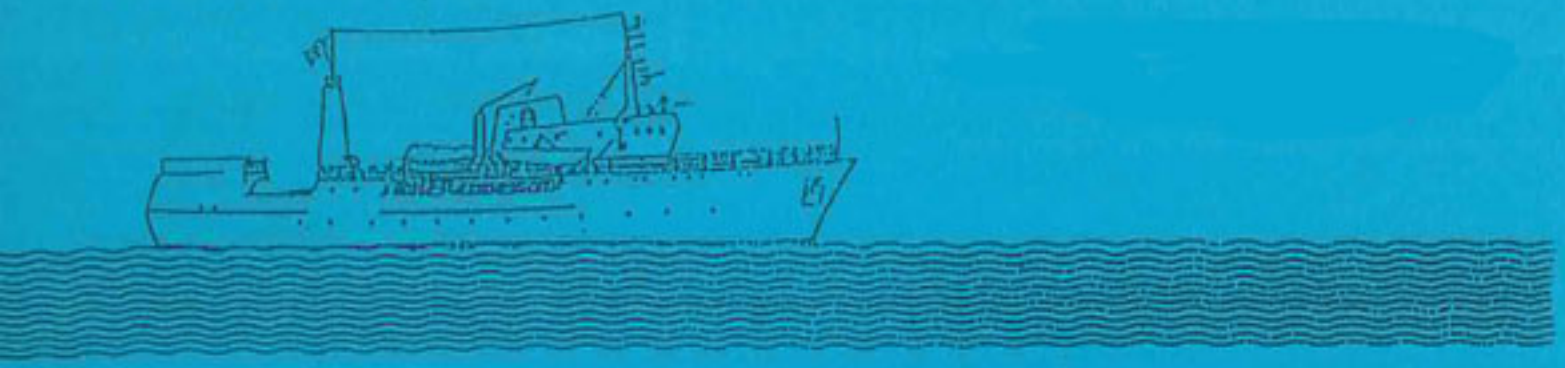


SURVEYS OF THE FISH RESOURCES OF MOZAMBIQUE

Preliminary Cruise Report No I

21 April - 14 May 1990

IIP, Maputo

IMR, 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 Mozambique is being conducted and planned under agreements between NORAD, Mozambique authorities, IIP Maputo and the Institute of Marine Research, Bergen, Norway.

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

Survey	1	4 weeks,	20 April to 14 May
"	2	4 "	primo August-primo September
"	3	5 "	primo November-mid December

This preliminary cruise report describes the work and some of the results of the first survey.

CHAPTER 1 INTRODUCTION

1.1 OBJECTIVES

The objectives of the "DR. FRIDTJOF NANSEN" programme in Mozambique in 1990 were discussed in a general way at the annual MOZ-038 project meeting in Maputo in October 1989. At a meeting in Maputo on 19 April1990 before the start of the cruise the following objectives were defined:

(i) Conduct a swept area trawl survey at randomly chosen preselected locations covering the Sofala Bank area from Angoche at 16°10' to Bazaruto at 21°20' with up to 105 stations and the Delagoa Bay from 22°00' to 26°20' with up to 26 stations.

(ii) Conduct a simultaneous acoustic survey of the same areas with identification of recordings by mid water trawling with the aim of making an acoustic assessment of the stocks of small pelagic fish in these areas.

(iii) Run a hydrographical programme including six main profiles 120 to 180 nm offshore using the CTD sonde equipment of IIP. A proposal to extend the hydrographical work northwards past Pemba could not be included without seriously reducing the time required to complete the other objectives of the programme. Even without this northern programme some of the selected locations in the swept area programme had to be cancelled due to shortage of time. It also proved necessary to make some reductions in the hydrographic programme by shortening the oceanic parts of some of the profiles.

1.2 PARTICIPATION

The scientific staff from IIP, Maputo was:
Rui de Paula e Silva, Antonio Mubango Hoguane,
Daniel Fernando, Bernardo Alberto, Nelson Manhica.
The scientific staff from NORAD Project Mo 038 was:
Jan Erick Steen
The scientific staff from IMR, Bergen was:
G. Sætersdal, E.Torstensen, Jan Petter Kjekshus

1.3 NARRATIVE

The course tracks with fishing stations and the main hydrographical profiles are shown in Figure 1.

After departure from Maputo on April 20 the positions for anchoring two current meters near the coast a little north of Beira were reached on April 22. From here course was set for the outermost station in the Angoche profile, a distance of 260 nm. This profile was worked up to the evening of April 24 when the hydrographic work was interrupted and course was set for the shallow ground close inshore off Angoche. The acoustic-cum trawl survey was started in the morning of April 25 with stations southwards inside the islands and reefs towards Moma. The last remaining stations in the profile were occupied during the night and the survey was resumed on the 26th inshore past Pebane and continued down to the Zambezi delta up to April 29. From Angoche to Zambezi a total of 27 swept area hauls were worked, all half hour tows during daylight hours. In addition two hauls were made at night in the slope at 380 and 500 m for deep sea shrimp and six pelagic hauls were made for identification.

The profile out of Zambezi was started in the evening of April 29 and combined with the Bazaruto profile which was completed in the morning of May 1. That day was spent surveying the shelf north of Bazaruto. Surface schools were observed in this area. The night was spent steaming up to the Zambezi and May 2-5 were spent surveying the broad shelf down to Beira. The planned swept area programme in this area was too extensive and some parts had to be cancelled. In order to have a maximum of daylight hauls a high density of stations were maintained in the areas worked.

On May 4-5 attempts were made to retrieve the current meter rigs. The inner rig was picked up directly, but the outer rig was not found despite two 5-hour searches with radar, sonar, hydrophone and visual aid.

Near the edge of the shelf off Beira a concentration of scad was found and in this area a good catch of large sized snappers etc. was made together with a heap of sponges.

The nights May 5-7 were spent in acoustic surveying of the inner parts of the Sofala Bank. Only a few denser aggregations of pelagic fish were encountered. Bazaruto was passed on May 7 and a few stations worked down the coast where bottom conditions were difficult.

The profile Inhambane-eastwards reduced to 80 nm due to shortage of time was worked on May 7-8. Two hauls for deep sea shrimp were worked in the slope on the return course.

May 9 and10 were spent working the swept area programme on the Boa Paz Bank with acoustic surveying during the night.

The two southernmost hydrographical profiles were worked on May10-11 and May12-13 were spent on the swept area programme and surveying of the shelf area southwards to Inhaca with arrival in Maputo at noon May13.

CHAPTER 2 HYDROGRAPHY

The observations include continuous recording of the surface temperature and CTD stations in profiles and along the shelf as shown in Figure 1. The data will be processed and interpreted by IIP.

CHAPTER 3 DISTRIBUTION AND ABUNDANCE OF PELAGIC FISH FROM THE ACOUSTIC OBSERVATION SYSTEM

The acoustic integration system provides observations of fish densities. The units of acoustic reflection used is 0.1 * m^2/nm^2 reflecting surface. Because of low fish densities and a high number of species no attempt was made to allocate the integrator values among the types of fish, carangids, clupeids, engraulids and scombrids which contribute to them. This type of analysis may be tried in a general way later, on the basis of the catch rates and frequency of appearance of the various main groups by depth strata. Reference is made to ANNEX I for descriptions of the instruments and their use.

An arbitrary scale is used in the distribution charts to illustrate different levels of concentration.

Figure 2 shows the distribution of all fish based on the integrator readings which could be allocated to fish. The overall densities are low and one consequence of this is that the precision of the method becomes low because of the difficulties of discerning the mostly very scattered traces of fish from those of commonly occuring plankton and other irrelevant targets. It is not thought, however, that the conditions have caused any special bias. The general behaviour was for the fish to occur in dispersed single fish layers at night, some times in loose schools, and in denser aggregations and small schools in mid water or near the bottom in daytime.

From Angoche to Quelimane there was a continuous, but scattered distribution inside the shelf with some denser aggregations off Angoche and south of Pebane. The bottom and mid water trawl catches in this area contained the following proportions of pelagic fish: clupeids 48%, anchovies 27%, carangids 18% and scombrids 6%. All the fish except some Spanish mackerel were small sized. A biomass estimate of the areas covered gives 30 000 tons. If allowance is made for areas close to the reefs and islands which were not covered assuming a similar density of fish there, the estimate may be increased to 35 000 tons.

The fishability of these resources is related to the density in which they are found. About 20 000 tons of the total estimate of 30 000 tons or a 2/3 part was found in a thinly scattered distribution with a mean density of 12.5 t/nm^2, while the mean density of the remaining 10 000 tons was considerably higher at 69 t/nm^2.

Fish was found over nearly all of the wider shelf from Quelimane past Zambezi and Beira down to Bazaruto, see Figure 2. More extensive areas of denser aggregations were only encountered over the inshore bank, north and south of the Zambezi and offshore off Beira. The pelagic groups in the catches of both bottom and mid water hauls were represented in the following proportions: carangids 63%, scombrids mostly Spanish mackerel 20%, clupeids 8%, anchovies 4%, barracudas 3% and hairtails 2%. The estimated total biomass of this area is 180 000 tons. Of this 100 000 tons derive from a thinly scattered distribution over nearly 8 000 nm^2 having a mean density of 13 t/nm^2. The remaining 80 000 tons represent a mean density of 50 t/nm^2.

Previous estimates of the pelagic stocks of the Sofala Bank have reached 120-140 000 tons excluding anchovy. This surveys estimate of about 200 000 tons is thus somewhat higher, but the difference may lie within the precision of the method and perhaps in particular be related to the use of representative sizes for the various species. Sampling in mid water was very incomplete in the present survey due to other programs.

It is noteworthy that anchovy which in previous surveys have been found in generally high although varying abundance was very poorly represented in these findings. This could be caused by a seasonal or interannual fluctuation.

On the passage along the narrow shelf from Bazaruto to Ponta da Barra only low densities of fish were recorded. Some denser patches of small pelagic fish were observed in shallow water over the Boa Paz Bank as well as recordings of fish usually over rough bottom in deeper waters offshore. This pattern of distribution was also observed outside and north of Inhaca.

CAPTER 4 RESULTS OF FISHING EXPERIMENTS, CATCH COMPOSITIONS

All catches were sampled for composition in weight and numbers by species, and size sampling was made of important species, using total length. The complete records of fishing stations are shown in ANNEX III.

One should note that the catch rates would not simulate those of a commercial fishery as most of the fishing formed part of a programme for "swept area" biomass estimation for which the trawl stations are positioned in advance in a random system.

Except in deep water, hauls were of 30 minutes duration, but the catch data are presented standardized to kg/hour. All swept area hauls were made in daylight and tow direction was with the current.

Some of the results are commented on below. These data will otherwise be fully processed and interpreted by the responsible scientists of IIP, Maputo who planned this particular programme.

4.1 ANGOCHE TO THE ZAMBEZI RIVER

The fishing programme in this area included 27 swept area hauls inside the shelf, 2 for deep water shrimp in the slope and 6 hauls with mid water gear for identification.

Table 1 shows the standardized catch rates for main groups in the shelf hauls. The average total catch was 215 kg/hour with roughly equal amounts of pelagic and demersal fish, small amounts of cephalopods, shelf squids and a few cuttlefish, and sharks and a few fair catches of shallow water shrimp.

Table 2 shows the types of pelagic fish in the catches. The carangids were dominated by the scads, the clupeids by the pellona with some sardinellas, the anchovies by the orangemouth glassnose and the scombrids by Spanish mackerels with a few Indian mackerels. The hairtail was fairly common.

Pooled size compositions of the main species of these pelagic fish are shown in ANNEX II. They are mainly of small size with a mean of about 10 cm for the anchovies, 12 cm for the clupeids and 18 cm for the scads. The Spanish mackerels were large sized.

Table 3 shows the standardized catch rates for the main families of demersal fish. The mullets were represented by four species of goatfish, the blotched and silver lined grunts were the main species of that family, the emperor red snapper and the streaker were the main lutjanids and the croakers were the belangers and tigertooth species. Also the demersal fish were generally small sized except at stations 28 where a 15 minute tow gave about 90 kilos of large sized commercial fish (mean weight about 7 kg) mostly snappers but including grunts, emperors and jacks. Such aggregations are probably more common on hard ground than on trawlable bottom.

The two randomly positioned test hauls in the slope at 370 and 500 m of depth yielded about 10 and 35 kg/hour of good sized shrimp.

ST.NO.	DEP.	Pelagic	Demersal	Cephalopod	Sharks	Shrimp	Other
1	18	36.3	51.8	15.0			6.9
2	15	113.7	6.7	3.9		22.5	94.1
3	13	38.9	64.4				11.8
4	18	102.7	102.6			4.5	65.7
5	21	4.7	0.2	0.4		0.4	0.4
8	15	76.9	2.6		31.2	2.5	2.5
9	17	5.1	0.3	1.1			0.2
10	81	45.7		9.1			
11	32	6.0	0.2	0.8			2.8
12	13	90.2	115.5			69.6	12.1
13	17	27.8	36.6			7.4	33.6
16	17	67.5	31.4		4.2	0.2	240.0
17	23	28.3		6.0			
18	19	13.6	226.4	0.4	46.0		10.8
19	10	1169.0	0.4	0.4	14.0	111.8	0.4
20	38	17.2	14.9	0.6			2.6
21	71	237.4	9.2	9.7			25.8
25	15	278.2	309.0	3.0		23.6	0.4
26	29	11.0	1.8				0.1
27	50	9.8	1.5	3.2	17.0		19.3
28	47	18.0	298.6	0.6			124.6
29	55	1.8	2.0	0.4			1.9
30	74	5.7	83.0	3.5			12.2
31	68	19.6	275.5			6.0	212.1
33	23	12.3	3.9	8.0			0.9
34	25	93.1	252.0				1.2
35	32	88.6	12.3	3.0			1.2
MEAN		97.0	70.4	2.5	4.1	9.2	32.7

Total number of stations : 27

Table 1. Angoche to Zambezi. Catch rates by main groups in bottom trawl standardized to kg/hour.

ST.NO.	DEP.	Carangids	Clupeids	Anchovies	Scombrids	Bar.+Trich	Other
1	18	16.0	0.2	12.0	4.9	3.2	73.7
2	15	14.4	46.2	32.4	5.7	15.0	127.3
3	13	19.5	8.6	3.9	2.1	4.6	76.3
4	18	9.0	56.7	16.3	0.9	19.8	172.8
5	21	3.9			0.2	0.6	1.5
6		8.2	14.2	2.2	0.4	0.6	4.2
7		1.6	0.8	8.3	0.4	4.6	1.0
8	15	10.0	26.5	29.5		10.8	38.9
9	17			0.3	4.6	0.2	1.6
10	81	7.9			37.5	0.2	9.1
11	32	6.0					3.8
12	13	7.7	5.5	66.0		11.0	197.2
13	17	4.6	3.4	9.2	3.0	7.6	77.6
14		14.3	0.4	6.6	1.2	36.0	97.5
15			0.2	0.2		0.4	0.4
16	17		12.0	24.5	1.0	30.0	275.8
17	23				28.2	0.1	6.0
18	19	8.8	2.4	2.4			283.6
19	10	9.2	802.2	346.6	11.0		127.0
20	38	0.0			17.2		18.1
21	71	218.8			18.6		44.7
23	36	3.8			0.2	0.4	3.9
24		0.1		3.3			1.4
25	15	14.2	4.5	42.0		217.5	336.0
26	29				11.0		1.9
27	50	3.4			6.4		41.0
28	47	18.0					423.8
29	55	1.8					4.3
30	74	5.6				0.1	98.7
31	68	19.5		0.1			493.6
33	23	4.5			7.6	0.2	12.8
34	25	93.1					253.2
35	32	59.8			28.8		16.5
MEAN		17.6	29.8	18.3	5.7	11.0	100.7

Total number of stations : 33

Table 2. Angoche to Zambezi. Catch rates by families of pelagic fish in bottom-and midwater hauls. Kg/hour.

ST.NO.	DEP.	Croakers	Snappers	Grunts	Mullets	Ponyfish	Other
1	18			6.7	1.8	50.0	51.5
2	15	1.2		59.0	4.9	0.6	175.2
3	13			5.4	45.0	19.4	45.3
4	18	7.2		42.3	75.6	18.9	131.5
5	21						6.2
8	15	1.9		0.2	0.3	0.3	113.0
9	17					0.3	6.4
10	81						54.8
11	32						9.8
12	13	115.5		1.6			170.3
13	17	7.0		24.0	8.2	19.8	46.4
16	17	16.0		196.0	3.2	12.2	116.0
17	23						34.3
18	19				216.0	6.8	74.4
19	10				0.4		1295.6
20	38				4.9		30.4
21	71						282.1
25	15	132.0				3.0	479.2
26	29				1.0		11.8
27	50				0.4		50.4
28	47		240.8	74.0	0.6		126.4
29	55		0.2			1.8	4.1
30	74				1.8		102.6
31	68			162.7	242.5		108.0
33	23						25.1
34	25				214.0		132.3
35	32						105.1
MEAN		10.4	8.9	21.1	30.4	4.9	140.3

Total number of stations : 27

Table 3. Angoche to Zambezi. Catch rates by families of demersal fish in bottom hauls. Kg/hour.

4.2 ZAMBEZI TO BAZARUTO

A total of 45 swept area hauls were made in this area with four hauls with mid water trawl for identification and one tow at 500 m for deep water shrimp.

Table 4 shows the catch rates in the swept area hauls by main groups. The mean total catch is 275 kg/hour somewhat higher than in the northern sector and about equally devided between pelagic and demersal fish with an element of cephalopods of some importance, but insignificant rates of sharks and shrimp. Most of the cephalopods were shelf squids, nearly all referred to as *Loligo* species, provisionally identified as *Loligo duvauceli*. The highest catch rates of the squids were made in the 20-40 m depth range. Some cuttlefish were caught in the 40-60 and 60-80 m depth ranges. The length compositions (mantle) of samples of the squid are shown in ANNEX II. Squids often demonstrate an annual cycle in availability and this subject should also be analysed for the Mozambique stocks.

ST.NO.	DEP.	Pelagic	Demersal	Cephalopod	Sharks	Shrimp	Other
36	31	26.2	13.8	3.3		0.0	0.6
38	25	59.5	14.7	8.1			0.9
39	25	126.4	27.3	49.0			2.0
40	22	0.6	9.0	50.1		0.0	3.3
41	13	86.8	348.4	1.0	5.5	13.7	7.8
42	15	30.1	114.3				48.0
43	8	107.4		7.0			10.6
44	15	174.3	54.0	0.7			140.4
45	29	285.7	163.5	79.5	3.6		34.6
46	15	275.1	85.4	0.2		8.6	95.8
47	16	63.1	31.2	3.0		19.5	6.2
48	22	19.0	121.6		1.0		9.4
49	23	5.5	4.1	15.3			258.7
50	21	170.0	156.0		17.7	1.5	182.7
51	13	50.0	192.6	4.0			4.0
52	19	45.3	156.0	0.6		0.2	1.3
53	19	26.7	7.6	20.1			0.3
54	89	0.4	13.7	31.5	2.4		35.9
55	77	282.0	400.8				16.8
56	69	10.4	44.0	0.8			48.6
57	49	0.4	173.4				4.4
58	34	1.1	95.4	9.9			23.1
59	27	1.4	41.7	4.6			1.0
60	34	1.1	71.0	6.0			0.9
61	38	10.6	75.0	5.0		2.4	44.7
63	74	0.8	56.4	8.8	1.6		145.3
64	69	10.9	71.2	18.0			24.4
65	65	315.5	17.5	18.9			46.9
66	54	53.2	767.0	27.2		1.2	103.4
67	50	660.8	371.1				4.7
68	41	5.9	102.1	13.0			3.6
69	33	15.8	164.1	7.2	1.8		4.2
70	29	6.4	35.6	19.7			2.8
71	11	16.9	2.0		4.9		0.5
72	16	31.5	35.1	5.5			2.4
73	22	32.7	24.1	24.3			1.9
74	28	22.0	45.1	3.8			6.7
76	34	13.5	38.0	13.1			0.7
79	46	242.0	101.5	8.0			5.6
80	56	39.2	118.8	14.3			53.6
81	64	285.3	29.7	16.2			28.8
82	51	187.5	254.0	8.2			3.7
83	59	1042.5	331.6	6.9			0.9
84	55		98.8	0.0			204.7
85	56	29.0	42.5	63.7			113.8
MEAN		108.2	113.8	12.8	0.8	1.0	38.6

Total number of stations : 45

Table 4. Zambezi to Bazaruto. Catch rates by main groups in bottom trawl standardized to kg/hour.

Table 5 shows the catch rates by families of pelagic fish. The low representation of clupeids and anchovies should be noted. Of the carangid catches Indian scad were 68% and shortfin scad 18% with Malabar trevally 5%, bigeye scad 4% and kingfish 3%. The highest density of scads were in the 40-80 m depth range. The three highest catch rates for the Indian, shortfin and bigeye scads together were 900, 450 and 300 kg/hour. Size compositions of samples of the scads are shown in ANNEX II. Of the scombrids 2/3 were Spanish mackerel, 1/3 Indian mackerel. Spanish mackerel occurred over the whole survey area, specimens were generally large sized and the three highest catch rates were 140, 90 and 60 kg/hour.

ST.NO.	DEP.	Carangids	Clupeids	Anchovies	Scombrids	Bar+Trich	Other
36	31	5.7			20.5		17.8
37		0.1		0.1			261.0
38	25	49.0			10.2	0.3	23.9
39	25	42.8	52.5		30.4	0.7	78.3
40	22	0.4	0.0		0.1		62.5
41	13		1.8	38.8		46.2	376.4
42	15	10.8	1.8		17.1	0.4	162.3
43	8	58.8	0.7		47.9		17.6
44	15	36.4			17.8	120.0	195.2
45	29	148.6	26.2		110.9		281.2
46	15	10.1	169.2	66.3		29.5	190.0
47	16	12.2	14.0	16.1	0.8	20.0	59.9
48	22	15.0	2.4	1.6			132.0
49	23	5.2			0.3	0.0	278.1
50	21	45.6	21.8	61.7	35.1	5.7	358.0
51	13	12.9	0.3	28.8	8.0		200.6
52	19	12.3			33.0		158.2
53	19	0.3			26.4		28.0
54	89	0.4					83.5
55	77	279.6			2.4		417.6
56	69	10.4					93.4
57	49	0.4					177.8
58	34	1.0	0.0		0.0		128.4
59	27	1.4					47.3
60	34	1.0	0.0		0.1		77.9
61	38	2.0			8.6		127.1
63	74	0.8					212.1
64	69				10.9		113.6
65	65	302.6			12.9		83.3
66	54	20.8			32.4		898.8
67	50	454.3	0.7		205.8		375.8
68	41	5.5				0.4	118.7
69	33	0.0			14.6	1.2	177.4
70	29	0.0			6.4	0.0	58.2
71	11				14.3	2.6	7.4
72	16	11.1			20.4		43.0
73	22	1.6			31.1		50.3
74	28	9.5			12.3	0.2	55.6
75	5	2.1			52.7		218.3
76	34	4.0			9.5		51.9
77	10	35.5	51.7		17.4		1.3
78	5	6.8	5.7		1.0		0.7
79	46	156.2	0.3		85.5		115.1
80	56	20.7			18.5		186.7
81	64	283.5			1.8		74.7
82	51	187.3			0.1		266.0
83	59	911.2	27.6		103.7		339.4
84	55						303.5
85	56	29.0					220.0
MEAN		65.4	7.6	4.3	20.8	4.6	163.4

Table 5. Zambezi to Bazaruto. Catch rates by families of pelagic fish in bottom-and midwaterhauls. Kg/hour.

Table 6 gives the standardized catch rates of the most abundant families of demersal fish. Of the mullets the yellowstriped goatfish occurred down to 40 m of depth while the yellowfin goatfish was most abundant in the 40-60 m depth range. The lizardfish was most common between 20 and 60 m of depth. The threadfin breams was represented by the Delagoa species with highest rates beyond 40 m of depth. The size samples of these species which represented the main part of the demersal fish catch show small sized fish

with mean and modal lengths between 10 and 19 cm and few fish larger than 20 cm of length, see ANNEX II. Of the three families shown together in Table 6, the croakers were caught in shallow water and the snappers and grunts in the deeper parts. One catch of snappers and groupers on spongy ground had very large sized fish. A test haul in the slope at 550 m gave well over 20 kg of good sized shrimp.

ST.NO.	DEP.	Mullets	Ponyfish	Lizardfish	Thrf.bream	CroSnaGru	Other
36	31	7.4		3.8	2.4		30.3
38	25	0.0		14.7	0.0		68.7
39	25			26.6	0.7		177.5
40	22	7.5	0.0	1.5			54.1
41	13					325.0	138.2
42	15	2.7	111.6				78.1
43	8						125.1
44	15	33.7		20.2			315.5
45	29	48.0	1.5	101.2	12.8		403.4
46	15	29.4	32.7	18.9		82.1	302.0
47	16		1.4			10.0	111.6
48	22	120.0	1.6				29.4
49	23	1.1		2.8	0.2		279.5
50	21	95.2	38.2	22.0		127.8	244.7
51	13	138.2	17.6	36.8		3.2	54.8
52	19	128.7	4.5	22.7			47.5
53	19			7.6			47.2
54	89	0.4	0.4	11.5	1.4		70.2
55	77	366.0		1.2	33.6		298.8
56	69			7.4	29.6		66.8
57	49	29.6		42.8	13.6	87.2	5.1
58	34	37.2		37.2	21.0		34.2
59	27	9.0		24.9	7.8		7.0
60	34	26.0		25.0	20.0		8.1
61	38	10.5		55.5	9.0		62.7
63	74	14.8	29.2	9.2	3.2		156.5
64	69	37.2		25.2	8.8		53.3
65	65			17.5			381.3
66	54	219.8		473.6	73.6		185.0
67	50	216.3		118.8	36.0		665.5
68	41	36.1		53.2	12.8		22.5
69	33	6.0		150.3	7.8		29.1
70	29	0.0		35.5	0.1		29.0
71	11			2.0			22.3
72	16			32.4	0.3	2.4	39.4
73	22	6.3		3.8	13.1	0.4	59.4
74	28	6.5	1.4	35.2	1.0		33.5
76	34	1.5		22.2	14.2		27.4
79	46	22.5		35.0	44.0		255.6
80	56	85.0		16.2	9.1		115.6
81	64	15.3		8.1	6.3		330.3
82	51	6.6	216.4	0.1	0.1	30.6	199.5
83	59	4.6	317.4	0.4	9.2		1050.3
84	55					98.8	204.7
85	56	7.5	22.5	12.5			206.5
MEAN		39.4	17.7	34.1	8.7	17.0	158.4

Total number of stations : 45

Table 6. Zambezi to Bazaruto. Catch rates by families of demersal fish in bottom hauls. Kg/hour.

4.3 BAZARUTO TO INHACA

22 swept area hauls were made in this area, 14 of which covered the Boa Paz Bank. Table 7 shows the catch rates by main groups. Demersal fish dominate the catches with some sharks and squid. Table 8 shows that the assemblage of bottom fish in this southern area and in particular on the Boa Paz Bank is different from that found on the Sofala Bank with a high dominance of seabreams. The most common species were *Polysteganus coeruleopunctatus, Chrysoplephus puniceus* and *Pagellus natalensis* all found in deeper waters. Judging from the echo sounder records where fish traces close to the bottom were mostly found over hard rough bottom, it seems doubtful whether trawl catches will provide unbiased observations of the density of demersal fish in this area.

ST.NO.	DEP.	PELAGIC	DEMERSAL	SHARKS	SQUID	Other
86	49		186.60		15.20	14.04
87	61	0.16	45.90		25.12	8.66
88	109		45.00		15.42	8.94
89	84	0.60	2.50	41.40	0.30	6.40
90	30	11.74			1.71	0.17
93	47	46.80	632.90	0.40	6.10	37.00
94	108		99.50	24.00	16.00	16.80
95	70			111.12	54.67	4.89
96	35	11.46	4.44		12.10	4.28
97	46	45.92	7.32		7.10	1.72
98	55	2.92	10.68		1.42	6.84
99	146	49.60	376.80			42.70
100	18	8.09			1.50	2.08
101	117	2.80	489.90	68.40		47.80
102	128	7.60	18.20		9.20	53.10
103	174	3.20	3.00	8.00	1.30	33.70
104	92	38.44	8.61	15.23	7.85	11.41
105	27	41.94	5.36		7.15	17.03
106	43	38.70	41.46		1.50	0.39
107	50	11.40	21.50		14.30	0.70
108	42	20.50	129.20		3.20	15.60
109	86	0.04	9.66	16.70	35.10	0.08
110	21	19.70	0.80		7.80	
111	47	62.92	0.60		6.80	18.00
MEAN		18.63	89.16	11.89	10.52	14.85

Table 7. Bazaruto to Inhaca. Catch rates by main groups in bottom trawl standardized to kg/hour.

ST.NO.	DEP.	SEABREAMS	SNAPPERS	CROAKERS	EMPERORS	MULLETS	Other
86	49	2.52				90.88	122.44
87	61					30.60	49.24
88	109	31.00	1.20			12.80	24.36
89	84					0.80	50.40
93	47	527.30	11.30		62.70	28.80	93.10
94	108	50.80	11.50				94.00
95	70						170.68
96	35	2.90					29.38
97	46	0.04					62.02
98	55	2.04				0.04	19.78
99	146	300.00		56.00			113.10
101	117	481.70				0.20	127.00
102	128	6.60		0.30			81.20
103	174			1.30			47.90
104	92	0.05				0.02	81.47
105	27						71.48
106	43	0.06				41.40	40.59
107	50	2.00					45.90
108	42	18.20	108.60			0.20	41.50
109	86	9.62					51.96
110	21						28.30
111	47						88.32
MEAN		65.22	6.03	2.62	2.85	9.35	69.73

Total number of stations : 22

Table 8,Bazaruto to Inhaca. Catch rates by families of demersal fish in bottom hauls. Kg/hour.

CHAPTER 5 SUMMARY OF FINDINGS AND GENERAL COMMENTS

The three main survey objectives, a swept area trawl programme covering the shelf from Angoche to Inhaca, an acoustic programme of the same area and a special hydrographical programme were achieved largely in accordance with the plans. Some modifications had to be made in the number of observations set out for the trawl and hydrographical programmes, but it is not thought that these will reduce the value of the data sets to any significant degree. The details of coverage of the acoustic programme were insufficient in some areas as was also the sampling of targets with the mid water gear.

The hydrographical observations will be processed and reported on by IIP.

The acoustic integration system showed that pelagic fish was distributed over the greater part of the shelf area, but mostly scattered with low densities. Clupeids dominated in the north and carangids, especially scads over the broad bank southwards. Estimates of biomass of the pelagic fish were 30 000 tons for the shelf from Angoche to Quelimane and 180 000 tons from Quelimane to Bazaruto. About 120 000 tons of this total was found at low densities, 12-13 t/nm over wide parts of the bank, while the remaining 90 000 tons occurred in limited areas with higher densities 50-70 t/nm. The fishability of the pelagic fish would generally be low in the areas of low density. But judging from the recordings it even seems doubtful whether the schools and layers observed in the areas of higher fish density are sufficiently concentrated to make exploitation by purse seines a practicable and economic proposition. Little time was, however, spent on details of behaviour in this survey, but it is recommended that the question of fishability should be especially adressed in the August survey.

Previous estimates of the pelagic fish biomass in this area have reached 120-140 000 tons excluding anchovy. The figure obtained from this survey, about 200 000 tons, although somewhat higher is still thought to lie within the precision of the method. Anchovy which has been found in high although varying abundance in previous surveys was very poorly represented this time.

The full processing and interpretation of the catch data from the swept area trawl survey will be undertaken by the IIP and only some comments on catch rates and on the composition of the catches will be made here.

The trawl survey programme over the northern parts of the bank from Angoche to the Zambezi gave an average catch rate of 215 kg/hour, about equally devided between pelagic and demersal species with small amounts of cephalopods and sharks and a few fair catches of shallow water shrimp. A few of the 27 hauls gave relatively high catches, the three highest being 1 300, 600 and 350 kg/hour. The pelagic species were a mixture mainly of small sized clupeids, carangids, and anchovies and some Indian mackerel with lower contributions of larger predators, Spanish mackerels, barracudas and hairtails. Of the demersal species various small sized goatfishes dominated, but with croakers inshore and snappers, emperors and grunts offshore. Of the last mentioned grouo of species one

catch of very large sized fish was made on the outer bank. It seems likely that such fish will be underrepresented in a trawl programme because they prefer hard untrawlable ground. They could probably best be exploited by hook fishing.

The mean standardized catch rate on the shelf from Zambezi to Bazaruto was 275 kg/hour with three highest rates of about 1 400, 1 000 and 800 kg/hour. Again the pelagic and the demersal groups have roughly the same representation, but with higher catch rates than in the northern area of cephalopods, mostly shelf squids. The three highest rates for these were 80, 60 and 50 kg/hour obtained at intermediate depths. These rates may represent indications of the mean rates that could be obtained in a directed fishery for the squids keeping in mind that the random trawl survey made in the present programme does not simulate catch rates in a commercial fishery. The squids usually show seasonal cycles in availability, and it is recommended that this question should be studied in the following surveys by some trial fishing in the appropriate depth range.

