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SURVEYS OF THE OFFSHORE FISHERIES RESOURCES OF PAKISTAN – 2010

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SURVEYS OF THE OFFSHORE FISHERIES RESOURCES OF PAKISTAN – 2010

by

L. Paul Fanning
FAO Fishery Resources Appraisal in Pakistan project
Karachi, Pakistan

M. Wasim Khan
FAO Fishery Resources Appraisal in Pakistan project
Karachi, Pakistan

Samina Kidwai
National Institute of Oceanography
Karachi, Pakistan

and

Gavin J. Macauley
Institute of Marine Research
Bergen, Norway

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PREPARATION OF THIS DOCUMENT

This report was prepared during and immediately after the subject surveys were conducted in late 2010. Many of the survey participants contributed to various sections of this report. The authors and other contributors were as indicated below.

Paul Fanning (author)	FAO	Overall editor, Survey narratives and fish catch sections
Tariq Hanif	MFD	Fish catch sections
Muhsan Kalhoro	MFD	Fish catch sections
Wasim Khan (author)	MFD	Survey narratives and fish catch sections
Samina Kidwai (author)	NIO	Oceanography
Gavin Macauley (author)	IMR	Pelagic survey acoustics
Magne Olsen	CDCF, IMR	Pelagic survey acoustics, Pelagic survey oceanography
Mohsin Tabrez	NIO	Oceanography
Badar Usmany	MFD	Taxonomy
Thomas Wenneck	IMR	Acoustics , Demersal survey oceanography
Diana Zaera	CDCF,IMR	Demersal survey fish catch sections, Acoustics, Mapping

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ABSTRACT

In October and November 2010, the R/V *Dr. Fridtjof Nansen* conducted two offshore fisheries resource surveys in Paksitan's waters. These included sampling by acoustics, pelagic trawling, demersal trawling and collected a suite of concurrent biological and physical oceanography observations.

Preliminary analyses presented in this cruise report include the distribution maps, catch rate estimates and raw abundance information for many stocks of interest to fisheries. Further analysis and comparison with historical data will be provided in later reports. The mesopelagic biomass estimated from these preliminary analyses is substantially lower than in previous surveys and further investigations in this regard are required.

Of interest in the overview of some key oceanographic parameters is the presence of an hypoxic layer in deep waters (offshelf) which has been reported in earlier surveys and oceanographic studies. Some evidence of flood-induced productivity was also detected in the near-shelf waters off Sindh.

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ACKNOWLEDGEMENTS

Prior to the Fisheries Resources Appraisal in Pakistan project, it had been 25 years since the last offshore survey of the marine resources of Pakistan. The long and sustained efforts of Mr. M. Moazzam Khan (former Director-General and now retired) of the Marine Fisheries Department, Government of Pakistan in leading the efforts to once again bring the *R/V Dr. Fridtjof Nansen* to Pakistan were crucial to this happening.

The strong interest of the Royal Norwegian Embassy to Pakistan, Islamabad, in assisting Pakistan to improve the management of their fisheries and the livelihoods of their fishermen resulted in the Embassy providing substantial financial assistance to the survey project towards the cost of bringing the *R/V Dr. Fridtjof Nansen* to Pakistan. The continuing support by Institute of Marine Research, Bergen, Norway, before, during and after the survey was central to the development of and completion of the survey programme.

The enthusiastic participation from National Institute of Oceanography in both field and post-survey activities was central to the quality and completeness of the environmental sampling component of the survey programme. Survey operations were greatly assisted by the coordination and liaison provided by Lt. Manzoor Ahmed and S/Lt. Rao Ghulam Dastagir of the Pakistan Navy, Hydrographic Department. Participation by representatives from the provincial fisheries authorities (Balochistan Fisheries Department and Fisheries Department, Government of Sindh) is gratefully acknowledged. Finally, the efficient action by the officials of the various agencies and authorities whose review and clearance for the survey activities were required is also gratefully acknowledged.

Finally, the expertise, interest and genuine concern of the Captains (Capt. Karl Robert Røttingen, first leg and Capt. Aron Håpoldøy on the second leg) and their respective crews on the *R/V Dr. Fridtjof Nansen* made the survey programmes efficient, safe and comfortable for all involved. It was a great pleasure to work on board.

