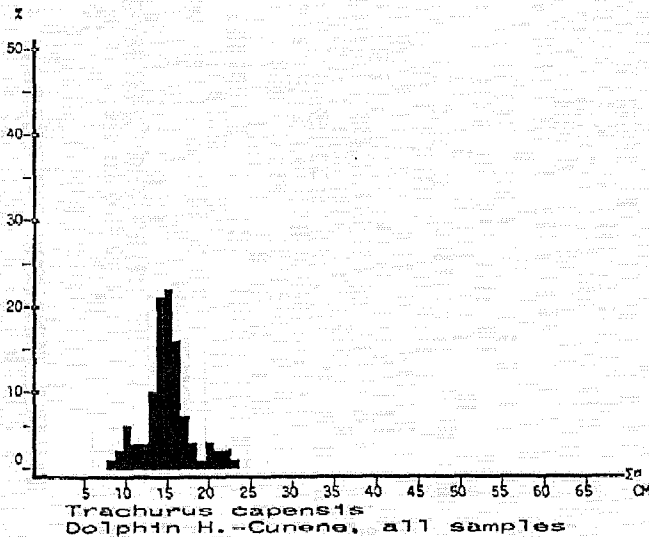




Pooled sample (simple adding)
 MEAN LENGTH = 15.13cm N= 3327
 NUMBER OF SUBSAMPLES : 37



Pooled sample (simple adding)
 MEAN LENGTH = 16.79cm N= 1206
 NUMBER OF SUBSAMPLES : 17



Pooled sample (simple adding)
 MEAN LENGTH = 15.58cm N= 4533
 NUMBER OF SUBSAMPLES : 54

ANNEX II. RECORDS OF FISHING STATIONS

PROJECT STATION: 259
 DATE: 27/ 5/90 GEAR TYPE: PT No:6 POSITION: Lat S 2259 Long E 1416
 start stop duration
 TIME :20:50:00 21:00:00 10 (min) Purpose code: 1
 LOG :8469.40 8470.00 0.60 Area code : 2
 FDEPTH: 30 30 GearCond.code: 1
 BDEPTH: 90 87 Validity code:
 Towing dir: 70° Wire out: 100 m Speed: 29 kn*10
 Sorted: 30 Kg Total catch: 30.60 CATCH/HOUR: 183.60

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP.NO.
Sufflogobius bibarbatu	180.00		98.04	
Chelidonichthys capensis	1.20	6	0.65	
Merluccius capensis juveniles	1.20	30	0.65	
Trachurus capensis	1.20	42	0.65	
Total	183.60		99.99	

PROJECT STATION: 265
 DATE: 28/ 5/90 GEAR TYPE: PT No:5 POSITION: Lat S 2340 Long E 1411
 start stop duration
 TIME :22:17:00 22:31:00 14 (min) Purpose code: 1
 LOG :8660.90 8681.50 0.60 Area code : 2
 FDEPTH: 5 5 GearCond.code: 1
 BDEPTH: 137 133 Validity code:
 Towing dir: 90° Wire out: 150 m Speed: 29 kn*10
 Sorted: Kg Total catch: 2.43 CATCH/HOUR: 10.41

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP.NO.
Engraulis capensis	8.57	2229	82.32	2
Merluccius capensis juveniles	0.90	30	9.51	
Stenopus hutchingsi	0.64	73	6.15	
Sufflogobius bibarbatu	0.21	13	2.02	
Total	10.41		100.00	

PROJECT STATION: 260
 DATE: 28/ 5/90 GEAR TYPE: PT No:6 POSITION: Lat S 2259 Long E 1339
 start stop duration
 TIME :02:26:00 02:56:00 30 (min) Purpose code: 1
 LOG :8511.00 8512.50 1.50 Area code : 2
 FDEPTH: 100 120 GearCond.code: 2
 BDEPTH: 146 148 Validity code: 4
 Towing dir: 90° Wire out: 300 m Speed: 30 kn*10
 Sorted: 4 Kg Total catch: 44.50 CATCH/HOUR: 89.00

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP.NO.
Chelidonichthys capensis	57.60	192	64.72	
Trachurus capensis	11.40	82	12.81	1
Thyrsites atun	9.60	2	10.79	
Merluccius capensis juveniles	8.00	288	8.99	
Lophius upsicephalus	2.40	8	2.70	
Total	89.00		100.01	

PROJECT STATION: 266
 DATE: 29/ 5/90 GEAR TYPE: PT No:6 POSITION: Lat S 2411 Long E 1416
 start stop duration
 TIME :11:55:00 12:05:00 10 (min) Purpose code: 1
 LOG :8793.00 8793.30 0.30 Area code : 2
 FDEPTH: 40 40 GearCond.code:
 BDEPTH: 111 111 Validity code:
 Towing dir: 30° Wire out: 150 m Speed: 30 kn*10
 Sorted: 7 Kg Total catch: 7.40 CATCH/HOUR: 44.40

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP.NO.
Thyrsites atun	24.00	6	54.05	
Sufflogobius bibarbatu	18.00		40.54	
Chelidonichthys capensis	1.20	6	2.70	
Trachurus capensis	1.20	12	2.70	
Total	44.40		99.99	

PROJECT STATION: 261
 DATE: 28/ 5/90 GEAR TYPE: PT No:6 POSITION: Lat S 2320 Long E 1327
 start stop duration
 TIME :11:27:00 11:37:00 10 (min) Purpose code: 1
 LOG :8595.00 8595.40 0.40 Area code : 2
 FDEPTH: 235 225 GearCond.code:
 BDEPTH: 250 254 Validity code:
 Towing dir: 360° Wire out: 500 m Speed: 24 kn*10
 Sorted: 157 Kg Total catch: 157.40 CATCH/HOUR: 944.40

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP.NO.
MYCTOPHIDAE	420.00		44.47	
Zu elongatus	395.40	168	41.87	
Brama brama	120.00	84	12.71	
Merluccius capensis	9.00	42	0.95	
Total	944.40		100.00	

PROJECT STATION: 267
 DATE: 29/ 5/90 GEAR TYPE: PT No:6 POSITION: Lat S 2440 Long E 1406
 start stop duration
 TIME :17:41:00 17:54:00 13 (min) Purpose code: 1
 LOG :8846.00 8846.60 0.60 Area code : 2
 FDEPTH: 70 40 GearCond.code:
 BDEPTH: 157 157 Validity code:
 Towing dir: 270° Wire out: 150 m Speed: 30 kn*10
 Sorted: Kg Total catch: 11.00 CATCH/HOUR: 50.77

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP.NO.
Sufflogobius bibarbatu	50.77	29091	100.00	3
Total	50.77		100.00	

PROJECT STATION: 262
 DATE: 28/ 5/90 GEAR TYPE: PT No:5 POSITION: Lat S 2320 Long E 1350
 start stop duration
 TIME :14:33:00 14:43:00 10 (min) Purpose code: 1
 LOG :8619.30 8619.70 0.40 Area code : 2
 FDEPTH: 0 0 GearCond.code:
 BDEPTH: 157 159 Validity code:
 Towing dir: 90° Wire out: 150 m Speed: 30 kn*10
 Sorted: Kg Total catch: CATCH/HOUR:

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP.NO.
N O C A T C H	0.00			
Total				

PROJECT STATION: 268
 DATE: 29/ 5/90 GEAR TYPE: PT No:6 POSITION: Lat S 2440 Long E 1402
 start stop duration
 TIME :18:32:00 18:42:00 10 (min) Purpose code: 1
 LOG :8847.60 8848.00 0.40 Area code : 2
 FDEPTH: 40 40 GearCond.code:
 BDEPTH: 157 157 Validity code:
 Towing dir: 270° Wire out: 150 m Speed: 28 kn*10
 Sorted: Kg Total catch: CATCH/HOUR:

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP.NO.
N O C A T C H	0.00			
Total				

PROJECT STATION: 263
 DATE: 28/ 5/90 GEAR TYPE: PT No:6 POSITION: Lat S 2330 Long E 1359
 start stop duration
 TIME :16:12:00 16:42:00 30 (min) Purpose code: 1
 LOG :8630.30 8631.80 1.50 Area code : 2
 FDEPTH: 80 100 GearCond.code: 8
 BDEPTH: 150 150 Validity code: 4
 Towing dir: 270° Wire out: 250 m Speed: 30 kn*10
 Sorted: Kg Total catch: CATCH/HOUR:

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP.NO.
N O C A T C H	0.00			
Total				

PROJECT STATION: 269
 DATE: 29/ 5/90 GEAR TYPE: PT No:5 POSITION: Lat S 2449 Long E 1418
 start stop duration
 TIME :21:33:00 21:43:00 10 (min) Purpose code: 1
 LOG :8873.50 8874.00 0.50 Area code : 2
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 133 132 Validity code:
 Towing dir: 360° Wire out: 150 m Speed: 26 kn*10
 Sorted: Kg Total catch: CATCH/HOUR:

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP.NO.
N O C A T C H	0.00			
Total				