The component of pelagic fish in the catches from Zambezi to Bazaruto was dominated by carangids, mostly scads, with minor contributions from sardines and anchovies and some Indian mackerel. Of the predators Spanish mackerel occurred over the whole area with large sized specimens, the three highest catch rates giving 140, 90 and 60 kg/hour.

The dominating forms of the demersal group were the small sized goatfishes, lizardfish, and ponyfishes with some threadfin bream. Some croakers appeared in the shallow inshore hauls and snappers offshore. Also here a catch of large sized snappers and groupers was made near the slope, this time on spongy medium hard bottom indicating the existence of stocks of these fish along the edge of the platform.

Three test hauls were made in the slope at night at 370-550 m of depth north of 20°S with catches of 10 - 35 kg/hour of good sized shrimp, mainly the species *Halioporoides thriarthrus*. These grounds should be included in the survey of the slope resources planned for November-December.

Small surface schools of apparently medium sized, but unidentified fish were observed in various locations near the shelf edge especially off and north of Bazaruto.

The swept area programme with 22 hauls between Bazaruto and Inhaca showed that the assemblage of demersal fish here and in particular on the Boa Paz Bank differs from that of the Sofala Bank in being dominated by various species of seabreams. Since echo sounder traces of near bottom fish was mostly found over rough stretches of bottom it seems perhaps doubtful whether trawl catches will provide unbiased observations of the density of these types of fish.

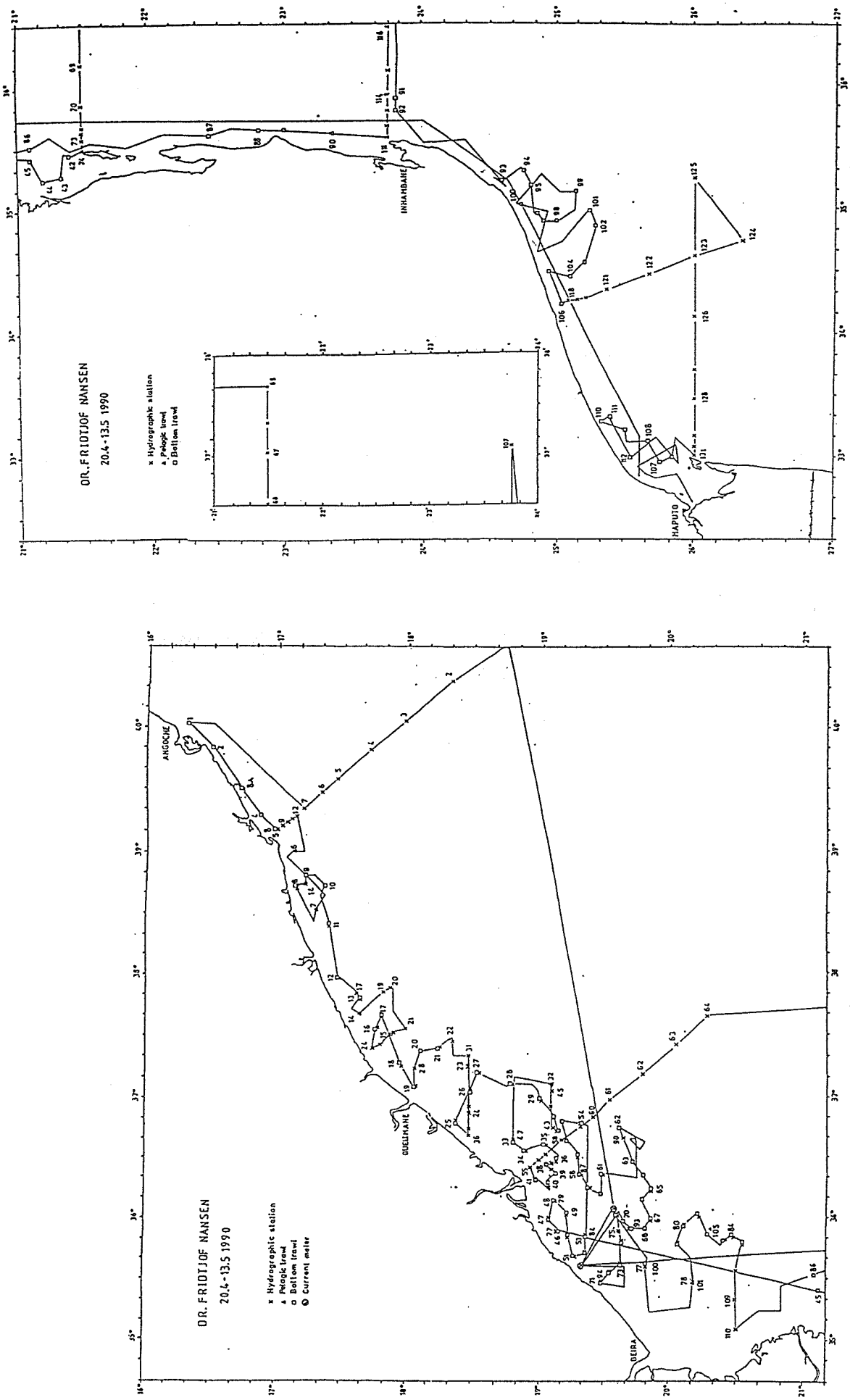


Figure 1. Course tracks, fishing-and hydrographical stations.

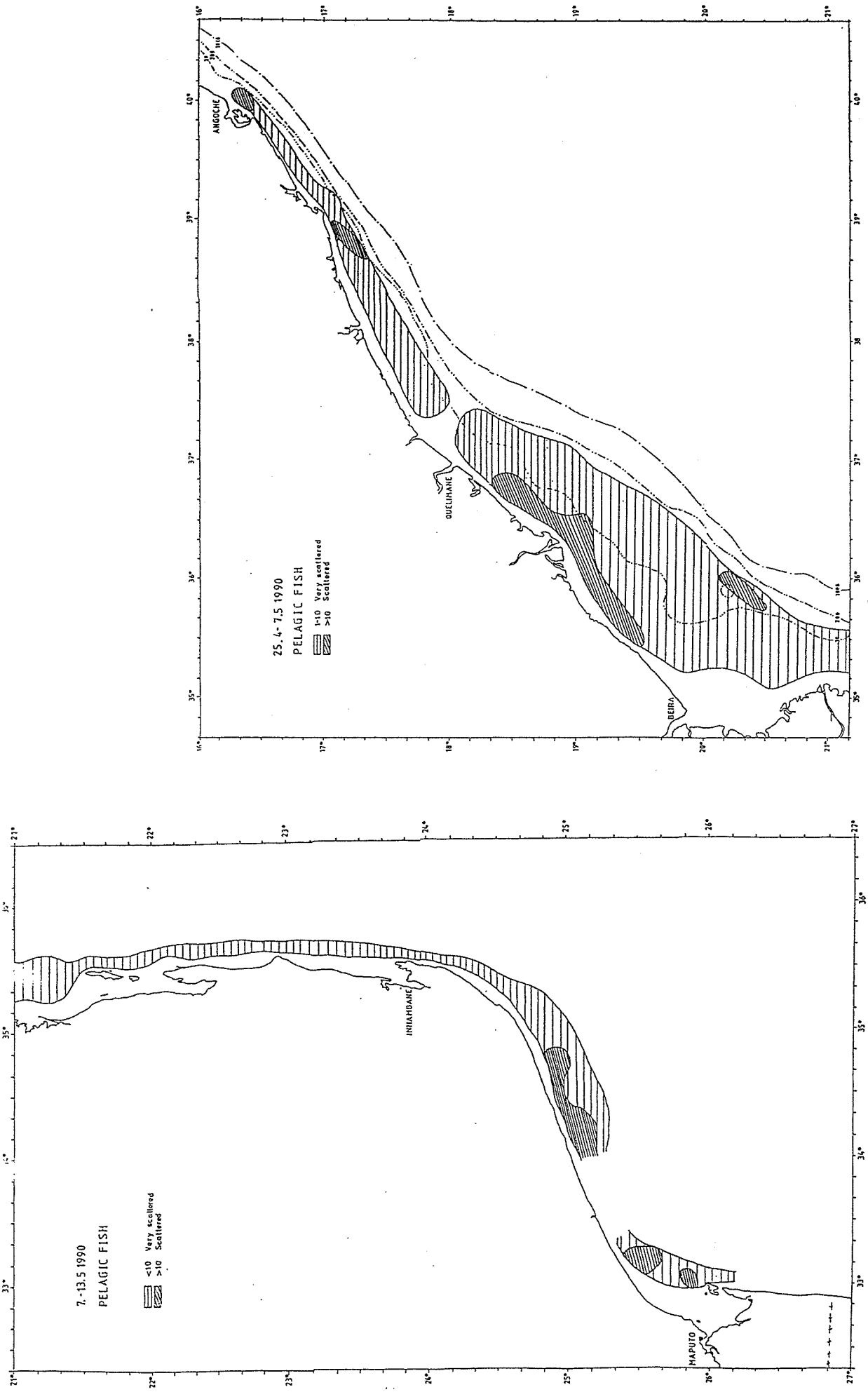


Figure 2. Distribution of fish from observations of the acoustic integration system.

ANNEX I 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:

	EK400/38	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	0.5 ms	1 ms
TVG	20 log R	20 log R
Attenuator	20 dB	0
Rec. gain	7	5
Transducer	Split beam	Ceramic 10cm

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

QM settings: Gain 20 dB x 10. Threshold 7

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

A calibration experiment using a standard copper sphere performed in Bahia dos Tigres, Angola on March 7, 1990 gave the following results:
30x30 transducer: SL+VR 142.3, instr.constants 1ms 0.77, 0.5 ms 1.85; gain QD: 1ms 28.9, o.5 ms 32.7. ES transducer: SL+VR 135.4, instr.constant 4.09, gain QD 36.1.

HYDROGRAPHY

Use was made of a CTD sonde belonging to IIP. The instrument was calibrated against casts with Nansen bottles.

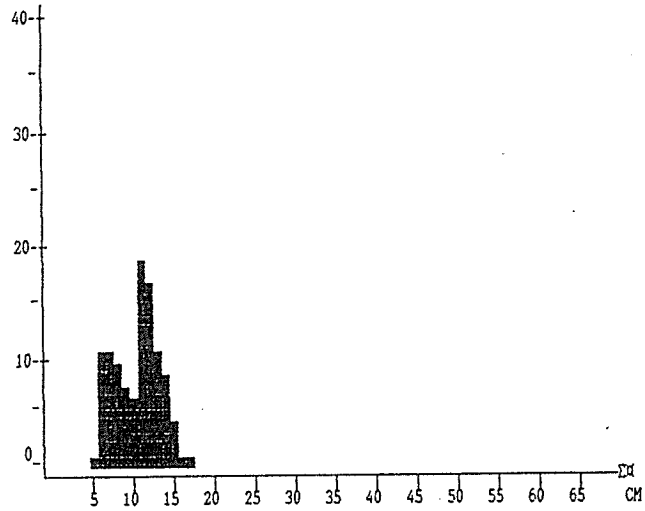
FISHING GEAR

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

Pelagic trawl: Bottom trawl was used with floats for surface tows in shallow water and in deeper water a modified "Harstadtrawl" with a vertical opening of 20-25 m was used.

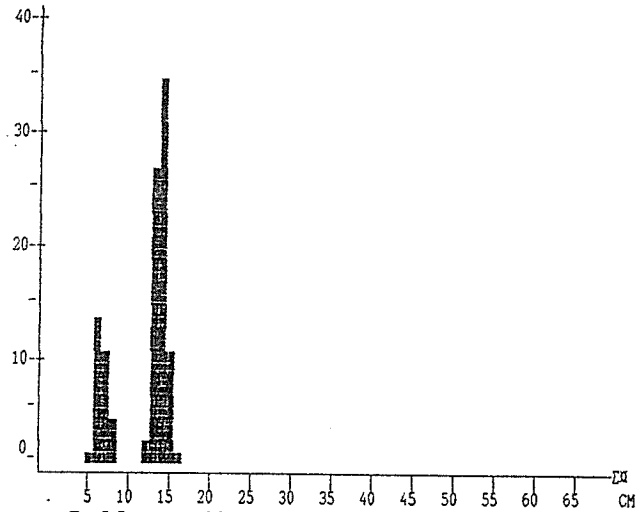
Cod ends of trawls with fine meshed inner lining.

ANNEX II LENGTH DISTRIBUTION OF COMMON SPECIES.



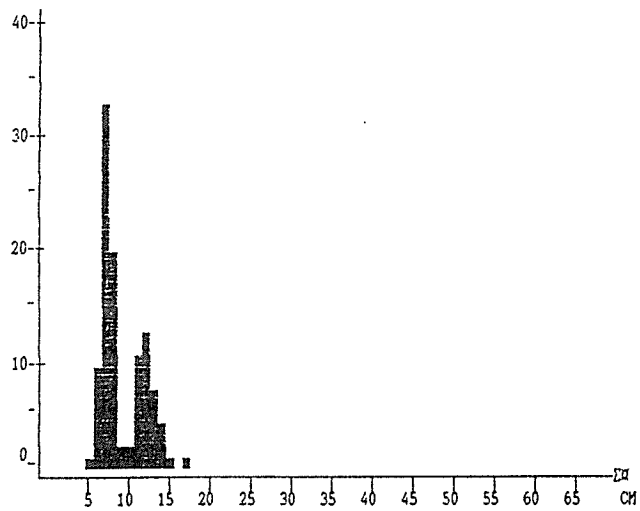
Thryssa vitrirostris
ANGOCHE-ZAMBEZI

Pooled sample (simple adding)
MEAN LENGTH = 10.45cm N= 901
NUMBER OF SUBSAMPLES : 6



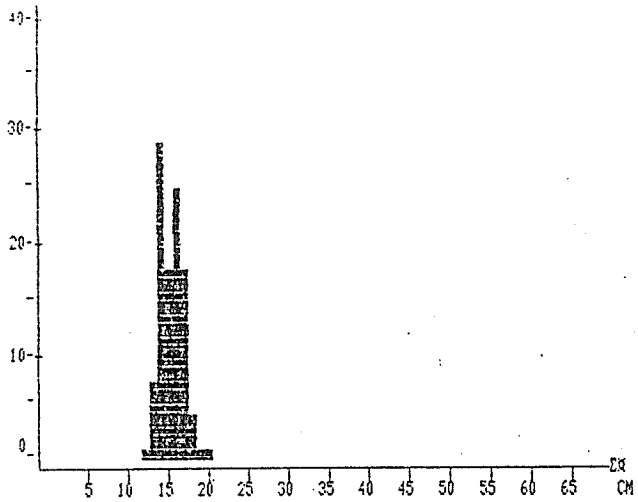
Pellona ditchela
ANGOCHE-ZAMBEZI

Pooled sample (simple adding)
MEAN LENGTH = 11.80cm N= 315
NUMBER OF SUBSAMPLES : 3



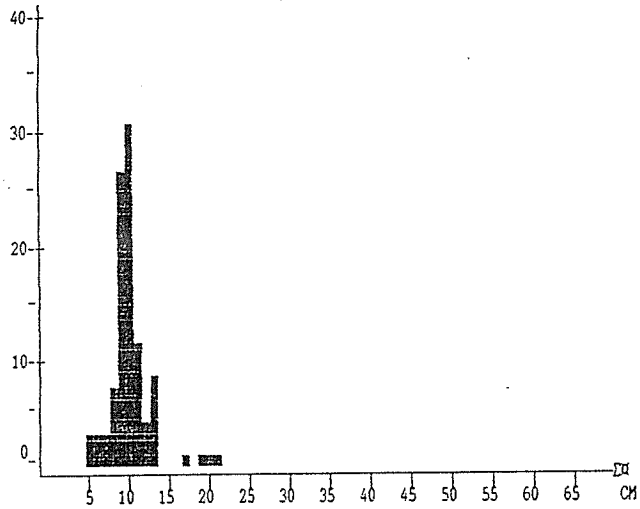
Sardinella melanura
ANGOCHE-ZAMBEZI

Pooled sample (simple adding)
MEAN LENGTH = 9.08cm N= 288
NUMBER OF SUBSAMPLES : 2



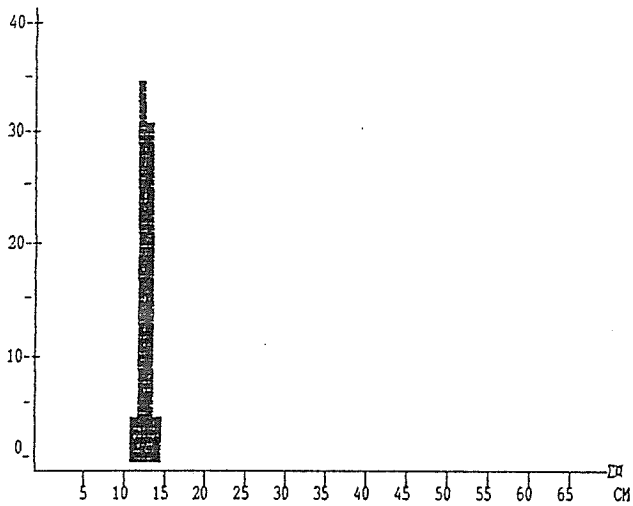
Decapterus russelli
Angoche - Zambezi

Pooled sample (simple adding)
MEAN LENGTH = 15.28cm N= 179
NUMBER OF SUBSAMPLES : 3



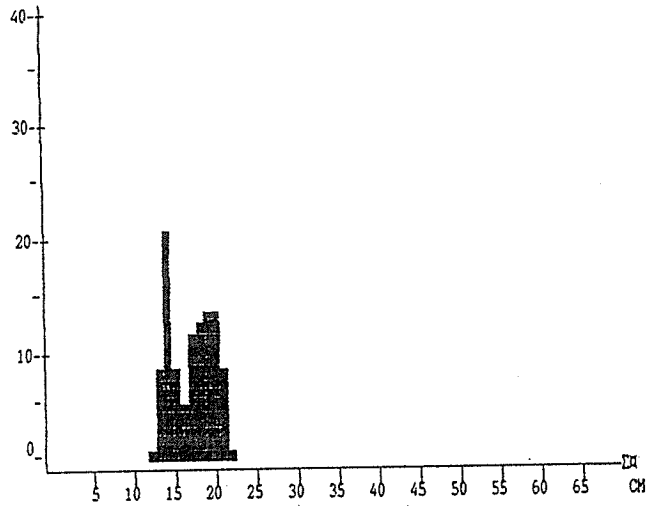
Atule mate
ANGOCHE-ZAMBEZI

Pooled sample (simple adding)
MEAN LENGTH = 10.22cm N= 146
NUMBER OF SUBSAMPLES : 2



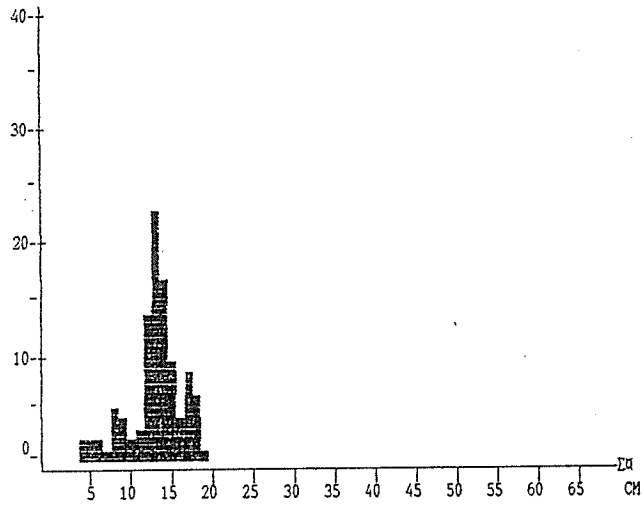
Rastrelliger kanagurta
ANGOCHE-ZAMBEZI

Pooled sample (simple adding)
MEAN LENGTH = 12.34cm N= 47
NUMBER OF SUBSAMPLES : 1



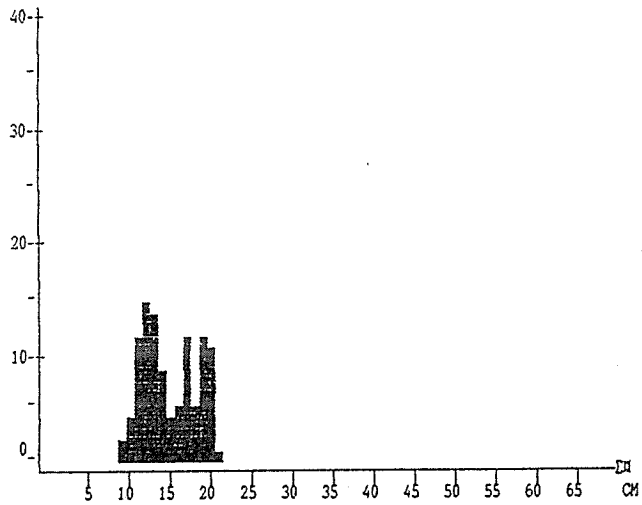
Rastrelliger kanagurta
ZAMBEZI-BAZARUTO

Pooled sample (simple adding)
MEAN LENGTH = 16.96cm N= 331
NUMBER OF SUBSAMPLES : 6



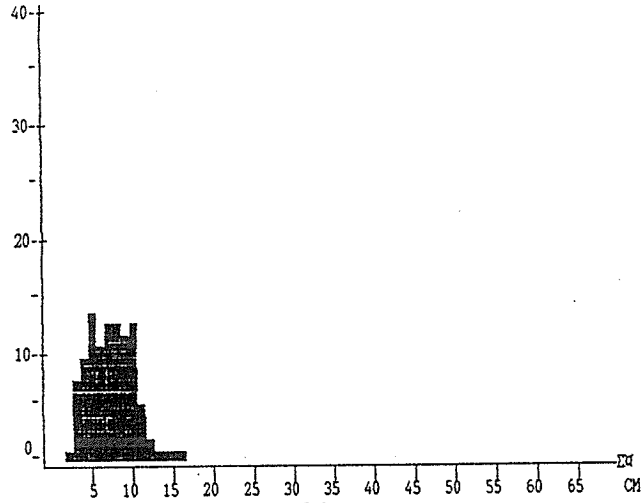
Decapterus russelli
ZAMBEZI-BAZARUTO

Pooled sample (simple adding)
MEAN LENGTH = 12.93cm N= 1447
NUMBER OF SUBSAMPLES : 16



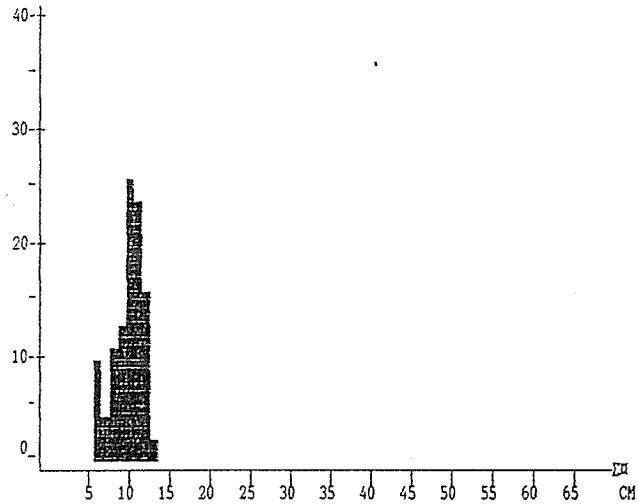
Decapterus macrosoma
ZAMBEZI-BAZARUTO

Pooled sample (simple adding)
MEAN LENGTH = 14.85cm N= 322
NUMBER OF SUBSAMPLES : 4



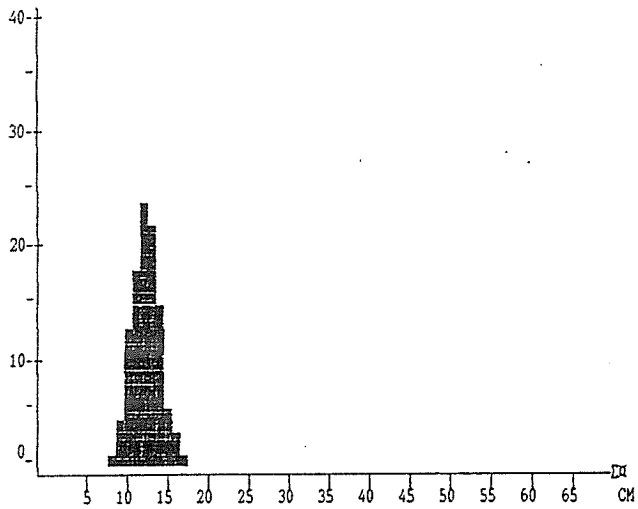
Loligo duvauceli
ZAMBEZI-BAZARUTO

Pooled sample (simple adding)
MEAN LENGTH = 7.45cm N= 847
NUMBER OF SUBSAMPLES : 12



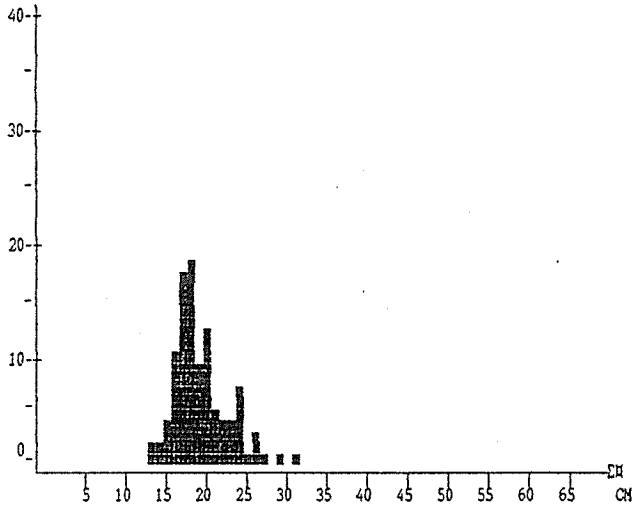
Upeneus vittatus
ZAMBEZI-BAZARUTO

Pooled sample (simple adding)
MEAN LENGTH = 9.79cm N= 774
NUMBER OF SUBSAMPLES : 7



Upeneus bensasi
ZAMBEZI-BAZARUTO

Pooled sample (simple adding)
MEAN LENGTH = 12.23cm N= 907
NUMBER OF SUBSAMPLES : 12



Saurida undosquamis
ZAMBEZI-BAZARUTO

Pooled sample (simple adding)
MEAN LENGTH = 19.04cm N= 752
NUMBER OF SUBSAMPLES : 8

ANNEX III RECORDS OF FISHING STATIONS

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 1
DATE :25/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 16°18.00
start stop duration Lon E 40°4.02
TIME :07:52:00 08:22:00 30.0 (min) Purpose : 3
LOG : 3226.70 3228.20 1.5 Region : 1
FDEPTH: 18 17 Gear cond.: 0
BDEPTH: 18 17 Validity : 0
Towing dir: 210° Wire out : 100 m Speed : 3.0 kn
Sorted : 24 Total catch: 55.04 Catch/hour: 110.08

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Secutor insidiator	50.00	9654	45.42	2
LOLIGINIDAE	15.00	1552	13.63	
Encrasicholina heteroloba	12.00	4000	10.90	1
Scomberoides commersonianus	10.60	2	9.63	
Pomadasys maculatus	6.72	72	6.10	
Atule mate	5.00	20	4.54	
Rastrelliger kanagurta	3.32	188	3.02	3
Upeneus vittatus	1.84	76	1.67	
Sphyraena jello	1.80	36	1.64	
Scomberomorus commerson	1.60	14	1.45	
Sphyraena chrysotaenia	1.40	16	1.27	
Selar crumenophthalmus	0.40	156	0.36	
Chirocentrus dorab	0.20	4	0.18	
Sardinella gibbosa	0.20	56	0.18	
ARIOMMIDAE	0.00	4	0.00	
BALISTIDAE	0.00	4	0.00	
Carangoides ferdau	0.00	16	0.00	
Carangoides hedlandensis	0.00	36	0.00	
Decapterus russelli	0.00	8	0.00	
Stolephorus indicus	0.00	4	0.00	
Gerres filamentosus	0.00	4	0.00	
Leiognathus lineolatus	0.00	4	0.00	
Upeneus moluccensis	0.00	4	0.00	
Penaeus semisulcatus	0.00	4	0.00	
Total	110.08		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 2
DATE :25/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 16°33.00
start stop duration Lon E 39°46.02
TIME :10:42:00 11:12:00 30.0 (min) Purpose : 3
LOG : 3250.90 3252.40 1.5 Region : 1
FDEPTH: 14 15 Gear cond.: 0
BDEPTH: 14 15 Validity : 0
Towing dir: 60° Wire out : 125 m Speed : 3.0 kn
Sorted : 33 Total catch: 120.54 Catch/hour: 241.08

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Thryssa vitrirostris	32.40	2094	13.44	4
Pomadasys commersonni	31.70	12	13.15	
Pomadasys maculatus	27.30	1596	11.32	
Pellona ditchela	16.20	702	6.72	5
Sphyraena chrysotaenia	14.40	306	5.97	
Pelates quadrilineatus	14.10	540	5.85	
Penaeus japonicus	13.50	480	5.60	
Sardinella gibbosa	12.60	252	5.23	6
Polynemus sextarius	12.60	510	5.23	
Sardinella melanura	10.50	342	4.36	
Dussumieria acuta	6.90	156	2.86	
Parastromateus niger	5.80	6	2.41	
Scomberomorus commerson	5.70	132	2.36	
Megalaspis cordyla	5.40	264	2.24	
Chirocentrus dorab	5.40	36	2.24	
Metapenaeus monoceros	5.40	672	2.24	
Upeneus sulphureus	4.80	216	1.99	
LOLIGINIDAE	3.90	150	1.62	
Scomberoides tol	3.00	42	1.24	
Penaeus indicus	2.40	102	1.00	
Penaeus monodon	1.20	18	0.50	
STROMATEIDAE	1.20	24	0.50	
Lagocephalus sp.	1.20	36	0.50	
Ariomma indica	0.60	12	0.25	
Secutor insidiator	0.60	30	0.25	
Johnius dussumieri	0.60	30	0.25	
Otolithes ruber	0.60	24	0.25	
Trichiurus lepturus	0.60	18	0.25	
Carangoides ferdau	0.18	54	0.07	
Upeneus vittatus	0.18	18	0.07	
Alectis indicus	0.06	12	0.02	
Pomadasys kaakan	0.06	6	0.02	
Apogon quadrifasciatus	0.00	12	0.00	
Carangoides malabaricus	0.00	6	0.00	
Gazza minuta	0.00	12	0.00	
Sillago sihama	0.00	6	0.00	
Terapon jarbua	0.00	18	0.00	
Total	241.08		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 3
DATE :25/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 16°45.00
start stop duration Lon E 39°27.00
TIME :14:02:00 14:32:00 30.0 (min) Purpose : 3
LOG : 3282.60 3284.30 1.5 Region : 1
FDEPTH: 13 13 Gear cond.: 0
BDEPTH: 13 13 Validity : 0
Towing dir: 70° Wire out : 150 m Speed : 3.0 kn
Sorted : 32 Total catch: 57.62 Catch/hour: 115.24

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Upeneus vittatus	33.30	932	28.90	7
Secutor insidiator	16.20	926	14.06	
Parastromateus niger	15.12	4	13.12	
Upeneus sulphureus	11.70	584	10.15	
Dussumieria acuta	5.40	140	4.69	
Pomadasys maculatus	5.40	100	4.69	
Sphyraena chrysotaenia	4.68	64	4.06	
Stolephorus indicus	3.96	386	3.44	
Pellona ditchela	3.24	98	2.81	
Gerres oyena	2.88	28	2.50	
Leiognathus equulus	2.52	82	2.19	
Polynemus sextarius	2.34	26	2.03	
Carangoides malabaricus	1.80	32	1.56	
Scomberoides tol	1.80	8	1.56	
Scomberomorus commerson	1.80	14	1.56	
Pterois mombasae	1.08	4	0.94	
Carangoides armatus	0.72	4	0.62	
Gazza minuta	0.72	32	0.62	
Rastrelliger kanagurta	0.36	4	0.31	
Pomadasys stridens	0.08	8	0.07	
Terapon jarbua	0.08	4	0.07	
Alectis ciliaris	0.06	10	0.05	
Apogon quadrifasciatus	0.00	4	0.00	
Alectis indicus	0.00	8	0.00	
PORTUNIDAE	0.00	4	0.00	
Penaeus monodon	0.00	8	0.00	
Total	115.24		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 4
DATE :25/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 16°52.02
start stop duration Lon E 39°18.00
TIME :15:55:00 16:25:00 30.0 (min) Purpose : 3
LOG : 3297.30 3299.30 1.5 Region : 1
FDEPTH: 18 17 Gear cond.: 0
BDEPTH: 18 17 Validity : 0
Towing dir: 215° Wire out : 100 m Speed : 3.0 kn
Sorted : 30 Total catch: 137.80 Catch/hour: 275.60