LIST OF ACRONYMS AND ABBREVIATIONS

CDFC	Centre for Development Cooperation in Fisheries, part of IMR in Bergen, Norway
CTD	Conductivity-Temperature-Depth recording instrument for oceanography
EEZ	Exclusive Economic Zone
FAO	Food and Agriculture Organization of the United Nations
IMR	Institute of Marine Research, Bergen, Norway
MFD	Marine Fisheries Department, Karachi, Pakistan
NIO	National Institute of Oceanography, Karachi, Pakistan
nm	nautical mile
PN	Pakistan Navy
S_A	Acoustic backscattering area coefficient per nautical mile

FOREWORD

Fisheries resources play an important role in the economic development of a country and well-being of its people. It is a well known fact that fisheries stocks are susceptible to fishing pressure and environmental degradation. Marine Fisheries Department, since its inception, has been involved in stock assessment, which were conducted either through departmental own research vessels or through international collaboration programme (mainly started under International Indian Ocean Expedition (IIOE) during the period (1960–1970) or FAO/NORAD sponsored "*Dr. Fridtjof Nansen*" programme during the period 1975–1977 and 1983–1984, to provide the information needed for stock assessment and advice to managers, including management recommendations for the priority fisheries and the resources supporting them. Stock assessment should be a regular activity, preferably carried out annually. However, due to lack of a research vessel, no new stock assessment survey was conducted in Pakistan since 1990. There are indications that some important resources including shrimp, lobsters, sharks and crabs, etc., have already crossed their maximum sustainable limits and their fisheries are believed to be severely overfished. It is clear that fisheries management and the supporting management information in Pakistan needs significant renovation and support.

To address the information gaps, the Marine Fisheries Department (MFD), Government of Pakistan is conducting a major project with technical assistance from the Food and Agriculture Organization of the United Nations and financial and technical assistance from the Norwegian Agency for Development Cooperation (NORAD) and the Institute of Marine Research, Bergen Norway. All the activities of these projects are closely linked and interdependent, and resource surveys are central to all. Under the FAO UTF project, a demersal survey was conducted in 2009 aboard the *R/V Ferdows-1*, the vessel owned by the Iranian Fisheries Research Organization (IFRO). In 2010, the FAO UTF project, with additional financial support from the Government of Norway, obtained the services of the *R/V Dr. Fridtjof Nansen* to conduct a programme of demersal, pelagic and deep-sea fisheries resource surveys.

This Norwegian-built fisheries research vessel is the premier fisheries research vessel operating in the developing countries of the world. The *R/V Dr. Fridtjof Nansen* provides state of the art capabilities that are difficult or impossible to achieve using the research vessels available in the region. This vessel is capable of fishing both bottom trawls and pelagic (midwater) trawls to depths of as much as 1 200 metres. The biological sampling laboratories provide a fully digital sampling regime including electronic scales, measuring boards and data entry stations. The fisheries acoustics instrument suite includes a multifrequency Simrad EK60 echo-sounder and echo-integrator with post-processing workstations running state of the art software. This system allows estimation of fish biomass in a variety of species groups and depth ranges as well as distribution and abundance mapping. The ship is fully equipped for oceanographic sampling in support of fisheries research and stock assessment.

Equally important, this crew and supporting staff are the most experienced in the world in conducting surveys while training inexperienced staff at-sea. The MFD staff had limited experience in such an undertaking and for those that did, the experience was over 20 years ago. Completing a survey on *R/V Dr. Fridtjof Nansen* has provided training and experience that will be invaluable as they conduct further offshore surveys on chartered vessels from the region.

1. INTRODUCTION

Objectives

The survey programme covered the exclusive economic zone (EEZ) of Pakistan from 20 m depth contour out to the 200 nautical mile (nm) limit using combined acoustic and trawl methods for pelagic, demersal and deep-sea species. It also included oceanographic observations such as CTD, O_2 and nutrient measurements. The scientific programme was designed through consultations amongst the Food and Agriculture Organization of the United Nations (FAO), IMR, NIO and MFD.

The specific objectives were to:

- obtain acoustic biomass estimates for the major small pelagic and mesopelagic fisheries resource species;
- obtain acoustic/swept-area biomass estimates for continental shelf demersal fisheries resource species;
- obtain oceanographic observations of the marine environment as related to the fisheries resources;
- obtain exploratory fishing information on the demersal fisheries resources in deep sea areas such as the Murray Ridge and deep continental slope; and
- conduct 3D mapping of specified areas in the Indus Swatch and the Murray Ridge.