PROJECT STATION: 264
 DATE: 28/ 5/90 GEAR TYPE: PT No:5 POSITION: Lat S 2328 Long E 1416
 start stop duration
 TIME :19:53:00 20:03:00 10 (min) Purpose code: 1
 LOG :8660.60 8661.00 0.40 Area code : 2
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 104 104 Validity code:
 Towing dir: 360° Wire out: 150 m Speed: 30 kn*10
 Sorted: Kg Total catch: 1.20 CATCH/HOUR: 7.20

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP.NO.
Sufflogobius bibarbatu	6.00		83.33	
Merluccius capensis juveniles	1.20	30	16.67	
Total	7.20		100.00	

PROJECT STATION: 270
 DATE: 30/ 5/90 GEAR TYPE: PT No:6 POSITION: Lat S 2540 Long E 1426
 start stop duration
 TIME :08:40:00 08:50:00 10 (min) Purpose code: 1
 LOG :8983.00 8983.60 0.60 Area code : 1
 FDEPTH: 30 30 GearCond.code:
 BDEPTH: 163 161 Validity code:
 Towing dir: 90° Wire out: 100 m Speed: 35 kn*10
 Sorted: Kg Total catch: 25.00 CATCH/HOUR: 150.00

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP.NO.
MYCTOPHIDAE	150.00	150000	100.00	4
Total	150.00		100.00	

PROJECT STATION: 271
 DATE: 30/ 5/90 GEAR TYPE: PT No:6 POSITION: Lat S 2500 Long E 1442
 start stop duration
 TIME :19:24:00 19:45:00 21 (min) Purpose code: 1
 LOG :9072.90 9073.90 1.00 Area code : 1
 FDEPTH: 22 60 GearCond.code:
 BDEPTH: 140 129 Validity code:
 Towing dir: 90° Wire out: 100 m Speed: 35 kn*10
 Sorted: Kg Total catch: 90.05 CATCH/HOUR: 257.29

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP.NO.
Sufflogobius bibarbatu	145.71	2569	56.63	5
Thyrsites atun	15.71	90	25.54	
MYCTOPHIDAE	37.14	11066	14.44	6
Merluccius capensis	8.71	211	3.39	7
Total	207.27		100.00	

PROJECT STATION: 272
 DATE: 30/ 5/90 GEAR TYPE: PT No:6 POSITION: Lat S 2601 Long E 1434
 start stop duration
 TIME :22:40:00 22:50:00 10 (min) Purpose code: 1
 LOG :9089.70 9090.30 0.60 Area code : 1
 FDEPTH: 15 15 GearCond.code:
 BDEPTH: 50 50 Validity code:
 Towing dir: 360° Wire out: 75 m Speed: 33 kn*10
 Sorted: Kg Total catch: 25.80 CATCH/HOUR: 154.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Chelidonichthys capensis	108.00	444	69.77	
Thyrsites atun	19.80	6	12.79	
Sufflogobius bibarbatatus	18.00	1680	11.83	
Etrumeus whiteheadi	6.00	342	3.88	
Trachurus capensis	3.00	48	1.94	
Total	154.80		100.01	

PROJECT STATION: 279
 DATE: 1/ 6/90 GEAR TYPE: PT No:6 POSITION: Lat S 2450 Long E 1437
 start stop duration
 TIME :09:29:00 09:36:00 7 (min) Purpose code: 1
 LOG :9382.60 9382.90 0.30 Area code : 2
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 61 62 Validity code:
 Towing dir: 270° Wire out: 150 m Speed: 30 kn*10
 Sorted: 2 Kg Total catch: 20.80 CATCH/HOUR: 178.29

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Engraulis capensis	96.00	6651	53.84	14
Etrumeus whiteheadi	75.43	6926	42.31	15
Trachurus capensis	6.86	69	3.85	
Total	178.29		100.00	

PROJECT STATION: 273
 DATE: 31/ 5/90 GEAR TYPE: PT No:5 POSITION: Lat S 2536 Long E 1449
 start stop duration
 TIME :02:50:00 03:00:00 10 (min) Purpose code: 1
 LOG :9126.60 9127.00 0.40 Area code : 1
 FDEPTH: 5 5 GearCond.code: 8
 BDEPTH: 43 33 Validity code: 9
 Towing dir: 7° Wire out: 150 m Speed: 30 kn*10
 Sorted: Kg Total catch: CATCH/HOUR:

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
N O C A T C H	0.00			
Total				

PROJECT STATION: 280
 DATE: 1/ 6/90 GEAR TYPE: PT No:6 POSITION: Lat S 2401 Long E 1421
 start stop duration
 TIME :21:50:00 21:56:00 6 (min) Purpose code: 1
 LOG :9495.10 9495.40 0.30 Area code : 2
 FDEPTH: 12 12 GearCond.code:
 BDEPTH: 83 80 Validity code:
 Towing dir: 135° Wire out: 75 m Speed: 30 kn*10
 Sorted: Kg Total catch: 1.40 CATCH/HOUR: 14.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Sufflogobius bibarbatatus	5.00	900	35.71	
Engraulis capensis	5.00	350	35.71	
Trachurus capensis	2.50	50	17.86	
Etrumeus whiteheadi	1.50	100	10.71	
Total	14.00		99.99	

PROJECT STATION: 274
 DATE: 31/ 5/90 GEAR TYPE: PT No:6 POSITION: Lat S 2500 Long E 1445
 start stop duration
 TIME :09:03:00 09:13:00 10 (min) Purpose code: 1
 LOG :9180.70 9181.20 0.50 Area code : 1
 FDEPTH: 15 15 GearCond.code: 8
 BDEPTH: 39 37 Validity code:
 Towing dir: 58° Wire out: 75 m Speed: 36 kn*10
 Sorted: 10 Kg Total catch: 87.42 CATCH/HOUR: 524.52

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Sardinops ocellata	254.40	4032	48.50	9
Engraulis capensis	177.60	11952	33.86	10
Etrumeus whiteheadi	72.00	6240	13.73	8
Chelidonichthys capensis	16.20	6	3.09	
Chelidonichthys capensis	4.32	12	0.82	
Total	524.52		100.00	

PROJECT STATION: 281
 DATE: 1/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 2402 Long E 1421
 start stop duration
 TIME :22:40:00 22:50:00 10 (min) Purpose code: 1
 LOG :9497.20 9497.60 0.40 Area code : 2
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 78 75 Validity code:
 Towing dir: 135° Wire out: 150 m Speed: 26 kn*10
 Sorted: Kg Total catch: 8.20 CATCH/HOUR: 49.20

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Thyrsites atun	37.20	6	75.61	
Etrumeus whiteheadi	8.40	960	17.07	
Engraulis capensis	3.60	552	7.32	
Total	49.20		100.00	

PROJECT STATION: 275
 DATE: 31/ 5/90 GEAR TYPE: PT No:6 POSITION: Lat S 2513 Long E 1442
 start stop duration
 TIME :20:07:00 20:10:00 3 (min) Purpose code: 1
 LOG :9275.00 9275.20 0.20 Area code : 1
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 65 65 Validity code:
 Towing dir: 184° Wire out: 150 m Speed: 30 kn*10
 Sorted: Kg Total catch: 0.21 CATCH/HOUR: 4.20

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Etrumeus whiteheadi	3.40	340	80.95	
Engraulis capensis	0.80	120	19.05	
Total	4.20		100.00	

PROJECT STATION: 282
 DATE: 2/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 2325 Long E 1420
 start stop duration
 TIME :08:27:00 08:38:00 11 (min) Purpose code: 1
 LOG :9594.10 9594.70 0.60 Area code : 2
 FDEPTH: 20 20 GearCond.code:
 BDEPTH: 75 79 Validity code:
 Towing dir: 270° Wire out: 75 m Speed: 35 kn*10
 Sorted: 3 Kg Total catch: 27.60 CATCH/HOUR: 150.55

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Etrumeus whiteheadi	130.91	6016	86.95	16
Sufflogobius bibarbatatus	13.09	3535	6.69	
Engraulis capensis	4.36	393	2.90	
Sardinops ocellata	2.18	87	1.45	
Total	150.54		99.99	

PROJECT STATION: 276
 DATE: 31/ 5/90 GEAR TYPE: PT No:6 POSITION: Lat S 2502 Long E 1442
 start stop duration
 TIME :23:10:00 23:13:00 3 (min) Purpose code: 1
 LOG :9290.10 9290.30 0.20 Area code : 1
 FDEPTH: 20 20 GearCond.code:
 BDEPTH: 62 64 Validity code:
 Towing dir: 184° Wire out: 75 m Speed: 30 kn*10
 Sorted: Kg Total catch: 2.00 CATCH/HOUR: 40.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Trachurus capensis	20.00	400	50.00	
Sardinops ocellata	12.00	80	30.00	
Etrumeus whiteheadi	4.00	320	10.00	
Sufflogobius bibarbatatus	2.00	120	5.00	
Engraulis capensis	2.00	1250	5.00	
Total	40.00		100.00	

PROJECT STATION: 283
 DATE: 2/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 2300 Long E 1419
 start stop duration
 TIME :16:30:00 16:40:00 10 (min) Purpose code: 1
 LOG :9668.50 9668.70 0.20 Area code : 2
 FDEPTH: 5 10 GearCond.code: 3
 BDEPTH: 70 63 Validity code: 9
 Towing dir: 330° Wire out: 100 m Speed: 30 kn*10
 Sorted: Kg Total catch: CATCH/HOUR:

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
N O C A T C H	3.00			
Total				

PROJECT STATION: 277
 DATE: 1/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 2455 Long E 1435
 start stop duration
 TIME :01:10:00 01:17:00 7 (min) Purpose code: 1
 LOG :9305.50 9305.70 0.20 Area code : 2
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 81 78 Validity code:
 Towing dir: 90° Wire out: 150 m Speed: 30 kn*10
 Sorted: Kg Total catch: 5.20 CATCH/HOUR: 44.57

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Engraulis capensis	42.86	8657	96.16	11
Etrumeus whiteheadi	1.71	429	3.84	
Total	44.57		100.00	

PROJECT STATION: 284
 DATE: 2/ 6/90 GEAR TYPE: PT No:6 POSITION: Lat S 2310 Long E 1413
 start stop duration
 TIME :22:10:00 22:20:00 10 (min) Purpose code: 1
 LOG :9721.10 9721.60 0.50 Area code : 2
 FDEPTH: 12 12 GearCond.code:
 BDEPTH: 108 110 Validity code:
 Towing dir: 270° Wire out: 75 m Speed: 32 kn*10
 Sorted: Kg Total catch: 3.00 CATCH/HOUR: 18.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Sufflogobius bibarbatatus	18.00	9240	100.00	
Total	18.00		100.00	

PROJECT STATION: 278
 DATE: 1/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 2439 Long E 1437
 start stop duration
 TIME :04:26:00 04:31:00 5 (min) Purpose code: 1
 LOG :9335.70 9335.90 0.20 Area code : 2
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 24 24 Validity code:
 Towing dir: 145° Wire out: 150 m Speed: 30 kn*10
 Sorted: 2 Kg Total catch: 2.30 CATCH/HOUR: 27.60

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Engraulis capensis	16.80	1020	60.87	12
Chelidonichthys capensis	9.60	48	34.78	
Trachurus capensis	1.20	228	4.35	13
Total	27.60		100.00	

PROJECT STATION: 285
 DATE: 3/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 2259 Long E 1400
 start stop duration
 TIME :01:06:00 01:11:00 5 (min) Purpose code: 1
 LOG :9746.50 9746.80 0.30 Area code : 2
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 130 130 Validity code:
 Towing dir: 180° Wire out: 150 m Speed: 30 kn*10
 Sorted: 30 Kg Total catch: 150.30 CATCH/HOUR: 1803.60

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Sardinops ocellata	1800.00	20112	99.80	17
Etrumeus whiteheadi	3.60	120	0.20	
Total	1803.60		100.00	

PROJECT STATION: 285
 DATE: 3/ 6/90 GEAR TYPE: PT No:6 POSITION:Lat S 2257 Long E 1340
 start stop duration
 TIME :12:00:00 12:25:00 25 (min) Purpose code: 1
 LOG :9950.50 9851.90 1.40 Area code : 2
 FDEPTH: 120 145 GearCond.code:
 BDEPTH: 146 147 Validity code:
 Towing dir: 180° Wire out: 350 m Speed: 30 kn*10

Sorted: 4 Kg Total catch: 4.90 CATCH/HOUR: 11.76

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Lepidopus caudatus	6.40	62	55.10	
Merluccius capensis	3.60	108	30.61	
Chelidonichthys capensis	1.20	7	10.20	
Trachurus capensis	0.48	5	4.08	
Total	11.76		99.99	

PROJECT STATION: 287
 DATE: 3/ 6/90 GEAR TYPE: BT No:1 POSITION:Lat S 2230 Long E 1357
 start stop duration
 TIME :17:42:00 18:02:00 20 (min) Purpose code: 1
 LOG :9902.50 9904.30 0.80 Area code : 2
 FDEPTH: 114 117 GearCond.code:
 BDEPTH: 114 117 Validity code:
 Towing dir: 270° Wire out: 500 m Speed: 30 kn*10

Sorted: 4 Kg Total catch: 15.10 CATCH/HOUR: 45.30

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Merluccius capensis	28.80	1005	63.58	18
Sufflogobius bibarbat	16.50	4620	36.42	19
Total	45.30		100.00	

PROJECT STATION: 288
 DATE: 3/ 6/90 GEAR TYPE: PT No:6 POSITION:Lat S 2249 Long E 1345
 start stop duration
 TIME :22:25:00 22:35:00 10 (min) Purpose code: 1
 LOG :9945.70 9945.90 0.20 Area code : 2
 FDEPTH: 20 20 GearCond.code:
 BDEPTH: 138 138 Validity code:
 Towing dir: 360° Wire out: 75 m Speed: 25 kn*10

Sorted: 12 Kg Total catch: 173.10 CATCH/HOUR: 1038.60

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Sardinops ocellata	1036.80	10764	99.83	20
Etrumeus whiteheadi	1.80	36	0.17	
Total	1038.60		100.00	

PROJECT STATION: 289
 DATE: 4/ 6/90 GEAR TYPE: PT No:6 POSITION:Lat S 2259 Long E 1345
 start stop duration
 TIME :00:40:00 01:00:00 20 (min) Purpose code: 1
 LOG :9962.10 9962.90 0.80 Area code : 2
 FDEPTH: 110 140 GearCond.code:
 BDEPTH: 142 141 Validity code:
 Towing dir: 360° Wire out: 350 m Speed: 30 kn*10

Sorted: 33 Kg Total catch: 169.50 CATCH/HOUR: 508.50

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Trachurus capensis	312.00	3525	61.36	21
Merluccius capensis	165.00	2994	32.45	22
Lophius upsicephalus	10.50	30	2.06	
Sardinops ocellata	10.50	135	2.06	
Chelidonichthys capensis	10.50	150	2.06	
Total	508.50		99.99	

PROJECT STATION: 290
 DATE: 4/ 6/90 GEAR TYPE: PT No:5 POSITION:Lat S 2303 Long E 1355
 start stop duration
 TIME :03:33:00 03:39:00 6 (min) Purpose code: 1
 LOG :9985.50 9985.80 0.30 Area code : 2
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 142 143 Validity code:
 Towing dir: 180° Wire out: 150 m Speed: 30 kn*10

Sorted: 30 Kg Total catch: 391.50 CATCH/HOUR: 3915.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Sardinops ocellata	3900.00	40640	99.62	23
Prionace glauca	15.00	10	0.38	
Total	3915.00		100.00	

PROJECT STATION: 291
 DATE: 5/ 6/90 GEAR TYPE: PT No:5 POSITION:Lat S 2224 Long E 1422
 start stop duration
 TIME :01:59:00 02:04:00 5 (min) Purpose code: 1
 LOG :124.80 125.10 0.30 Area code : 2
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 23 23 Validity code:
 Towing dir: 335° Wire out: 150 m Speed: 30 kn*10

Sorted: 25 Kg Total catch: 75.00 CATCH/HOUR: 900.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Engraulis capensis	396.00	27324	44.00	24
Etrumeus whiteheadi	324.00	16200	36.00	25
Trachurus capensis	90.00	2016	10.00	26
Galeichthys feliceps	64.80	144	7.20	
Sardinops ocellata	10.80	324	1.20	27
Thyrsites atun	7.20	36	0.80	
Merluccius capensis	7.20	36	0.80	
Total	900.00		100.00	

PROJECT STATION: 292
 DATE: 5/ 6/90 GEAR TYPE: PT No:6 POSITION:Lat S 2211 Long E 1353
 start stop duration
 TIME :09:23:00 09:31:00 8 (min) Purpose code: 1
 LOG :195.80 197.50 1.70 Area code : 2
 FDEPTH: 15 15 GearCond.code:
 BDEPTH: 96 95 Validity code:
 Towing dir: 360° Wire out: 75 m Speed: 37 kn*10

Sorted: Kg Total catch: 0.40 CATCH/HOUR: 0.86

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Sardinops ocellata	0.86	9	100.00	28
Trachurus capensis	0.00	2		29
Total	0.86		100.00	

PROJECT STATION: 293
 DATE: 5/ 6/90 GEAR TYPE: PT No:5 POSITION:Lat S 2205 Long E 1412
 start stop duration
 TIME :13:20:00 13:35:00 15 (min) Purpose code: 1
 LOG :227.80 228.50 0.70 Area code : 2
 FDEPTH: 10 10 GearCond.code: 3
 BDEPTH: 19 21 Validity code: 9
 Towing dir: 180° Wire out: 150 m Speed: 30 kn*10

Sorted: Kg Total catch: 0.60 CATCH/HOUR: 2.40

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Trachurus capensis	1.60	24	66.67	
Chelidonichthys capensis	0.80	12	33.33	
Total	2.40		100.00	

PROJECT STATION: 294
 DATE: 5/ 6/90 GEAR TYPE: PT No:6 POSITION:Lat S 2207 Long E 1411
 start stop duration
 TIME :22:32:00 22:55:00 23 (min) Purpose code: 1
 LOG :298.40 299.30 0.90 Area code : 2
 FDEPTH: 0 0 GearCond.code:
 BDEPTH: 24 22 Validity code:
 Towing dir: 325° Wire out: 150 m Speed: 23 kn*10