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pellona ditchela	56.70	4302	20.57	
Upeneus vittatus	51.30	2088	18.61	
Upeneus sulphureus	24.30	1016	8.82	
Pomadasys stridens	24.30	1036	8.82	
Sphyraena chrysotaenia	18.90	352	6.86	
Pomadasys maculatus	18.00	756	6.53	
Thryssa vitrirostris	16.20	2574	5.88	
Secutor insidiator	16.20	1332	5.88	
Polynemus sextarius	12.60	684	4.57	
Otolithes ruber	7.20	18	2.61	
Parastromateus niger	6.30	8	2.29	
Terapon jarbua	6.30	44	2.29	
Metapenaeus monoceros	2.70	306	0.98	
Apogon quadrifasciatus	1.80	126	0.65	
Scomberoides tol	1.80	18	0.65	
Gerres oyena	1.80	44	0.65	
Leiognathus elongatus	1.80	234	0.65	
Penaeus japonicus	1.80	234	0.65	
Megalaspis cordyla	0.90	8	0.33	
Leiognathus equulus	0.90	144	0.33	
Rastrelliger kanagurta	0.90	8	0.33	
Saurida undosquamis	0.90	8	0.33	
Lagocephalus inermis	0.90	28	0.33	
Trichiurus lepturus	0.90	18	0.33	
Stolephorus indicus	0.10	108	0.04	
Ariomma indica	0.00	8	0.00	
Alepes djedaba	0.00	8	0.00	
Dussumieria acuta	0.00	18	0.00	
Gazza minuta	0.00	8	0.00	
Penaeus indicus	0.00	18	0.00	
Total	275.50		99.96	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 5
DATE :25/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 17°0.00
start stop duration Lon E 39°12.00
TIME :17:30:00 18:00:00 30.0 (min) Purpose : 3
LOG : 3309.70 3311.20 1.5 Region : 1
FDEPTH: 21 20 Gear cond.: 0
BDEPTH: 21 20 Validity : 0
Towing dir: 230° Wire out : 125 m Speed : 3.0 kn
Sorted : 0 Total catch: 3.10 Catch/hour: 6.20

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus russelli	3.20	90	51.61	8
Carangoides ferdau	0.40	32	6.45	
Sphyraena jello	0.40	2	6.45	
LOLIGINIDAE	0.40	16	6.45	
Chirocentrus dorab	0.20	2	3.23	
Rastrelliger kanagurta	0.20	18	3.23	
Sphyraena chrysotaenia	0.20	6	3.23	
Saurida micropectoralis	0.20	2	3.23	
Alectis indicus	0.10	14	1.61	
Decapterus macrosoma	0.10	16	1.61	
Selar crumenophthalmus	0.10	4	1.61	
CARIDEA	0.10	32	1.61	
Penaeus japonicus	0.10	8	1.61	
Penaeus latisulcatus	0.10	6	1.61	
Metapenaeus monoceros	0.10	10	1.61	
Terapon theraps	0.10	4	1.61	
PORTUNIDAE	0.04	2	0.65	
Gerres filamentosus	0.04	2	0.65	
Penaeus indicus	0.04	2	0.65	
Trachinocephalus myops	0.04	2	0.65	
Cynoglossus sp.	0.02	2	0.32	
Fistularia petimba	0.02	2	0.32	
Squilla sp.	0.00	6	0.00	
Total	6.20		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 6
DATE :25/04/1990 GEAR TYPE: PT NO: 0 POSITION:Lat S 17°7.02
start stop duration Lon E 38°58.98
TIME :23:05:00 23:35:00 30.0 (min) Purpose : 1
LOG : 3345.00 3346.40 1.4 Region : 1
FDEPTH: 0 0 Gear cond.: 0
BDEPTH: 11 11 Validity : 0
Towing dir: 60° Wire out : 150 m Speed : 3.0 kn
Sorted : 14 Total catch: 14.83 Catch/hour: 29.66

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Pellona ditchela	6.40	548	21.58	9
Sardinella melanura	5.60	304	18.88	10
Parastromateus niger	4.00	10	13.49	
Secutor insidiator	3.00	248	10.11	
Scomberoides tol	2.20	44	7.42	
Dussumieria acuta	2.20	48	7.42	
Thryssa vitrirostris	2.00	92	6.74	
Alepes djedaba	1.40	4	4.72	
Trichiurus lepturus	0.60	18	2.02	
Chirocentrus dorab	0.40	2	1.35	
Johnius belangerii	0.40	4	1.35	
Rastrelliger kanagurta	0.40	4	1.35	
Carangoides armatus	0.20	2	0.67	
Decapterus russelli	0.20	2	0.67	
Encrasicholina heteroloba	0.20	186	0.67	
Upeneus sulphureus	0.20	10	0.67	
Mene maculata	0.10	2	0.34	
Upeneus vittatus	0.10	6	0.34	
Carangoides malabaricus	0.06	4	0.20	
Alectis ciliaris	0.00	2	0.00	
Carangoides ferdau	0.00	2	0.00	
Stolephorus indicus	0.00	4	0.00	
Stolephorus devisi *	0.00	18	0.00	
Leiognathus elongatus	0.00	2	0.00	
Lagocephalus inermis	0.00	2	0.00	
Total	29.66		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 7
DATE :26/04/1990 GEAR TYPE: PT NO: 0 POSITION:Lat S 17°18.00
start stop duration Lon E 38°31.98
TIME :03:25:00 03:55:00 30.0 (min) Purpose : 1
LOG : 3383.80 3385.20 1.4 Region : 1
FDEPTH: 0 0 Gear cond.: 0
BDEPTH: 27 27 Validity : 0
Towing dir: 40° Wire out : 150 m Speed : 3.0 kn
Sorted : 8 Total catch: 8.37 Catch/hour: 16.74

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Encrasicholina heteroloba	7.50	2138	44.80	11
Sphyraena chrysotaenia	4.40	18	26.28	
Scomberoides tol	1.60	18	9.56	
Thryssa vitrirostris	0.80	30	4.78	
Sardinella melanura	0.60	12	3.58	
Cheilopogon sp.	0.40	2	2.39	
Upeneus vittatus	0.40	4	2.39	
Sardinella gibbosa	0.20	6	1.19	
Rastrelliger kanagurta	0.20	2	1.19	
Scomber japonicus	0.20	4	1.19	
LOLIGINIDAE	0.20	10	1.19	
Trichiurus lepturus	0.20	4	1.19	
Secutor insidiator	0.04	14	0.24	
Carangoides ferdau	0.00	2	0.00	
Selar crumenophthalmus	0.00	4	0.00	
Pervagor melanocephalus	0.00	4	0.00	
Upeneus sulphureus	0.00	2	0.00	
Total	16.74		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 8
DATE :26/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 17°9.00
start stop duration Lon E 38°40.98
TIME :06:19:00 06:49:00 30.0 (min) Purpose : 3
LOG : 3408.80 3410.20 1.4 Region : 1
FDEPTH: 14 15 Gear cond.: 0
BDEPTH: 14 15 Validity : 0
Towing dir: 65° Wire out : 125 m Speed : 3.0 kn
Sorted : 44 Total catch: 57.05 Catch/hour: 114.10

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Thryssa vitrirostris	29.10	1866	25.50	12
Pellona ditchela	20.40	1686	17.88	
Carcharhinus limbatus	16.00	2	14.02	
Sphyrna lewini	15.20	4	13.32	
Trichiurus lepturus	10.50	48	9.20	
Parastromateus niger	9.10	28	7.98	
Sardinella melanura	3.90	708	3.42	13
Sardinella gibbosa	2.10	354	1.84	
Platax orbicularis	2.00	2	1.75	
Penaeus indicus	1.60	56	1.40	
Megalaspis cordyla	0.60	6	0.53	
Scomberoides tol	0.30	2	0.26	
Thryssa setirostris	0.30	30	0.26	
Secutor insidiator	0.30	76	0.26	
Upeneus sulphureus	0.30	30	0.26	
Otolithes ruber	0.30	6	0.26	
Metapenaeus monoceros	0.30	40	0.26	
Sphyraena chrysotaenia	0.30	60	0.26	
Polynemus sextarius	0.20	12	0.18	
Metapenaeus stebbingi	0.20	12	0.18	
Dussumieria acuta	0.16	8	0.14	
Stolephorus devisi *	0.16	156	0.14	
Pomadasys maculatus	0.16	40	0.14	
Umbrina sp.	0.16	4	0.14	
Saurida micropectoralis	0.16	4	0.14	
Pomadasys stridens	0.10	6	0.09	
PENAEIDAE	0.10	30	0.09	
Terapon theraps	0.10	6	0.09	
Apogon quadrifasciatus	0.00	2	0.00	
Mene maculata	0.00	2	0.00	
Upeneus vittatus	0.00	2	0.00	
Johnius belangerii	0.00	2	0.00	
Johnius dussumieri	0.00	2	0.00	
Total	114.10		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 9
DATE :26/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 17°13.02
start stop duration Lon E 38°46.98
TIME :07:44:00 08:14:00 30.0 (min) Purpose : 3
LOG : 3415.40 3416.60 1.5 Region : 1
FDEPTH: 16 18 Gear cond.: 0
BDEPTH: 16 18 Validity : 0
Towing dir: 90° Wire out : 150 m Speed : 3.0 kn
Sorted : 0 Total catch: 3.38 Catch/hour: 6.76

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Scomberomorus plurilineatus	4.60	4	68.05	
LOLIGINIDAE	1.10	130	16.27	
Leiognathus elongatus	0.30	64	4.44	
Encrasicholina heteroloba	0.20	132	2.96	
Trichiurus lepturus	0.20	2	2.96	
Terapon theraps	0.16	4	2.37	
Thryssa vitrirostris	0.10	26	1.48	
Gerres filamentosus	0.10	4	1.48	
Alectis indicus	0.00	2	0.00	
Carangoides ferdau	0.00	2	0.00	
Sardinella melanura	0.00	6	0.00	
Upeneus moluccensis	0.00	2	0.00	
Upeneus sulphureus	0.00	2	0.00	
Total	6.76		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 10
DATE :26/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 17°22.02
start stop duration Lon E 38°43.02
TIME :09:40:00 10:05:00 25.0 (min) Purpose : 3
LOG : 3430.40 3431.30 0.9 Region : 1
FDEPTH: 81 80 Gear cond.: 0
BDEPTH: 81 80 Validity : 0
Towing dir: 255° Wire out : 400 m Speed : 2.2 kn
Sorted : 0 Total catch: 22.85 Catch/hour: 54.84

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Scomberomorus commerson	37.32	5	68.05	
SEPIIDAE	6.48	19	11.82	
Carangoides malabaricus	4.44	48	8.10	
LOLIGINIDAE	2.64	130	4.81	
Selar crumenophthalmus	1.80	31	3.28	
Decapterus russelli	1.68	36	3.06	
Rastrelliger kanagurta	0.24	10	0.44	
Trichiurus lepturus	0.24	2	0.44	
Pseudorhombus natalensis	0.00	2	0.00	
Total	54.84		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 11
DATE :26/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 17°22.98
start stop duration Lon E 38°25.98
TIME :12:04:00 12:34:00 30.0 (min) Purpose : 3
LOG : 3449.40 3450.90 1.5 Region : 1
FDEPTH: 30 33 Gear cond.: 0
BDEPTH: 30 33 Validity : 0
Towing dir: 225° Wire out : 150 m Speed : 3.0 kn
Sorted : 0 Total catch: 4.90 Catch/hour: 9.80

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Carangoides malabaricus	5.00	50	51.02	
BALISTIDAE	2.40	4	24.49	
LOLIGINIDAE	0.80	44	8.16	
Alectis indicus	0.60	6	6.12	
Selar crumenophthalmus	0.40	14	4.08	
C R A B S	0.20	10	2.04	
Chrysoblephus lophus	0.20	2	2.04	
Lagocephalus inermis	0.20	2	2.04	
Bothus myriaster	0.00	2	0.00	
Carangoides armatus	0.00	4	0.00	
Upeneus bensasi	0.00	2	0.00	
Saurida tumbil	0.00	8	0.00	
Total	9.80		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 12
DATE :26/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 17°27.00
start stop duration Lon E 37°57.00
TIME :15:07:00 15:37:00 30.0 (min) Purpose : 3
LOG : 3475.90 3477.30 1.4 Region : 1
FDEPTH: 13 13 Gear cond.: 0
BDEPTH: 13 13 Validity : 0
Towing dir: 250° Wire out : 125 m Speed : 3.0 kn
Sorted : 25 Total catch: 143.73 Catch/hour: 287.46

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Johnius belangerii	77.00	4884	26.79	
Thryssa vitrirostris	66.00	6600	22.96	14
Otolithes ruber	38.50	286	13.39	
Penaeus indicus	35.20	1848	12.25	
Metapenaeus monoceros	17.60	2068	6.12	
Penaeus monodon	12.10	88	4.21	
Trichiurus lepturus	11.00	320	3.83	
Parastromateus niger	7.70	22	2.68	
C R A B S	7.16	56	2.49	
Pellona ditchela	5.50	210	1.91	
CARIDEA	4.40	0	1.53	
Pomadasys maculatus	1.66	22	0.58	
Cynoglossus attenuatus	1.10	34	0.38	
Polynemus sextarius	1.10	22	0.38	
Terapon jarbua	1.10	12	0.38	
Penaeus semisulcatus	0.34	12	0.12	
Alepes djedaba	0.00	12	0.00	
Carangoides malabaricus	0.00	12	0.00	
Drepane punctata	0.00	22	0.00	
Secutor insidiator	0.00	22	0.00	
Sillago sihama	0.00	12	0.00	
Total	287.46		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 13
DATE :26/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 17°37.98
start stop duration Lon E 37°49.98
TIME :16:58:00 17:28:00 30.0 (min) Purpose : 3
LOG : 3488.50 3489.90 1.5 Region : 1
FDEPTH: 16 18 Gear cond.: 0
BDEPTH: 16 18 Validity : 0
Towing dir: 230° Wire out : 125 m Speed : 3.0 kn
Sorted : 26 Total catch: 52.70 Catch/hour: 105.40

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Pomadasys maculatus	21.60	308 20.49	15
Leiognathus equulus	17.40	280 16.51	
Thryssa vitrirostris	9.20	1040 8.73	
Trichiurus lepturus	7.40	88 7.02	
Drepane punctata	5.40	68 5.12	
Otolithes ruber	5.00	28 4.74	
CARIDEA	5.00	0 4.74	
Upeneus vittatus	4.80	148 4.55	16
Megalaspis cordyla	4.00	8 3.80	
Upeneus sulphureus	3.40	184 3.23	
Pellona ditchela	3.20	404 3.04	
Scomberomorus plurilineatus	3.00	4 2.85	
Leiognathus elongatus	2.40	0 2.28	
Polynemus sextarius	2.40	96 2.28	
Pomadasys kaakan	2.00	12 1.90	
Johnius dussumieri	1.20	12 1.14	
Saurida micropectoralis	1.20	8 1.14	
Penaeus indicus	0.90	36 0.85	
Johnius belangerii	0.80	20 0.76	
Penaeus japonicus	0.80	34 0.76	
Terapon theraps	0.80	4 0.76	
PORTUNIDAE	0.60	6 0.57	
Selar crumenophthalmus	0.40	4 0.38	
Cynoglossus lachneri	0.40	28 0.38	
Pomadasys stridens	0.40	16 0.38	
Metapenaeus monoceros	0.40	28 0.38	
Trachinocephalus myops	0.40	24 0.38	
Penaeus monodon	0.30	2 0.28	
Alectis indicus	0.20	8 0.19	
Hilsa kelee	0.20	4 0.19	
Sphyraena chrysotaenia	0.20	8 0.19	
Carangoides malabaricus	0.00	4 0.00	
Stolephorus devisi *	0.00	40 0.00	
Platycephalus scaber *	0.00	16 0.00	
Total	105.40	100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 14
DATE :26/04/1990 GEAR TYPE: PT NO: 0 POSITION:Lat S 17°36.00
start stop duration Lon E 37°40.98
TIME :19:15:00 19:45:00 30.0 (min) Purpose : 1
LOG : 3504.60 3505.70 1.1 Region : 1
FDEPTH: 0 0 Gear cond.: 0
BDEPTH: 13 13 Validity : 0
Towing dir: 230° Wire out : 150 m Speed : 2.4 kn
Sorted : 0 Total catch: 78.00 Catch/hour: 156.00

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Carcharhinus limbatus	96.00	8 61.54	
Trichiurus lepturus	36.00	200 23.08	
Parastromateus niger	14.00	22 8.97	
Thryssa vitrirostris	6.60	1000 4.23	
Chirocentrus dorab	1.40	6 0.90	
Scomberomorus plurilineatus	1.20	2 0.77	
Alepes djedaba	0.20	2 0.13	
Hilsa kelee	0.20	4 0.13	
Pellona ditchela	0.20	24 0.13	
Scomberoides tol	0.10	2 0.06	
Leiognathus equulus	0.10	2 0.06	
Megalaspis cordyla	0.00	2 0.00	
Total	156.00	100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 15
DATE :27/04/1990 GEAR TYPE: PT NO: 0 POSITION:Lat S 17°52.98
start stop duration Lon E 37°30.00
TIME :01:55:00 02:25:00 30.0 (min) Purpose : 1
LOG : 3555.90 3557.40 1.5 Region : 1
FDEPTH: 0 0 Gear cond.: 0
BDEPTH: 25 22 Validity : 0
Towing dir: 341° Wire out : 150 m Speed : 3.0 kn
Sorted : 0 Total catch: 0.65 Catch/hour: 1.30

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
LOLIGINIDAE	0.40	132 30.77	
Trichiurus lepturus	0.40	2 30.77	
Pellona ditchela	0.20	4 15.38	
Engraulis japonicus	0.20	52 15.38	
Thryssa vitrirostris	0.06	4 4.62	
Dussumieria acuta	0.04	2 3.08	
PENAEIDAE	0.00	4 0.00	
Total	1.30	100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 16
DATE :27/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 17°43.02
start stop duration Lon E 37°34.02
TIME :05:35:00 06:05:00 30.0 (min) Purpose : 3
LOG : 3583.90 3585.10 1.5 Region : 1
FDEPTH: 17 17 Gear cond.: 0
BDEPTH: 17 17 Validity : 0
Towing dir: 240° Wire out : 125 m Speed : 3.0 kn
Sorted : 16 Total catch: 171.70 Catch/hour: 343.40

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Pomadasys maculatus	196.00	2280 57.08	
Drepane punctata	42.00	360 12.23	
Trichiurus lepturus	30.00	140 8.74	
Thryssa vitrirostris	24.00	4290 6.99	17
Otolithes ruber	16.00	80 4.66	
Pellona ditchela	12.00	820 3.49	
Leiognathus equulus	12.00	200 3.49	
Rhizoprionodon acutus	4.26	2 1.24	
Upeneus vittatus	2.00	100 0.58	
Polynemus sextarius	2.00	120 0.58	
Upeneus sulphureus	1.20	80 0.35	
Rastrelliger kanagurta	1.00	20 0.29	
Thryssa setirostris	0.40	80 0.12	
Leiognathus elongatus	0.20	220 0.06	
Metapenaeus monoceros	0.20	20 0.06	
Stolephorus devisi *	0.14	140 0.04	
Total	343.40	100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 17
DATE :27/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 17°46.98
start stop duration Lon E 37°40.98
TIME :07:27:00 07:57:00 30.0 (min) Purpose : 3
LOG : 3595.60 3597.00 1.5 Region : 1
FDEPTH: 23 22 Gear cond.: 0
BDEPTH: 23 22 Validity : 0
Towing dir: 240° Wire out : 150 m Speed : 3.0 kn
Sorted : 0 Total catch: 17.15 Catch/hour: 34.30

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Scomberomorus plurilineatus	15.30	12 44.61	
Scomberomorus commerson	12.90	18 37.61	
LOLIGINIDAE	6.00	996 17.49	
Sphyraena chrysotaenia	0.10	2 0.29	
Total	34.30	100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 18
DATE :27/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 17°55.98
start stop duration Lon E 37°16.98
TIME :10:35:00 11:05:00 30.0 (min) Purpose : 3
LOG : 3622.60 3624.10 1.5 Region : 1
FDEPTH: 20 17 Gear cond.: 0
BDEPTH: 20 17 Validity : 0
Towing dir: 250° Wire out : 150 m Speed : 3.0 kn
Sorted : 31 Total catch: 148.60 Catch/hour: 297.20

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Upeneus moluccensis	216.00	10490 72.68	18
Carcharhinus brevipinna	46.00	2 15.48	
Gerres filamentosus	10.80	232 3.63	
Carangoides malabaricus	8.00	160 2.69	
Leiognathus equulus	6.80	144 2.29	
Saurida micropectoralis	3.60	24 1.21	
Encrasicholina heteroloba	2.40	1200 0.81	19
Dussumieria acuta	1.60	72 0.54	
Alepes djedaba	0.80	8 0.27	
Sardinella melanura	0.80	8 0.27	
LOLIGINIDAE	0.40	56 0.13	
Total	297.20	100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 19
DATE :27/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 18°4.02
start stop duration Lon E 37°4.98
TIME :12:55:00 13:25:00 30.0 (min) Purpose : 3
LOG : 3640.00 3642.00 1.5 Region : 1
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 10 10 Validity : 0
Towing dir: 35° Wire out : 100 m Speed : 3.0 kn
Sorted : 44 Total catch: 648.02 Catch/hour: 1296.04

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Pellona ditchela	777.00	44400 59.95	21
Thryssa vitrirostris	342.40	41088 26.42	20
Penaeus indicus	86.20	6384 6.65	
Metapenaeus monoceros	25.20	4578 1.94	
S H A R K S	14.00	2 1.08	
Dussumieria acuta	12.60	672 0.97	
Sardinella gibbosa	12.60	1176 0.97	
Scomberomorus commerson	10.00	6 0.77	
Scomberoides tol	7.00	2 0.54	
Thryssa setirostris	4.20	546 0.32	
Parastromateus niger	2.20	2 0.17	
Scomberomorus plurilineatus	0.60	2 0.05	
Upeneus vittatus	0.42	42 0.03	
Polynemus sextarius	0.42	504 0.03	
LOLIGINIDAE	0.42	546 0.03	
Rastrelliger kanagurta	0.40	42 0.03	
Penaeus monodon	0.40	42 0.03	
Carangoides ferdau	0.00	42 0.00	
Encrasicholina heteroloba	0.00	42 0.00	
Secutor insidiator	0.00	84 0.00	
Pomadasys maculatus	0.00	42 0.00	
Terapon theraps	0.00	84 0.00	
Total	1296.06	100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 20
DATE :27/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 18°4.98
start stop duration Lon E 37°24.00
TIME :15:43:00 16:13:00 30.0 (min) Purpose : 3
LOG : 3663.70 3665.40 1.5 Region : 1
FDEPTH: 37 38 Gear cond.: 0
BDEPTH: 37 38 Validity : 0
Towing dir: 240° Wire out : 200 m Speed : 3.0 kn
Sorted : 18 Total catch: 17.69 Catch/hour: 35.38

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Scomberomorus commerson	17.20	4 48.62	
Nemipterus bipunctatus	9.00	98 25.44	22
Upeneus bensasi	4.20	102 11.87	
Abalistes stellatus	1.60	2 4.52	
Fistularia petimba	1.00	78 2.83	
Saurida undosquamis	1.00	8 2.83	
Parupeneus cinnabarinus *	0.70	12 1.98	
LOLIGINIDAE	0.60	16 1.70	
Carangoides armatus	0.04	4 0.11	
Stephanolepis auratus	0.04	2 0.11	
Torquigener sp.	0.00	2 0.00	
Torquigener hypselogenion	0.00	2 0.00	
Total	35.38	100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 21
DATE :27/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 18°12.00
start stop duration Lon E 37°25.98
TIME :17:07:00 17:37:00 30.0 (min) Purpose : 3
LOG : 3673.60 3675.20 1.5 Region : 1
FDEPTH: 69 73 Gear cond.: 0
BDEPTH: 69 73 Validity : 0
Towing dir: 200° Wire out : 350 m Speed : 3.0 kn
Sorted : 0 Total catch: 141.05 Catch/hour: 282.10

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus macrosoma	196.00	3266	69.48	23
Abalistes stellatus	25.00	26	8.86	
Decapterus russelli	22.00	472	7.80	24
Scomberomorus commerson	18.60	4	6.59	
Saurida undosquamis	8.00	48	2.84	
LOLIGINIDAE	7.20	720	2.55	
SEPIIDAE	2.50	12	0.89	
Carangoides malabaricus	0.80	8	0.28	
Dactyloptena orientalis	0.80	8	0.28	
Saurida tumbil	0.40	64	0.14	
Saurida micropectoralis	0.40	8	0.14	
Trachinocephalus myops	0.40	48	0.14	
Total	282.10		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 22
DATE :27/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 18°22.02
start stop duration Lon E 37°27.00
TIME :19:32:00 20:17:00 45.0 (min) Purpose : 3
LOG : 3690.40 3693.00 2.6 Region : 1
FDEPTH: 370 387 Gear cond.: 0
BDEPTH: 370 387 Validity : 0
Towing dir: 15° Wire out : 1100 m Speed : 3.0 kn
Sorted : 20 Total catch: 88.05 Catch/hour: 117.40

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
MYCTOPHIDAE	56.53	5216	48.15	
Chlorophthalmus punctatus	17.07	459	14.54	
Neoscombrops annectens	8.53	85	7.27	
Haliporoides triarthrus	8.40	277	7.16	
Lophius upsicephalus	6.40	21	5.45	
Elagatis bipinnulata	4.80	11	4.09	
Squalus acanthias	1.87	1	1.59	
Metanephrops andamanicus	1.73	17	1.48	
Geryon quinquedens	1.67	1	1.42	
Rexea prometheoides	1.07	32	0.91	
Caelorinchus sp.	1.07	64	0.91	
Halieutaea fitzsimonsi	1.07	21	0.91	
RAJIDAE	1.07	21	0.91	
PROSCYLLIIDAE	1.07	43	0.91	
Squalus sp.	1.07	32	0.91	
CONGRIDAE	0.53	21	0.45	
OPHIDIIDAE	0.53	11	0.45	
Peristedion weberi	0.53	21	0.45	
Poecilopsetta sp.	0.53	11	0.45	
Saurida micropectoralis	0.53	11	0.45	
SEPIIDAE	0.40	4	0.34	
C R A B S	0.27	3	0.23	
Zenion sp.	0.27	21	0.23	
Branchiostegus doliatus *	0.13	1	0.11	
Torpedo sp.	0.13	11	0.11	
PENAEIDAE	0.13	19	0.11	
CARIDEA	0.00	4	0.00	
Total	117.40		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 23
DATE :27/04/1990 GEAR TYPE: PT NO: 2 POSITION:Lat S 18°27.00
start stop duration Lon E 37°15.00
TIME :23:40:00 00:10:00 30.0 (min) Purpose : 1
LOG : 3712.90 3714.40 1.5 Region : 1
FDEPTH: 30 42 Gear cond.: 0
BDEPTH: 58 67 Validity : 0
Towing dir: 85° Wire out : 100 m Speed : 3.0 kn
Sorted : 0 Total catch: 4.17 Catch/hour: 8.34

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus macrosoma	2.00	46	23.98	
LOLIGINIDAE	2.00	100	23.98	
Decapterus russelli	1.80	40	21.58	
Upeneus vittatus	1.80	42	21.58	
Sphyraena chrysotaenia	0.40	4	4.80	
Rastrelliger kanagurta	0.20	2	2.40	
Saurida undosquamis	0.10	2	1.20	
Pomadasys olivaceum	0.04	2	0.48	
Dussumieria acuta	0.00	6	0.00	
ENGRAULIDIDAE	0.00	18	0.00	
Total	8.34		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 24
DATE :28/04/1990 GEAR TYPE: PT NO: 0 POSITION:Lat S 18°28.02
start stop duration Lon E 36°54.00
TIME :02:55:00 03:25:00 30.0 (min) Purpose : 1
LOG : 3735.60 3737.00 1.4 Region : 1
FDEPTH: 0 0 Gear cond.: 0
BDEPTH: 25 24 Validity : 0
Towing dir: 270° Wire out : 150 m Speed : 3.0 kn
Sorted : 0 Total catch: 2.46 Catch/hour: 4.92

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Engraulis japonicus	3.30	858	67.07	25
C R A B S	1.20	6	24.39	
Saurida undosquamis	0.20	12	4.07	
Decapterus russelli	0.10	4	2.03	
Thryssa setirostris	0.04	2	0.81	
LOLIGINIDAE	0.04	18	0.81	
Lophodiodon calori	0.02	2	0.41	
SYNAXIDAE	0.02	6	0.41	
Alepes djedaba	0.00	8	0.00	
Parastromateus niger	0.00	4	0.00	
Selar crumenophthalmus	0.00	4	0.00	
Dussumieria acuta	0.00	6	0.00	
Sicyonia sp.	0.00	2	0.00	
Total	4.92		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 25
DATE :28/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 18°22.98
start stop duration Lon E 36°46.98
TIME :05:45:00 06:15:00 30.0 (min) Purpose : 3
LOG : 3755.60 3757.20 1.5 Region : 1
FDEPTH: 15 15 Gear cond.: 0
BDEPTH: 15 15 Validity : 0
Towing dir: 60° Wire out : 100 m Speed : 3.0 kn
Sorted : 19 Total catch: 307.10 Catch/hour: 614.20

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trichiurus lepturus	217.50	2940	35.41	
Arius dussumieri	174.00	690	28.33	
Johnius belangerii	111.00	5190	18.07	
Thryssa vitrirostris	42.00	7890	6.84	25
Otolithes ruber	18.00	120	2.93	
Parastromateus niger	14.20	12	2.31	
CARIDEA	12.60	0	2.05	
Penaeus indicus	6.00	456	0.98	
Penaeus monodon	3.20	38	0.52	
Pellona ditchela	3.00	270	0.49	
Gazza minuta	3.00	720	0.49	
Johnius dussumieri	3.00	60	0.49	
SEPIIDAE	3.00	90	0.49	
Metapenaeus monoceros	1.80	278	0.29	
Dussumieria acuta	1.50	30	0.24	
Polynemus sextarius	0.40	30	0.07	
Total	614.20		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 26
DATE :28/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 18°27.00
start stop duration Lon E 37°4.02
TIME :08:11:00 08:36:00 25.0 (min) Purpose : 3
LOG : 3774.90 3776.20 1.3 Region : 1
FDEPTH: 28 30 Gear cond.: 0
BDEPTH: 28 30 Validity : 0
Towing dir: 240° Wire out : 200 m Speed : 3.0 kn
Sorted : 0 Total catch: 5.40 Catch/hour: 12.96

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Scomberomorus commerson	9.84	2	75.93	
Rastrelliger kanagurta	1.20	14	9.26	
Upeneus bensasi	1.08	26	8.33	
Nemipterus bipunctatus	0.48	7	3.70	
Saurida undosquamis	0.24	7	1.85	
Fistularia petimba	0.12	7	0.93	
Torquigener hypselogenion	0.00	2	0.00	
Total	12.96		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 27
DATE :28/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 18°31.98
start stop duration Lon E 37°12.00
TIME :09:46:00 10:16:00 30.0 (min) Purpose : 3
LOG : 3786.80 3788.40 1.6 Region : 1
FDEPTH: 52 48 Gear cond.: 0
BDEPTH: 52 48 Validity : 0
Towing dir: 220° Wire out : 300 m Speed : 3.0 kn
Sorted : 0 Total catch: 25.40 Catch/hour: 50.80

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Carcharhinus sealei	17.00	4	33.46	
Abalistes stellatus	10.10	14	19.88	
Scomberomorus commerson	6.40	2	12.60	
Seriola dumerili	3.40	2	6.69	
Fistularia petimba	3.00	110	5.91	
SEPIIDAE	3.00	28	5.91	
Chilomycterus orbicularis *	1.80	8	3.54	
Rhinobatos leucospilus*	1.50	2	2.95	
Lactoria cornuta	1.20	8	2.36	
Gymnocranius griseus	1.10	4	2.17	
Thenus orientalis	0.80	4	1.57	
Lagocephalus lagocephalus	0.80	22	1.57	
Parupeneus cinnabarinus *	0.20	6	0.39	
Upeneus bensasi	0.20	16	0.39	
LOLIGINIDAE	0.20	18	0.39	
C R A B S	0.10	2	0.20	
Cynoglossus lachneri	0.00	2	0.00	
Stephanolepis auratus	0.00	2	0.00	
Canthigaster solandri	0.00	2	0.00	
Total	50.80		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 28
DATE :28/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 18°46.98
start stop duration Lon E 37°6.00
TIME :12:02:00 12:17:00 15.0 (min) Purpose : 3
LOG : 3804.90 3805.80 0.9 Region : 1
FDEPTH: 47 46 Gear cond.: 0
BDEPTH: 47 46 Validity : 0
Towing dir: 30° Wire out : 250 m Speed : 3.0 kn
Sorted : 0 Total catch: 110.46 Catch/hour: 441.84