Participation

The scientific staff consisted of:

2010408 – Pelagic survey (12–31 October 2010)		
Paul Fanning	FAO	Chief Technical Advisor/Cruise Leader
Gavin Macaulay	IMR	Acoustic Scientist
Magne Olsen	IMR	Instrument Engineer
Moazzam Ali	NIO	Oceanographer
Waqar Ahmed	NIO	Oceanographer
Ibrahim Zia	NIO	Oceanographer
Saira Ishaq	NIO	Oceanographer
Manzoor Ahmed	PN	Navy Hydrographer
M. Wasim Khan *	MFD	Project Director
Muhsan Kalhoro	MFD	Acoustic Specialist
Tariq Hanif	MFD	Acoustic Specialist
Dildar Shafi	MFD	Fisheries Specialist.
Hina Mansoor	MFD	Fisheries Specialist
Deedar Ali	MFD	Fisheries Specialist
Arif Mahmood	MFD	Fisheries Specialist
Hamid Badar Usmany	MFD	Fisheries Specialist
M. Iqbal Khan	DoF	Sindh Fisheries
Aslam Ansari *	MFD	Fisheries Specialist

* Due to illness, Wasim Khan was replaced by Aslam Ansari on 17 October 2010

2010409 – Demersal survey (2–21 November 2010)

Paul Fanning	FAO	Chief Technical Advisor/Cruise Leader
Thomas Wenneck	IMR	Acoustic Scientist
Diana Zaera	IMR	Fisheries Specialist
Mohsin Tabrez	NIO	Oceanographer
Waqar Ahmed	NIO	Oceanographer
Khalid Mehmood	NIO	Oceanographer
Samina Kidwai	NIO	Oceanographer
Rao Ghulam Dastagir	PN	Navy Hydrographer
M. Wasim Khan	MFD	Project Director
Muhsan Kalhoro	MFD	Acoustic Specialist
Tariq Hanif	MFD	Acoustic Specialist
Dildar Shafi	MFD	Fisheries Specialist
Liaquat Haroon	MFD	Fisheries Specialist
Deedar Ali	MFD	Fisheries Specialist
Aslam Ansari	MFD	Fisheries Specialist
Hamid Badar Usmany	MFD	Fisheries Specialist
Shakeel Ahmed	DoF	Balochistan Fisheries

Overview of activities

The survey programme for Pakistan was conducted in two legs. Survey 2010408 was a pelagic/acoustic survey which covered the entire Pakistan EEZ from approximately the 20 m contour on the shelf out to the 200 nm limit. Survey 2010409 was a swept-area trawl survey for demersal species on the shelf area (20–200 m) only.

Overall the surveys proceeded as planned however the survey activities were subject to scheduling and area constraints from the Pakistan Navy (PN). In general, the PN liaison officers carried aboard were able to advise and coordinate minimal impact on the survey programme. There were two interruptions to the survey programme. On 17 October 2010, the ship diverted to Karachi to land a seriously ill staff member and pick up a replacement. The survey transects were resumed that night. A second diversion to Karachi was required on 16 November 2010, this time to land two ill crew members for medical examination and treatment. The ship waited at anchor until their return from medical treatment and resumed the demersal survey on 17 October 2010.

The survey programme on the shelf at night was often hampered by fishing vessels and in particular by gillnets. This was most significant on the Balochistan shelf where night transects were simply not possible (Figure 1). In the final week of the pelagic survey, it was necessary to skip transects as there was insufficient time remaining to wait until the fishing gear was hauled in the morning. During the demersal survey, night-time trawl stations or hydrographic work on the shelf required extensive manoeuvring when it was possible at all.