Sorted: 30 Kg Total catch: 1512.80 CATCH/HOUR: 3946.44

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Trachurus capensis	2360.87	66796	59.82	30
Sardinops ocellata	1565.22	15443	39.66	31
Mustelus mustelus	10.43	3	0.26	
Argyrosomus hololepidotus	9.91	3	0.25	
Sufflogobius bibarbat	0.00	130		
Total	3946.43		99.99	

PROJECT STATION: 295
 DATE: 6/ 6/90 GEAR TYPE: PT No:5 POSITION:Lat S 2208 Long E 1338
 start stop duration
 TIME :04:41:00 05:09:00 28 (min) Purpose code: 1
 LOG :355.10 356.20 1.10 Area code : 2
 FDEPTH: 10 10 GearCond.code: 3
 BDEPTH: 125 123 Validity code: 9
 Towing dir: 360° Wire out: 150 m Speed: 30 kn*10

Sorted: Kg Total catch: 0.60 CATCH/HOUR: 1.29

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Sardinops ocellata	1.29	11	100.00	
Total	1.29		100.00	

PROJECT STATION: 296
 DATE: 6/ 6/90 GEAR TYPE: PT No:5 POSITION:Lat S 2155 Long E 1403
 start stop duration
 TIME :20:11:00 20:31:00 20 (min) Purpose code: 1
 LOG :503.40 504.40 1.00 Area code : 2
 FDEPTH: 5 5 GearCond.code: 2
 BDEPTH: 21 24 Validity code: 9
 Towing dir: 270° Wire out: 150 m Speed: 32 kn*10

Sorted: 24 Kg Total catch: 492.60 CATCH/HOUR: 1477.80

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Sardinops ocellata	1008.00	9576	68.21	33
Trachurus capensis	258.00	7680	17.46	32
Engraulis capensis	180.00	12960	12.18	34
Etrumeus whiteheadi	30.00	1320	2.03	35
Chelidonichthys capensis	1.80	3	0.12	
Total	1477.80		100.00	

PROJECT STATION: 297
 DATE: 6/ 6/90 GEAR TYPE: PT No:6 POSITION:Lat S 2149 Long E 1355
 start stop duration
 TIME :21:58:00 22:23:00 25 (min) Purpose code: 1
 LOG :513.90 515.30 1.40 Area code : 2
 FDEPTH: 5 5 GearCond.code: 2
 BDEPTH: 27 26 Validity code: 9
 Towing dir: 138° Wire out: 150 m Speed: 34 kn*10

Sorted: 6 Kg Total catch: 12.50 CATCH/HOUR: 30.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Trachurus capensis	16.80	590	56.00	36
Etrumeus whiteheadi	7.20	442	24.00	37
Chelidonichthys capensis	2.40	5	8.00	
Engraulis capensis	1.92	134	6.40	38
Merluccius capensis	1.20	14	4.00	39
Sardinops ocellata	0.48	29	1.60	40
Total	30.00		100.00	

PROJECT STATION: 298
 DATE: 7/ 6/90 GEAR TYPE: PT No:5 POSITION:Lat S 2143 Long E 1350
 start stop duration
 TIME :00:01:00 00:21:00 20 (min) Purpose code: 1
 LOG :527.60 528.60 1.00 Area code : 2
 FDEPTH: 5 5 GearCond.code: 2
 BDEPTH: 52 52 Validity code:
 Towing dir: 160° Wire out: 150 m Speed: 30 kn*10

Sorted: Kg Total catch: 18.60 CATCH/HOUR: 55.80

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Etrumeus whiteheadi	48.00	3300	86.02	41
Trachurus capensis	6.50	240	11.83	42
Engraulis capensis	1.20	120	2.15	43
Total	55.80		100.00	

PROJECT STATION: 299
 DATE: 7/ 6/90 GEAR TYPE: PT No:5 POSITION:Lat S 2135 Long E 1348
 start stop duration
 TIME :01:46:00 02:06:00 20 (min) Purpose code: 1
 LOG :540.20 541.20 1.00 Area code : 2
 FDEPTH: 5 5 GearCond.code: 2
 BDEPTH: 34 41 Validity code:
 Towing dir: 270° Wire out: 150 m Speed: 30 kn*10

Sorted: 1 Kg Total catch: 21.00 CATCH/HOUR: 63.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Trachurus capensis	60.00	2001	95.24	44
Callorhynchus capensis	3.00	3	4.76	
Total	63.00		100.00	

PROJECT STATION: 300
 DATE: 7/ 6/90 GEAR TYPE: PT No:5 POSITION:Lat S 2125 Long E 1346
 start stop duration
 TIME :03:46:00 04:01:00 15 (min) Purpose code: 1
 LOG : 555.20 555.00 0.60 Area code : 2
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 17 17 Validity code:
 Towing dir: 150° Wire out: 150 m Speed: 30 kn*10
 Sorted: 1 Kg Total catch: 30.00 CATCH/HOUR: 120.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Trachurus capensis	120.00	4628	100.00	45
Total	120.00		100.00	

PROJECT STATION: 307
 DATE: 8/ 6/90 GEAR TYPE: BT No:1 POSITION:Lat S 2020 Long E 1251
 start stop duration
 TIME :14:57:00 15:17:00 20 (min) Purpose code: 1
 LOG : 858.60 859.60 1.00 Area code : 2
 FDEPTH: 121 123 GearCond.code:
 BDEPTH: 121 123 Validity code:
 Towing dir: 160° Wire out: 550 m Speed: 30 kn*10
 Sorted: 31 Kg Total catch: 1576.40 CATCH/HOUR: 4729.20

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Trachurus capensis	4725.00	170625	99.91	53
Merluccius capensis	3.00	3	0.06	
Chelidonichthys capensis	1.20	3	0.03	
Total	4729.20		100.00	

PROJECT STATION: 301
 DATE: 7/ 6/90 GEAR TYPE: PT No:5 POSITION:Lat S 2124 Long E 1346
 start stop duration
 TIME :05:12:00 05:22:00 10 (min) Purpose code: 1
 LOG : 562.40 562.90 0.50 Area code : 2
 FDEPTH: 1 1 GearCond.code:
 BDEPTH: 11 12 Validity code:
 Towing dir: 330° Wire out: 75 m Speed: 30 kn*10
 Sorted: 5 Kg Total catch: 2000.00 CATCH/HOUR: 12000.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Trachurus capensis	12000.00	542610	100.00	46
Total	12000.00		100.00	

PROJECT STATION: 308
 DATE: 8/ 6/90 GEAR TYPE: PT No:6 POSITION:Lat S 2019 Long E 1302
 start stop duration
 TIME :18:40:00 19:00:00 20 (min) Purpose code: 1
 LOG : 889.70 891.10 1.40 Area code : 2
 FDEPTH: 65 65 GearCond.code:
 BDEPTH: 93 91 Validity code:
 Towing dir: 141° Wire out: 200 m Speed: 30 kn*10
 Sorted: 4 Kg Total catch: 45.00 CATCH/HOUR: 135.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Trachurus capensis	135.00	4890	100.00	54
Total	135.00		100.00	

PROJECT STATION: 302
 DATE: 7/ 6/90 GEAR TYPE: PT No:5 POSITION:Lat S 2115 Long E 1338
 start stop duration
 TIME :07:15:00 07:30:00 15 (min) Purpose code: 1
 LOG : 579.20 579.80 0.60 Area code : 2
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 15 15 Validity code:
 Towing dir: 130° Wire out: 160 m Speed: 32 kn*10
 Sorted: 32 Kg Total catch: 128.00 CATCH/HOUR: 512.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Trachurus capensis	512.00	15928	100.00	47
Total	512.00		100.00	

PROJECT STATION: 309
 DATE: 8/ 6/90 GEAR TYPE: PT No:5 POSITION:Lat S 2021 Long E 1313
 start stop duration
 TIME :21:09:00 21:29:00 20 (min) Purpose code: 1
 LOG : 909.20 910.10 0.90 Area code : 2
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 16 16 Validity code:
 Towing dir: 360° Wire out: 150 m Speed: 28 kn*10
 Sorted: 21 Kg Total catch: 198.00 CATCH/HOUR: 594.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Trachurus capensis	507.00	8823	85.35	55
Chelidonichthys capensis	87.00	168	14.65	
Total	594.00		100.00	

PROJECT STATION: 303
 DATE: 7/ 6/90 GEAR TYPE: BT No:1 POSITION:Lat S 2131 Long E 1322
 start stop duration
 TIME :13:33:00 13:58:00 25 (min) Purpose code: 1
 LOG : 637.30 638.00 1.30 Area code : 2
 FDEPTH: 122 122 GearCond.code:
 BDEPTH: 122 122 Validity code:
 Towing dir: 157° Wire out: 550 m Speed: 30 kn*10
 Sorted: 50 Kg Total catch: 2515.00 CATCH/HOUR: 6036.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Trachurus capensis	5496.00	127745	91.05	48
Merluccius capensis	540.00	4200	8.95	49
Total	6036.00		100.00	