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Lutjanus sebae	116.80	8	26.43	
Aprion virescens	90.00	16	20.37	
Plectorhinchus chubbi	74.00	12	16.75	
Abalistes stellatus	44.60	48	10.09	
Lutjanus sanguineus	33.20	8	7.51	
Lethrinus microdon	32.00	4	7.24	
Argyrops filamentosus	25.20	12	5.70	
Seriola dumerili	18.00	4	4.07	
Sufflamen fraenatus	2.40	4	0.54	
Lophodiodon calori	1.20	4	0.27	
Tetrosomus concatenatus	1.20	4	0.27	
Lutjanus bengalensis	0.80	312	0.18	
Lactoria diaphana	0.80	4	0.18	
Parupeneus cinnabarinus *	0.60	44	0.14	
LOLIGINIDAE	0.40	132	0.09	
Sepia sp.	0.20	8	0.05	
Lagocephalus lagocephalus	0.20	12	0.05	
Apogon apogonides	0.08	60	0.02	
Lactoria fornasini	0.08	4	0.02	
Emmelichthys nitidus	0.04	52	0.01	
Fistularia petimba	0.04	4	0.01	
C R A B S	0.00	4	0.00	
LABRIDAE	0.00	8	0.00	
Anampses lineatus	0.00	8	0.00	
Upeneus bensasi	0.00	12	0.00	
Total	441.84		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 29
DATE :28/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 18°58.98
start stop duration Lon E 36°58.02
TIME :14:39:00 15:09:00 30.0 (min) Purpose : 3
LOG : 3828.50 3829.90 1.5 Region : 1
FDEPTH: 52 57 Gear cond.: 0
BDEPTH: 52 57 Validity : 0
Towing dir: 72° Wire out : 250 m Speed : 3.0 kn
Sorted : 0 Total catch: 3.08 Catch/hour: 6.16

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Selar crumenophthalmus	1.80	100	29.22	
Fistularia petimba	1.80	60	29.22	
Leiognathus elongatus	1.80	244	29.22	
LOLIGINIDAE	0.30	38	4.87	
Lutjanus sebae	0.20	8	3.25	
Sepia sp.	0.10	2	1.62	
Torquigener hypselogenion	0.10	4	1.62	
Lophodiodon calori	0.04	2	0.65	
Lagocephalus lagocephalus	0.02	2	0.32	
Total	6.16		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 30
DATE :28/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°6.00
start stop duration Lon E 36°51.00
TIME :16:25:00 16:55:00 30.0 (min) Purpose : 3
LOG : 3839.70 3841.30 1.5 Region : 1
FDEPTH: 74 74 Gear cond.: 0
BDEPTH: 74 74 Validity : 0
Towing dir: 220° Wire out : 400 m Speed : 3.0 kn
Sorted : 29 Total catch: 52.25 Catch/hour: 104.50

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Nemipterus bipunctatus	80.86	1156	77.38	26
Fistularia petimba	8.40	476	8.04	
Carangoides armatus	5.60	46	5.36	
LOLIGINIDAE	3.50	130	3.35	
Abalistes stellatus	1.36	4	1.30	
C R A B S	1.36	4	1.30	
Upeneus moluccensis	1.36	176	1.30	
Priacanthus hamrur	0.70	18	0.67	
Parupeneus cinnabarinus *	0.52	22	0.50	
Dactyloptena peterseni	0.30	4	0.29	
Saurida undosquamis	0.30	18	0.29	
Trichiurus lepturus	0.16	8	0.15	
Lophodiodon calori	0.08	4	0.08	
Total	104.50		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 31
DATE :28/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°6.00
start stop duration Lon E 36°45.00
TIME :17:31:00 18:01:00 30.0 (min) Purpose : 3
LOG : 3846.40 3848.00 1.5 Region : 1
FDEPTH: 69 67 Gear cond.: 0
BDEPTH: 69 67 Validity : 0
Towing dir: 240° Wire out : 400 m Speed : 3.0 kn
Sorted : 41 Total catch: 256.50 Catch/hour: 513.00

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Upeneus vittatus	147.00	4130	28.65	28
Pomadasys kaakan	131.20	226	25.58	27
Upeneus moluccensis	94.50	2760	18.42	
Pomadasys maculatus	31.50	300	6.14	
Abalistes stellatus	28.50	30	5.56	
Carangoides malabaricus	19.50	300	3.80	
Saurida undosquamis	18.00	480	3.51	
Nemipterus zysron	12.00	180	2.34	
Fistularia petimba	9.00	480	1.75	
Lophodiodon calori	7.50	180	1.46	
PENAEIDAE	4.50	1140	0.88	
Argyrops filamentosus	3.00	30	0.58	
Citharoides macrolepis	1.60	2	0.31	
Penaeus indicus	1.50	60	0.29	
Terapon jarbua	1.50	30	0.29	
Parupeneus cinnabarinus *	1.00	30	0.19	
Thenus orientalis	0.90	6	0.18	
APOGONIDAE	0.20	30	0.04	
CONGRIDAE	0.20	30	0.04	
Encrasicholina punctifer	0.10	60	0.02	
Champsodon capensis	0.00	90	0.00	
Total	513.20		100.04	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 32
DATE :28/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°1.02
start stop duration Lon E 37°7.98
TIME :21:53:00 22:43:00 50.0 (min) Purpose : 3
LOG : 3879.30 3881.10 1.8 Region : 1
FDEPTH: 500 499 Gear cond.: 0
BDEPTH: 500 499 Validity : 0
Towing dir: 210° Wire out : 1350 m Speed : 3.0 kn
Sorted : 23 Total catch: 102.60 Catch/hour: 123.12

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Centrophorus granulosus	51.84	5	42.11	
Haliporoides triarthrus	35.04	980	28.46	
MACROURIDAE	13.92	326	11.31	
MYCTOPHIDAE	4.68	0	3.80	
PENAEIDAE	3.36	150	2.73	
Chlorophthalmus punctatus	3.00	41	2.44	
CARIDEA	2.64	0	2.14	
Gonorhynchus gonorhynchus	2.40	7	1.95	
Ateleopus natalensis	1.92	7	1.56	
Saurida micropectoralis	0.96	2	0.78	
Neoepinnula orientalis	0.72	12	0.58	
POLYCHAELIDAE	0.36	4	0.29	
Microstoma microstoma *	0.24	7	0.19	
Dermatopsoides talboti	0.24	14	0.19	
Chaunax pictus	0.24	5	0.19	
Cubiceps capensis	0.24	5	0.19	
PROSCYLLIIDAE	0.24	2	0.19	
Squalus sp.	0.24	2	0.19	
ALEPOCEPHALIDAE	0.12	2	0.10	
Parabembras robinsoni *	0.12	2	0.10	
Champsodon capensis	0.12	7	0.10	
Metanephrops andamanicus	0.12	5	0.10	
Cubiceps baxteri	0.12	2	0.10	
Neobythites analis	0.12	2	0.10	
Scorpaena scrofa	0.12	2	0.10	
Xenolepidichthys sp.	0.00	2	0.00	
Peristedion adeni	0.00	5	0.00	
Total	123.12		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 33
DATE :29/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 18°46.98
start stop duration Lon E 36°37.02
TIME :05:40:00 06:10:00 30.0 (min) Purpose : 3
LOG : 3936.50 3938.10 1.5 Region : 1
FDEPTH: 23 22 Gear cond.: 0
BDEPTH: 23 22 Validity : 0
Towing dir: 210° Wire out : 150 m Speed : 3.0 kn
Sorted : 0 Total catch: 12.55 Catch/hour: 25.10

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
LOLIGINIDAE	8.00	354	31.87	
Scomberomorus commerson	7.40	2	29.48	
Saurida undosquamis	3.90	80	15.54	
Atule mate	2.10	146	8.37	29
Carangoides malabaricus	1.60	38	6.37	
Selar crumenophthalmus	0.70	10	2.79	
PORTUNIDAE	0.50	2	1.99	
Rastrelliger kanagurta	0.20	10	0.80	
Sphyraena chrysotaenia	0.20	2	0.80	
Lagocephalus lagocephalus	0.20	14	0.80	
Terapon theraps	0.20	2	0.80	
Decapterus russelli	0.10	4	0.40	
Total	25.10		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 34
DATE :29/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 18°52.02
start stop duration Lon E 36°34.02
TIME :06:43:00 07:13:00 30.0 (min) Purpose : 3
LOG : 3941.80 3943.20 1.5 Region : 1
FDEPTH: 23 26 Gear cond.: 0
BDEPTH: 23 26 Validity : 0
Towing dir: 210° Wire out : 150 m Speed : 3.0 kn
Sorted : 17 Total catch: 173.15 Catch/hour: 346.30

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Upeneus vittatus	214.00	10700	61.80	32
Decapterus russelli	46.00	1500	13.28	30
Saurida undosquamis	38.00	680	10.97	
Selar crumenophthalmus	30.00	780	8.66	31
Atule mate	15.00	880	4.33	
Carangoides malabaricus	2.00	160	0.58	
Gerres filamentosus	1.00	20	0.29	
Apogon quadrifasciatus	0.20	80	0.06	
Decapterus macrosoma	0.10	20	0.03	
Total	346.30		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 35
DATE :29/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°1.98
start stop duration Lon E 36°37.02
TIME :08:22:00 08:52:00 30.0 (min) Purpose : 3
LOG : 3952.80 3953.80 1.5 Region : 1
FDEPTH: 31 32 Gear cond.: 0
BDEPTH: 31 32 Validity : 0
Towing dir: 210° Wire out : 200 m Speed : 3.0 kn
Sorted : 13 Total catch: 52.55 Catch/hour: 105.10

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Decapterus russelli	32.70	924	31.11	
Scomberomorus commerson	24.00	6	22.84	
Atule mate	22.80	162	21.69	
Saurida micropectoralis	11.40	78	10.85	
Rastrelliger kanagurta	4.80	66	4.57	
Carangoides malabaricus	3.00	66	2.85	
LOLIGINIDAE	3.00	60	2.85	
Scomberoides tol	1.20	6	1.14	
Echeneis naucrates	1.20	2	1.14	
Nemipterus bipunctatus	0.60	6	0.57	
Saurida undosquamis	0.30	12	0.29	
Decapterus macrosoma	0.10	6	0.10	
Total	105.10		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 36
DATE :29/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°7.02
start stop duration Lon E 36°31.98
TIME :09:42:00 10:12:00 30.0 (min) Purpose : 3
LOG : 3959.30 3960.90 1.5 Region : 1
FDEPTH: 30 32 Gear cond.: 0
BDEPTH: 30 32 Validity : 0
Towing dir: 210° Wire out : 150 m Speed : 3.0 kn
Sorted : 0 Total catch: 22.00 Catch/hour: 44.00

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Rastrelliger kanagurta	10.50	134	23.86	33
Scomberomorus commerson	10.00	2	22.73	
Upeneus bensasi	7.40	324	16.82	
Decapterus russelli	4.40	122	10.00	
Saurida undosquamis	3.60	56	8.18	
LOLIGINIDAE	3.30	108	7.50	
Nemipterus bipunctatus	2.40	40	5.45	
Carangoides malabaricus	1.20	28	2.73	
PORTUNIDAE	0.50	2	1.14	
Lethrinus variegatus	0.20	16	0.45	
Saurida micropectoralis	0.20	2	0.45	
Atule mate	0.10	30	0.23	
Priacanthus hamrur	0.10	12	0.23	
Penaeus indicus	0.06	2	0.14	
Parupeneus cinnabarinus *	0.04	2	0.09	
Decapterus macrosoma	0.00	2	0.00	
Fistularia petimba	0.00	8	0.00	
Total	44.00		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 37
DATE :29/04/1990 GEAR TYPE: PT NO: 4 POSITION:Lat S 19°6.00
start stop duration Lon E 36°31.02
TIME :11:24:00 11:54:00 30.0 (min) Purpose : 1
LOG : 3967.80 3969.30 1.5 Region : 1
FDEPTH: 0 0 Gear cond.: 0
BDEPTH: 26 26 Validity : 0
Towing dir: 190° Wire out : 150 m Speed : 3.0 kn
Sorted : 2 Total catch: 130.65 Catch/hour: 261.30

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Istiophorus platypterus	240.00	4	91.85	
Thamnaconus fajardoi	21.00	168000	8.04	
Atule mate	0.10	220	0.04	
Engraulis japonicus	0.10	40	0.04	
Carangoides armatus	0.02	30	0.01	
Megalaspis cordyla	0.02	10	0.01	
Parastromateus niger	0.02	30	0.01	
Selar crumenophthalmus	0.02	10	0.01	
Leiognathus elongatus	0.02	10	0.01	
Priacanthus hamrur	0.00	10	0.00	
Lagocephalus lagocephalus	0.00	10	0.00	
Total	261.30		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 38
DATE :29/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°3.00
start stop duration Lon E 36°27.00
TIME :12:50:00 13:20:00 30.0 (min) Purpose : 3
LOG : 3975.30 3976.80 1.5 Region : 1
FDEPTH: 25 25 Gear cond.: 0
BDEPTH: 25 25 Validity : 0
Towing dir: 240° Wire out : 150 m Speed : 3.0 kn
Sorted : 25 Total catch: 41.74 Catch/hour: 83.48

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Atule mate	45.60	348	54.62	34
Saurida undosquamis	14.70	282	17.61	
Scomberomorus commerson	8.40	2	10.06	
LOLIGINIDAE	8.10	360	9.70	
Carangoides armatus	3.30	118	3.95	
Rastrelliger kanagurta	1.80	34	2.16	
C R A B S	0.60	4	0.72	
PORTUNIDAE	0.30	4	0.36	
Decapterus russelli	0.16	6	0.19	
Sphyraena chrysotaenia	0.16	4	0.19	
Trichiurus lepturus	0.16	28	0.19	
Fistularia petimba	0.04	4	0.05	
Upeneus bensasi	0.04	4	0.05	
Nemipterus bipunctatus	0.04	4	0.05	
Sepia sp.	0.04	4	0.05	
Lagocephalus lagocephalus	0.04	4	0.05	
Terapon jarbua	0.00	4	0.00	
Total	83.48		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 39
DATE :29/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°6.00
start stop duration Lon E 36°22.02
TIME :14:13:00 14:43:00 30.0 (min) Purpose : 3
LOG : 3983.10 3985.10 1.5 Region : 1
FDEPTH: 25 24 Gear cond.: 0
BDEPTH: 25 24 Validity : 0
Towing dir: 255° Wire out : 150 m Speed : 3.0 kn
Sorted : 28 Total catch: 102.40 Catch/hour: 204.80

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Sardinella melanura	52.50	1496	25.63	37
LOLIGINIDAE	49.00	2786	23.93	
Decapterus russelli	35.00	1320	17.09	36
Saurida undosquamis	26.60	764	12.99	
Rastrelliger kanagurta	25.20	574	12.30	35
Atule mate	7.00	302	3.42	
Scomberomorus commerson	5.20	2	2.54	
Apogon lateralis	1.06	42	0.52	
Carangoides armatus	0.70	22	0.34	
Nemipterus bipunctatus	0.70	92	0.34	
Sphyraena chrysotaenia	0.70	8	0.34	
Lagocephalus inermis	0.50	14	0.24	
Abalistes stellatus	0.40	6	0.20	
Decapterus macrosoma	0.14	8	0.07	
MONACANTHIDAE	0.08	8	0.04	
Rachycentron canadum	0.02	14	0.01	
Total	204.80		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 40
DATE :29/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°3.00
start stop duration Lon E 36°18.00
TIME :15:28:00 15:58:00 30.0 (min) Purpose : 3
LOG : 3989.50 3991.00 1.5 Region : 1
FDEPTH: 23 21 Gear cond.: 0
BDEPTH: 23 21 Validity : 0
Towing dir: 265° Wire out : 150 m Speed : 3.0 kn
Sorted : 20 Total catch: 31.59 Catch/hour: 63.18

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Loligo duvauceli	50.10	4432	79.30	39
Upeneus vittatus	7.50	908	11.87	38
Psettodes erumei	1.80	10	2.85	
Saurida undosquamis	1.50	24	2.37	
Rhinobatos holcorhynchus	1.20	2	1.90	
Atule mate	0.30	6	0.47	
Gerres oyena	0.30	6	0.47	
Carangoides armatus	0.16	10	0.25	
Rastrelliger kanagurta	0.16	4	0.25	
Sardinella melanura	0.06	4	0.09	
Metapenaeus affinis	0.06	4	0.09	
Leiognathus elongatus	0.04	92	0.06	
Alectis indicus	0.00	4	0.00	
Total	63.18		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 41
DATE :29/04/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 18°58.02
start stop duration Lon E 36°19.02
TIME :17:10:00 17:40:00 30.0 (min) Purpose : 3
LOG : 4000.40 4002.20 1.5 Region : 1
FDEPTH: 13 12 Gear cond.: 0
BDEPTH: 13 12 Validity : 0
Towing dir: 40° Wire out : 100 m Speed : 3.0 kn
Sorted : 11 Total catch: 231.60 Catch/hour: 463.20

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Johnius belangerii	248.00	19840	53.54	40
Otolithes ruber	76.60	284	16.54	
Trichiurus lepturus	46.20	704	9.97	
Thryssa vitrirostris	38.80	4884	8.38	
Arius dussumieri	23.80	16	5.14	
CARIDEA	11.10	0	2.40	
Sphyrna lewini	5.50	2	1.19	
Cynoglossus lachneri	3.70	112	0.80	
Terapon jarbua	3.70	148	0.80	
Sardinella gibbosa	1.80	260	0.39	
Penaeus indicus	1.30	42	0.28	
Metapenaeus monoceros	1.30	70	0.28	
SEPIIDAE	1.00	36	0.22	
Pomadasys kaakan	0.40	2	0.09	
Total	463.20		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 42
DATE :01/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 21°24.00
start stop duration Lon E 35°28.02
TIME :10:40:00 11:10:00 30.0 (min) Purpose : 3
LOG : 4346.90 4348.50 1.5 Region : 1
FDEPTH: 12 18 Gear cond.: 0
BDEPTH: 12 18 Validity : 0
Towing dir: 180° Wire out : 100 m Speed : 3.0 kn
Sorted : 6 Total catch: 96.20 Catch/hour: 192.40

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Leiognathus elongatus	111.60	35970	58.00	
Rachycentron canadum	37.10	6	19.28	
Scomberomorus commerson	17.10	6	8.89	
Decapterus russelli	10.80	1692	5.61	41
Echeneis naucrates	10.00	6	5.20	
Upeneus bensasi	2.70	360	1.40	
Sardinella gibbosa	1.80	432	0.94	
Sillago sihama	0.90	54	0.47	
Sphyraena chrysotaenia	0.40	234	0.21	
Selar crumenophthalmus	0.00	18	0.00	
Total	192.40		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 43
DATE :01/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 21°18.00
start stop duration Lon E 35°16.98
TIME :13:00:00 13:30:00 30.0 (min) Purpose : 3
LOG : 4366.50 4368.00 1.5 Region : 1
FDEPTH: 8 8 Gear cond.: 0
BDEPTH: 8 8 Validity : 0
Towing dir: 180° Wire out : 100 m Speed : 3.0 kn
Sorted : 15 Total catch: 62.55 Catch/hour: 125.10

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus russelli	56.26	2296	44.97	42
Scomberomorus commerson	47.80	20	38.21	
Loligo duvauceli	7.00	276	5.60	
Chirocentrus dorab	6.60	16	5.28	
Remora remora	3.76	6	3.01	
Alepes djedaba	2.00	20	1.60	
Sardinella melanura	0.76	110	0.61	
Atule mate	0.50	60	0.40	
Rachycentron canadum	0.26	6	0.21	
Rastrelliger kanagurta	0.10	6	0.08	
Alectis indicus	0.02	6	0.02	
Carangoides malabaricus	0.02	6	0.02	
Thamnaconus fajardoi	0.02	40	0.02	
Lagocephalus inermis	0.00	6	0.00	
Total	125.10		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 44
DATE :01/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 21°9.00
start stop duration Lon E 35°19.02
TIME :14:55:00 15:25:00 30.0 (min) Purpose : 3
LOG : 4380.80 4382.60 1.5 Region : 1
FDEPTH: 15 14 Gear cond.: 0
BDEPTH: 15 14 Validity : 0
Towing dir: 180° Wire out : 100 m Speed : 3.0 kn
Sorted : 23 Total catch: 184.79 Catch/hour: 369.58

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Sphyraena jello	120.00	720	32.47	
Gerres oyena	108.00	2056	29.22	
Atule mate	34.50	1156	9.33	
Upeneus vittatus	33.76	1682	9.13	43
Saurida undosquamis	20.26	106	5.48	
Thenus orientalis	19.50	76	5.28	
Scomberomorus plurilineatus	13.20	2	3.57	
Plotosus lineatus	7.50	586	2.03	
Scomberomorus commerson	4.68	4	1.27	
Psettodes erumei	2.26	16	0.61	
Terapon jarbua	1.50	46	0.41	
Chirocentrus dorab	1.20	4	0.32	
Alectis indicus	0.76	30	0.21	
Carangoides armatus	0.76	106	0.21	
Loligo duvauceli	0.76	240	0.21	
Decapterus russelli	0.46	30	0.12	
Drepane punctata	0.46	16	0.12	
Thamnaconus fajardoi	0.02	120	0.01	
Total	369.58		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 45
DATE :01/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 21°6.00
start stop duration Lon E 35°25.98
TIME :16:57:00 17:27:00 30.0 (min) Purpose : 3
LOG : 4397.00 4398.50 1.5 Region : 1
FDEPTH: 29 29 Gear cond.: 0
BDEPTH: 29 29 Validity : 0
Towing dir: 180° Wire out : 150 m Speed : 3.0 kn
Sorted : 30 Total catch: 283.45 Catch/hour: 566.90

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus russelli	145.50	0	25.67	
Scomberomorus commerson	109.40	46	19.30	
Saurida undosquamis	101.20	3810	17.85	
LOLIGINIDAE	79.50	5116	14.02	
Upeneus bensasi	48.00	3600	8.47	
Lagocephalus lagocephalus	30.00	1500	5.29	
Sardinella gibbosa	26.20	930	4.62	
Nemipterus bipunctatus	12.80	224	2.26	
Carcharhinus limbatus	3.60	2	0.64	
Thenus orientalis	3.00	18	0.53	
Decapterus macrosoma	1.50	120	0.26	
Leiognathus elongatus	1.50	344	0.26	
Rastrelliger kanagurta	1.50	90	0.26	
Sillago sihama	1.50	60	0.26	
Carangoides malabaricus	0.80	76	0.14	
Selar crumenophthalmus	0.80	16	0.14	
Platycephalus indicus	0.10	16	0.02	
Total	566.90		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 46
DATE :02/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°9.00
start stop duration Lon E 35°54.00
TIME :05:55:00 06:25:00 30.0 (min) Purpose : 3
LOG : 4529.30 4530.90 1.5 Region : 1
FDEPTH: 15 15 Gear cond.: 0
BDEPTH: 15 15 Validity : 0
Towing dir: 20° Wire out : 100 m Speed : 3.0 kn
Sorted : 11 Total catch: 232.58 Catch/hour: 465.16

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pellona ditchela	163.80	11232	35.21	44
Pomadasys maculatus	77.70	7308	16.70	
Thryssa vitrirostris	65.10	6930	14.00	
Secutor insidiator	31.50	3570	6.77	
Trichiurus lepturus	27.30	630	5.87	
Upeneus sulphureus	25.20	1512	5.42	
Saurida undosquamis	18.90	294	4.06	
Polynemus sextarius	10.50	462	2.26	
Carangoides malabaricus	7.56	210	1.63	
Penaeus indicus	4.40	104	0.95	
Sardinella albella	4.20	378	0.90	
Upeneus vittatus	4.20	210	0.90	
Terapon theraps	4.20	756	0.90	
Penaeus semisulcatus	3.70	60	0.80	
Johnius dussumieri	2.20	42	0.47	
Otolithes ruber	2.20	42	0.47	
Sphyraena chrysotaenia	2.20	42	0.47	
Ariomma indica	1.60	280	0.34	
Carangoides ferdau	1.20	126	0.26	
Dussumieria acuta	1.20	42	0.26	
Leiognathus equulus	1.20	84	0.26	
Sillago sihama	1.20	42	0.26	
Stolephorus devisi *	1.00	588	0.21	
Scomberoides tol	0.80	84	0.17	
Atule mate	0.40	84	0.09	
C R A B S	0.40	126	0.09	
Metapenaeus monoceros	0.40	34	0.09	
Parastromateus niger	0.20	84	0.04	
Cynoglossus lachneri	0.20	42	0.04	
Thryssa setirostris	0.20	42	0.04	
LOLIGINIDAE	0.20	84	0.04	
Penaeus japonicus	0.10	6	0.02	
SEPIIDAE	0.00	42	0.00	
Lagocephalus lagocephalus	0.00	42	0.00	
Total	465.16		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 47
DATE :02/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°4.02
start stop duration Lon E 35°58.98
TIME :07:21:00 07:51:00 30.0 (min) Purpose : 3
LOG : 4537.80 4539.60 1.5 Region : 1
FDEPTH: 16 16 Gear cond.: 0
BDEPTH: 16 16 Validity : 0
Towing dir: 50° Wire out : 125 m Speed : 3.0 kn
Sorted : 8 Total catch: 61.50 Catch/hour: 123.00

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trichiurus lepturus	20.00	840	16.26	
Arius dussumieri	19.80	18	16.10	
Thryssa vitrirostris	15.00	2400	12.20	45
Parastromateus niger	11.60	8	9.43	46
Penaeus indicus	8.00	390	6.50	
Johnius dussumieri	7.50	960	6.10	
Pellona ditchela	7.00	520	5.69	
Sardinella albella	7.00	280	5.69	
CARIDEA	7.00	0	5.69	
Squilla sp.	5.00	50	4.07	
Metapenaeus monoceros	4.50	394	3.66	
SEPIIDAE	2.00	170	1.63	
Otolithes ruber	1.50	120	1.22	
Thryssa vitrirostris	1.00	20	0.81	
Secutor insidiator	1.00	130	0.81	
Polynemus sextarius	1.00	130	0.81	
Johnius belangerii	1.00	10	0.81	
LOLIGINIDAE	1.00	140	0.81	
Rastrelliger kanagurta	0.80	20	0.65	
Scomberoides tol	0.60	20	0.49	
Gazza minuta	0.40	40	0.33	
Terapon theraps	0.20	20	0.16	
Stolephorus devisi *	0.10	40	0.08	
Lagocephalus lagocephalus	0.00	90	0.00	
Total	123.00		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 48
DATE :02/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°6.00
start stop duration Lon E 36°9.00
TIME :09:10:00 09:40:00 30.0 (min) Purpose : 3
LOG : 4550.80 4552.20 1.5 Region : 1
FDEPTH: 23 21 Gear cond.: 0
BDEPTH: 23 21 Validity : 0
Towing dir: 240° Wire out : 150 m Speed : 3.0 kn
Sorted : 8 Total catch: 75.50 Catch/hour: 151.00

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Upeneus vittatus	120.00	7746	79.47	48
Scomberoides tol	11.00	2	7.28	
Abalistes stellatus	3.30	4	2.19	
Carangoides malabaricus	3.20	32	2.12	
Psettodes erumei	2.70	4	1.79	
Dussumieria acuta	2.40	240	1.59	
Encrasicholina heteroloba	1.60	1326	1.06	47
Gerres oyena	1.60	80	1.06	
Secutor insidiator	1.60	688	1.06	
Rachycentron canadum	1.00	2	0.66	
Rhizoprionodon acutus	1.00	2	0.66	
Alepes djedaba	0.80	16	0.53	
Lagocephalus lagocephalus	0.80	72	0.53	
Encrasicholina punctifer	0.00	16	0.00	
Total	151.00		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 49
DATE :02/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°13.02
start stop duration Lon E 36°3.00
TIME :10:30:00 11:00:00 30.0 (min) Purpose : 3
LOG : 4558.10 4559.40 1.5 Region : 1
FDEPTH: 23 23 Gear cond.: 0
BDEPTH: 23 23 Validity : 0
Towing dir: 220° Wire out : 150 m Speed : 3.0 kn
Sorted : 0 Total catch: 141.82 Catch/hour: 283.64

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Rachycentron canadum	168.70	30	59.48	50
Himantura gerrardi	90.00	6	31.73	51
Loligo duvauceli	15.30	1116	5.39	49
Carangoides ferdau	4.30	242	1.52	
Saurida undosquamis	2.80	100	0.99	
Upeneus bensasi	1.10	56	0.39	
Alepes djedaba	0.80	24	0.28	
Rastrelliger kanagurta	0.30	4	0.11	
Nemipterus bipunctatus	0.20	4	0.07	
Decapterus russelli	0.10	6	0.04	
Sphyraena jello	0.04	2	0.01	
Selar crumenophthalmus	0.00	4	0.00	
Fistularia petimba	0.00	2	0.00	
Total	283.64		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 50
DATE :02/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°13.02
start stop duration Lon E 35°52.98
TIME :12:24:00 12:54:00 30.0 (min) Purpose : 3
LOG : 4570.80 4572.30 1.5 Region : 1
FDEPTH: 21 21 Gear cond.: 0
BDEPTH: 21 21 Validity : 0
Towing dir: 220° Wire out : 150 m Speed : 3.0 kn
Sorted : 25 Total catch: 264.05 Catch/hour: 528.10

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pomadasys maculatus	127.30	2850	24.11	
Upeneus vittatus	95.00	4674	17.99	55
Engraulis japonicus	58.90	26388	11.15	53
Carangoides malabaricus	40.86	1368	7.74	52
Gerres oyena	38.00	722	7.20	56
Secutor insidiator	38.00	2262	7.20	57
Scomberomorus commerson	35.10	10	6.65	58
Saurida undosquamis	22.04	342	4.17	
Dussumieria acuta	21.86	1976	4.14	54
Carcharhinus sealei	17.74	10	3.36	
Abalistes stellatus	5.70	20	1.08	
Psettodes erumei	5.70	20	1.08	
Sphyraena jello	3.80	38	0.72	59
Alepes djedaba	2.86	248	0.54	
Thryssa vitrirostris	2.86	342	0.54	
Carangoides armatus	1.90	38	0.36	
Polynemus sextarius	1.90	248	0.36	
Sphyraena chrysotaenia	1.90	20	0.36	
Terapon jarbua	1.90	114	0.36	
Penaeus japonicus	1.14	58	0.22	
Apogon quadrifasciatus	0.96	342	0.18	
Sillago sihama	0.96	38	0.18	
Otolithes ruber	0.58	38	0.11	
Penaeus semisulcatus	0.38	20	0.07	
C R A B S	0.30	2	0.06	
Leiognathus equulus	0.20	20	0.04	
Upeneus bensasi	0.20	20	0.04	
Carangoides ferdau	0.02	20	0.00	
Drepane punctata	0.02	20	0.00	
Fistularia petimba	0.02	20	0.00	
Total	528.10		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 51
DATE :02/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°16.02
start stop duration Lon E 35°40.98
TIME :14:07:00 14:22:00 15.0 (min) Purpose : 3
LOG : 4582.50 4583.20 0.7 Region : 1
FDEPTH: 13 12 Gear cond.: 0
BDEPTH: 13 12 Validity : 0
Towing dir: 220° Wire out : 100 m Speed : 3.0 kn
Sorted : 15 Total catch: 62.68 Catch/hour: 250.72

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Upeneus vittatus	118.40	7520	47.22	62
Saurida undosquamis	36.80	320	14.68	
Engraulis japonicus	28.80	16416	11.49	66
Upeneus sulphureus	19.84	1088	7.91	63
Secutor insidiator	17.60	1648	7.02	60
Scomberomorus commerson	8.00	112	3.19	64
Carangoides ferdau	6.40	208	2.55	
Carangoides malabaricus	6.40	544	2.55	61
Loligo duvauceli	4.00	608	1.60	65
Pomadasys maculatus	3.20	192	1.28	
Gerres oyena	0.80	48	0.32	
Dussumieria acuta	0.32	64	0.13	
Carangoides armatus	0.16	48	0.06	
Atule mate	0.00	36	0.00	
Drepane punctata	0.00	16	0.00	
Stolephorus indicus	0.00	32	0.00	
Terapon jarbua	0.00	48	0.00	
Total	250.72		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 52
DATE :02/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°22.02
start stop duration Lon E 35°42.00
TIME :15:03:00 15:33:00 30.0 (min) Purpose : 3
LOG : 4587.70 4589.20 1.5 Region : 1
FDEPTH: 18 19 Gear cond.: 0
BDEPTH: 18 19 Validity : 0
Towing dir: 170° Wire out : 150 m Speed : 3.0 kn
Sorted : 13 Total catch: 101.80 Catch/hour: 203.60

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Upeneus vittatus	127.40	7762	62.57	67
Scomberomorus commerson	33.00	10	16.21	
Saurida undosquamis	22.76	534	11.18	
Atule mate	6.50	130	3.19	68
Carangoides malabaricus	4.56	170	2.24	
Secutor insidiator	4.56	248	2.24	
Decapterus russelli	1.30	40	0.64	
Gerres filamentosus	1.30	14	0.64	
Upeneus bensasi	1.30	26	0.64	
Loligo duvauceli	0.66	118	0.32	
Penaeus semisulcatus	0.26	14	0.13	
Apogon quadrifasciatus	0.00	14	0.00	
Total	203.60		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 53
DATE :02/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°22.98
start stop duration Lon E 35°51.00
TIME :16:28:00 16:58:00 30.0 (min) Purpose : 3
LOG : 4596.30 4597.90 1.5 Region : 1
FDEPTH: 19 18 Gear cond.: 0
BDEPTH: 19 18 Validity : 0
Towing dir: 50° Wire out : 150 m Speed : 3.0 kn
Sorted : 0 Total catch: 27.40 Catch/hour: 54.80