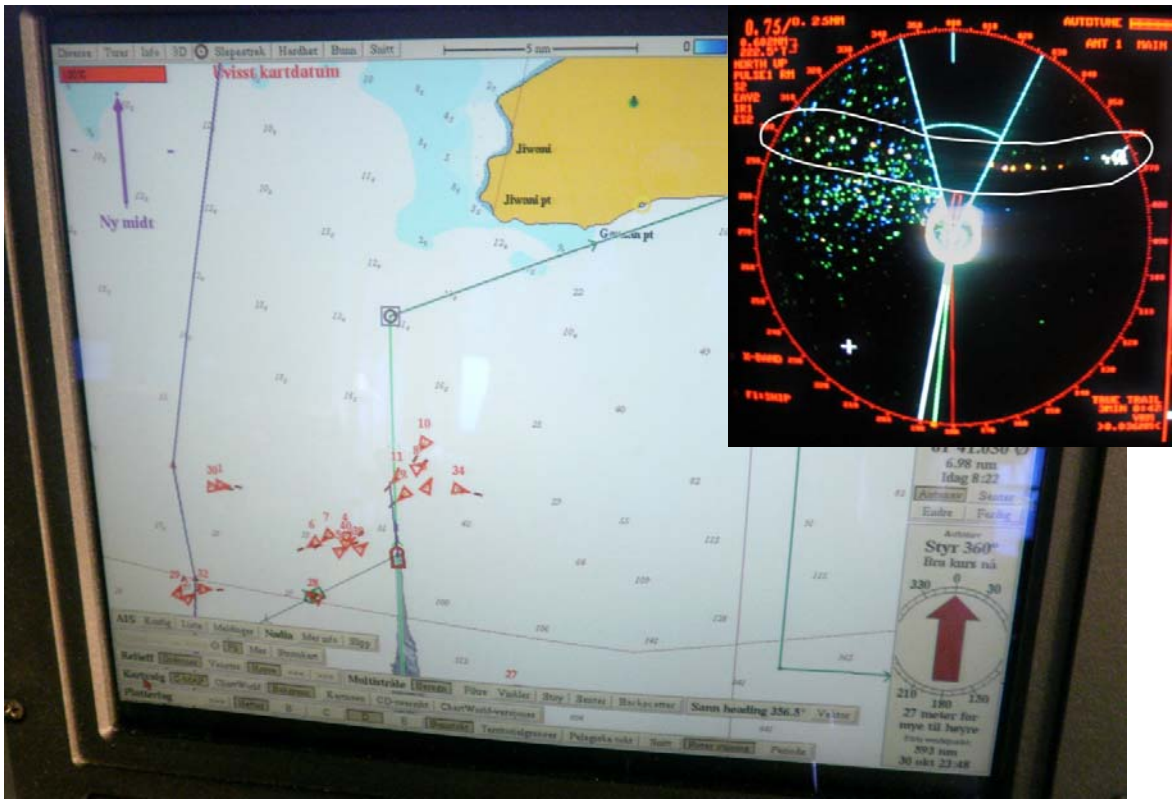

Figure 1: Navigation plot showing fishing vessels anchored at night. Many have gillnet gear set, extending to the westward of the vessels (inset: radar image highlighting gillnet vessel and line of floats)

Multibeam mapping using the EM710 multibeam echosounder was run continuously throughout both surveys when water depths were less than ~1400 m as data quality was too degraded for use below that. Except when specifically mapping pre-selected areas (Murray Ridge and The Swatch), the echosounder priority was assigned to the EK60 to prevent interference from the EM710.

Three different trawls were available on board, the “Harstadtrawl” pelagic trawl, the larger “Åkrahamn” pelagic trawl and the “Gisund Super” bottom trawl. Brief specifications of each trawl are given in Annex 1. The vessel is equipped with a Multisampler for the larger pelagic trawl, the “Åkrahamn”-type. This system is intended to allow up to four discrete samples to be collected on a single tow, preventing contamination of deeper catches with specimens from shallower layers. Unfortunately the acoustic communications link for this system would not function and this device could not be used.

2. METHODS

Fish sampling

All trawl catches (demersal and pelagic) were sampled for species composition by weights and numbers. Catches were sorted to species (or lowest taxon possible) using taxonomic identification sheets (Fischer and Bianchi, 1984) and a field guide (Bianchi, 1985). Large catches were subsampled by mixed baskets

after large specimens were collected separately. Raising factors were applied as required to estimate total catch (weights and numbers) per species/taxon. Station by station records of catches are given in Annex 2. Length frequency samples, or subsamples, were taken for all species of fish (total or fork length) and squid (mantle length), and for many decapod crustaceans (carapace length or width) on every station. Individual weights were collected on a stratified basis (1 per cm grouping) from the length frequency samples. In cases where individuals were too small for accurate weighing (<~5 gm) a pooled mean weight was estimated for each length. Other taxa were recorded in aggregate weights and/or numbers (jellyfish, gastropods, echinoderms and snakes). All catch data and biological sample data were entered into the Nansis database.

Acoustic sampling and analysis

Acoustic equipment

Acoustic data were recorded using a Simrad ER60 scientific echosounder equipped with drop-keel-mounted transducers at nominal operating frequencies of 18, 38, 120 and 200 kHz. Few locations along the Pakistan coast are favourable for transceiver calibration (essentially only the area east of Cape Monze near Karachi), and the survey was therefore started without *a priori* calibration. A post-survey calibration was completed on 20 November 2010 for the 18 and 38 kHz transducers only. Calibration results are given in Annex 1.

Acoustic data were logged and post-processed using the latest acoustic data post-processing software, the Large Scale Survey System (LSSS) Version 1.3.2. The technical specifications and operational settings of the echosounder used during the survey are given in Annex 1.