PROJECT STATION: 310
 DATE: 9/ 6/90 GEAR TYPE: PT No:6 POSITION:Lat S 2005 Long E 1259
 start stop duration
 TIME :01:28:00 01:48:00 20 (min) Purpose code: 1
 LOG : 945.20 946.30 0.90 Area code : 2
 FDEPTH: 35 45 GearCond.code:
 BDEPTH: 62 65 Validity code:
 Towing dir: 5° Wire out: 100 m Speed: 30 kn*10
 Sorted: 30 Kg Total catch: 420.00 CATCH/HOUR: 1260.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Trachurus capensis	1260.00	56934	100.00	56
Total	1260.00		100.00	

PROJECT STATION: 304
 DATE: 7/ 6/90 GEAR TYPE: PT No:5 POSITION:Lat S 2101 Long E 1330
 start stop duration
 TIME :19:44:00 20:04:00 20 (min) Purpose code: 1
 LOG : 696.10 697.40 1.30 Area code : 2
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 12 16 Validity code:
 Towing dir: 360° Wire out: 150 m Speed: 34 kn*10
 Sorted: 24 Kg Total catch: 119.60 CATCH/HOUR: 358.80

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Trachurus capensis	299.40	23532	83.44	50
Chelidonichthys capensis	46.50	702	12.96	
Galeichthys feliceps	7.20	30	2.01	
Merluccius capensis	5.70	45	1.59	
Sufflogobius bibarbatu	0.00	24		
Total	358.80		100.00	

PROJECT STATION: 311
 DATE: 9/ 6/90 GEAR TYPE: PT No:5 POSITION:Lat S 1945 Long E 1251
 start stop duration
 TIME :07:08:00 07:28:00 20 (min) Purpose code: 1
 LOG : 989.20 990.30 1.10 Area code : 3
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 26 35 Validity code:
 Towing dir: 270° Wire out: 100 m Speed: 30 kn*10
 Sorted: 7 Kg Total catch: 79.00 CATCH/HOUR: 237.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Trachurus capensis	180.00	9300	75.95	57
Engraulis capensis	30.00	2910	12.06	58
Krumeus whiteneadi	15.00	1410	6.33	59
Galeichthys feliceps	12.00	60	5.06	
Total	237.00		100.00	

PROJECT STATION: 305
 DATE: 8/ 6/90 GEAR TYPE: PT No:5 POSITION:Lat S 2054 Long E 1324
 start stop duration
 TIME :00:05:00 00:25:00 20 (min) Purpose code: 1
 LOG : 720.60 721.30 0.70 Area code : 2
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 36 50 Validity code:
 Towing dir: 232° Wire out: 150 m Speed: 30 kn*10
 Sorted: 9 Kg Total catch: 291.00 CATCH/HOUR: 873.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Trachurus capensis	459.00	16065	52.58	51
Chelidonichthys capensis	414.00	11250	47.42	
Total	873.00		100.00	

PROJECT STATION: 312
 DATE: 9/ 6/90 GEAR TYPE: PT No:6 POSITION:Lat S 1947 Long E 1242
 start stop duration
 TIME :09:57:00 10:17:00 20 (min) Purpose code: 1
 LOG : 1011.80 1012.90 1.10 Area code : 3
 FDEPTH: 40 40 GearCond.code:
 BDEPTH: 98 98 Validity code:
 Towing dir: 340° Wire out: 125 m Speed: 32 kn*10
 Sorted: 13 Kg Total catch: 500.00 CATCH/HOUR: 1500.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Trachurus capensis	1224.30	76119	81.62	61
Sardinops ocellata	275.70	5577	18.38	60
Engraulis capensis	0.00	660		
Total	1500.00		100.00	

PROJECT STATION: 306
 DATE: 8/ 6/90 GEAR TYPE: PT No:5 POSITION:Lat S 2043 Long E 1321
 start stop duration
 TIME :02:31:00 02:46:00 15 (min) Purpose code: 1
 LOG : 739.40 740.30 0.80 Area code : 2
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 21 21 Validity code:
 Towing dir: 13° Wire out: 150 m Speed: 30 kn*10
 Sorted: Kg Total catch: 420.00 CATCH/HOUR: 1680.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Trachurus capensis	1680.00	58800	100.00	52
Total	1680.00		100.00	

PROJECT STATION: 313
 DATE: 9/ 6/90 GEAR TYPE: PT No:6 POSITION:Lat S 1949 Long E 1243
 start stop duration
 TIME :11:32:00 11:52:00 20 (min) Purpose code: 1
 LOG : 1020.50 1021.40 0.90 Area code : 3
 FDEPTH: 40 40 GearCond.code:
 BDEPTH: 100 99 Validity code:
 Towing dir: 340° Wire out: 125 m Speed: 30 kn*10
 Sorted: 9 Kg Total catch: 798.00 CATCH/HOUR: 2394.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP.NO.
	weight	numbers		
Trachurus capensis	2268.00	147000	94.74	62
Engraulis capensis	105.90	7056	4.42	63
Etruneus whiteheadi	20.10	2010	0.84	
Total	2394.00		100.00	

PROJECT STATION: 314
 DATE: 9/ 6/90 GEAR TYPE: PT No:6 POSITION: Lat S 2000 Long E 1240
 start stop duration Purpose code: 1
 TIME :15:05:00 15:25:00 20 (min) Area code : 2
 LOG :1045:10 1046:50 1.40 GearCond.code: 1
 FDEPTH: 45 45 Validity code:
 BDEPTH: 126 122
 Towing dir: 90° Wire out: 150 m Speed: 30 kn*10

Sorted: 30 Kg Total catch: 3500.00 CATCH/HOUR: 10500.00

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight numbers		
Trachurus capensis	10500.00	100.00	64
Total	10500.00	100.00	

PROJECT STATION: 320
 DATE: 10/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 1850 Long E 1213
 start stop duration Purpose code: 1
 TIME :23:00:00 23:20:00 20 (min) Area code : 3
 LOG :1324:59 1335:40 0.90 GearCond.code: 3
 FDEPTH: 5 5 Validity code:
 BDEPTH: 65 54
 Towing dir: 49° Wire out: 150 m Speed: 30 kn*10

Sorted: 6 Kg Total catch: 69.30 CATCH/HOUR: 207.90

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight numbers		
Engraulis capensis	148.50	71.43	75
Etrumeus whiteheadi	49.50	23.81	76
Sardinops ocellata	9.90	4.76	
Total	207.90	100.00	

PROJECT STATION: 315
 DATE: 9/ 6/90 GEAR TYPE: PT No:6 POSITION: Lat S 1948 Long E 1238
 start stop duration Purpose code: 1
 TIME :19:32:00 19:52:00 20 (min) Area code : 3
 LOG :1079:90 1080:90 1.00 GearCond.code: 3
 FDEPTH: 1 1 Validity code:
 BDEPTH: 113 111
 Towing dir: 360° Wire out: 150 m Speed: 30 kn*10

Sorted: 22 Kg Total catch: 49.90 CATCH/HOUR: 149.70

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight numbers		
Trachurus capensis	75.90	50.70	65
Sardinops ocellata	73.80	49.30	66
Etrumeus whiteheadi	0.00	45	
Total	149.70	100.00	

PROJECT STATION: 321
 DATE: 11/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 1845 Long E 1215
 start stop duration Purpose code: 1
 TIME :00:45:00 00:48:00 3 (min) Area code : 3
 LOG :1347:00 1347:20 0.20 GearCond.code: 3
 FDEPTH: 10 10 Validity code:
 BDEPTH: 31 31
 Towing dir: 180° Wire out: 100 m Speed: 30 kn*10

Sorted: 9 Kg Total catch: 2800.00 CATCH/HOUR: 56000.00

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight numbers		
Sardinops ocellata	56000.00	100.00	77
Total	56000.00	100.00	

PROJECT STATION: 316
 DATE: 10/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 1925 Long E 1242
 start stop duration Purpose code: 1
 TIME :03:47:00 04:07:00 20 (min) Area code : 3
 LOG :1158:90 1160:00 1.10 GearCond.code: 3
 FDEPTH: 10 10 Validity code:
 BDEPTH: 37 47
 Towing dir: 270° Wire out: 150 m Speed: 30 kn*10

Sorted: 4 Kg Total catch: 40.00 CATCH/HOUR: 120.00

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight numbers		
Trachurus capensis	93.30	77.75	67
Galeichthys feliceps	15.90	13.25	
Engraulis capensis	9.00	7.50	68
Etrumeus whiteheadi	1.80	1.50	69
Total	120.00	100.00	

PROJECT STATION: 322
 DATE: 11/ 6/90 GEAR TYPE: BT No:1 POSITION: Lat S 1820 Long E 1151
 start stop duration Purpose code: 1
 TIME :01:30:00 01:50:00 20 (min) Area code : 3
 LOG :1434:00 1434:90 0.90 GearCond.code: 3
 FDEPTH: 63 63 Validity code:
 BDEPTH: 63 63
 Towing dir: 345° Wire out: 350 m Speed: 29 kn*10

Sorted: 14 Kg Total catch: 1489.30 CATCH/HOUR: 4467.90

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight numbers		
Trachurus capensis	2295.00	51.37	78
Merluccius capensis	1377.00	30.82	
Chelidonichthys capensis	612.00	13.70	
Helicolenus dactylopterus	153.30	3.43	
Sardinops ocellata	30.60	0.68	
Total	4467.90	100.00	