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Scomberomorus commerson	26.40	10	48.18	
Loligo duvauceli	19.80	692	36.13	70
Saurida undosquamis	7.60	214	13.87	69
C R A B S	0.30	10	0.55	
Sepia australis	0.30	10	0.55	
Atule mate	0.20	8	0.36	
Decapterus russelli	0.10	8	0.18	
Fistularia petimba	0.04	16	0.07	
Rastrelliger kanagurta	0.04	20	0.07	
Carangoides ferdau	0.02	2	0.04	
Carangoides armatus	0.00	2	0.00	
Acanthocepola limbata *	0.00	2	0.00	
Thamnaconus fajardoi	0.00	2	0.00	
Upeneus vittatus	0.00	2	0.00	
Nemipterus zysron	0.00	2	0.00	
Total	54.80		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 54
DATE :03/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°19.02
start stop duration Lon E 36°48.00
TIME :05:46:00 06:16:00 30.0 (min) Purpose : 3
LOG : 4662.60 4663.80 1.5 Region : 1
FDEPTH: 90 88 Gear cond.: 0
BDEPTH: 90 88 Validity : 0
Towing dir: 210° Wire out : 450 m Speed : 3.0 kn
Sorted : 9 Total catch: 41.95 Catch/hour: 83.90

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Loligo duvauceli	23.10	2244	27.53	71
Epinephelus tauvina	20.60	2	24.55	
Dactyloptena orientalis	11.60	92	13.83	
Sepia prashadi	8.40	280	10.01	72
Saurida undosquamis	7.00	104	8.34	
Trachinocephalus myops	4.50	104	5.36	
Halaelurus boesemani	2.40	26	2.86	
Priacanthus hamrur	2.00	20	2.38	
Nemipterus bipunctatus	1.40	30	1.67	
Fistularia petimba	0.70	64	0.83	
Decapterus macrosoma	0.40	48	0.48	
Leiognathus elongatus	0.40	56	0.48	
Upeneus bensasi	0.40	20	0.48	
Torpedo sp.	0.40	8	0.48	
Torquigener hypselogenion	0.40	14	0.48	
Minous coccineus	0.20	8	0.24	
Lagocephalus lagocephalus	0.00	6	0.00	
Total	83.90		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 55
DATE :03/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°10.02
start stop duration Lon E 36°49.02
TIME :08:42:00 09:12:00 30.0 (min) Purpose : 3
LOG : 4686.10 4687.30 1.5 Region : 1
FDEPTH: 76 78 Gear cond.: 0
BDEPTH: 76 78 Validity : 0
Towing dir: 210° Wire out : 400 m Speed : 3.0 kn
Sorted : 29 Total catch: 349.80 Catch/hour: 699.60

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Upeneus moluccensis	363.60	6128	51.97	75
Decapterus russelli	144.00	2840	20.58	73
Decapterus macrosoma	96.00	1680	13.72	74
Carangoides malabaricus	39.60	312	5.66	
Nemipterus bipunctatus	32.40	456	4.63	
Fistularia petimba	13.20	720	1.89	
Cyclichthys orbicularis	2.40	24	0.34	
Parupeneus cinnabarinus *	2.40	72	0.34	
Scomber japonicus	2.40	24	0.34	
Ariomma indica	1.20	24	0.17	
Nemipterus zysron	1.20	24	0.17	
Saurida undosquamis	1.20	96	0.17	
Total	699.60		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 56
DATE :03/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°12.00
start stop duration Lon E 36°40.02
TIME :10:13:00 10:43:00 30.0 (min) Purpose : 3
LOG : 4695.00 4696.30 1.5 Region : 1
FDEPTH: 69 68 Gear cond.: 0
BDEPTH: 69 68 Validity : 0
Towing dir: 220° Wire out : 350 m Speed : 3.0 kn
Sorted : 24 Total catch: 51.90 Catch/hour: 103.80

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Fistularia petimba	40.00	2500	38.54	
Nemipterus bipunctatus	28.40	308	27.36	76
Carangoides malabaricus	10.40	44	10.02	
Saurida undosquamis	7.20	80	6.94	
Argyrops filamentosus	7.00	72	6.74	
Citharoides macrolepis	6.20	4	5.97	
Nemipterus zysron	1.20	12	1.16	
Ariomma indica	1.00	12	0.96	
Abalistes stellatus	0.80	8	0.77	
Octopus vulgaris	0.80	8	0.77	
Cyclichthys orbicularis	0.40	16	0.39	
Priacanthus hamrur	0.20	4	0.19	
Synodus englemani	0.20	12	0.19	
Apogon quadrifasciatus	0.00	4	0.00	
Torquigener hypselogenion	0.00	4	0.00	
Total	103.80		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 57
DATE :03/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°16.98
start stop duration Lon E 36°31.98
TIME :11:39:00 12:09:00 30.0 (min) Purpose : 3
LOG : 4703.90 4705.30 1.5 Region : 1
FDEPTH: 50 47 Gear cond.: 0
BDEPTH: 50 47 Validity : 0
Towing dir: 220° Wire out : 250 m Speed : 3.0 kn
Sorted : 22 Total catch: 89.16 Catch/hour: 178.32

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Lutjanus fulviflamma	87.20	2592	48.90	81
Saurida undosquamis	31.20	296	17.50	79
Upeneus bensasi	20.80	664	11.66	78
Nemipterus bipunctatus	13.60	208	7.63	77
Trachinocephalus myops	11.60	208	6.51	
Parupeneus cinnabarinus *	8.80	200	4.93	80
Ariomma indica	4.00	56	2.24	
Selar crumenophthalmus	0.40	32	0.22	
Argyrops filamentosus	0.20	16	0.11	
Fistularia petimba	0.16	64	0.09	
Torquigener hypselogenion	0.16	64	0.09	
Decapterus macrosoma	0.08	8	0.04	
Heniochus acuminatus	0.08	24	0.04	
Bothus myriaster	0.02	8	0.01	
Priacanthus hamrur	0.02	8	0.01	
Carangoides armatus	0.00	8	0.00	
Lactoria fornasini	0.00	8	0.00	
Total	178.32		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 58
DATE :03/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°18.00
start stop duration Lon E 36°22.98
TIME :13:28:00 13:58:00 30.0 (min) Purpose : 3
LOG : 4715.80 4717.30 1.5 Region : 1
FDEPTH: 33 35 Gear cond.: 0
BDEPTH: 33 35 Validity : 0
Towing dir: 220° Wire out : 200 m Speed : 3.0 kn
Sorted : 21 Total catch: 64.82 Catch/hour: 129.64

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Upeneus bensasi	37.20	1772	28.69	83
Saurida undosquamis	37.20	844	28.69	84
Torquigener hypselogenion	22.80	834	17.59	
Nemipterus bipunctatus	21.00	408	16.20	82
Loligo duvauceli	4.80	132	3.70	
Sepia australis	4.20	42	3.24	
Carangoides chrysophrys	0.90	18	0.69	
Alloteuthis sp.	0.90	48	0.69	
Lactoria cornuta	0.18	6	0.14	
C R A B S	0.12	6	0.09	
Ariomma indica	0.06	6	0.05	
Decapterus russelli	0.06	12	0.05	
Selar crumenophthalmus	0.06	12	0.05	
Sardinella melanura	0.06	6	0.05	
Rastrelliger kanagurta	0.06	6	0.05	
Carangoides ferdau	0.04	84	0.03	
Caesio sp.	0.00	6	0.00	
Alectis indicus	0.00	6	0.00	
Carangoides armatus	0.00	6	0.00	
Decapterus macrosoma	0.00	6	0.00	
Thysanophrys chiltonae	0.00	6	0.00	
Lagocephalus inermis	0.00	6	0.00	
Lagocephalus lagocephalus	0.00	6	0.00	
Zanclus canescens *	0.00	6	0.00	
Total	129.64		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 59
DATE :03/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°22.02
start stop duration Lon E 36°16.02
TIME :14:54:00 15:24:00 30.0 (min) Purpose : 3
LOG : 4724.80 4726.50 1.5 Region : 1
FDEPTH: 26 27 Gear cond.: 0
BDEPTH: 26 27 Validity : 0
Towing dir: 210° Wire out : 200 m Speed : 3.0 kn
Sorted : 12 Total catch: 24.36 Catch/hour: 48.72

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Saurida undosquamis	24.52	480	50.33	87
Upeneus bensasi	9.00	412	18.47	86
Nemipterus bipunctatus	7.80	140	16.01	85
Sepia australis	2.60	22	5.34	89
Loligo duvauceli	2.00	58	4.11	88
Atule mate	1.20	2	2.46	
C R A B S	0.80	12	1.64	
Trachinocephalus myops	0.40	10	0.82	
Carangoides ferdau	0.20	14	0.41	
Priacanthus hamrur	0.10	4	0.21	
Cyclichthys orbicularis	0.04	2	0.08	
Solea turbynei	0.04	2	0.08	
Lactoria cornuta	0.02	2	0.04	
Abalistes stellatus	0.00	2	0.00	
Decapterus russelli	0.00	2	0.00	
Fistularia petimba	0.00	2	0.00	
Total	48.72		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 60
DATE :03/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°28.02
start stop duration Lon E 36°15.00
TIME :16:06:00 16:36:00 30.0 (min) Purpose : 3
LOG : 4731.00 4732.50 1.5 Region : 1
FDEPTH: 34 33 Gear cond.: 0
BDEPTH: 34 33 Validity : 0
Towing dir: 215° Wire out : 200 m Speed : 3.0 kn
Sorted : 31 Total catch: 39.56 Catch/hour: 79.12

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Upeneus bensasi	26.00	1040	32.86	91
Saurida undosquamis	20.50	312	25.91	92
Nemipterus bipunctatus	20.00	256	25.28	90
Trachinocephalus myops	4.50	60	5.69	93
Alloteuthis africana	3.00	242	3.79	94
Sepia australis	3.00	26	3.79	
Carangoides armatus	0.76	38	0.96	
Abalistes stellatus	0.50	8	0.63	
Priacanthus hamrur	0.26	26	0.33	
Carangoides chrysophrys	0.18	8	0.23	
Lactoria cornuta	0.16	8	0.20	
Rastrelliger kanagurta	0.12	6	0.15	
Decapterus russelli	0.06	8	0.08	
Loligo duvauceli	0.06	10	0.08	
Sardinella melanura	0.02	22	0.03	
Ariomma indica	0.00	2	0.00	
Caesio sp.	0.00	6	0.00	
Fistularia petimba	0.00	6	0.00	
Thenus orientalis	0.00	8	0.00	
Pervagor melanocephalus	0.00	22	0.00	
Thysanophrys chiltonae	0.00	2	0.00	
Synodus englemani	0.00	6	0.00	
Lagocephalus lagocephalus	0.00	6	0.00	
Torquigener hypselogenion	0.00	8	0.00	
Total	79.12		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 61
DATE :03/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°28.02
start stop duration Lon E 36°19.98
TIME :17:20:00 17:50:00 30.0 (min) Purpose : 3
LOG : 4739.30 4740.50 1.5 Region : 1
FDEPTH: 36 39 Gear cond.: 0
BDEPTH: 36 39 Validity : 0
Towing dir: 80° Wire out : 200 m Speed : 3.0 kn
Sorted : 14 Total catch: 68.88 Catch/hour: 137.76

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Saurida undosquamis	28.00	440	20.33	
Stephanolepis auratus	20.00	1290	14.52	
Saurida micropectoralis	19.00	140	13.79	
Sorsogona prionota	14.00	446	10.16	95
Upeneus bensasi	10.50	410	7.62	
Nemipterus bipunctatus	9.00	100	6.53	
Scomberomorus commerson	8.60	2	6.24	
Trachinocephalus myops	8.50	130	6.17	
Sepia prashadi	5.00	20	3.63	
Apistus carinatus	3.50	170	2.54	
Priacanthus hamrur	2.50	70	1.81	
Penaeus latisulcatus	2.40	58	1.74	
Torquigener hypselogenion	2.00	100	1.45	
Callionymus filamentosus	1.00	40	0.73	
Carangoides malabaricus	1.00	50	0.73	
Decapterus russelli	1.00	20	0.73	
PORTUNIDAE	0.50	10	0.36	
Thenus orientalis	0.50	4	0.36	
Aesopia cornuta	0.50	10	0.36	
Crossorhombus valderostratus	0.20	10	0.15	
Penaeus canaliculatus	0.06	2	0.04	
Total	137.76		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 62
DATE :04/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°34.02
start stop duration Lon E 36°46.98
TIME :00:45:00 01:45:00 60.0 (min) Purpose : 3
LOG : 4809.60 4812.60 3.0 Region : 1
FDEPTH: 557 548 Gear cond.: 0
BDEPTH: 557 548 Validity : 0
Towing dir: 215° Wire out : 1500 m Speed : 3.0 kn
Sorted : 23 Total catch: 81.86 Catch/hour: 81.86

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Centrophorus granulosus	35.00	7	42.76	
Haliporoides triarthrus	22.75	1047	27.79	96
Melanonus gracilis	10.15	263	12.40	100
Woodsia meyerwaardeni	5.60	392	6.84	99
Trachonurus villosus	4.20	130	5.13	98
Chlorophthalmus punctatus	2.60	32	3.18	97
Nephropsis stewarti	0.70	18	0.86	
Plesiopenaeus sp.	0.40	28	0.49	
CARIDEA	0.35	448	0.43	
ARISTEIDAE	0.11	35	0.13	
MAJIDAE	0.00	14	0.00	
Heterocarpus sp.	0.00	7	0.00	
Total	81.86		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 63
DATE :04/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°42.00
start stop duration Lon E 36°30.00
TIME :05:44:00 06:14:00 30.0 (min) Purpose : 3
LOG : 4832.70 4834.00 1.5 Region : 1
FDEPTH: 73 75 Gear cond.: 0
BDEPTH: 73 75 Validity : 0
Towing dir: 225° Wire out : 350 m Speed : 3.0 kn
Sorted : 26 Total catch: 106.48 Catch/hour: 212.96

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Dactyloptena orientalis	129.60	360	60.86	103
Leiognathus elongatus	29.20	4412	13.71	102
Upeneus bensasi	14.80	744	6.95	
Abalistes stellatus	9.60	8	4.51	
Synodus englemani	5.20	616	2.44	101
Loligo duvauceli	4.80	640	2.25	
Sepia prashadi	4.00	536	1.88	
Trachinocephalus myops	4.00	96	1.88	
Lagocephalus lagocephalus	4.00	120	1.88	
Nemipterus bipunctatus	3.20	88	1.50	
Psettodes erumei	1.60	2	0.75	
Halaelurus natalensis	1.60	8	0.75	
Decapterus macrosoma	0.80	24	0.38	
Priacanthus hamrur	0.20	8	0.09	
Torquigener hypselogenion	0.20	16	0.09	
Caesio sp.	0.16	16	0.08	
Sphyraena chrysotaenia	0.00	16	0.00	
Total	212.96		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 64
DATE :04/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°46.02
start stop duration Lon E 36°22.02
TIME :07:07:00 07:37:00 30.0 (min) Purpose : 3
LOG : 4840.60 4841.80 1.5 Region : 1
FDEPTH: 68 69 Gear cond.: 0
BDEPTH: 68 69 Validity : 0
Towing dir: 225° Wire out : 350 m Speed : 3.0 kn
Sorted : 14 Total catch: 62.25 Catch/hour: 124.50

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Upeneus bensasi	34.80	800	27.95	104
Saurida undosquamis	24.40	384	19.60	106
Sepia prashadi	13.20	72	10.60	
Scomberomorus commerson	10.50	2	8.43	112
Nemipterus bipunctatus	8.80	156	7.07	105
Dactyloptena orientalis	8.40	32	6.75	
Lagocephalus lagocephalus	8.00	504	6.43	
LOLIGINIDAE	4.80	712	3.86	
Fistularia petimba	3.60	136	2.89	
Torquigener hypselogenion	2.80	96	2.25	
Parupeneus cinnabarinus *	2.40	48	1.93	
Ranina ranina	0.80	8	0.64	
Trachinocephalus myops	0.80	16	0.64	
Chelidonichthys capensis	0.80	40	0.64	
Rastrelliger kanagurta	0.40	8	0.32	
Total	124.50		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 65
DATE :04/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°49.98
start stop duration Lon E 36°16.02
TIME :08:30:00 09:00:00 30.0 (min) Purpose : 3
LOG : 4847.70 4849.20 1.5 Region : 1
FDEPTH: 65 64 Gear cond.: 0
BDEPTH: 65 64 Validity : 0
Towing dir: 230° Wire out : 350 m Speed : 3.0 kn
Sorted : 27 Total catch: 199.40 Catch/hour: 398.80

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Decapterus russelli	302.40	10350	75.83	107
Dactyloptena orientalis	31.50	322	7.90	
Saurida undosquamis	13.30	84	3.34	
Scomberomorus commerson	12.90	2	3.23	113
Fistularia petimba	8.40	308	2.11	
Sepia prashadi	8.40	42	2.11	
Octopus vulgaris	7.00	28	1.76	
Trachinocephalus myops	4.20	56	1.05	
Loligo duvauceli	3.50	168	0.88	
Ranina ranina	1.40	14	0.35	
Chilomycterus orbicularis *	1.40	42	0.35	
Torquigener hypselogenion	1.40	56	0.35	
Chelidonichthys capensis	1.40	84	0.35	
Stephanolepis auratus	0.70	28	0.18	
Samaris cristatus	0.70	28	0.18	
Decapterus macrosoma	0.20	28	0.05	
Total	398.80		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 66
DATE :04/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°46.98
start stop duration Lon E 36°10.02
TIME :10:12:00 10:42:00 30.0 (min) Purpose : 3
LOG : 4858.00 4859.50 1.5 Region : 1
FDEPTH: 53 55 Gear cond.: 0
BDEPTH: 53 55 Validity : 0
Towing dir: 220° Wire out : 300 m Speed : 3.0 kn
Sorted : 28 Total catch: 476.00 Catch/hour: 952.00

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Saurida undosquamis	465.60	12416	48.91	109
Upeneus bensasi	201.60	6784	21.18	
Nemipterus bipunctatus	73.60	1600	7.73	108
Stephanolepis auratus	71.20	4704	7.48	
Scomberomorus commerson	32.40	6	3.40	111
Sepia prashadi	27.20	96	2.86	
Ariomma indica	17.60	384	1.85	
Parupeneus cinnabarinus *	17.60	448	1.85	
Carangoides malabaricus	11.20	128	1.18	
Decapterus russelli	9.60	384	1.01	
Trachinocephalus myops	6.40	96	0.67	
Ranina ranina	3.20	32	0.34	
Lagocephalus inermis	3.20	32	0.34	
Panulirus ornatus	3.00	2	0.32	110
Squilla sp.	1.60	32	0.17	
Fistularia petimba	1.60	256	0.17	
Synodus englemani	1.60	64	0.17	
Penaeus latisulcatus	1.20	32	0.13	
Abalistes stellatus	1.00	32	0.11	
Upeneus sulphureus	0.60	32	0.06	
Samaris cristatus	0.40	32	0.04	
Torquigener hypselogenion	0.40	32	0.04	
Crossorhombus valderostratus	0.20	32	0.02	
Total	952.00		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 67
DATE :04/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°49.98
start stop duration Lon E 36°1.98
TIME :11:32:00 12:02:00 30.0 (min) Purpose : 3
LOG : 4866.60 4868.30 1.5 Region : 1
FDEPTH: 48 51 Gear cond.: 0
BDEPTH: 48 51 Validity : 0
Towing dir: 225° Wire out : 250 m Speed : 3.0 kn
Sorted : 28 Total catch: 518.36 Catch/hour: 1036.72

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Decapterus russelli	392.40	15986	37.85	115
Upeneus bensasi	208.80	7164	20.14	118
Rastrelliger kanagurta	198.00	2628	19.10	114
Saurida undosquamis	118.80	2124	11.46	117
Decapterus macrosoma	57.60	1404	5.56	116
Nemipterus bipunctatus	36.00	468	3.47	
Scomberomorus commerson	7.80	2	0.75	
Parupeneus cinnabarinus *	7.20	144	0.69	
Priacanthus hamrur	4.32	144	0.42	
Selar crumenophthalmus	3.60	144	0.35	
Dussumieria acuta	0.72	36	0.07	
Carangoides malabaricus	0.70	36	0.07	
Upeneus vittatus	0.36	72	0.03	
Samaris cristatus	0.36	36	0.03	
Fistularia petimba	0.04	72	0.00	
Caesio sp.	0.00	108	0.00	
Dendrochirus zebra	0.00	16	0.00	
Total	1036.70		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 68
DATE :04/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°48.00
start stop duration Lon E 35°57.00
TIME :12:50:00 13:20:00 30.0 (min) Purpose : 3
LOG : 4874.00 4875.60 1.5 Region : 1
FDEPTH: 41 41 Gear cond.: 0
BDEPTH: 41 41 Validity : 0
Towing dir: 240° Wire out : 200 m Speed : 3.0 kn
Sorted : 30 Total catch: 62.30 Catch/hour: 124.60

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Saurida undosquamis	52.00	1176	41.73	119
Upeneus bensasi	36.00	2430	28.89	121
Nemipterus bipunctatus	12.80	408	10.27	120
Loligo duvauceli	7.60	204	6.10	122
Sepia australis	4.40	48	3.53	
Carangoides armatus	3.00	96	2.41	
Carangoides chrysophrys	2.40	28	1.93	
Ranina ranina	1.60	16	1.28	
Trachinocephalus myops	1.20	44	0.96	
Alloteuthis africana	1.00	48	0.80	
PORTUNIDAE	0.80	4	0.64	
Thamnaconus fajardoi	0.40	60	0.32	
BOTHIDAE	0.20	20	0.16	
Pseudorhombus arsius	0.20	16	0.16	
Thenus orientalis	0.20	4	0.16	
Sphyraena jello	0.20	12	0.16	
Trichiurus lepturus	0.20	4	0.16	
Alepes djedaba	0.10	8	0.08	
Upeneus vittatus	0.10	4	0.08	
Lagocephalus lagocephalus	0.10	8	0.08	
Torquigener hypselogenion	0.10	16	0.08	
Abalistes stellatus	0.00	4	0.00	
Decapterus russelli	0.00	8	0.00	
Fistularia petimba	0.00	4	0.00	
Leiognathus elongatus	0.00	4	0.00	
Thysanophrys chiltonae	0.00	4	0.00	
Total	124.60		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 69
DATE :04/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°43.98
start stop duration Lon E 35°52.98
TIME :14:14:00 14:44:00 30.0 (min) Purpose : 3
LOG : 4883.20 4884.50 1.5 Region : 1
FDEPTH: 33 32 Gear cond.: 0
BDEPTH: 33 32 Validity : 0
Towing dir: 40° Wire out : 200 m Speed : 3.0 kn
Sorted : 29 Total catch: 96.64 Catch/hour: 193.28

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Saurida undosquamis	150.00	4132	77.61	124
Scomberomorus commerson	14.60	2	7.55	
Nemipterus bipunctatus	7.80	204	4.04	125
Loligo duvauceli	6.60	258	3.41	123
Upeneus bensasi	6.00	456	3.10	126
Psettodes erumei	3.90	6	2.02	
Carcharhinus sealei	1.80	2	0.93	
Sphyraena jello	0.60	24	0.31	
Sepia australis	0.60	42	0.31	
Sphyraena chrysotaenia	0.30	12	0.16	
Trachinocephalus myops	0.30	30	0.16	
Trichiurus lepturus	0.30	42	0.16	
Lactoria cornuta	0.18	6	0.09	
Thysanophrys chiltonae	0.12	6	0.06	
Carangoides malabaricus	0.06	12	0.03	
Upeneus vittatus	0.06	12	0.03	
Lagocephalus lagocephalus	0.06	6	0.03	
Carangoides ferdau	0.00	6	0.00	
Carangoides armatus	0.00	6	0.00	
Decapterus russelli	0.00	6	0.00	
Fistularia petimba	0.00	24	0.00	
Thenus orientalis	0.00	6	0.00	
Thamnaconus fajardoi	0.00	36	0.00	
Alloteuthis africana	0.00	6	0.00	
Total	193.28		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 70
DATE :04/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°39.00
start stop duration Lon E 35°58.98
TIME :15:29:00 15:59:00 30.0 (min) Purpose : 3
LOG : 4890.00 4891.30 1.5 Region : 1
FDEPTH: 28 30 Gear cond.: 0
BDEPTH: 28 30 Validity : 0
Towing dir: 40° Wire out : 150 m Speed : 3.0 kn
Sorted : 0 Total catch: 32.36 Catch/hour: 64.72

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Saurida undosquamis	33.54	506	51.82	
Loligo duvauceli	17.60	724	27.19	128
Scomberomorus commerson	6.40	2	9.89	
Sepia australis	2.10	22	3.24	
Trachinocephalus myops	2.00	98	3.09	127
PORTUNIDAE	0.80	4	1.24	
Thysanophrys chiltonae	0.80	28	1.24	
Ranina ranina	0.60	8	0.93	
Thenus orientalis	0.60	2	0.93	
Nemipterus bipunctatus	0.12	6	0.19	
Sphyraena jello	0.04	2	0.06	
Alloteuthis africana	0.04	12	0.06	
Octopus vulgaris	0.04	2	0.06	
Decapterus russelli	0.02	2	0.03	
Upeneus bensasi	0.02	4	0.03	
BOTHIDAE	0.00	2	0.00	
Pseudorhombus arsius	0.00	12	0.00	
Atule mate	0.00	2	0.00	
Carangoides armatus	0.00	2	0.00	
Fistularia petimba	0.00	6	0.00	
Thamnaconus fajardoi	0.00	2	0.00	
Lagocephalus lagocephalus	0.00	2	0.00	
Trichiurus lepturus	0.00	2	0.00	
Total	64.72		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 71
DATE :05/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°28.98
start stop duration Lon E 35°30.00
TIME :05:45:00 06:15:00 30.0 (min) Purpose : 3
LOG : 4999.40 5000.90 1.5 Region : 1
FDEPTH: 11 11 Gear cond.: 0
BDEPTH: 11 11 Validity : 0
Towing dir: 215° Wire out : 100 m Speed : 3.0 kn
Sorted : 12 Total catch: 12.15 Catch/hour: 24.30

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Scomberomorus plurilineatus	13.70	2	56.38	129
Carcharhinus brevipinna	4.90	2	20.16	132
Sphyraena barracuda	2.60	2	10.70	131
Saurida undosquamis	2.00	24	8.23	
Scomberomorus commerson	0.60	2	2.47	130
Psettodes erumei	0.50	2	2.06	
Total	24.30		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 72
DATE :05/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°31.98
start stop duration Lon E 35°33.00
TIME :06:58:00 07:28:00 30.0 (min) Purpose : 3
LOG : 5005.70 5007.20 1.5 Region : 1
FDEPTH: 16 16 Gear cond.: 0
BDEPTH: 16 16 Validity : 0
Towing dir: 215° Wire out : 100 m Speed : 3.0 kn
Sorted : 8 Total catch: 37.25 Catch/hour: 74.50

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Saurida undosquamis	32.40	822	43.49	134
Scomberomorus commerson	20.40	4	27.38	135
Carangoides malabaricus	11.10	366	14.90	133
Loligo duvauceli	5.20	146	6.98	136
Lutjanus sanguineus	2.10	18	2.82	
Gerres oyena	0.90	12	1.21	
Thenus orientalis	0.60	6	0.81	
PORTUNIDAE	0.30	6	0.40	
Fistularia petimba	0.30	12	0.40	
Lutjanus lutjanus	0.30	12	0.40	
Nemipterus bipunctatus	0.30	12	0.40	
Sepia prashadi	0.30	6	0.40	
Sorsogona prionota	0.20	12	0.27	
Callionymus filamentosus	0.10	6	0.13	
Encrasicholina heteroloba	0.00	18	0.00	
Total	74.50		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 73
DATE :05/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°37.98
start stop duration Lon E 35°39.00
TIME :08:30:00 09:00:00 30.0 (min) Purpose : 3
LOG : 5016.10 5017.60 1.5 Region : 1
FDEPTH: 21 23 Gear cond.: 0
BDEPTH: 21 23 Validity : 0
Towing dir: 215° Wire out : 150 m Speed : 3.0 kn
Sorted : 13 Total catch: 41.50 Catch/hour: 83.00

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Scomberomorus commerson	31.00	16	37.35	137
Loligo duvauceli	22.40	828	26.99	
Nemipterus bipunctatus	13.10	702	15.78	138
Upeneus moluccensis	5.70	338	6.87	139
Saurida undosquamis	3.40	60	4.10	
Sepia prashadi	1.90	46	2.29	
Thenus orientalis	1.50	10	1.81	
Decapterus russelli	1.20	84	1.45	
Upeneus bensasi	0.60	148	0.72	
Alepes djedaba	0.40	20	0.48	
Lethrinus microdon	0.40	8	0.48	
Lutjanus sanguineus	0.40	8	0.48	
Rachycentron canadum	0.40	2	0.48	
Trachinocephalus myops	0.40	18	0.48	
Gymnocranius griseus	0.10	4	0.12	
Rastrelliger kanagurta	0.10	4	0.12	
Lagocephalus lagocephalus	0.00	8	0.00	
Total	83.00		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 74
DATE :05/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°39.00
start stop duration Lon E 35°48.00
TIME :10:21:00 10:51:00 30.0 (min) Purpose : 3
LOG : 5029.40 5031.00 1.5 Region : 1
FDEPTH: 30 26 Gear cond.: 0
BDEPTH: 30 26 Validity : 0
Towing dir: 50° Wire out : 150 m Speed : 3.0 kn
Sorted : 12 Total catch: 38.82 Catch/hour: 77.64

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Saurida undosquamis	35.20	572	45.34	
Scomberomorus plurilineatus	12.30	2	15.84	142
Carangoides malabaricus	9.00	100	11.59	
Upeneus vittatus	4.80	960	6.18	140
Chirocentrus dorab	4.40	6	5.67	143
Loligo duvauceli	3.80	850	4.89	
Leiognathus elongatus	1.40	2324	1.80	141
Psettodes erumei	1.40	2	1.80	
Upeneus assymetricus	1.00	62	1.29	
Nemipterus bipunctatus	1.00	34	1.29	
Argyrops filamentosus	1.00	10	1.29	
Alepes djedaba	0.50	154	0.64	
Upeneus moluccensis	0.50	20	0.64	
Terapon theraps	0.50	4	0.64	
PORCELLANIDAE *	0.20	4	0.26	
Upeneus bensasi	0.20	10	0.26	
Trichiurus lepturus	0.20	14	0.26	
Fistularia petimba	0.10	10	0.13	
Stephanolepis auratus	0.10	38	0.13	
Decapterus russelli	0.04	24	0.05	
Mene maculata	0.00	10	0.00	
Total	77.64		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 75
DATE :05/05/1990 GEAR TYPE: PT NO: 6 POSITION:Lat S 19°37.02
start stop duration Lon E 35°55.02
TIME :12:27:00 12:57:00 30.0 (min) Purpose : 1
LOG : 5041.40 5042.90 1.5 Region : 1
FDEPTH: 5 5 Gear cond.: 0
BDEPTH: 30 34 Validity : 0
Towing dir: 265° Wire out : 200 m Speed : 3.0 kn
Sorted : 1 Total catch: 136.59 Catch/hour: 273.18

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Carcharhinus amboinensis	210.00	2	76.87	147
Scomberomorus commerson	38.80	10	14.20	146
Scomberomorus plurilineatus	13.90	2	5.09	
Thamnaconus fajardoi	6.72	5440	2.46	
Decapterus russelli	1.60	696	0.59	145
Loligo duvauceli	1.60	328	0.59	
Atule mate	0.48	360	0.18	144
Selar crumenophthalmus	0.08	8	0.03	
Ariomma indica	0.00	8	0.00	
Carangoides ferdau	0.00	16	0.00	
Carangoides armatus	0.00	16	0.00	
Megalaspis cordyla	0.00	416	0.00	
Encrasicholina heteroloba	0.00	40	0.00	
Fistularia petimba	0.00	8	0.00	
Priacanthus hamrur	0.00	40	0.00	
Sphyraena chrysotaenia	0.00	176	0.00	
Lagocephalus lagocephalus	0.00	32	0.00	
Total	273.18		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 76
DATE :05/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 19°34.98
start stop duration Lon E 36°4.02
TIME :15:20:00 15:50:00 30.0 (min) Purpose : 3
LOG : 5064.50 5065.90 1.5 Region : 1
FDEPTH: 34 34 Gear cond.: 0
BDEPTH: 34 34 Validity : 0
Towing dir: 258° Wire out : 200 m Speed : 0.3 kn
Sorted : 22 Total catch: 32.77 Catch/hour: 65.54

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Saurida undosquamis	18.50	400	28.23	151
Nemipterus bipunctatus	14.26	242	21.76	150
Scomberomorus commerson	9.50	2	14.49	
Loligo duvauceli	6.26	176	9.55	148
Alloteuthis sp.	4.76	326	7.26	149
Trachinocephalus myops	3.76	98	5.74	153
Sepia australis	2.12	22	3.23	
Carangoides chrysophrys	2.00	26	3.05	
Decapterus russelli	2.00	70	3.05	152
Upeneus bensasi	1.50	88	2.29	
Thenus orientalis	0.60	2	0.92	
Carangoides armatus	0.06	6	0.09	
Decapterus macrosoma	0.06	6	0.09	
Torquigener hypselogenion	0.06	28	0.09	
Cyclichthys orbicularis	0.02	2	0.03	
Thamnaconus fajardoi	0.02	42	0.03	
Thysanophrys chiltonae	0.02	8	0.03	
Priacanthus hamrur	0.02	2	0.03	
Octopus vulgaris	0.02	2	0.03	
Bothus myriaster	0.00	18	0.00	
Fistularia petimba	0.00	8	0.00	
Total	65.54		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 77
DATE :05/05/1990 GEAR TYPE: PT NO: 2 POSITION:Lat S 19°51.00
start stop duration Lon E 35°37.02
TIME :21:05:00 21:25:00 20.0 (min) Purpose : 1
LOG : 5112.90 5114.10 1.2 Region : 1
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 25 27 Validity : 0
Towing dir: 90° Wire out : 50 m Speed : 0.3 kn
Sorted : 11 Total catch: 35.35 Catch/hour: 106.05

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Amblygaster sirm	49.05	1392	46.25	155
Decapterus russelli	34.65	1935	32.67	154
Scomberomorus commerson	10.80	3	10.18	157
Rastrelliger kanagurta	6.60	138	6.22	156
Dussumieria acuta	2.70	117	2.55	
Alepes djedaba	0.90	81	0.85	
Upeneus assymetricus	0.90	54	0.85	
Sorsogona prionota	0.27	9	0.25	
Trachinocephalus myops	0.18	9	0.17	
Total	106.05		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 78
DATE :06/05/1990 GEAR TYPE: PT NO: 0 POSITION:Lat S 20°10.98
start stop duration Lon E 35°28.98
TIME :03:32:00 04:02:00 30.0 (min) Purpose : 1
LOG : 5172.30 5173.80 1.5 Region : 1
FDEPTH: 5 5 Gear cond.: 0
BDEPTH: 30 35 Validity : 0
Towing dir: 90° Wire out : 150 m Speed : 3.0 kn
Sorted : 0 Total catch: 7.12 Catch/hour: 14.24

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dussumieria acuta	5.30	188	37.22	160
Decapterus russelli	5.20	244	36.52	161
Selar crumenophthalmus	1.60	46	11.24	158
Rastrelliger kanagurta	1.00	30	7.02	159
Loligo duvauceli	0.60	450	4.21	162
Sardinella gibbosa	0.20	6	1.40	
Sardinella melanura	0.20	6	1.40	
Emmelichthys nitidus	0.14	30	0.98	163
Thamnaconus fajardoi	0.00	8	0.00	
Total	14.24		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 79
DATE :06/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 20°3.00
start stop duration Lon E 35°46.98
TIME :06:05:00 06:35:00 30.0 (min) Purpose : 3
LOG : 5193.70 6195.10 1.5 Region : 1
FDEPTH: 46 46 Gear cond.: 0
BDEPTH: 46 46 Validity : 0
Towing dir: 230° Wire out : 200 m Speed : 3.0 kn
Sorted : 27 Total catch: 178.55 Catch/hour: 357.10

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus russelli	147.00	7130	41.16	164
Scomberomorus commerson	79.00	16	22.12	167
Nemipterus bipunctatus	44.00	710	12.32	165
Saurida undosquamis	35.00	630	9.80	
Upeneus assymetricus	22.50	870	6.30	166
Loligo duvauceli	8.00	200	2.24	
Rastrelliger kanagurta	6.50	160	1.82	
Selar crumenophthalmus	5.00	160	1.40	
Carangoides malabaricus	2.50	130	0.70	
Echeneis naucrates	2.00	10	0.56	
Decapterus macrosoma	1.50	40	0.42	
Thenus orientalis	1.00	10	0.28	
Cyclichthys orbicularis	0.50	10	0.14	
Fistularia petimba	0.50	10	0.14	
Stephanolepis auratus	0.50	20	0.14	
Lagocephalus sceleratus	0.50	20	0.14	
Dussumieria acuta	0.30	10	0.08	
Ariomma indica	0.20	10	0.06	
Carangoides gymnostethus	0.20	10	0.06	
Sorsogona prionota	0.20	10	0.06	
Torquigener hypselogenion	0.20	10	0.06	
Total	357.10		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 80
DATE :06/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 20°6.00
start stop duration Lon E 35°55.98
TIME :07:59:00 08:29:00 30.0 (min) Purpose : 3
LOG : 5206.20 5207.50 1.5 Region : 1
FDEPTH: 55 57 Gear cond.: 0
BDEPTH: 55 57 Validity : 0
Towing dir: 210° Wire out : 300 m Speed : 3.0 kn
Sorted : 15 Total catch: 112.95 Catch/hour: 225.90

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Upeneus bensasi	78.60	2208	34.79	169
Torquigener hypselogenion	44.80	1846	19.83	
Decapterus russelli	19.50	430	8.63	168
Scomberomorus commerson	18.50	4	8.19	170
Saurida undosquamis	14.30	78	6.33	
Sepia prashadi	13.00	64	5.75	
Nemipterus bipunctatus	9.10	104	4.03	
Gymnocranius griseus	6.50	182	2.88	
Parupeneus cinnabarinus *	5.80	182	2.57	
Priacanthus hamrur	3.20	52	1.42	
Fistularia petimba	2.60	40	1.15	
Lethrinus microdon	2.00	40	0.89	
Lagocephalus sceleratus	2.00	64	0.89	
Loligo duvauceli	1.30	116	0.58	
Trachinocephalus myops	1.30	40	0.58	
Bothus mancus	1.00	12	0.44	
Decapterus macrosoma	0.60	12	0.27	
Selar crumenophthalmus	0.60	12	0.27	
Upeneus assymetricus	0.60	12	0.27	
Synodus englemani	0.60	12	0.27	
Total	225.90		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 81
DATE :06/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 20°12.00
start stop duration Lon E 36°1.02
TIME :09:36:00 10:06:00 30.0 (min) Purpose : 3
LOG : 5215.20 5216.80 1.5 Region : 1
FDEPTH: 65 63 Gear cond.: 0
BDEPTH: 65 63 Validity : 0
Towing dir: 210° Wire out : 400 m Speed : 3.0 kn
Sorted : 20 Total catch: 270.10 Catch/hour: 540.20

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus russelli	424.00	9962	78.49	171
Upeneus bensasi	18.90	1134	3.50	172
Sepia prashadi	18.90	296	3.50	
Caesio sp.	16.20	864	3.00	
Echeneis naucrates	16.20	28	3.00	
Nemipterus bipunctatus	9.40	216	1.74	
Trachinocephalus myops	8.00	136	1.48	
Thenus orientalis	5.40	28	1.00	
Loligo duvauceli	5.40	108	1.00	
Parupeneus cinnabarinus *	4.20	136	0.78	
Cyclichthys orbicularis	2.70	28	0.50	
Fistularia petimba	2.70	54	0.50	
Rastrelliger kanagurta	2.70	136	0.50	
Saurida undosquamis	2.70	54	0.50	
Decapterus macrosoma	1.40	28	0.26	
Synodus englemani	1.40	162	0.26	
Halichoeres sp.	0.00	28	0.00	
Total	540.20		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 82
DATE :06/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 20°16.98
start stop duration Lon E 35°55.02
TIME :11:02:00 11:28:00 26.0 (min) Purpose : 3
LOG : 5223.30 5224.50 1.2 Region : 1
FDEPTH: 59 43 Gear cond.: 0
BDEPTH: 59 43 Validity : 0
Towing dir: 210° Wire out : 300 m Speed : 3.0 kn
Sorted : 26 Total catch: 196.56 Catch/hour: 453.60

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Leiognathus elongatus	216.46	41488	47.72	175
Decapterus russelli	105.00	6150	23.15	178
Decapterus macrosoma	74.31	6155	16.38	173
Aprion virescens	30.69	5	6.77	179
Selar crumenophthalmus	8.08	582	1.78	176
Sepia australis	8.08	48	1.78	180
Upeneus bensasi	6.46	468	1.42	177
Caesio sp.	3.23	517	0.71	
Lactoria cornuta	0.32	16	0.07	
Parupeneus cinnabarinus *	0.16	16	0.04	
Nemipterus bipunctatus	0.16	113	0.04	
Rastrelliger kanagurta	0.16	65	0.04	
Alloteuthis sp.	0.16	178	0.04	174
Synodus indicus	0.16	113	0.04	
Lagocephalus lagocephalus	0.16	145	0.04	
Fistularia petimba	0.00	16	0.00	
Total	453.60		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 83
DATE :06/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 20°22.02
start stop duration Lon E 35°49.98
TIME :13:05:00 13:35:00 30.0 (min) Purpose : 3
LOG : 5239.20 5240.50 1.5 Region : 1
FDEPTH: 60 57 Gear cond.: 0
BDEPTH: 60 57 Validity : 0
Towing dir: 185° Wire out : 300 m Speed : 3.0 kn
Sorted : 29 Total catch: 695.59 Catch/hour: 1391.18

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus russelli	460.00	44160	33.07	186
Decapterus macrosoma	345.00	13156	24.80	185
Leiognathus elongatus	317.40	80938	22.82	184
Selar crumenophthalmus	106.22	8980	7.64	183
Rastrelliger kanagurta	85.10	2438	6.12	182
Sardinella melanura	27.60	552	1.98	181
Scomberomorus commerson	18.60	4	1.34	189
Upeneus bensasi	13.80	1284	0.99	187
Nemipterus bipunctatus	9.20	414	0.66	
Sepia sp.	6.90	92	0.50	
Thenus orientalis	0.90	4	0.06	188
Synodus indicus	0.46	230	0.03	
Parupeneus cinnabarinus *	0.00	46	0.00	
Sphyraena jello	0.00	230	0.00	
Trachinocephalus myops	0.00	46	0.00	
Total	1391.18		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 84
DATE :06/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 20°25.98
start stop duration Lon E 35°52.98
TIME :14:37:00 15:07:00 30.0 (min) Purpose : 3
LOG : 5247.30 5248.70 1.5 Region : 1
FDEPTH: 54 56 Gear cond.: 0
BDEPTH: 54 56 Validity : 0
Towing dir: 185° Wire out : 300 m Speed : 3.0 kn
Sorted : 0 Total catch: 151.77 Catch/hour: 303.54

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Lutjanus sanguineus	50.00	12	16.47	
Epinephelus multinotatus	46.40	6	15.29	
Aprion virescens	25.80	6	8.50	
Scarus tricolor	25.00	6	8.24	
Lutjanus sebae	23.00	4	7.58	
Abalistes stellatus	21.40	22	7.05	
Ostracion cubicus	19.60	24	6.46	
Sufflamen fraenatus	18.00	14	5.93	
Acanthurus xanthopterus	16.40	10	5.40	
Pomacanthus imperator	14.00	12	4.61	
Lactoria fornasini	9.60	12	3.16	
Diodon holocanthus	7.60	20	2.50	
Tetrosomus concatenatus	7.20	16	2.37	
Lophodiodon calori	5.30	10	1.75	
Gymnothorax favagineus	3.80	2	1.25	
Chilomycterus reticulatus	3.60	2	1.19	
Acanthurus nigricauda	3.30	2	1.09	
Epinephelus chlorostigma	2.40	2	0.79	
Lactoria cornuta	1.00	4	0.33	
Fistularia commersonii	0.10	4	0.03	
Sepia sp.	0.04	2	0.01	
CHAETODONTIDAE	0.00	4	0.00	
Heniochus acuminatus	0.00	2	0.00	
Labroides dimidiatus	0.00	8	0.00	
Parupeneus cinnabarinus *	0.00	2	0.00	
SCORPAENIDAE	0.00	0	0.00	
Total	303.54		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 85
DATE :06/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 20°34.02
start stop duration Lon E 35°46.98
TIME :16:53:00 17:23:00 30.0 (min) Purpose : 3
LOG : 5257.50 5259.40 1.5 Region : 1
FDEPTH: 54 58 Gear cond.: 0
BDEPTH: 54 58 Validity : 0
Towing dir: 40° Wire out : 300 m Speed : 3.0 kn
Sorted : 24 Total catch: 124.50 Catch/hour: 249.00

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Abalistes stellatus	77.00	80	30.92	
Loligo sp.	56.50	5254	22.69	190
Caesio sp.	26.00	2780	10.44	
Decapterus russelli	26.00	1560	10.44	191
Leiognathus elongatus	22.50	4904	9.04	192
Trachinocephalus myops	10.50	170	4.22	
Pterois volitans	7.50	10	3.01	
Upeneus bensasi	7.00	1400	2.81	
Sepia prashadi	7.00	50	2.81	
Decapterus macrosoma	2.50	130	1.00	
Synodus englemani	2.00	80	0.80	
Bleekeria sp.	1.00	110	0.40	
Torquigener hypselogenion	1.00	40	0.40	
Selar crumenophthalmus	0.50	30	0.20	
Chaetodon dolosus	0.50	10	0.20	
Parupeneus cinnabarinus *	0.50	10	0.20	
Sorsogona prionota	0.50	10	0.20	
Pseudalutarius sp.	0.30	10	0.12	
Octopus vulgaris	0.20	10	0.08	
Priacanthus hamrur	0.00	30	0.00	
Total	249.00		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 86
DATE :07/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 21°4.98
start stop duration Lon E 35°31.02
TIME :03:46:00 04:01:00 15.0 (min) Purpose : 1
LOG : 5366.00 5366.90 0.9 Region : 1
FDEPTH: 50 47 Gear cond.: 0
BDEPTH: 50 47 Validity : 0
Towing dir: 330° Wire out : 300 m Speed : 3.0 kn
Sorted : 0 Total catch: 51.86 Catch/hour: 207.44

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Upeneus bensasi	89.20	2848	43.00	196
Trachinocephalus myops	46.40	976	22.37	195
Saurida undosquamis	29.60	420	14.27	194
Nemipterus bipunctatus	16.80	220	8.10	193
Loligo duvauceli	6.80	172	3.28	197
Pseudorhombus natalensis	4.40	32	2.12	
Lactoria cornuta	4.40	16	2.12	
Lagocephalus sp.	3.60	160	1.74	
Pagellus natalenses	2.52	92	1.21	
Parupeneus cinnabarinus *	1.68	48	0.81	
Priacanthus hamrur	0.84	16	0.40	
Apogon apogonides	0.40	464	0.19	
Leiognathus elongatus	0.40	60	0.19	
Pomadasys olivaceum	0.40	16	0.19	
Decapterus russelli	0.00	8	0.00	
Thamnaconus fajardoi	0.00	60	0.00	
Thysanophrys chiltonae	0.00	32	0.00	
Plotosus lineatus	0.00	8	0.00	
Penaeus japonicus	0.00	24	0.00	
Sepia australis	0.00	32	0.00	
Synodus englemani	0.00	24	0.00	
TETRAODONTIDAE	0.00	8	0.00	
Total	207.44		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 87
DATE :07/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 22°25.98
start stop duration Lon E 35°36.00
TIME :12:02:00 12:32:00 30.0 (min) Purpose : 3
LOG : 5453.80 5455.30 1.5 Region : 1
FDEPTH: 58 64 Gear cond.: 0
BDEPTH: 58 64 Validity : 0
Towing dir: 10° Wire out : 300 m Speed : 3.0 kn
Sorted : 0 Total catch: 39.92 Catch/hour: 79.84

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Upeneus bensasi	30.60	1272	38.33	199
Sepia australis	22.40	474	28.06	202
Synodus englemani	11.40	836	14.28	198
Caesio sp.	5.10	268	6.39	200
Pomadasys olivaceum	2.82	236	3.53	
Alloteuthis sp.	2.72	204	3.41	203
Leiognathus elongatus	2.20	340	2.76	201
Nemipterus bipunctatus	1.70	126	2.13	
Lagocephalus sp.	0.68	28	0.85	
Decapterus russelli	0.16	6	0.20	
Chilomycterus reticulatus	0.06	4	0.08	
Fistularia petimba	0.00	108	0.00	
Pseudojuloides cerasinus	0.00	6	0.00	
Parupeneus cinnabarinus *	0.00	10	0.00	
Plotosus lineatus	0.00	4	0.00	
Saurida undosquamis	0.00	10	0.00	
Trachinocephalus myops	0.00	18	0.00	
TETRAODONTIDAE	0.00	4	0.00	
Total	79.84		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 88
DATE :07/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 22°49.98
start stop duration Lon E 35°37.98
TIME :15:20:00 15:50:00 30.0 (min) Purpose : 3
LOG : 5485.50 5487.10 1.5 Region : 1
FDEPTH: 106 112 Gear cond.: 0
BDEPTH: 106 112 Validity : 0
Towing dir: 360° Wire out : 500 m Speed : 3.0 kn
Sorted : 0 Total catch: 34.68 Catch/hour: 69.36

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Argyrops spinifer	21.60	4	31.14	
Sepia pharaonis	15.40	270	22.20	206
Parupeneus cinnabarinus *	9.20	156	13.26	204
Parupeneus rubescens	3.60	22	5.19	
Scyllarides elisabethae	3.40	6	4.90	
Argyrops filamentosus	3.40	28	4.90	
Polysteganus coeruleopunctatus	3.20	14	4.61	205
Thamnaconus arenaceus	2.20	10	3.17	
Priacanthus hamrur	1.60	8	2.31	
Boopsoidea inornata	1.50	18	2.16	
Pagellus natalenses	1.30	20	1.87	
Pristipomoides typus	1.20	8	1.73	
Chaetodon dolosus	0.80	24	1.15	
Sebastes capensis	0.60	2	0.87	
Tetrosomus gibbosus	0.30	8	0.43	
Lactoria cornuta	0.04	4	0.06	
Alloteuthis sp.	0.02	12	0.03	
Thamnaconus fajardoi	0.00	2	0.00	
Synodus englemani	0.00	2	0.00	
Canthigaster rivulata	0.00	2	0.00	
Torquigener hypselogenion	0.00	2	0.00	
Total	69.36		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 89
DATE :07/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 23°0.00
start stop duration Lon E 35°37.98
TIME :17:22:00 17:52:00 30.0 (min) Purpose : 3
LOG : 5500.70 5502.20 1.5 Region : 1
FDEPTH: 82 85 Gear cond.: 0
BDEPTH: 82 85 Validity : 0
Towing dir: 360° Wire out : 400 m Speed : 3.0 kn
Sorted : 0 Total catch: 25.60 Catch/hour: 51.20

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Galeocerdo cuvier	41.40	2	80.86	
Zeus faber	4.00	2	7.81	
Crossorhombus valderostratus	1.60	120	3.13	
Nemipterus bipunctatus	1.00	24	1.95	
Upeneus bensasi	0.80	34	1.56	
Sphyraena chrysotaenia	0.60	4	1.17	
Dactyloptena orientalis	0.50	66	0.98	
Synodus englemani	0.40	16	0.78	
Sepia prashadi	0.30	10	0.59	
Trachinocephalus myops	0.20	6	0.39	
Sorsogona prionota	0.10	4	0.20	
Priacanthus hamrur	0.10	10	0.20	
Saurida tumbil	0.10	12	0.20	
Torquigener hypselogenion	0.10	12	0.20	
Bleekeria sp.	0.00	4	0.00	
Callionymus marleyi	0.00	2	0.00	
Cyclichthys orbicularis	0.00	2	0.00	
Trigloporus lastoviza africanu	0.00	8	0.00	
Total	51.20		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 90
DATE :07/05/1990 GEAR TYPE: PT NO: 2 POSITION:Lat S 23°21.00
start stop duration Lon E 35°37.02
TIME :20:35:00 21:10:00 35.0 (min) Purpose : 1
LOG : 5527.70 5529.40 1.7 Region : 1
FDEPTH: 30 30 Gear cond.: 6
BDEPTH: 45 64 Validity : 0
Towing dir: 30° Wire out : 100 m Speed : 3.6 kn
Sorted : 0 Total catch: 7.95 Catch/hour: 13.63

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Scomberomorus commerson	11.74	2	86.16	208
Loligo sp.	1.71	166	12.58	207
Dussumieria acuta	0.14	2	1.01	
Apogon coccineus	0.03	7	0.25	
Decapterus russelli	0.00	2	0.00	
Leiognathus elongatus	0.00	2	0.00	
Priacanthus sp.	0.00	9	0.00	
Total	13.63		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 91
DATE :08/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 23°43.98
start stop duration Lon E 35°55.98
TIME :18:30:00 19:30:00 60.0 (min) Purpose : 3
LOG : 5721.20 5723.80 3.0 Region : 1
FDEPTH: 780 769 Gear cond.: 0
BDEPTH: 780 769 Validity : 0
Towing dir: 200° Wire out : 1850 m Speed : 30.6 kn
Sorted : 0 Total catch: 36.65 Catch/hour: 36.65

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Caelorinchus sp.	11.25	171	30.70	
OPHIDIIDAE	4.50	22	12.28	
Nansenia macrolepis *	3.80	58	10.37	
CARIDEA	3.50	333	9.55	
Raja clavata	3.45	1	9.41	
Heterocarpus dorsalis	3.15	459	8.59	
Neobythites analis	2.00	76	5.46	
Histioteuthis sp.	1.45	1	3.96	
Todarodes sagittatus	1.40	1	3.82	
MYCTOPHIDAE	0.90	36	2.46	
Haliporoides triarthrus	0.90	59	2.46	209
Hoplostethus sp.	0.20	4	0.55	
PENAEIDAE	0.10	18	0.27	
Diretmus argenteus	0.05	4	0.14	
Total	36.65		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 92
DATE :08/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 23°46.02
start stop duration Lon E 35°49.02
TIME :20:56:00 21:56:00 60.0 (min) Purpose : 3
LOG : 5732.80 5736.10 3.0 Region : 1
FDEPTH: 497 491 Gear cond.: 0
BDEPTH: 497 491 Validity : 0
Towing dir: 195° Wire out : 1300 m Speed : 3.0 kn
Sorted : 10 Total catch: 51.40 Catch/hour: 51.40

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Chlorophthalmus punctatus	25.00	755	48.64	
Squalus acanthias	12.50	40	24.32	
Haliporoides triarthrus	4.50	257	8.75	210
Halaelurus natalensis	2.50	135	4.86	
Pliotrema warreni	2.00	15	3.89	
PORTUNIDAE	1.50	70	2.92	
Caelorinchus sp.	0.70	60	1.36	
Microstoma microstoma *	0.50	20	0.97	
Chascanopsetta lugubris	0.50	5	0.97	
MAJIDAE	0.50	25	0.97	
Not found	0.50	35	0.97	
Diaphus sp.	0.50	45	0.97	
Peristedion weberi	0.10	10	0.19	
Sicyonia sp.	0.10	15	0.19	
Total	51.40		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 93
DATE :09/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 24°34.02
start stop duration Lon E 35°15.00
TIME :05:54:00 06:24:00 30.0 (min) Purpose : 3
LOG : 5810.60 5811.80 1.5 Region : 1
FDEPTH: 47 47 Gear cond.: 0
BDEPTH: 47 47 Validity : 0
Towing dir: 225° Wire out : 250 m Speed : 3.0 kn
Sorted : 0 Total catch: 361.60 Catch/hour: 723.20

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Chrysoblephus puniceus	329.70	430	45.59	212
Cheimerius nufar	190.20	252	26.30	211
Lethrinus variegatus	62.10	124	8.59	
Decapterus russelli	42.80	3498	5.92	213
Parupeneus rubescens	28.60	116	3.95	
Priacanthus hamrur	14.60	20	2.02	
Lutjanus sebae	10.80	6	1.49	
Taeniura lymma	7.40	8	1.02	
Pagellus natalenses	7.40	206	1.02	
Pomacanthus striatus	6.80	6	0.94	
Loligo duvauceli	4.40	120	0.61	
Selar crumenophthalmus	4.00	340	0.55	
Tetrosomus concatenatus	3.30	8	0.46	
Nemipterus bipunctatus	2.80	22	0.39	
Abalistes stellatus	2.40	2	0.33	
Sepia prashadi	1.70	4	0.24	
Platax orbicularis	1.20	4	0.17	
Acanthurus nigrofuscus	1.00	4	0.14	
Gymnocranius griseus	0.60	4	0.08	
Lutjanus sp.	0.50	6	0.07	
Pliotrema warreni	0.40	4	0.06	
Chaetodon marleyi	0.20	2	0.03	
Upeneus bensasi	0.20	18	0.03	
Chaetodon dolosus	0.10	2	0.01	
Total	723.20		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 94
DATE :09/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 24°43.98
start stop duration Lon E 35°19.98
TIME :07:47:00 08:17:00 30.0 (min) Purpose : 3
LOG : 5824.90 5826.90 1.5 Region : 1
FDEPTH: 110 106 Gear cond.: 0
BDEPTH: 110 106 Validity : 0
Towing dir: 25° Wire out : 500 m Speed : 3.0 kn
Sorted : 0 Total catch: 78.15 Catch/hour: 156.30

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Polysteganus coeruleopunctatus	44.00	72	28.15	
Squalus acanthias	24.00	10	15.36	
Epinephelus poecilonotus	20.70	6	13.24	
Loligo duvauceli	16.00	0	10.24	
Epinephelus albomarginatus	15.90	2	10.17	
Lutjanus ehrenbergii	11.50	2	7.36	
Arothron stellatus	9.00	10	5.76	
Chrysoblephus anglicus	6.50	2	4.16	
Chirodactylus jessicalenorum	5.40	4	3.45	
Scyllarides elisabethae	2.40	4	1.54	
Epinephelus sp.	0.60	2	0.38	
Cheimerius nufar	0.30	2	0.19	
Total	156.30		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 95
DATE :09/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 24°46.98
start stop duration Lon E 35°12.00
TIME :09:18:00 09:45:00 27.0 (min) Purpose : 3
LOG : 5834.70 5835.80 1.3 Region : 1
FDEPTH: 70 69 Gear cond.: 0
BDEPTH: 70 69 Validity : 0
Towing dir: 270° Wire out : 350 m Speed : 3.0 kn
Sorted : 6 Total catch: 76.80 Catch/hour: 170.67

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Carcharhinus amboinensis	95.56	2	55.99	
Sepia prashadi	50.67	2729	29.69	214
Loxodon macrorhinus	15.56	7	9.11	
Loligo duvauceli	4.00	658	2.34	
Fistularia petimba	3.56	80	2.08	
Torquigener hypselogenion	0.89	80	0.52	
Lagocephalus lagocephalus	0.44	27	0.26	
Total	170.67		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 96
DATE :09/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 24°49.02
start stop duration Lon E 34°57.00
TIME :11:30:00 12:00:00 30.0 (min) Purpose : 3
LOG : 5852.10 5853.60 1.5 Region : 1
FDEPTH: 34 35 Gear cond.: 0
BDEPTH: 34 35 Validity : 0
Towing dir: 50° Wire out : 200 m Speed : 3.0 kn
Sorted : 0 Total catch: 16.09 Catch/hour: 32.18

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Loligo duvauceli	9.40	184	29.21	219
Scomberomorus commerson	7.40	2	23.00	
Plotosus lineatus	4.20	920	13.05	
Argyrops filamentosus	2.90	22	9.01	218
Alloteuthis sp.	2.70	34	8.39	220
Carangoides armatus	1.60	92	4.97	217
Saurida undosquamis	1.50	8	4.66	
Selar crumenophthalmus	1.40	106	4.35	215
Megalaspis cordyla	0.50	94	1.55	216
Decapterus russelli	0.40	82	1.24	
Carangoides chrysophrys	0.04	2	0.12	
Penaeus japonicus	0.04	2	0.12	
Trachinocephalus myops	0.04	2	0.12	
Decapterus macrosoma	0.02	6	0.06	
Ranina ranina	0.02	2	0.06	
Fistularia petimba	0.02	10	0.06	
Trachurus trachurus	0.00	2	0.00	
Leiognathus elongatus	0.00	4	0.00	
Nemipterus bipunctatus	0.00	2	0.00	
Pterois miles	0.00	2	0.00	
Pagellus natalenses	0.00	2	0.00	
Sepia sp.	0.00	16	0.00	
Trichiurus lepturus	0.00	2	0.00	
Zanclus cornutus *	0.00	2	0.00	
Total	32.18		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 97
DATE :09/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 24°54.00
start stop duration Lon E 34°55.02
TIME :13:02:00 13:32:00 30.0 (min) Purpose : 3
LOG : 5862.30 5863.80 1.5 Region : 1
FDEPTH: 45 46 Gear cond.: 0
BDEPTH: 45 46 Validity : 0
Towing dir: 205° Wire out : 250 m Speed : 3.0 kn
Sorted : 0 Total catch: 30.83 Catch/hour: 61.66

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Carangoides malabaricus	44.00	266	71.36	222
Nemipterus bipunctatus	7.20	46	11.68	221
Loligo duvauceli	6.20	216	10.06	223
Alepes djedaba	1.40	4	2.27	
Thenus orientalis	0.60	4	0.97	
Plotosus lineatus	0.60	180	0.97	
Alloteuthis sp.	0.50	20	0.81	
Remora remora	0.40	2	0.65	
Sepia pharaonis	0.40	2	0.65	
Rastrelliger kanagurta	0.06	4	0.10	
Trachinocephalus myops	0.06	6	0.10	
Pseudorhombus natalensis	0.04	2	0.06	
Carangoides armatus	0.04	10	0.06	
Chaetodon dolosus	0.04	2	0.06	
Argyrops filamentosus	0.04	2	0.06	
Megalaspis cordyla	0.02	26	0.03	
Scyllarus sp.	0.02	6	0.03	
Saurida undosquamis	0.02	4	0.03	
Torquigener hypselogenion	0.02	6	0.03	
Selar crumenophthalmus	0.00	12	0.00	
Loligo sp.	0.00	2	0.00	
Sepia sp.	0.00	6	0.00	
Total	61.66		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 98
DATE :09/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 24°58.98
start stop duration Lon E 34°55.02
TIME :14:44:00 15:14:00 30.0 (min) Purpose : 3
LOG : 5874.60 5876.40 1.5 Region : 1
FDEPTH: 54 55 Gear cond.: 0
BDEPTH: 54 55 Validity : 0
Towing dir: 60° Wire out : 300 m Speed : 3.0 kn
Sorted : 0 Total catch: 10.93 Catch/hour: 21.86

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nemipterus zysron	5.60	40	25.62	226
Thenus orientalis	3.60	24	16.47	228
Saurida undosquamis	3.00	28	13.72	224
Carangoides malabaricus	2.60	18	11.89	225
Fistularia petimba	2.40	94	10.98	
Argyrops filamentosus	2.00	12	9.15	
Loligo duvauceli	0.80	46	3.66	
Sepia pharaonis	0.60	34	2.74	227
Thamnaconus modestoides	0.40	2	1.83	
Tetrosomus concatenatus	0.40	2	1.83	
Decapterus macrosoma	0.20	12	0.91	
Selar crumenophthalmus	0.06	2	0.27	
Rastrelliger kanagurta	0.06	2	0.27	
Dussumieria acuta	0.04	2	0.18	
Upeneus bensasi	0.04	8	0.18	
Polysteganus coeruleopunctatus	0.04	2	0.18	
Octopus vulgaris	0.02	2	0.09	
Pseudorhombus natalensis	0.00	2	0.00	
Decapterus russelli	0.00	2	0.00	
Torquigener hypselogenion	0.00	2	0.00	
Total	21.86		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 99
DATE :09/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 25°7.98
start stop duration Lon E 35°9.00
TIME :17:03:00 17:33:00 30.0 (min) Purpose : 3
LOG : 5895.40 5896.80 1.5 Region : 1
FDEPTH: 144 148 Gear cond.: 0
BDEPTH: 144 148 Validity : 0
Towing dir: 200° Wire out : 600 m Speed : 3.0 kn
Sorted : 27 Total catch: 234.55 Catch/hour: 469.10

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pagellus natalenses	259.20	4722	55.25	231
Umbrina canariensis	56.00	272	11.94	
Polysteganus coeruleopunctatus	40.80	352	8.70	230
Trachurus delagoa	35.20	464	7.50	229
Saurida undosquamis	20.80	96	4.43	
Fistularia petimba	11.70	10	2.49	
Priacanthus hamrur	11.20	80	2.39	
Sphyraena acutipinnis	10.40	112	2.22	
Scyllarides elisabethae	7.90	18	1.68	
Ariomma indica	6.40	64	1.36	
Ibacus novemdentatus	1.90	16	0.41	
Carangoides equula	1.60	16	0.34	
Myripristis murdjan	1.60	32	0.34	
Lophiodes mutilus	1.60	16	0.34	
Scomber japonicus	1.60	16	0.34	
Decapterus tabl	0.80	16	0.17	
Citharoides macrolepis	0.20	32	0.04	
Zeus faber	0.20	16	0.04	
Chelidonichthys capensis	0.00	16	0.00	
Total	469.10		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 100
DATE :09/05/1990 GEAR TYPE: PT NO: 2 POSITION:Lat S 24°43.02
start stop duration Lon E 35°3.00
TIME :22:40:00 23:06:00 26.0 (min) Purpose : 1
LOG : 5943.70 5945.00 1.3 Region : 1
FDEPTH: 18 18 Gear cond.: 0
BDEPTH: 34 36 Validity : 0
Towing dir: 61° Wire out : 50 m Speed : 3.0 kn
Sorted : 0 Total catch: 5.05 Catch/hour: 11.65