PROJECT STATION: 317
 DATE: 10/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 1911 Long E 1235
 start stop duration Purpose code: 1
 TIME :06:29:00 06:49:00 20 (min) Area code : 3
 LOG :1181:20 1182:30 1.10 GearCond.code: 3
 FDEPTH: 10 10 Validity code:
 BDEPTH: 27 32
 Towing dir: 190° Wire out: 150 m Speed: 33 kn*10

Sorted: 22 Kg Total catch: 89.30 CATCH/HOUR: 267.90

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight numbers		
Engraulis capensis	234.00	87.35	70
Trachurus capensis	29.25	10.32	71
Sardinops ocellata	4.68	1.75	
Total	267.93	100.02	

PROJECT STATION: 323
 DATE: 11/ 6/90 GEAR TYPE: PT No:6 POSITION: Lat S 1818 Long E 1152
 start stop duration Purpose code: 1
 TIME :11:58:00 12:18:00 20 (min) Area code : 3
 LOG :1441:50 1442:40 0.90 GearCond.code: 3
 FDEPTH: 40 40 Validity code:
 BDEPTH: 57 55
 Towing dir: 340° Wire out: 100 m Speed: 30 kn*10

Sorted: 11 Kg Total catch: 1798.00 CATCH/HOUR: 5394.00

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight numbers		
Sardinops ocellata	4650.00	86.21	79
Engraulis capensis	418.50	7.76	81
Trachurus capensis	232.50	4.21	80
Etrumeus whiteheadi	93.00	1.72	
Total	5394.00	100.00	

PROJECT STATION: 318
 DATE: 10/ 6/90 GEAR TYPE: PT No:6 POSITION: Lat S 1923 Long E 1222
 start stop duration Purpose code: 1
 TIME :15:57:00 16:17:00 20 (min) Area code : 3
 LOG :1274:80 1275:30 0.50 GearCond.code: 3
 FDEPTH: 30 15 Validity code:
 BDEPTH: 128 128
 Towing dir: 340° Wire out: 100 m Speed: 30 kn*10

Sorted: 8 Kg Total catch: 1500.00 CATCH/HOUR: 4500.00

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight numbers		
Trachurus capensis	4500.00	100.00	72
Total	4500.00	100.00	

PROJECT STATION: 324
 DATE: 11/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 1750 Long E 1145
 start stop duration Purpose code: 1
 TIME :19:05:00 19:25:00 20 (min) Area code : 3
 LOG :1502:20 1503:50 1.30 GearCond.code: 3
 FDEPTH: 20 30 Validity code:
 BDEPTH: 55 50
 Towing dir: 360° Wire out: 75 m Speed: 30 kn*10

Sorted: 10 Kg Total catch: 89.90 CATCH/HOUR: 269.70

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight numbers		
Sardinops ocellata	269.70	100.00	82
Etrumeus whiteheadi	0.00	135	
Total	269.70	100.00	

PROJECT STATION: 319
 DATE: 10/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 1905 Long E 1231
 start stop duration Purpose code: 1
 TIME :19:30:00 19:50:00 20 (min) Area code : 3
 LOG :1303:50 1304:40 0.90 GearCond.code: 3
 FDEPTH: 5 5 Validity code:
 BDEPTH: 21 33
 Towing dir: 240° Wire out: 150 m Speed: 31 kn*10

Sorted: 55 Kg Total catch: 153.90 CATCH/HOUR: 581.70

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight numbers		
Trachurus capensis	391.20	67.25	74
Engraulis capensis	133.50	22.95	73
Diplodus sargus	27.00	4.64	
Lithognathus aureti	21.00	3.61	
Pomatomus saltatrix	3.00	0.52	
Pyrosoma aquila	1.80	0.31	
Galeichthys feliceps	1.80	0.31	
Chelidonichthys capensis	0.90	0.15	
Sardinops ocellata	0.90	0.15	
Trichurus lepturus	0.60	0.10	
Total	581.70	99.99	

PROJECT STATION: 325
 DATE: 11/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 1749 Long E 1145
 start stop duration Purpose code: 1
 TIME :21:30:00 21:50:00 20 (min) Area code : 3
 LOG :1517:10 1518:30 1.20 GearCond.code: 3
 FDEPTH: 5 5 Validity code:
 BDEPTH: 42 50
 Towing dir: 360° Wire out: 100 m Speed: 29 kn*10

Sorted: 1 Kg Total catch: 30.00 CATCH/HOUR: 90.00

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight numbers		
Engraulis capensis	90.00	100.00	83
Total	90.00	100.00	

PROJECT STATION: 326
 DATE: 12/ 6/90 GEAR TYPE: BT No:1 POSITION: Lat S 1715 Long E 1120
 start stop duration
 TIME :17:45:00 18:16:00 30 (min) Purpose code: 1
 LOG :1683.70 1685.40 1.70 Area code : 3
 FDEPTH: 354 354 GearCond.code:
 BDEPTH: 354 354 Validity code:
 Towing dir: 12° Wire out: 1100 m Speed: 30 kn*10
 Sorted: 37 Kg Total catch: 327.80 CATCH/HOUR: 655.60

PROJECT STATION: 332
 DATE: 13/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 1806 Long E 1147
 start stop duration
 TIME :19:50:00 15:58:00 8 (min) Purpose code: 1
 LOG :1698.20 1698.80 0.60 Area code : 3
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 32 29 Validity code:
 Towing dir: 35° Wire out: 75 m Speed: 40 kn*10
 Sorted: 28 Kg Total catch: 8999.40 CATCH/HOUR: 87495.50

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight numbers		
Merluccius capensis	148.60 432	22.67	84
Coelorinchus polli	108.00 3808	16.47	
Neoharringtonia pinnata	100.00 24	15.25	
Helicolenus dactylopterus	99.00 504	15.10	
Todarodes sagittatus	54.00 128	8.24	
Centropristis sp	40.00 8	6.10	
Laemonoea laureysi	37.80 504	5.77	
Aristeus varidens	22.60 2758	3.45	
Trachurus capensis	18.00 144	2.75	85
Galeus polli	18.00 180	2.75	
Lophius upsicephalus	4.00 2	0.61	
Raja sp	3.00 2	0.46	
Nezumia sp	1.80 72	0.27	
Epigonus denticulatus	0.60 234	0.09	
Chlorophthalmus punctatus	0.20 18	0.03	
Total	655.60	100.01	

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight numbers		
Sardinops ocellata	67495.50 787298	100.00	98
Total	67495.50	100.00	

PROJECT STATION: 333
 DATE: 13/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 1820 Long E 1153
 start stop duration
 TIME :23:25:00 23:36:00 10 (min) Purpose code: 1
 LOG :1927.80 1928.40 0.60 Area code : 3
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 36 44 Validity code:
 Towing dir: 30° Wire out: 75 m Speed: 40 kn*10
 Sorted: 5 Kg Total catch: 39.80 CATCH/HOUR: 238.80

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight numbers		
Engraulis capensis	180.00 15300	75.38	99
Sardinops ocellata	40.80 1038	17.09	100
Trachurus capensis	18.00 810	7.54	101
Etrumeus whiteheadi	0.00 90		
Total	238.80	100.01	

PROJECT STATION: 327
 DATE: 12/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 1720 Long E 1133
 start stop duration
 TIME :21:01:00 21:21:00 20 (min) Purpose code: 1
 LOG :1709.30 1710.60 1.30 Area code : 3
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 124 113 Validity code:
 Towing dir: 90° Wire out: 50 m Speed: 4 kn*10
 Sorted: 6 Kg Total catch: 39.60 CATCH/HOUR: 118.80

PROJECT STATION: 334
 DATE: 14/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 1823 Long E 1154
 start stop duration
 TIME :00:40:00 00:50:00 10 (min) Purpose code: 1
 LOG :1937.30 1937.90 0.60 Area code : 3
 FDEPTH: 12 12 GearCond.code:
 BDEPTH: 42 42 Validity code:
 Towing dir: 35° Wire out: 100 m Speed: 30 kn*10
 Sorted: 10 Kg Total catch: 459.45 CATCH/HOUR: 2756.70

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight numbers		
Trachurus capensis	118.80 2694	100.00	86
Total	118.80	100.00	

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight numbers		
Sardinops ocellata	255.00 48894	93.05	102
Engraulis capensis	108.00 12150	3.92	103
Trachurus capensis	81.00 4860	2.94	104
Etrumeus whiteheadi	2.70 2160	0.10	
Total	2756.70	100.01	

PROJECT STATION: 328
 DATE: 12/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 1731 Long E 1141
 start stop duration
 TIME :22:28:00 23:38:00 10 (min) Purpose code: 1
 LOG :1729.80 1730.80 1.00 Area code : 3
 FDEPTH: 15 15 GearCond.code:
 BDEPTH: 63 66 Validity code:
 Towing dir: 360° Wire out: 75 m Speed: 39 kn*10
 Sorted: 4 Kg Total catch: 9.40 CATCH/HOUR: 56.40

PROJECT STATION: 335
 DATE: 14/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 1815 Long E 1132
 start stop duration
 TIME :13:00:00 13:07:00 7 (min) Purpose code: 1
 LOG :2069.40 2069.70 0.30 Area code : 3
 FDEPTH: 130 130 GearCond.code:
 BDEPTH: 235 230 Validity code:
 Towing dir: 90° Wire out: 400 m Speed: 35 kn*10
 Sorted: 16 Kg Total catch: 160.00 CATCH/HOUR: 1371.43