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus russelli	3.92	168	33.66	232
Rastrelliger kanagurta	2.08	39	17.82	234
Etrumeus teres	1.96	58	16.83	235
Selar crumenophthalmus	1.50	44	12.87	233
Loligo duvauceli	0.92	21	7.92	
Loligo forbesi	0.58	5	4.95	
Trachurus delagoa	0.35	12	2.97	
Sardinella melanura	0.12	2	0.99	
Sphyraena acutipinnis	0.12	2	0.99	
Sphyraena chrysotaenia	0.12	2	0.99	
Total	11.65		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 101
DATE :10/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 25°15.00
start stop duration Lon E 34°58.98
TIME :05:59:00 06:29:00 30.0 (min) Purpose : 3
LOG : 6013.50 6014.80 1.5 Region : 1
FDEPTH: 113 120 Gear cond.: 0
BDEPTH: 113 120 Validity : 0
Towing dir: 180° Wire out : 500 m Speed : 3.0 kn
Sorted : 0 Total catch: 304.45 Catch/hour: 608.90

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Polysteganus coeruleopunctatus	434.40	862	71.34	236
Carcharhinus limbatus	60.40	8	9.92	
Chrysoblephus anglicus	23.60	6	3.88	
Priacanthus hamrur	23.40	28	3.84	
Cheimerius nufar	23.30	22	3.83	
Epinephelus albomarginatus	8.00	2	1.31	
Carcharhinus obscurus	8.00	4	1.31	
Cookeolus boops	7.00	14	1.15	
Thamnaconus modestoides	6.30	12	1.03	
Scyllarides elisabethae	3.90	6	0.64	
Sphyraena barracuda	2.80	2	0.46	
Platax orbicularis	2.50	6	0.41	
Metavelifer multiradiatus	1.90	4	0.31	
Monocentris japonicus	1.00	14	0.16	
Rhynchobatus djeddensis	1.00	4	0.16	
Sebastes capensis	0.80	4	0.13	
Pagellus natalenses	0.40	12	0.07	
Parupeneus rubescens	0.20	2	0.03	
Total	608.90		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 102
DATE :10/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 25°16.98
start stop duration Lon E 34°52.98
TIME :07:20:00 07:50:00 30.0 (min) Purpose : 3
LOG : 6020.90 6022.50 1.5 Region : 1
FDEPTH: 126 129 Gear cond.: 0
BDEPTH: 126 129 Validity : 0
Towing dir: 320° Wire out : 550 m Speed : 3.0 kn
Sorted : 0 Total catch: 44.05 Catch/hour: 88.10

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Ibacus novemdentatus	15.00	122	17.03	
Scyllarides elisabethae	11.00	28	12.49	
Priacanthus hamrur	11.00	46	12.49	
Epinephelus retouti	9.80	4	11.12	
Ariomma indica	8.50	90	9.65	
Carangoides equula	7.20	20	8.17	
Sepia prashadi	7.00	28	7.95	
Polysteganus coeruleopunctatus	6.60	10	7.49	
Branchiostegus doliatus *	3.70	6	4.20	
Lophiodes mutilus	3.60	4	4.09	
Loligo duvauceli	2.20	72	2.50	
Saurida undosquamis	1.50	14	1.70	
Umbrina canariensis	0.30	2	0.34	
Acanthocepola limbata *	0.20	2	0.23	
Trichiurus lepturus	0.20	6	0.23	
Trachurus delagoa	0.10	2	0.11	
Sphyraena chrysotaenia	0.10	2	0.11	
Lagocephalus inermis	0.10	4	0.11	
Total	88.10		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 103
DATE :10/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 25°13.02
start stop duration Lon E 34°34.98
TIME :09:35:00 10:05:00 30.0 (min) Purpose : 3
LOG : 6038.90 6040.30 1.5 Region : 1
FDEPTH: 172 175 Gear cond.: 0
BDEPTH: 172 175 Validity : 0
Towing dir: 285° Wire out : 700 m Speed : 3.0 kn
Sorted : 0 Total catch: 24.60 Catch/hour: 49.20

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Ateleopus natalensis	12.00	54	24.39	
Scyllarides elisabethae	9.00	22	18.29	
Squatina africana	8.00	2	16.26	
Ibacus novemdentatus	6.00	58	12.20	
Trichiurus lepturus	3.20	68	6.50	
Champsodon capensis	2.40	162	4.88	
Torpedo marmorata	1.90	2	3.86	
Saurida undosquamis	1.70	12	3.46	
Umbrina canariensis	1.30	8	2.64	
Loligo duvauceli	1.20	120	2.44	
Priacanthus hamrur	0.40	2	0.81	
PENAEIDAE	0.40	24	0.81	
Uranoscopus archionema	0.40	2	0.81	
Apogon coccineus	0.30	128	0.61	
Thamnaconus modestoides	0.30	2	0.61	
Thamnaconus fajardoi	0.20	2	0.41	
Neobythites analis	0.20	4	0.41	
Chaunax pictus	0.10	2	0.20	
Cyclichthys orbicularis	0.10	2	0.20	
Sepia prashadi	0.10	2	0.20	
Halieutaea fitzsimonsi	0.00	2	0.00	
Peristedion weberi	0.00	4	0.00	
Total	49.20		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 104
DATE :10/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 25°4.98
start stop duration Lon E 34°27.00
TIME :11:20:00 11:46:00 26.0 (min) Purpose : 3
LOG : 6050.40 6051.70 1.3 Region : 1
FDEPTH: 100 83 Gear cond.: 0
BDEPTH: 100 83 Validity : 0
Towing dir: 285° Wire out : 500 m Speed : 3.0 kn
Sorted : 0 Total catch: 35.33 Catch/hour: 81.53

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Selar crumenophthalmus	17.77	92	21.79	237
Carangoides malabaricus	15.23	102	18.68	238
Carcharhinus falciformis	15.23	7	18.68	
Saurida undosquamis	8.54	78	10.47	240
Loligo duvauceli	7.85	97	9.62	241
Ariomma indica	6.23	55	7.64	239
Trichiurus lepturus	2.58	16	3.17	
Priacanthus hamrur	2.31	16	2.83	
Torpedo fuscomaculata	1.85	2	2.26	
Decapterus russelli	1.38	9	1.70	
Sphyraena chrysotaenia	1.38	9	1.70	
Scyllarides elisabethae	0.46	2	0.57	
Ibacus novemdentatus	0.35	5	0.42	
Branchiostegus sawakinensis *	0.07	2	0.08	
Thamnaconus modestoides	0.07	2	0.08	
Alectis filamentosus ???	0.05	2	0.06	
Trachurus delagoa	0.05	2	0.06	
Dactyloptena peterseni	0.05	2	0.06	
Polysteganus coeruleopunctatus	0.05	2	0.06	
Cyclichthys orbicularis	0.02	2	0.03	
Upeneus moluccensis	0.02	5	0.03	
Parapenaeus sp.	0.00	2	0.00	
Total	81.53		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 105
DATE :10/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 24°55.02
start stop duration Lon E 34°30.00
TIME :12:56:00 13:22:00 26.0 (min) Purpose : 3
LOG : 6062.10 6063.40 1.3 Region : 1
FDEPTH: 28 26 Gear cond.: 8
BDEPTH: 28 26 Validity : 1
Towing dir: 250° Wire out : 150 m Speed : 3.0 kn
Sorted : 0 Total catch: 30.97 Catch/hour: 71.47

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Carangoides malabaricus	36.92	258	51.66	245
Drepane punctata	13.15	2	18.40	
Loligo duvauceli	7.15	321	10.01	246
Leiognathus equulus	5.31	32	7.43	242
Rastrelliger kanagurta	3.00	18	4.20	243
Terapon jarbua	2.31	25	3.23	244
Atule mate	1.85	14	2.58	
Pomadasys maculatus	1.50	14	2.10	
Alepes djedaba	0.07	2	0.10	
Carangoides ferdau	0.05	16	0.06	
Saurida undosquamis	0.05	7	0.06	
Terapon theraps	0.05	2	0.06	
Trichiurus lepturus	0.05	2	0.06	
Ariomma indica	0.02	2	0.03	
Alectis indicus	0.00	2	0.00	
Carangoides armatus	0.00	2	0.00	
Decapterus russelli	0.00	5	0.00	
Megalaspis cordyla	0.00	14	0.00	
Upeneus vittatus	0.00	2	0.00	
Sillago sihama	0.00	2	0.00	
Total	71.47		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 106
DATE :10/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 25°1.98
start stop duration Lon E 34°13.98
TIME :16:57:00 17:17:00 20.0 (min) Purpose : 3
LOG : 6081.30 6082.20 0.9 Region : 1
FDEPTH: 44 42 Gear cond.: 0
BDEPTH: 44 42 Validity : 0
Towing dir: 350° Wire out : 250 m Speed : 3.0 kn
Sorted : 0 Total catch: 27.35 Catch/hour: 82.05

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Upeneus vittatus	41.40	1302	50.46	247
Carangoides malabaricus	36.00	429	43.88	248
Stolephorus indicus	2.40	60	2.93	249
Loligo duvauceli	1.50	39	1.83	
Lagocephalus lagocephalus	0.30	6	0.37	
Selar crumenophthalmus	0.09	6	0.11	
Alectis filamentosus ???	0.06	3	0.07	
Carangoides fulvoguttatus	0.06	3	0.07	
Polysteganus coeruleopunctatus	0.06	6	0.07	
Terapon jarbua	0.06	3	0.07	
Carangoides armatus	0.03	3	0.04	
Trachurus delagoa	0.03	3	0.04	
Thenus orientalis	0.03	3	0.04	
Rastrelliger kanagurta	0.03	3	0.04	
Decapterus russelli	0.00	6	0.00	
Saurida undosquamis	0.00	3	0.00	
Trichiurus lepturus	0.00	6	0.00	
Total	82.05		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 107
DATE :12/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 25°49.98
start stop duration Lon E 33°3.00
TIME :06:32:00 07:02:00 30.0 (min) Purpose : 3
LOG : 6357.10 6358.60 1.5 Region : 1
FDEPTH: 48 51 Gear cond.: 0
BDEPTH: 48 51 Validity : 0
Towing dir: 145° Wire out : 250 m Speed : 3.0 kn
Sorted : 8 Total catch: 23.95 Catch/hour: 47.90

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Leiognathus elongatus	17.80	2302	37.16	250
Loligo sp.	14.30	926	29.85	252
Scomberomorus commerson	10.80	2	22.55	251
Pagellus natalenses	2.00	46	4.18	
Nemipterus bipunctatus	1.00	8	2.09	
Saurida undosquamis	0.60	10	1.25	
Torquigener hypselogenion	0.50	18	1.04	
Decapterus macrosoma	0.40	28	0.84	253
Selar crumenophthalmus	0.20	4	0.42	
Dussumieria acuta	0.10	2	0.21	
Xyrichthys novacula *	0.10	2	0.21	
Trachinocephalus myops	0.10	2	0.21	
Crossorhombus valderostratus	0.00	2	0.00	
Upeneus bensasi	0.00	2	0.00	
Sphyraena jello	0.00	2	0.00	
Lagocephalus lagocephalus	0.00	2	0.00	
Total	47.90		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 108
DATE :12/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 25°46.02
start stop duration Lon E 32°58.02
TIME :08:09:00 08:39:00 30.0 (min) Purpose : 3
LOG : 6367.90 6369.40 1.5 Region : 1
FDEPTH: 40 43 Gear cond.: 0
BDEPTH: 40 43 Validity : 0
Towing dir: 160° Wire out : 250 m Speed : 3.0 kn
Sorted : 0 Total catch: 84.25 Catch/hour: 168.50

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Aprion virescens	108.60	18	64.45	254
Argyrops spinifer	18.20	4	10.80	
Scomberomorus commerson	16.00	4	9.50	255
Abalistes stellatus	13.40	6	7.95	
Carangoides ferdau	4.20	14	2.49	
Loligo sp.	3.20	180	1.90	
Thenus orientalis	2.20	8	1.31	
Nemipterus bipunctatus	2.20	16	1.31	
Alepes djedaba	0.30	2	0.18	
Upeneus bensasi	0.20	6	0.12	
Total	168.50		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 109
DATE :12/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 25°30.00
start stop duration Lon E 33°13.98
TIME :13:54:00 14:24:00 30.0 (min) Purpose : 3
LOG : 6409.30 6410.60 1.5 Region : 1
FDEPTH: 85 86 Gear cond.: 0
BDEPTH: 85 86 Validity : 0
Towing dir: 55° Wire out : 450 m Speed : 3.0 kn
Sorted : 0 Total catch: 30.79 Catch/hour: 61.58

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Loligo duvauceli	24.60	3280	39.95	256
Carcharhinus sp.	16.70	8	27.12	
Sepia sp.	10.50	124	17.05	257
Argyrops spinifer	9.60	2	15.59	
Tetrosomus concatenatus	0.08	4	0.13	
Selar crumenophthalmus	0.04	2	0.06	
Saurida undosquamis	0.04	2	0.06	
Argyrops filamentosus	0.02	2	0.03	
Diodon hystrix	0.00	2	0.00	
Fistularia petimba	0.00	2	0.00	
Leiognathus elongatus	0.00	2	0.00	
Torquigener hypselogenion	0.00	2	0.00	
Total	61.58		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 110
DATE :12/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 25°19.98
start stop duration Lon E 33°16.98
TIME :15:42:00 16:12:00 30.0 (min) Purpose : 3
LOG : 6421.70 6423.30 1.6 Region : 1
FDEPTH: 21 21 Gear cond.: 0
BDEPTH: 21 21 Validity : 0
Towing dir: 250° Wire out : 150 m Speed : 3.0 kn
Sorted : 0 Total catch: 14.15 Catch/hour: 28.30

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Scomberomorus commerson	19.20	4	67.84	261
Loligo sp.	7.80	468	27.56	258
Leiognathus elongatus	0.80	490	2.83	259
Carangoides ferdau	0.50	24	1.77	260
Total	28.30		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 111
DATE :12/05/1990 GEAR TYPE: BT NO: 1 POSITION:Lat S 25°24.00
start stop duration Lon E 33°19.02
TIME :17:00:00 17:30:00 30.0 (min) Purpose : 3
LOG : 6430.10 6431.90 1.8 Region : 1
FDEPTH: 49 44 Gear cond.: 0
BDEPTH: 49 44 Validity : 0
Towing dir: 245° Wire out : 250 m Speed : 0.3 kn
Sorted : 44 Total catch: 44.16 Catch/hour: 88.32

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Scomberomorus commerson	61.60	14	69.75	265
Rachycentron canadum	17.40	2	19.70	
Loligo duvauceli	6.60	232	7.47	264
Decapterus russelli	1.30	52	1.47	262
Echeneis naucrates	0.60	2	0.68	
Leiognathus elongatus	0.60	138	0.68	263
Loligo sp.	0.20	6	0.23	
Sphyraena jello	0.02	2	0.02	
Carangoides ferdau	0.00	2	0.00	
Decapterus macrosoma	0.00	2	0.00	
Ranina ranina	0.00	2	0.00	
Total	88.32		100.00	

R/V "DR. FRIDTJOF NANSEN" SURVEY:1990402 STATION: 112
DATE :12/05/1990 GEAR TYPE: PT NO: 0 POSITION:Lat S 25°33.00
start stop duration Lon E 33°4.02
TIME :19:45:00 20:15:00 30.0 (min) Purpose : 1
LOG : 6451.10 6452.40 1.3 Region : 1
FDEPTH: 5 5 Gear cond.: 0
BDEPTH: 18 25 Validity : 0
Towing dir: 65° Wire out : 150 m Speed : 0.3 kn
Sorted : 14 Total catch: 14.10 Catch/hour: 28.20

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Encrasicholina punctifer	15.80	4108	56.03	269
Selar crumenophthalmus	3.50	138	12.41	266
Sardinella melanura	2.30	210	8.16	268
Rastrelliger kanagurta	2.30	180	8.16	267
Loligo duvauceli	1.60	60	5.67	
Apogon lateralis	1.50	674	5.32	
Sphyraena acutipinnis	0.80	6	2.84	
Caesio sp.	0.20	4	0.71	
Decapterus russelli	0.20	36	0.71	
Total	28.20		100.00	

ANNEX IV LIST OF SPECIES WITH CATCHES.

ACANTHURIDAE	
Acanthurus nigrofuscus	93(1.00)
Acanthurus xanthopterus	84(16.40) , 84(3.30)
ACROPOMATIDAE	
Neoscombrops annectens	22(8.53)
ALEPOCEPHALIDAE	32(0.12)
AMMODYTIDAE	
Bleekeria sp	85(1.00) , 89(0.00)
ANGUILLIFORMES	23(0.00)
APOGONIDAE	31(0.20)
Apogon quadrifasciatus	2(0.00) , 3(0.00) , 4(1.80) , 8(0.00) , 34(0.20) , 50(0.96) , 52(0.00) , 56(0.00)
Apogon apogonides	28(0.08) , 86(0.40)
Apogon lateralis	39(1.06) , 103(0.30) , 112(1.50)
Apogon coccineus	90(0.03)
ARIIDAE	
Arius dussumierii	25(174.00) , 41(23.80) , 47(19.80)
ARGENTINIDAE	
Microstoma microstoma	32(0.24) , 92(0.50)
Nansenia macrolepis	91(3.80)
ARIOMMIDAE	1(0.00)
Ariomma bondi	99(6.40) , 102(8.50)
Ariomma indica	2(0.60) , 4(0.00) , 46(1.60) , 55(1.20) , 56(1.00) , 57(4.00) , 58(0.06) , 60(0.00) , 66(17.60) , 75(0.00) , 79(0.20) , 104(6.23) , 105(0.02)
ATELEOPIDAE	
Ateleopus natalensis	32(1.92) , 103(12.00)
BALISTIDAE	1(0.00) , 11(2.40)
Abalistes sp.	60(0.50)
Abalistes stellatus	20(1.60) , 21(25.00) , 27(10.10) , 28(44.60) , 30(1.36) , 31(28.50) , 39(0.40) , 48(3.30) , 50(5.70) , 56(0.80) , 59(0.00) , 63(9.60) , 66(1.00) , 68(0.00) , 84(21.40) , 85(77.00) , 93(2.40) , 108(13.40) ,
Sufflamen frenatus	28(2.40) , 84(18.00)
BEMBRIDAE	
Parabembras robinsoni	32(0.12)
BOTHIDAE	68(0.20) , 70(0.00)
Bothus myriaster	11(0.00) , 57(0.02) , 76(0.00)
Bothus mancus	80(1.00)
Chascanopsetta lugubris	92(0.50)
Engyprosopon valde rostratus	61(0.20) , 66(0.20) , 89(1.60) , 107(0.00)
Pseudorhombus natalensis	10(0.00) , 86(4.40) , 97(0.04) , 98(0.00)
Pseudorhombus arsius	68(0.20) , 70(0.00)
BRANCHIOSTEGIDAE	
Branchiostegus doliatus	22(0.13) , 102(3.70)
Branchiostegus sawakinensis	104(0.07)
BYTIIDAE	
Dermatopsoides talboti	32(0.24)
CAESIONIDAE	
Caesio sp.	58(0.00) , 60(0.00) , 63(0.16) , 67(0.00) , 81(10.80) , 82(3.23) , 85(26.00) , 87(5.10) , 112(0.20)
CALLIONYMIDAE	
Callionymus marleyi	89(0.00)
Callionymus filamentosus	61(1.00) , 72(0.10)

CARANGIDAE
Alectis alexandrinus 13(0.20) , 14(0.20) , 18(0.80) , 24(0.00)
Alectis indicus 2(0.06) , 3(0.00) , 5(0.10) , 9(0.00) , 11(0.60) , 40(0.00) ,
43(0.02) , 44(0.76) , 58(0.00) , 105(0.00)
Alectis ciliaris 3(0.06) , 6(0.00)
Alectis filamentosus 104(0.05) , 106(0.06)
Alepes djeddaba 4(0.00) , 6(1.40) , 12(0.00) , 43(2.00) , 48(0.80) , 49(0.80) ,
50(2.86) , 68(0.10) , 73(0.40) , 74(0.50) , 77(0.90) , 97(1.80) ,
105(0.07) , 108(0.30)
Atule mate 1(5.00) , 33(2.10) , 34(15.00) , 35(22.80) , 36(0.10) , 37(0.10) ,
38(45.60) , 39(7.00) , 40(0.30) , 43(0.50) , 44(34.50) , 46(0.40) ,
51(0.00) , 52(6.50) , 53(0.20) , 59(1.20) , 70(0.00) , 75(0.48) ,
105(1.85)
Carangoides ferdau 1(0.00) , 2(0.18) , 5(0.40) , 6(0.00) , 7(0.00) , 9(0.00) ,
19(0.00) , 46(1.20) , 49(4.30) , 50(0.02) , 51(6.40) , 53(0.02) ,
58(0.04) , 59(0.20) , 69(0.00) , 75(0.00) , 105(0.05) , 108(4.20) ,
110(0.50) , 111(0.00)
Carangoides malabaricus 2(0.00) , 3(1.80) , 6(0.06) , 10(4.44) , 11(5.00) , 12(0.00) ,
13(0.00) , 21(0.80) , 31(19.50) , 34(2.00) , 35(3.00) , 36(1.20) ,
43(0.02) , 45(0.80) , 46(7.56) , 48(3.20) , 50(40.86) , 51(6.40) ,
52(4.56) , 55(39.60) , 56(10.40) , 61(1.00) , 66(11.20) , 67(0.70) ,
69(0.06) , 72(11.10) , 74(9.00) , 79(2.50) , 97(44.00) , 98(2.60) ,
104(15.23) , 105(36.92) , 106(36.00)
Carangoides fulvoguttatus 106(0.06)
Carangoides chrysophrys 58(0.90) , 60(0.18) , 68(2.40) , 76(2.00) , 96(0.04)
Carangoides armatus 3(0.72) , 6(0.20) , 11(0.00) , 20(0.04) , 30(5.60) , 37(0.02) ,
38(3.30) , 39(0.70) , 40(0.16) , 44(0.76) , 50(1.90) , 51(0.16) ,
53(0.00) , 57(0.00) , 58(0.00) , 60(0.76) , 68(3.00) , 69(0.00) ,
70(0.00) , 75(0.00) , 76(0.06) , 96(1.60) , 97(0.04) , 105(0.00) ,
106(0.03)
Carangoides hedlandensis 1(0.00)
Carangoides equula 99(1.60) , 102(7.20)
Carangoides gymnostethus 79(0.20)
Decapterus tabl 99(0.80)
Decapterus macrosoma 5(0.10) , 21(196.00) , 23(2.00) , 34(0.10) , 35(0.10) , 36(0.00) ,
39(0.14) , 45(1.50) , 54(0.40) , 55(96.00) , 57(0.08) , 58(0.00) ,
63(0.80) , 65(0.20) , 67(57.60) , 1(0.06) , 79(1.50) , 80(0.60) ,
81(0.90) , 82(74.31) , 83(345.00) , 85(2.50) , 96(0.02) , 98(0.20) ,
107(0.40) , 111(0.00)
Decapterus russelli 5(3.20) , 6(0.20) , 10(1.68) , 21(22.00) , 23(1.80) , 24(0.10) ,
33(0.10) , 34(46.00) , 35(32.70) , 36(4.40) , 38(0.16) , 39(35.00) ,
42(10.80) , 43(56.26) , 44(0.46) , 45(145.50) , 49(0.10) , 52(1.30) ,
53(0.10) , 55(144.00) , 58(0.06) , 59(0.00) , 60(0.06) , 61(1.00) ,
65(302.40) , 66(9.60) , 67(392.40) , 68(0.00) , 69(0.00) , 70(0.02) ,
73(1.20) , 74(0.04) , 75(1.60) , 76(2.00) , 77(34.65) , 78(5.20) ,
79(147.00) , 80(19.50) , 81(282.60) , 82(105.00) , 83(460.00) , 85(26.00) ,
86(0.00) , 87(0.16) , 90(0.00) , 93(42.80) , 96(0.40) , 98(0.00) ,
100(3.92) , 104(1.38) , 105(0.00) , 106(0.00) , 111(1.30) , 112(0.20) ,

Elagatis bipinnulata 22(4.80)
Megalaspis cordyla 2(5.40) , 4(0.90) , 8(0.60) , 13(4.00) , 14(0.00) , 37(0.02) ,
75(0.00) , 96(0.50) , 97(0.02) , 105(0.00)
Parastromateus niger 2(5.80) , 3(15.12) , 4(6.30) , 6(4.20) , 8(9.10) , 12(7.70) ,
14(14.00) , 19(2.20) , 24(0.00) , 25(14.20) , 37(0.02) , 46(0.20) ,
47(11.60)
Selar crumenophthalmus 1(0.40) , 5(0.10) , 7(0.00) , 11(0.40) , 13(0.40) , 24(0.00) ,
29(1.80) , 33(0.70) , 34(30.00) , 37(0.02) , 42(0.00) , 45(0.80) ,
57(0.40) , 58(0.06) , 67(3.60) , 75(0.08) , 78(1.60) , 79(5.00) ,
80(0.60) , 82(8.08) , 83(106.22) , 85(0.50) , 93(4.00) , 96(1.50) ,
97(0.00) , 98(0.06) , 100(1.50) , 104(17.77) , 106(0.09) , 107(0.20) ,
109(0.04) , 112(3.50)
Scomberoides tol 3(1.80) , 4(1.80) , 6(2.20) , 7(1.60) , 8(0.30) , 14(0.10) ,
19(7.00) , 35(1.20) , 46(0.80) , 47(0.60) , 48(11.00)
Scomberoides commersonianus 1(10.60)
Scomberoides tala 2(3.00) , 18(8.00) , 33(1.60)
Seriola rivoliana 10(1.80)
Seriola dumerilii 27(3.40) , 28(18.00)
Selene dorsalis 49(0.00)
Trachurus trachurus 96(0.00)
Trachurus delagoa 99(35.20) , 100(0.35) , 102(0.10) , 104(0.05) , 106(0.03)

CEPOLIDAE
Acanthocepola limbata 53(0.00) , 102(0.20)

CHAETODONTIDAE 84(0.00)
Chaetodon dolosus 85(0.50) , 88(0.80) , 93(0.10) , 97(0.04)
Chaetodon marleyi 93(0.20)
Heniochus acenninatus 57(0.08) , 84(0.00)

CHEAA00
Chirodactylus jessicalenorum 94(5.40)

CHLOROPHTHALMIDAE
Chlorophthalmus punctatus 22(17.07) , 32(3.00) , 62(2.60) , 92(25.00)

CHAMPSODONTIDAE
Champsodon capensis 31(0.00) , 32(0.12) , 103(2.40)

CHIROCENTRIDAE
Chirocentrus dorab 1(0.20) , 2(5.40) , 5(0.20) , 6(0.40) , 14(1.40) , 43(6.60) ,
44(1.20) , 74(4.40)

CHAUNACIDAE
Chaunax pictus 32(0.24) , 103(0.10)

CLUPEIDAE
Amblygaster sirm 77(49.05)
Dussumieria acuta 2(6.90) , 3(5.40) , 4(0.00) , 6(2.20) , 8(0.16) , 15(0.04) ,
18(1.60) , 19(12.60) , 23(0.00) , 24(0.00) , 25(1.50) , 46(1.20) ,
48(2.40) , 50(21.86) , 51(0.32) , 67(0.72) , 77(2.70) , 78(5.30) ,
79(0.30) , 90(0.14) , 98(0.04) , 107(0.10)
Etrumeus micropus 100(1.96)
Hilsa macrura 14(0.20)
Hilsa kelee 13(0.20)
Pellona ditchela 2(16.20) , 3(3.24) , 4(56.70) , 6(6.40) , 8(20.40) , 12(5.50) ,
13(3.20) , 14(0.20) , 15(0.20) , 16(12.00) , 19(777.00) , 25(3.00) ,
46(163.80) , 47(7.00)
Sardinella gibbosa 1(0.20) , 2(12.60) , 7(0.20) , 8(2.10) , 19(12.60) , 41(1.80) ,
42(1.80) , 45(26.20) , 78(0.20)
Sardinella albella 39(52.50) , 46(4.20) , 47(7.00)
Sardinella melanura 2(10.50) , 6(5.60) , 7(0.60) , 8(3.90) , 9(0.00) , 18(0.80) ,
40(0.06) , 43(0.76) , 58(0.06) , 60(0.02) , 78(0.20) , 83(27.60) ,
100(0.12) , 112(2.30)

CONGRIDAE 22(0.53) , 31(0.20)

C R A B S 11(0.20) , 12(7.16) , 22(0.27) , 24(1.20) , 27(0.10) , 28(0.00) ,
30(1.36) , 38(0.60) , 46(0.40) , 50(0.30) , 53(0.30) , 58(0.12) ,
59(0.80)
Geryon quinquedens 22(1.67)
MAJIDAE 62(0.00) , 92(0.50)
PORTUNIDAE 3(0.00) , 5(0.04) , 13(0.60) , 33(0.50) , 36(0.50) , 38(0.30) ,
61(0.50) , 68(0.80) , 70(0.80) , 72(0.30) , 92(1.50)
PORCELANIDAE 74(0.20)
Ranina ranina 64(0.80) , 65(1.40) , 66(3.20) , 68(1.60) , 70(0.60) , 96(0.02) ,
111(0.00)

CRUSTACEANS
Squilla sp. 5(0.00) , 47(5.00) , 66(1.60)

CYNOGLOSSIDAE
Cynoglossus sp 5(0.02)
Cynoglossus attenuatus 12(1.10)
Cynoglossus lachneri 13(0.40) , 27(0.00) , 41(3.70) , 46(0.20)
Symphurus variegatus 92(0.50)

DACTYLOPTERIDAE
Dactyloptena orientalis 21(0.80) , 54(11.60) , 63(129.60) , 64(8.40) , 65(31.50) , 89(0.50) ,

Dactyloptena peterseni 30(0.30) , 104(0.05)

DIODONTIDAE
Chilomycterus orbicularis 27(1.80) , 65(1.40)
Chilomycterus reticulatus 84(3.60) , 87(0.06)
Cyclichthys orbicularis 55(2.40) , 76(0.02) , 79(0.50) , 81(1.80) , 89(0.00) , 59(0.04) ,
56(0.40) , 103(0.10) , 104(0.02)
Diodon hystrix 109(0.00)
Diodon holocanthus 84(7.60)
Lophodiodon calori 28(1.20) , 29(0.04) , 30(0.08) , 31(7.50) , 24(0.02) , 84(5.30) ,

DIRETMIDAE
Diretmus argenteus 91(0.05)

DREPANIDAE
Drepane punctata 12(0.00) , 13(5.40) , 16(42.00) , 44(0.46) , 50(0.02) , 51(0.00) ,
105(13.15)

ECHENEIDAE
Echeneis naucrates 35(1.20) , 42(10.00) , 79(2.00) , 81(10.80) , 111(0.60)
Remora remora 43(3.76) , 97(0.40)

EMMELICHTHYIDAE
Emmelichthys nitidus 28(0.04) , 78(0.14)

ENGRAULIDAE
Stolephorus indicus 1(0.00) , 3(3.96) , 4(0.10) , 6(0.00) , 51(0.00) , 106(2.40) ,

Stolephorus japonicus 24(3.30) , 37(0.10) , 50(58.90) , 51(28.80)
Stolephorus punctifer 6(0.20) , 31(0.10) , 48(0.00) , 112(15.80)
Stolephorus heterolobus 1(12.00) , 7(7.50) , 9(0.20) , 18(2.40) , 19(0.00) , 48(1.60) ,
15(0.20) , 72(0.00) , 75(0.00)
Stolephorus devisi 6(0.00) , 8(0.16) , 13(0.00) , 16(0.14) , 46(1.00) , 47(0.10) ,

Thryssa vitrirostris 2(32.40) , 4(16.20) , 6(2.00) , 7(0.80) , 8(29.10) , 12(66.00) ,
13(9.20) , 14(6.60) , 15(0.06) , 16(24.00) , 19(342.40) , 25(42.00) ,
41(38.80) , 46(65.10) , 47(1.00) , 47(15.00) , 50(2.86)
Tryssa setirostris 8(0.30) , 16(0.40) , 19(4.20) , 24(0.04) , 46(0.20)
Thryssa longirostris 9(0.10)

EXOCOETIDAE
Cheilopogon sp 7(0.40)

FISTULARIIDAE
Fistularia petimba 5(0.02) , 20(1.00) , 26(0.12) , 27(3.00) , 28(0.04) , 29(1.80) ,
30(8.40) , 31(9.00) , 36(0.00) , 38(0.04) , 49(0.00) , 50(0.02) ,
53(0.04) , 54(0.70) , 55(13.20) , 56(40.00) , 57(0.16) , 59(0.00) ,
60(0.00) , 64(3.60) , 65(8.40) , 66(1.60) , 67(0.04) , 68(0.00) ,
69(0.00) , 70(0.00) , 72(0.30) , 74(0.10) , 75(0.00) , 76(0.00) ,
79(0.50) , 80(2.60) , 81(1.80) , 82(0.00) , 87(0.00) , 95(3.56) ,
96(0.02) , 98(2.40) , 99(11.70) , 109(0.00)
Fistularia commersonii 84(0.10)

GEMPHYLIDAE
Neopinulla orientalis 32(0.72)
Rexea prometheoides 22(1.07)

GERREIDAE
Gerres filamentosus 1(0.00) , 5(0.04) , 9(0.10) , 18(10.80) , 34(1.00) , 52(1.30) ,

Gerres oyena 3(2.88) , 4(1.80) , 40(0.30) , 44(108.00) , 48(1.60) , 50(38.00) ,
51(0.80) , 72(0.90)

GONORHYNCHIDAE
Gonorynchus gonorynchus 32(2.40)

GRAMMICOLEPIDIDAE
Xenolepidichthys sp. 32(0.00)

HOLOCENTRIDAE
Myripristis murdjan 99(1.60)

ISTIOPHORIDAE
Istiophorus platypterus 37(240.00)

LABRIDAE 28(0.00)
Anampses lineatus 28(0.00)
Halichoeres sp 81(0.00)
Labroides dimidiatus 84(0.00)
Pseudojuloides cerasinus 87(0.00)

LEIOGNATHIDAE
Gazza minuta 2(0.00) , 3(0.72) , 4(0.00) , 25(3.00) , 47(0.40)
Leiognathus elongatus 4(1.80) , 6(0.00) , 9(0.30) , 13(2.40) , 16(0.20) , 29(1.80) ,
37(0.02) , 40(0.04) , 42(111.60) , 45(1.50) , 54(0.40) , 63(29.20) ,
68(0.00) , 74(1.40) , 82(216.46) , 83(317.40) , 85(22.50) , 86(0.40) ,
87(2.20) , 90(0.00) , 96(0.00) , 107(17.80) , 110(0.80) , 109(0.00) ,
111(0.60)
Leiognathus equulus 3(2.52) , 4(0.90) , 13(17.40) , 14(0.10) , 16(12.00) , 18(6.80) ,
46(1.20) , 50(0.20) , 105(5.31)
Leiognathus lineolatus 1(0.00)
Secutor insidiator 1(50.00) , 2(0.60) , 3(16.20) , 4(16.20) , 6(3.00) , 7(0.04) ,
8(0.30) , 12(0.00) , 19(0.00) , 46(31.50) , 47(1.00) , 48(1.60) ,
50(38.00) , 51(17.60) , 52(4.56)

LETHRINIDAE
Gymnocranius griseus 27(1.10) , 73(0.10) , 80(6.50) , 93(0.60)
Lethrinus lentjan 93(62.10)
Lethrinus variegatus 36(0.20)
Lethrinus miniatus 28(32.00) , 73(0.40) , 80(2.00)

L O B S T E R S
Metanephrops andamanicus 22(1.73) , 32(0.12)
Nephropsis stewarti 62(0.70)
Panulirus ornatus 66(3.00)
POLYCHAELIDAE,deep sea lobster 32(0.36)
Scyllarides elisabethae 88(3.40) , 94(2.40) , 99(7.90) , 101(3.90) , 102(11.00) , 103(9.00) ,
104(0.46)
Thenus orientalis 27(0.80) , 31(0.90) , 44(19.50) , 45(3.00) , 60(0.00) , 61(0.50) ,
68(0.20) , 69(0.00) , 70(0.60) , 72(0.60) , 73(1.50) , 76(0.60) ,
79(1.00) , 81(3.60) , 83(0.90) , 97(0.60) , 98(3.60) , 106(0.03) ,
108(2.20)
Ibacus novemdentatus 99(1.90) , 102(15.00) , 103(6.00) , 104(0.35)
Scyllarus sp 97(0.02)

LOPHIIDAE
Lophiodes inutilus 99(1.60) , 102(3.60)
Lophius upsicephalus 22(6.40)

LUTJANIDAE
Aprion virescens 28(90.00) , 82(30.69) , 84(25.80) , 108(108.60)
Lutjanus sp 93(0.50)
Lutjanus sebae 28(116.80) , 29(0.20) , 84(23.00) , 93(10.80)
Lutjanus coccineus 28(33.20) , 84(50.00)
Lutjanus lutjanus 72(0.30)
Lutjanus malabaricus 72(2.10) , 73(0.40)
Lutjanus fulviflamus 57(87.20)
Lutjanus bengalensis 28(0.80)
Lutjanus ehrenbergii 94(11.50)
Pristipomoides typus 88(1.20)

MACROURIDAE 32(13.92)
Coelorhynchus sp 22(1.07) , 91(11.25) , 92(0.70)
Trachonurus villosus 62(4.20)

MENIDAE
Mene maculata 6(0.10) , 8(0.00) , 74(0.00)

MELANONIDAE
Melanonus gracilis 62(10.15)

MONOCENTRIDAE
Monocentris japonicus 101(1.00)

MONACANTHIDAE 39(0.08)
Pervagor melanocephalus 7(0.00) , 60(0.00)
Pseudalutarius sp. 85(0.30)
Stephanolepis auratus 27(0.00) , 61(20.00) , 65(0.70) , 66(71.20) , 74(0.10) , 79(0.50) ,

Stephanolepis rectifrons 20(0.04)
Thamnaconus modestoides 98(0.40) , 101(6.30) , 103(0.30) , 104(0.07)
Thamnaconus arenaceus 88(2.20)
Thamnaconus fajardoi 76(0.02) , 37(21.00) , 43(0.02) , 44(0.02) , 68(0.40) , 69(0.00) ,
70(0.00) , 75(6.72) , 78(0.00) , 86(0.00) , 103(0.20)

MULLIDAE
Parupeneus heptacanthus 20(0.70) , 27(0.20) , 30(0.52) , 31(1.00) , 36(0.04) , 57(8.80) ,
64(2.40) , 66(17.60) , 67(7.20) , 28(0.60)
Parupeneus rubescens 88(3.60) , 93(28.60) , 101(0.20)
Parupeneus cinnabarinus 55(2.40) , 80(5.80) , 81(2.70) , 82(0.16) , 83(0.00) , 84(0.00) ,
85(0.50) , 86(1.68) , 87(0.00) , 88(9.20)
Upeneus bensasi 11(0.00) , 20(4.20) , 26(1.08) , 27(0.20) , 28(0.00) , 31(147.00) ,
36(7.40) , 38(0.04) , 42(2.70) , 45(48.00) , 49(1.00) , 49(0.10) ,
50(0.20) , 52(1.30) , 54(0.40) , 57(20.80) , 58(37.20) , 59(9.00) ,
60(26.00) , 61(10.50) , 63(14.80) , 64(34.80) , 66(201.60) , 67(208.80) ,
68(36.00) , 69(6.00) , 70(0.02) , 73(0.60) , 74(0.20) , 76(1.50) ,
80(78.60) , 81(12.60) , 82(6.46) , 83(4.60) , 85(7.00) , 86(89.20) ,
87(30.60) , 89(0.80) , 93(0.20) , 98(0.04) , 107(0.00) , 108(0.20) ,

Upeneus vittatus 1(1.84) , 2(0.18) , 3(33.30) , 4(51.30) , 6(0.10) , 7(0.40) ,
8(0.00) , 13(4.80) , 16(2.00) , 19(0.42) , 23(1.80) , 34(214.00) ,
40(7.50) , 44(33.76) , 46(4.20) , 48(120.00) , 50(95.00) , 51(118.40) ,
52(127.40) , 53(0.00) , 67(0.36) , 68(0.10) , 69(0.06) , 74(4.80) ,
105(0.00) , 106(41.40)
Upeneus moluccensis 1(0.00) , 9(0.00) , 30(1.36) , 31(94.50) , 74(0.50) , 104(0.02) ,

Upeneus tragula	18(	216.00) ,	55(	363.60)																				
Upeneus sulphureus	2(	4.80) ,	3(	11.70) ,	4(	24.30) ,	6(	0.20) ,	7(	0.00) ,	8(	0.30) ,												
	9(	0.00) ,	13(	3.40) ,	16(	1.20) ,	46(	25.20) ,	51(	19.84) ,	66(	0.60) ,												
Upeneus assymetricus	73(	5.70) ,	74(	1.00) ,	77(	0.90) ,	79(	22.50) ,	80(	0.60)														
MURAENIDAE																								
Gymnothorax favagineus	84(	3.80)																						
MYCTOPHIDAE	22(	56.53) ,	32(	4.68) ,	91(	0.90)																		
Diaphus sp.	92(	0.50)																						
NEMIPTERIDAE																								
Nemipterus delagoae	20(	9.00) ,	26(	0.48) ,	30(	80.86) ,	35(	0.60) ,	36(	2.40) ,	38(	0.04) ,												
	39(	0.70) ,	45(	12.80) ,	49(	0.20) ,	54(	1.40) ,	55(	32.40) ,	56(	28.40) ,												
	57(	13.60) ,	58(	21.00) ,	59(	7.80) ,	60(	20.00) ,	61(	9.00) ,	63(	3.20) ,												
	64(	8.80) ,	66(	73.60) ,	67(	36.00) ,	68(	12.80) ,	69(	7.80) ,	70(	0.12) ,												
	72(	0.30) ,	73(	13.10) ,	74(	1.00) ,	76(	14.26) ,	79(	44.00) ,	80(	9.10) ,												
	81(	6.30) ,	82(	0.16) ,	83(	9.20) ,	86(	16.80) ,	87(	1.70) ,	89(	1.00) ,												
	93(	2.80) ,	96(	0.00) ,	97(	7.20) ,	107(	1.00) ,	108(	2.20)														
Nemipterus metopias	31(	12.00) ,	53(	0.00) ,	55(	1.20) ,	56(	1.20) ,	98(	5.60)														
NOMEIDAE																								
Cubiceps baxteri	32(	0.24)																						
Cubiceps capensis	32(	0.12)																						
OGCOCEPHALIDAE																								
Halieutea fitzsimonsi	22(	1.07) ,	103(	0.00)																				
OPHIDIIDAE	22(	0.53) ,	91(	4.50)																				
Neobythites analis	32(	0.12) ,	91(	2.00) ,	103(	0.20)																		
OSTRACIONTIDAE																								
Lactoria cornuta	59(	0.02) ,	60(	0.16) ,	69(	0.18) ,	82(	0.32) ,	84(	1.00) ,	86(	4.40) ,												
	88(	0.04)																						
Lactoria fornasini	28(	0.08) ,	57(	0.00) ,	58(	0.18) ,	84(	9.60)																
Lactoria diaphana	27(	1.20) ,	28(	0.80)																				
Ostracion cubicus	84(	19.60)																						
Tetrosomus gibbosus	88(	0.30)																						
Tetrosomus concatenatus	28(	1.20) ,	84(	7.20) ,	93(	3.30) ,	98(	0.40) ,	109(	0.08)														
PERISTEDIIDAE																								
Peristedion adeni	32(	0.00)																						
Peristedion weberi	22(	0.53) ,	92(	0.10) ,	103(	0.00)																		
PHOTICHTHYIDA																								
Woodsia meyerwaardeni	62(	5.60)																						
PLATYCEPHALIDAE																								
Platycephalus indicus	45(	0.10)																						
Platycephalus scaber	13(	0.00)																						
Sorsogona prionota	61(	14.00) ,	72(	0.20) ,	77(	0.27) ,	79(	0.20) ,	85(	0.50) ,	89(	0.10) ,												
Thysanophry chiltonae	58(	0.00) ,	60(	0.00) ,	68(	0.00) ,	69(	0.12) ,	70(	0.80) ,	76(	0.02) ,												
	86(	0.00)																						
PLATACIDAE																								
Platax orbicularis	8(	2.00) ,	93(	1.20) ,	101(	2.50)																		
PLEURONECTIDAE																								
Poecilopsetta sp	22(	0.53)																						
Smaris cristatus	65(	0.70) ,	66(	0.40) ,	67(	0.36)																		
POLYNEMIDAE																								
Polynemus sextarius	2(	12.60) ,	3(	2.34) ,	4(	12.60) ,	8(	0.20) ,	12(	1.10) ,	13(	2.40) ,												
	16(	2.00) ,	19(	0.42) ,	25(	0.40) ,	46(	10.50) ,	47(	1.00) ,	50(	1.90) ,												
PLOTOSIDAE																								
Plotosus lineatus	44(	7.50) ,	86(	0.00) ,	87(	0.00) ,	96(	4.20) ,	97(	0.60)														
POMACANTHIDAE																								
Pomacanthus imperator	84(	14.00)																						
Pomacanthus striatus	93(	6.80)																						

POMADASYIDAE
Plectorhynchus chubbi 28(74.00)
Pomadasys maculatus 1(6.72) , 2(27.30) , 3(5.40) , 4(18.00) , 8(0.16) , 12(1.66) ,
13(21.60) , 16(196.00) , 19(0.00) , 31(31.50) , 46(77.70) , 50(127.30) ,
51(3.20) , 105(1.50)
Pomadasys hasta 2(0.06) , 13(2.00) , 31(131.20) , 41(0.40)
Pomadasys olivaceum 23(0.04) , 86(0.40) , 87(1.02) , 87(1.80)
Pomadasys stridens 3(0.08) , 4(24.30) , 8(0.10) , 13(0.40)
Pomadasys commersonni 2(31.70)

PRIACANTHIDAE
Cookeolus boops 101(7.00)
Priacanthus sp. 90(0.00)
Priacanthus arenatus 56(0.20) , 61(2.50) , 63(0.20) , 80(3.20) , 85(0.00) , 89(0.10) ,
103(0.40)
Priacanthus hamrur 30(0.70) , 36(0.10) , 37(0.00) , 54(2.00) , 57(0.02) , 59(0.10) ,
60(0.26) , 67(4.32) , 75(0.00) , 76(0.02) , 86(0.84) , 88(1.60) ,
93(14.60) , 99(11.20) , 101(23.40) , 102(11.00) , 104(2.31)

PSETTODIDAE
Citharoides macrolepis 56(6.20) , 99(0.20)
Psettodes erumei 31(1.60) , 40(1.80) , 44(2.26) , 48(2.70) , 50(5.70) , 63(1.60) ,
69(3.90) , 71(0.50) , 74(1.40)

RACHYCENTRIDAE
Rachycentron canadus 39(0.02) , 42(37.10) , 43(0.26) , 48(1.00) , 49(168.70) , 73(0.40) ,
111(17.40)

R A Y S
Himantura gerrardi 49(90.00)
RAJIDAE 22(1.07)
Raja clavata 91(3.45)
Taeniura lymma 93(7.40)
Rhinobatus leucosfilus 27(1.50)
Rhinobatus holcorhynchus 40(1.20)
Rhynchobatus djeddensis 101(1.00)
Torpedo nobiliana 22(0.13) , 54(0.40)
Torpedo marmorata 103(1.90)
Torpedo fuscomaculata 104(1.85)

SCARIDAE
Scarus tricolor 84(25.00)
Xyrichthys novacula 107(0.10)

SCIAENIDAE
Johnius belangerii 6(0.40) , 8(0.00) , 12(77.00) , 13(0.80) , 25(111.00) , 41(248.00) ,
47(1.00)
Johnius dussumieri 2(0.60) , 8(0.00) , 13(1.20) , 25(3.00) , 46(2.20) , 47(7.50) ,

Otolithes ruber 2(0.60) , 4(7.20) , 8(0.30) , 12(38.50) , 13(5.00) , 16(16.00) ,
25(18.00) , 41(76.60) , 46(2.20) , 47(1.50) , 50(0.58)
Umbrina sp. 8(1.60)
Umbrina canariensis 99(56.00) , 102(0.30) , 103(1.30)

SCOMBRIDAE
Rastrelliger kanagurta 1(3.32) , 3(0.36) , 4(0.90) , 5(0.20) , 6(0.40) , 7(0.20) ,
10(0.24) , 16(1.00) , 19(0.40) , 23(0.20) , 26(1.20) , 33(0.20) ,
35(4.80) , 36(10.50) , 38(1.80) , 39(25.20) , 40(0.16) , 43(0.10) ,
45(1.50) , 47(0.80) , 49(0.30) , 58(0.06) , 60(0.12) , 64(0.40) ,
67(198.00) , 73(0.10) , 77(6.60) , 78(1.00) , 79(6.50) , 81(1.80) ,
82(0.16) , 83(85.10) , 97(0.06) , 98(0.06) , 100(2.08) , 105(3.00) ,
106(0.03) , 112(2.30)
Rastrelliger brachysoma 53(0.04)
Scomber japonicus 7(0.20) , 55(2.40) , 99(1.60)
Scomberomorus tritor 26(9.84)
Scomberomorus lineolatus 9(4.60) , 13(3.00) , 14(1.20) , 17(15.30) , 71(13.70) , 74(12.30) ,
75(13.90)
Scomberomorus commersoni 1(1.60) , 2(5.70) , 3(1.80) , 10(37.32) , 17(12.90) , 19(10.00) ,
20(17.20) , 21(18.60) , 27(6.40) , 33(7.40) , 35(24.00) , 36(10.00) ,
38(8.40) , 39(5.20) , 42(17.10) , 43(47.80) , 44(4.68) , 45(109.40) ,
50(35.10) , 51(8.00) , 52(33.00) , 53(26.40) , 61(8.60) , 64(10.50) ,
65(12.90) , 66(32.40) , 67(7.80) , 69(14.60) , 70(6.40) , 71(0.60) ,
72(20.40) , 73(31.00) , 75(38.80) , 76(9.50) , 77(10.80) , 79(79.00) ,
80(18.50) , 83(18.60) , 90(11.74) , 96(7.40) , 107(10.80) , 108(16.00) ,
110(19.20) , 111(61.60)
Scomberomorus plurilineatus 19(0.60) , 44(13.20)

SCORPAENIDAE 84(0.00)
Apistus carinatus 61(3.50)
Dendrochirus zebra 67(0.00)
Minous coccineus 54(0.20)
Pterois volitans 85(7.50)
Pterois mombasa 3(1.08)
Pterois miles 96(0.00)
Sebastes capensis 88(0.60) , 101(0.80)
Scorpaena scrofa 32(0.12)

SERRANIDAE
Epinephelus sp 94(0.60)
Epinephelus tauvina 54(20.60)
Epinephelus chlorostigma 84(2.40)
Epinephelus multinotatus 84(46.40)
Epinephelus albimarginatus 94(15.90) , 101(8.00)
Epinephelus poecilonotus 94(20.70)
Epinephelus retouti 102(9.80)

S H A R K S 19(14.00)
Carcarhinus sp. 109(16.70)
Carcharhinus sealei 27(17.00) , 50(17.74)
Carcharhinus obscurus 101(8.00)
Charcarhinus dussumieri 69(1.80)
Carcharhinus limbatus 8(16.00) , 14(96.00) , 45(3.60) , 101(60.40)
Prionace acutus 104(15.23)
Carcharinus brevipinna 18(46.00) , 71(4.90)
Carcharhinus amboinensis 75(210.00) , 95(95.56)
Rhizoprionodon acutus 16(4.26) , 48(1.00)
Loxodon macrorhinus 95(15.56)
Galeocerdo cuvier 89(41.40)
PROSCYLLIDAE 22(1.07) , 32(0.24)
Pliotrema warenni 92(2.00) , 93(0.40)
Halaelurus boesmani 54(2.40)
Halaelurus natalensis 63(1.60) , 92(2.50)
Sphyrna lewini 8(15.20) , 41(5.50)
Centrophorus granulosus 32(51.84) , 62(35.00)
Squalus sp. 22(1.07) , 32(0.24)
Squalus acanthias 22(1.87) , 92(12.50) , 94(24.00)
Squatina africana 103(8.00)

S H R I M P S
ARISTEIDAE 62(0.11)
Plesiopenaeus sp. 62(0.40)
CARIDEA 5(0.10) , 12(4.40) , 13(5.00) , 22(0.00) , 25(12.00) , 25(0.60) ,
32(2.64) , 41(11.10) , 47(7.00) , 62(0.35) , 91(3.50)
Parapandalus sp. 62(0.00)
Heterocarpus dorsalis 91(3.15)
PENAEIDAE 8(0.10) , 15(0.00) , 22(0.07) , 22(0.07) , 22(0.00) , 31(1.50) ,
31(3.00) , 32(3.36) , 91(0.10) , 103(0.40)
Penaeus monodon 2(1.20) , 3(0.00) , 12(12.10) , 13(0.30) , 19(0.40) , 25(3.20) ,
Penaeus indicus 2(2.40) , 4(0.00) , 5(0.04) , 8(1.60) , 12(35.20) , 13(0.90) ,
19(86.20) , 25(6.00) , 31(1.50) , 36(0.06) , 41(1.30) , 46(4.40) ,
47(8.00)
Penaeus japonicus 2(13.50) , 4(1.80) , 5(0.10) , 13(0.80) , 46(0.10) , 50(1.14) ,
86(0.00) , 96(0.04)
Penaeus semisulcatus 1(0.00) , 12(0.34) , 46(3.70) , 50(0.38) , 52(0.26)
Penaeus latisulcatus 5(0.10) , 61(2.40) , 66(1.20)
Penaeus canaliculatus 61(0.06)
Metapenaeus monoceros 8(0.30) , 4(2.70) , 5(0.10) , 8(0.30) , 12(17.60) , 13(0.40) ,
16(0.20) , 19(25.20) , 25(1.80) , 41(1.30) , 2(5.40) , 46(0.40) ,
47(4.50)
Metapenaeus stebbingi 8(0.20)
Metapenaeus affinis 40(0.06)
Parapenaeus sp. 104(0.00)
Sicyonia sp. 24(0.00) , 92(0.10)
Haliporoides triarthrus 22(35.04) , 32(0.00) , 62(22.75) , 91(0.90) , 92(4.50) , 32(35.04) ,

SILLAGIDAE
Sillago sihama 2(0.00) , 12(0.00) , 42(0.90) , 45(1.50) , 46(1.20) , 50(0.96) ,
105(0.00)

SOLEIDAE
Aesopia cornuta 61(0.50)
Solea bleekeri 59(0.04)

SPARIDAE
Argyrops spinifer 88(21.60) , 108(18.20) , 109(9.60)
Argyrops filamentosus 28(25.20) , 31(3.00) , 56(7.00) , 57(0.20) , 74(1.00) , 88(3.40) ,
96(2.90) , 97(0.04) , 98(2.00) , 109(0.02)
Boopsoidea inornata 88(1.50)
Cheimerius nufar 93(190.20) , 94(0.30) , 101(23.30)
Chysoblephus anglicus 94(6.50) , 101(23.60)
Chrysoblephus lophus 11(0.20)
Chrysoblephus puniceus 93(329.70)
Pagellus natalensis 86(2.52) , 88(1.30) , 96(0.00) , 93(7.40) , 99(259.20) , 101(0.40) ,
107(2.00)
Polysteganus coeruleopunctatus 88(3.20) , 94(44.00) , 98(0.04) , 99(40.80) , 101(434.40) , 102(6.60) ,
104(0.05) , 106(0.06)

SPHYRAENIDAE
Sphyraena barracuda 71(2.60) , 101(2.80)
Sphyraena obtusata 1(1.40) , 2(14.40) , 3(4.68) , 4(18.90) , 5(0.20) , 7(0.80) ,
7(3.60) , 8(0.30) , 13(0.20) , 17(0.10) , 23(0.40) , 33(0.20) ,
38(0.16) , 39(0.70) , 42(0.40) , 46(2.20) , 50(1.90) , 63(0.00) ,
69(0.30) , 70(0.04) , 75(0.00) , 89(0.60) , 100(0.12) , 102(0.10) ,
104(1.38)
Sphyraena jello 1(1.80) , 5(0.40) , 44(120.00) , 49(0.04) , 50(3.80) , 68(0.20) ,
69(0.60) , 83(0.00) , 107(0.00) , 111(0.02)
Sphyraena acutipinnis 99(10.40) , 100(0.12) , 112(0.80)

CEPHALOPODA
Histioteuthis sp. 91(1.45)
LOLIGINIDAE 1(15.00) , 2(3.90) , 5(0.40) , 7(0.20) , 9(1.10) , 10(2.64) ,
11(0.80) , 15(0.40) , 17(6.00) , 18(0.40) , 19(0.42) , 20(0.60) ,
21(7.20) , 23(2.00) , 24(0.04) , 27(0.20) , 28(0.40) , 29(0.30) ,
30(3.50) , 33(8.00) , 35(3.00) , 36(3.30) , 38(8.10) , 39(49.00) ,
45(79.50) , 46(0.20) , 47(1.00) , 64(4.80)
Alloteuthis sp 58(0.90) , 76(4.76) , 82(0.16) , 87(2.72) , 88(0.02) , 96(2.70) ,
97(0.50)
Alloteuthis africana 60(3.00) , 68(1.00) , 69(0.00) , 70(0.04)
Loligo sp 85(56.50) , 90(1.71) , 97(0.00) , 107(14.30) , 108(3.20) , 110(7.80) ,
111(0.20)
Loligo duvauceli 40(50.10) , 43(7.00) , 44(0.76) , 49(15.30) , 51(4.00) , 52(0.66) ,
53(19.80) , 54(23.10) , 58(4.80) , 59(2.00) , 60(0.06) , 63(4.80) ,
65(3.50) , 68(7.60) , 69(6.60) , 70(17.60) , 72(5.20) , 73(22.40) ,
74(3.80) , 75(1.60) , 76(6.26) , 78(0.60) , 79(8.00) , 80(1.30) ,
81(3.60) , 86(15.20) , 93(4.40) , 94(16.00) , 95(4.00) , 96(9.40) ,
97(6.20) , 98(0.80) , 100(0.92) , 102(2.20) , 103(1.20) , 104(7.85) ,
105(7.15) , 106(1.50) , 109(24.60) , 111(6.60) , 112(1.60)
Loligo forbesi 100(0.58)
Octopus sp. 70(0.04)
Octopus vulgaris 56(0.80) , 65(7.00) , 76(0.02) , 85(0.20) , 98(0.02)
Todarodes sagittatus 91(1.40)
SEPIIDAE 10(6.48) , 21(2.50) , 22(0.00) , 25(3.00) , 27(3.00) , 41(1.00) ,
46(0.00) , 47(2.00)
Sepia sp 28(0.20) , 29(0.10) , 38(0.04) , 83(6.90) , 84(0.04) , 96(0.00) ,
97(0.00) , 109(10.50)
Sepia faraonis 88(15.40) , 97(0.40) , 98(0.60)
Sepia australis 53(0.30) , 58(4.20) , 59(2.60) , 60(3.00) , 68(4.40) , 69(0.60) ,
70(2.10) , 76(2.12) , 82(8.08) , 86(0.00) , 87(22.40)
Sepia prashadi 54(8.40) , 61(5.00) , 63(4.00) , 64(13.20) , 65(8.40) , 66(27.20) ,
72(0.30) , 73(1.90) , 80(13.00) , 81(12.60) , 85(7.00) , 89(0.30) ,
93(1.70) , 95(50.67) , 102(7.00) , 103(0.10)

STROMATEIDAE 2(1.20)

SYNODONTIDAE
Saurida tumbil 11(0.00) , 21(0.40) , 89(0.10)
Saurida undosquamis 4(0.90) , 20(1.00) , 21(8.00) , 23(0.10) , 24(0.20) , 26(0.24) ,
30(0.30) , 31(18.00) , 33(3.90) , 34(38.00) , 35(0.30) , 36(3.60) ,
38(14.70) , 39(26.60) , 40(1.50) , 44(20.26) , 45(101.20) , 46(18.90) ,
50(22.04) , 51(36.80) , 52(22.76) , 57(31.20) , 59(24.52) , 60(20.50) ,
67(118.80) , 76(18.50) , 86(29.60) , 87(0.00) , 96(1.50) , 97(0.02) ,
98(3.00) , 99(20.80) , 102(1.50) , 103(1.70) , 104(8.54) , 105(0.05) ,
106(0.00) , 107(0.60) , 109(0.04) , 54(7.00) , 55(1.20) , 56(7.20) ,
58(37.20) , 61(28.00) , 64(24.40) , 65(13.30) , 66(465.60) , 68(52.00) ,
69(150.00) , 70(33.54) , 71(2.00) , 72(32.40) , 73(3.40) , 74(35.20) ,
79(35.00) , 80(14.30) , 81(1.80)
Saurida micropectoralis 5(0.20) , 8(0.16) , 13(1.20) , 18(3.60) , 21(0.40) , 22(0.53) ,
35(11.40) , 36(0.20) , 61(19.00)
Saurida gracilis 32(0.96)
Synodus saurus 66(1.60)
Synodus indicus 49(2.80) , 53(7.60) , 82(0.16) , 83(0.46)
Synodus englemani 56(0.20) , 60(0.00) , 63(5.20) , 80(0.60) , 81(0.90) , 85(2.00) ,
86(0.00) , 87(11.40) , 88(0.00) , 89(0.40)

Trachinocephalus myops	5(	0.04)	,	13(	0.40)	,	21(	0.40)	,	54(	4.50)	,	57(	11.60)	,	59(	0.40)	,
	60(	4.50)	,	61(	8.50)	,	63(	4.00)	,	64(	0.80)	,	65(	4.20)	,	66(	6.40)	,
	68(	1.20)	,	69(	0.30)	,	70(	2.00)	,	73(	0.40)	,	76(	3.76)	,	77(	0.18)	,
	80(	1.30)	,	81(	5.40)	,	83(	0.00)	,	85(	10.50)	,	86(	46.40)	,	87(	0.00)	,
	89(	0.20)	,	96(	0.04)	,	97(	0.06)	,	107(	0.10)							
Synaxidae sp	24(	0.02)																
TETRAODONTIDAE	86(	0.00)	,	87(	0.00)													
Arothron stellatus	94(	9.00)																
Canthigaster solandri	27(	0.00)																
Canthigaster rivulata	88(	0.00)																
Lagocephalus sp	2(	1.20)	,	86(	3.60)	,	87(	0.68)										
Lagocephalus inermis	4(	0.90)	,	6(	0.00)	,	11(	0.20)	,	39(	0.50)	,	43(	0.00)	,	58(	0.00)	,
	66(	3.20)	,	102(	0.10)													
Lagocephalus sceleratus	79(	0.50)	,	80(	2.00)													
Lagocephalus lagocephalus	27(	0.80)	,	28(	0.20)	,	29(	0.02)	,	33(	0.20)	,	37(	0.00)	,	38(	0.04)	,
	45(	30.00)	,	46(	0.00)	,	47(	0.00)	,	48(	0.80)	,	54(	0.00)	,	58(	0.00)	,
	60(	0.00)	,	63(	4.00)	,	64(	8.00)	,	68(	0.10)	,	69(	0.06)	,	70(	0.00)	,
	73(	0.00)	,	75(	0.00)	,	82(	0.16)	,	95(	0.44)	,	106(	0.30)	,	107(	0.00)	,
Torquigener sp.	20(	0.00)																
Torquigener hypselogeneion	20(	0.00)	,	26(	0.00)	,	29(	0.10)	,	54(	0.40)	,	56(	0.00)	,	57(	0.16)	,
	58(	22.80)	,	60(	0.00)	,	61(	2.00)	,	63(	0.20)	,	64(	2.80)	,	65(	1.40)	,
	66(	0.40)	,	68(	0.10)	,	76(	0.06)	,	79(	0.20)	,	80(	44.80)	,	85(	1.00)	,
	88(	0.00)	,	89(	0.10)	,	95(	0.89)	,	97(	0.02)	,	98(	0.00)	,	107(	0.50)	,
	109(	0.00)																
THERAPONIDAE																		
Pelates quadrilineatus	2(	14.10)																
Therapon jarbua	2(	0.00)	,	3(	0.08)	,	4(	6.30)	,	12(	1.10)	,	31(	1.50)	,	38(	0.00)	,
	41(	3.70)	,	44(	1.50)	,	50(	1.90)	,	51(	0.00)	,	105(	2.31)	,	106(	0.06)	,
Therapon theraps	5(	0.10)	,	8(	0.10)	,	9(	0.16)	,	13(	0.80)	,	19(	0.00)	,	33(	0.20)	,
	46(	4.20)	,	47(	0.20)	,	74(	0.50)	,	105(	0.05)							
TRIGLIDAE																		
Chelidonichthys capensis	64(	0.80)	,	65(	1.40)	,	99(	0.00)										
Trigloporus lagstoviza african	89(	0.00)																
TRACHICHTHYIDAE																		
Hoplostethus sp.	91(	0.20)																
TRICHIURIDAE																		
Trichiurus lepturus	4(	0.90)	,	6(	0.60)	,	2(	0.60)	,	7(	0.20)	,	8(	10.50)	,	9(	0.20)	,
	10(	0.24)	,	12(	11.00)	,	13(	7.40)	,	14(	36.00)	,	15(	0.40)	,	16(	30.00)	,
	25(	217.50)	,	30(	0.16)	,	38(	0.16)	,	41(	46.20)	,	46(	27.30)	,	47(	20.00)	,
	68(	0.20)	,	69(	0.30)	,	70(	0.00)	,	74(	0.20)	,	96(	0.00)	,	102(	0.20)	,
	103(	3.20)	,	104(	2.58)	,	105(	0.05)	,	106(	0.00)							
TRIACANTHIDAE																		
Tamnaconus fajardoi	53(	0.00)	,	88(	0.00)													
URANOSCOPIDAE																		
Uranoscopus archionema	103(	0.40)																
VELIFERIDAE																		
Metavelifer multiradiatus	101(	1.90)																
ZANCLIDAE																		
Zanclus canescens	58(	0.00)																
Zanclus cornutus	96(	0.00)																
ZEIDAE																		
Zeus faber	89(	4.00)	,	99(	0.20)													
Zenion sp.	22(	0.27)																