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight numbers		
Trachurus capensis	28.80 1200	51.06	87
Sardinops ocellata	21.60 288	38.30	88
Etrumeus whiteheadi	6.00 444	10.64	89
Total	56.40	100.00	

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight numbers		
Trachurus capensis	1371.43 33557	100.00	105
Total	1371.43	100.00	

PROJECT STATION: 329
 DATE: 13/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 1725 Long E 1141
 start stop duration
 TIME :01:34:00 01:49:00 15 (min) Purpose code: 1
 LOG :1747.90 1748.80 0.90 Area code : 3
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 60 66 Validity code:
 Towing dir: 360° Wire out: 150 m Speed: 30 kn*10
 Sorted: 15 Kg Total catch: 915.00 CATCH/HOUR: 3660.00

PROJECT STATION: 336
 DATE: 14/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 1845 Long E 1135
 start stop duration
 TIME :19:05:00 19:20:00 15 (min) Purpose code: 1
 LOG :2128.20 2128.90 0.70 Area code : 3
 FDEPTH: 40 40 GearCond.code:
 BDEPTH: 250 250 Validity code:
 Towing dir: 90° Wire out: 250 m Speed: 40 kn*10
 Sorted: 5 Kg Total catch: 24.70 CATCH/HOUR: 98.80

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight numbers		
Sardinops ocellata	352.00 39784	97.05	90
Trachurus capensis	72.00 5760	1.97	91
Engraulis capensis	36.90 3840	0.95	92
Total	3660.00	100.00	

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight numbers		
Trachurus capensis	98.80 2140	100.00	106
Lampanyctodes hectoris	0.00 452		
Total	98.80	100.00	

PROJECT STATION: 330
 DATE: 13/ 6/90 GEAR TYPE: BT No:1 POSITION: Lat S 1759 Long E 1128
 start stop duration
 TIME :14:05:00 14:35:00 30 (min) Purpose code: 1
 LOG :1859.00 1860.80 1.80 Area code : 3
 FDEPTH: 242 247 GearCond.code:
 BDEPTH: 242 247 Validity code:
 Towing dir: 340° Wire out: 850 m Speed: 30 kn*10
 Sorted: 73 Kg Total catch: 739.50 CATCH/HOUR: 1479.00

PROJECT STATION: 337
 DATE: 14/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 1837 Long E 1146
 start stop duration
 TIME :22:10:00 22:30:00 20 (min) Purpose code: 1
 LOG :2156.30 2157.70 1.20 Area code : 3
 FDEPTH: 40 40 GearCond.code:
 BDEPTH: 190 191 Validity code:
 Towing dir: 131° Wire out: 100 m Speed: 30 kn*10
 Sorted: 6 Kg Total catch: 30.00 CATCH/HOUR: 90.00

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight numbers		
Merluccius capensis	1068.00 1800	72.21	93
Trachurus capensis	158.00 2340	10.68	96
Chlorophthalmus punctatus	145.00 4488	9.87	
Dentex macrophthalmus	60.00 200	4.06	
Helicolenus dactylopterus	30.00 1820	2.03	
Synsagropsis microlepis	7.00 1050	0.47	
MYCTOPHIDAE	4.60 1460	0.31	
Todarodes eblanae	2.40 20	0.16	
Centrolophus niger	2.00 2	0.14	
Coelorinchus polli	1.00 80	0.07	
Total	1479.00	100.00	

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight numbers		
Trachurus capensis	90.00 2772	100.00	107
Total	90.00	100.00	

PROJECT STATION: 331
 DATE: 13/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 1800 Long E 1135
 start stop duration
 TIME :16:27:00 16:33:00 6 (min) Purpose code: 1
 LOG :1072.20 1072.60 0.40 Area code : 3
 FDEPTH: 140 130 GearCond.code:
 BDEPTH: 175 203 Validity code:
 Towing dir: 270° Wire out: 500 m Speed: 35 kn*10
 Sorted: 15 Kg Total catch: 300.00 CATCH/HOUR: 3000.00

PROJECT STATION: 338
 DATE: 15/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 1909 Long E 1235
 start stop duration
 TIME :05:40:00 05:50:00 10 (min) Purpose code: 1
 LOG :2232.30 2232.90 0.60 Area code : 3
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 25 29 Validity code:
 Towing dir: 230° Wire out: 150 m Speed: 30 kn*10
 Sorted: 14 Kg Total catch: 118.50 CATCH/HOUR: 711.00

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight numbers		
Trachurus capensis	3000.00 81000	100.00	97
Total	3000.00	100.00	

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight numbers		
Engraulis capensis	59.00 3660	63.54	108
Trachurus capensis	108.00 3240	15.19	109
Diplodus sargus capensis	9.00 12	1.27	
Etrumeus whiteheadi	0.00 270		
Total	711.00	100.00	

PROJECT STATION: 339
 DATE: 15/ 6/90 GEAR TYPE: BT No:1 POSITION: Lat S 1901 Long E 1153
 start stop duration
 TIME 12:35:00 12:46:00 11 (min) Purpose code: 1
 LOG 2289.00 2289.30 0.30 Area code: 3
 FDEPTH: 255 255 GearCond.code: 8
 BDEPTH: 255 255 Validity code: 9
 Towing dir: 50° Wire out: 900 m Speed: 30 kn*10

Sorted: Kg Total catch: CATCH/HOUR:

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight	numbers	
N O C A T C H	0.00		
Total			

PROJECT STATION: 346
 DATE: 17/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 2036 Long E 1213
 start stop duration
 TIME 10:25:00 10:55:00 30 (min) Purpose code: 1
 LOG 2752.50 2754.30 1.80 Area code: 2
 FDEPTH: 200 190 GearCond.code:
 BDEPTH: 355 371 Validity code:
 Towing dir: 156° Wire out: 600 m Speed: 35 kn*10

Sorted: 5 Kg Total catch: 5.30 CATCH/HOUR: 10.60

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight	numbers	
MYCTOPHIDAE	6.00	56.60	
Brana brana	2.60	24.52	4
Trachurus capensis	2.00	18.87	116
Total	10.60	100.00	

PROJECT STATION: 340
 DATE: 15/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 1915 Long E 1149
 start stop duration
 TIME 17:07:00 17:27:00 20 (min) Purpose code: 1
 LOG 2333.30 2334.70 1.40 Area code: 3
 FDEPTH: 125 90 GearCond.code:
 BDEPTH: 312 307 Validity code:
 Towing dir: 90° Wire out: 350 m Speed: 35 kn*10

Sorted: 5 Kg Total catch: 5.60 CATCH/HOUR: 16.80

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight	numbers	
Taractes sp	12.00	71.43	
Trachurus capensis	3.30	19.64	110
Todarodes pacificus	1.20	7.14	
Lampanyctodes hectoris	0.30	1.79	
Total	16.80	100.00	

PROJECT STATION: 347
 DATE: 17/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 2055 Long E 1323
 start stop duration
 TIME 19:05:00 19:25:00 20 (min) Purpose code: 1
 LOG 2840.60 2841.60 1.20 Area code: 2
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 41 29 Validity code:
 Towing dir: 15° Wire out: 75 m Speed: 34 kn*10

Sorted: 10 Kg Total catch: 18.20 CATCH/HOUR: 54.60

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight	numbers	
Trachurus capensis	24.20	81.0	117
Argyrosomus hololepidotus	15.50	85.71	3
Strumeus whiteheadi	6.50	44.7	118
Merluccius capensis	4.20	7.69	
Engraulis capensis	0.00	24	
Total	54.60	100.00	

PROJECT STATION: 341
 DATE: 16/ 6/90 GEAR TYPE: BT No:3 POSITION: Lat S 1931 Long E 1240
 start stop duration
 TIME 03:37:00 03:47:00 10 (min) Purpose code: 1
 LOG 2451.10 2451.70 0.60 Area code: 3
 FDEPTH: 70 70 GearCond.code:
 BDEPTH: 70 70 Validity code:
 Towing dir: 156° Wire out: 350 m Speed: 30 kn*10

Sorted: 3 Kg Total catch: 600.50 CATCH/HOUR: 3603.00

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight	numbers	
Trachurus capensis	3600.00	99.92	111
Chelidonichthys queketti	3.00	0.08	
Total	3603.00	100.00	

PROJECT STATION: 348
 DATE: 16/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 2104 Long E 1304
 start stop duration
 TIME 01:20:00 01:30:00 10 (min) Purpose code: 1
 LOG 2903.40 2904.00 0.60 Area code: 2
 FDEPTH: 12 12 GearCond.code: 3
 BDEPTH: 130 129 Validity code: 9
 Towing dir: 150° Wire out: 150 m Speed: 30 kn*10

Sorted: Kg Total catch: CATCH/HOUR:

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight	numbers	
N O C A T C H	0.00		
Total			

PROJECT STATION: 342
 DATE: 16/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 1930 Long E 1148
 start stop duration
 TIME 09:24:00 09:34:00 20 (min) Purpose code: 1
 LOG 2510.50 2511.90 1.20 Area code: 3
 FDEPTH: 130 130 GearCond.code:
 BDEPTH: 330 337 Validity code:
 Towing dir: 270° Wire out: 400 m Speed: 40 kn*10

Sorted: 1 Kg Total catch: 30.50 CATCH/HOUR: 91.50

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight	numbers	
Lampanyctodes hectoris	90.00	95.36	
Thyrates atun	1.50	1.64	
Trachurus capensis	0.00	297	
Total	91.50	100.00	

PROJECT STATION: 349
 DATE: 18/ 6/90 GEAR TYPE: PT No:6 POSITION: Lat S 2105 Long E 1304
 start stop duration
 TIME 02:12:00 02:32:00 20 (min) Purpose code: 1
 LOG 2905.40 2906.60 1.20 Area code: 2
 FDEPTH: 60 120 GearCond.code:
 BDEPTH: 130 131 Validity code:
 Towing dir: 330° Wire out: 200 m Speed: 35 kn*10

Sorted: 2 Kg Total catch: 30.00 CATCH/HOUR: 90.00

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight	numbers	
Trachurus capensis	30.00	100.00	119
Total	30.00	100.00	

PROJECT STATION: 343
 DATE: 16/ 6/90 GEAR TYPE: PT No:6 POSITION: Lat S 1943 Long E 1144
 start stop duration
 TIME 11:55:00 12:10:00 15 (min) Purpose code: 1
 LOG 3530.30 3531.00 0.70 Area code: 3
 FDEPTH: 250 250 GearCond.code:
 BDEPTH: 281 279 Validity code:
 Towing dir: 245° Wire out: 600 m Speed: 24 kn*10

Sorted: 18 Kg Total catch: 1816.30 CATCH/HOUR: 7265.20

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight	numbers	
Trachurus capensis	7200.00	99.10	112
Brana brana	61.20	0.84	113
MYCTOPHIDAE	4.00	0.06	
Total	7265.20	100.00	

PROJECT STATION: 350
 DATE: 18/ 6/90 GEAR TYPE: BT No:1 POSITION: Lat S 2120 Long E 1313
 start stop duration
 TIME 13:57:00 14:17:00 20 (min) Purpose code: 1
 LOG 3023.20 3035.00 1.00 Area code: 2
 FDEPTH: 142 140 GearCond.code:
 BDEPTH: 142 140 Validity code:
 Towing dir: 90° Wire out: 500 m Speed: 35 kn*10

Sorted: 15 Kg Total catch: 800.00 CATCH/HOUR: 2400.00

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight	numbers	
Trachurus capensis	2400.00	100.00	120
Total	2400.00	100.00	

PROJECT STATION: 344
 DATE: 16/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 2000 Long E 1227
 start stop duration
 TIME 18:40:00 19:00:00 20 (min) Purpose code: 1
 LOG 2598.40 2599.40 1.00 Area code: 3
 FDEPTH: 1 1 GearCond.code:
 BDEPTH: 156 161 Validity code:
 Towing dir: 270° Wire out: 150 m Speed: 29 kn*10

Sorted: Kg Total catch: 0.90 CATCH/HOUR: 2.70

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight	numbers	
Thyrates atun	1.50	55.56	
Trachurus capensis	1.20	44.44	114
Total	2.70	100.00	

PROJECT STATION: 351
 DATE: 18/ 6/90 GEAR TYPE: PT No:6 POSITION: Lat S 2120 Long E 1315
 start stop duration
 TIME 15:00:00 15:20:00 20 (min) Purpose code: 1
 LOG 3022.20 3035.50 1.30 Area code: 2
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 129 134 Validity code:
 Towing dir: 270° Wire out: 50 m Speed: 30 kn*10

Sorted: Kg Total catch: 0.01 CATCH/HOUR: 0.03

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight	numbers	
Trachurus capensis	0.03	100.00	6
Total	0.03	100.00	

PROJECT STATION: 345
 DATE: 16/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 2002 Long E 1157
 start stop duration
 TIME 23:19:00 23:43:00 30 (min) Purpose code: 1
 LOG 2634.30 2636.30 2.00 Area code: 2
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 360 360 Validity code:
 Towing dir: 150° Wire out: 100 m Speed: 42 kn*10

Sorted: 9 Kg Total catch: 90.70 CATCH/HOUR: 181.40

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight	numbers	
Trachurus capensis	180.00	99.23	115
Thyrates atun	1.40	0.77	
Total	181.40	100.00	

PROJECT STATION: 352
 DATE: 19/ 6/90 GEAR TYPE: PT No:6 POSITION: Lat S 2215 Long E 1303
 start stop duration
 TIME 08:22:00 08:52:00 30 (min) Purpose code: 1
 LOG 2219.60 2221.20 1.40 Area code: 2
 FDEPTH: 250 220 GearCond.code:
 BDEPTH: 255 264 Validity code:
 Towing dir: 270° Wire out: 375 m Speed: 30 kn*10

Sorted: 46 Kg Total catch: 86.00 CATCH/HOUR: 182.00

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP. NO.
	weight	numbers	
Trachurus capensis	48.00	55.81	121
Lampanyctodes hectoris	40.00	46.51	122
Zu zlenbatus	40.00	46.51	123
Merluccius capensis	6.00	6.98	124
Total	132.00	100.00	

PROJECT STATION: 353
 DATE: 19/ 6/90 GEAR TYPE: PT No:6 POSITION: Lat S 2216
 start stop duration Long E 1336
 TIME :13:10:00 13:30:00 20 (min) Purpose code: 1
 LOG :3261.70 3263.00 1.30 Area code : 2
 FDEPTH: 25 25 GearCond.code:
 BDEPTH: 130 132 Validity code:
 Towing dir: 360° Wire out: 50 m Speed: 30 kn'10
 Sorted: 9 Kg Total catch: 160.00 CATCH/HOUR: 540.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP. NO.
	weight	numbers		
Sardinops ocellata	540.00	5121	100.00	123
Total	540.00		100.00	

PROJECT STATION: 354
 DATE: 19/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 2230
 start stop duration Long E 1320
 TIME :15:58:00 17:23:00 25 (min) Purpose code: 1
 LOG :3296.50 3298.00 1.50 Area code : 2
 FDEPTH: 180 239 GearCond.code:
 BDEPTH: 243 239 Validity code:
 Towing dir: 90° Wire out: 750 m Speed: 35 kn'10
 Sorted: 21 Kg Total catch: 32.00 CATCH/HOUR: 76.80

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP. NO.
	weight	numbers		
Merluccius capensis	50.40	206	65.63	124
Zu elongatus	16.80	5	21.88	
MYCTOPHIDAE	9.60		12.50	
Total	76.80		100.00	

PROJECT STATION: 355
 DATE: 19/ 6/90 GEAR TYPE: PT No:5 POSITION: Lat S 2240
 start stop duration Long E 1251
 TIME :21:30:00 21:50:00 20 (min) Purpose code: 1
 LOG :3338.40 3339.30 0.90 Area code : 2
 FDEPTH: 1 1 GearCond.code:
 BDEPTH: 433 449 Validity code:
 Towing dir: 180° Wire out: 150 m Speed: 28 kn'10
 Sorted: 4 Kg Total catch: 4.80 CATCH/HOUR: 14.40

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP. NO.
	weight	numbers		
Lompanycodes hectoris	13.20	607	91.67	
TRICHIURIDAE	1.20	45	8.33	
Total	14.40		100.00	

ANNEX III INSTRUMENTS AND FISHING GEAR USED.

ACOUSTIC INSTRUMENTS

Two SIMRAD scientific echo sounders, EK 400/38 kHz and EK 400/120kHz were used during the survey for estimation of fish density. The EK 400/38 was coupled to a digital integrator QD as well as to an analog integrator QM. The details of the instrument settings used are as follows:

	EK 400/38	EK 400/120
Range	0-100 or 0-250	0-100
Transmitter	High (5000 W Nom)	High (1250 W Nom)
Bandwidth	3.3 kHz	3.3 kHz
Pulselength	1.0 ms	1 ms
TVG	20 log R	20 log R
Attenuator	20 dB	0
Rec. gain	8 or 9	5
Transducer	Split beam	Ceramic 10 cm

QD settings: Threshold 10 to 24 mv. Gain: 36.1

An ES 400 colour displayer was used for target strength observations.

A calibration experiment using a standard copper sphere performed in Baia dos Tigres on June 12, 1990 gave the following results:

ES transducer: SL+VR 135.4, instr. constant 3.89, gain QD 35.9.

HYDROGRAPHY

Temperature, salinity and oxygen were sampled at standard depths with Nansen bottles. Oxygen was measured using the Winkler method and salinity determined with an inductive salinometer.

FISHING GEAR

Bottom trawl: High opening shrimp and fish trawl with net headline 31 m (floatline),- foot-rope 47 m, gear with 12 cm diameter roller disks, 40 m sweeps, estimated headline height 6m and distance between wings during towing 18-20 m. This gear was also used for some of the mid-water trawls.

Pelagic trawl: Type Modified "Harstadtrawl" with a vertical opening of 20-25 m.

Cod ends of trawls with fine meshed inner lining.