Design

There are two distinct areas of pelagic waters in the Pakistan EEZ, the on-shelf area and the off-shelf area. On-shelf is the area between the minimum sampling depth (approximately 15 m) and the 500 m offshore contour. Off-shelf is from the 500 m contour to the EEZ boundary. Sampling was restricted from approaching within 8 km of international boundaries. On-shelf strata for Balochistan and Sindh were based on the different natures of the continental shelf in each area. The specific boundary is the 24°50’ parallel as is used in the demersal stratification. The off-shelf area was divided into western, central and eastern strata. The central stratum covered the Murray Ridge and adjoining trough while the western and eastern strata cover the continental shelf margins from 500 m and outwards (Figure 2).

Sampling allocation to strata (Table 1) was based on stratum area however the sampling intensity (track miles per unit area) was reduced in the offshore strata due to the very large size of these. There is also little question that the shelf areas should be sampled more intensively than the off-shelf waters. The exact proportionality selected (2.5x greater on-shelf) was arbitrary.

A hybrid design was adopted, using zigzag transects for efficiency offshore, and parallel transects for improved mapping and distribution information on-shelf. The offshore zigzags were adjusted to align with oceanographic transect lines however it is assumed that no discernible bias would be introduced by this.

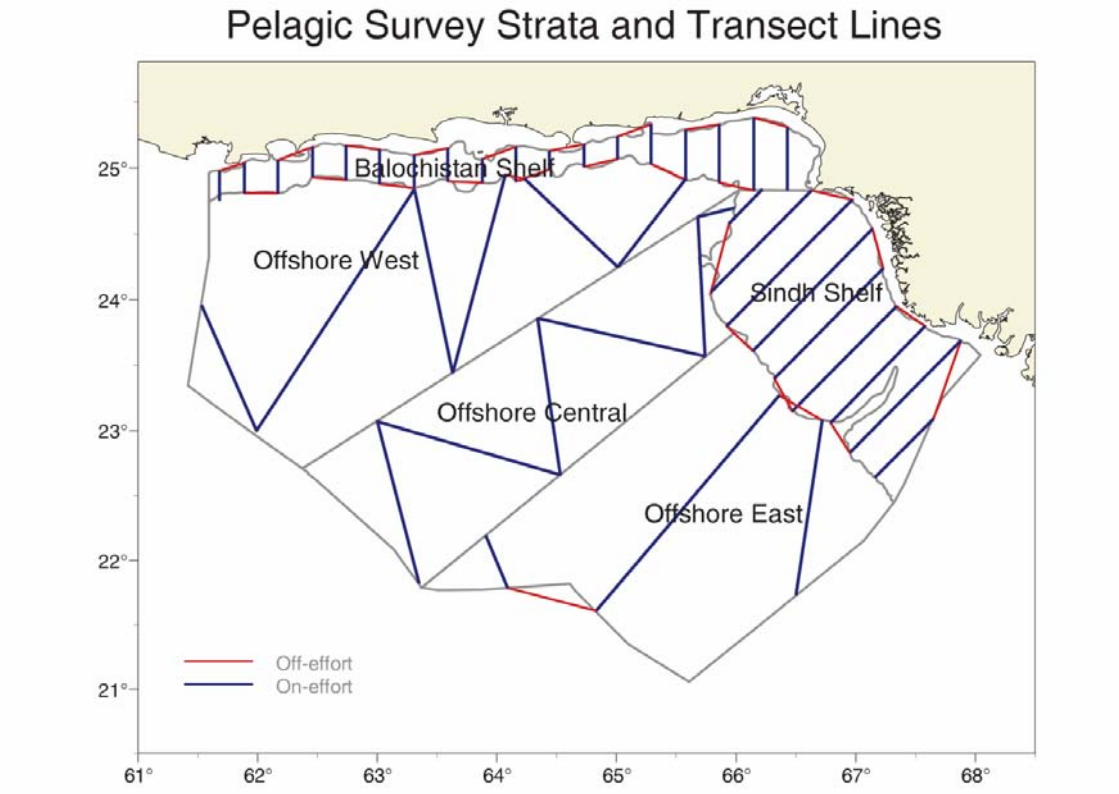

Figure 2: Acoustic survey strata and transect lines

Planned transects totalled 2500 nm (4625 km) of acoustic track lines in the study area required approximately 15 hours per day of on-effort steaming to complete. The remaining time was used for pelagic trawling, oceanographic sampling and multibeam mapping.

Table 1: Acoustic sampling effort allocation to strata based on 4600 km (2500 nm) total effort

Hybrid – adjusted sampling design

Stratum	Area (km^2)	Weight	Wt %	On-effort (km)	Total (km)	Percent on-effort	Km track /km^2
Balochistan	15466	2.5	13.8	566.5	1067.9	53.0	0.037
West offshore	65231	1	23.2	897	913.7	98.2	0.014
Sindh	30579	2.5	27.2	1034.2	1299.7	79.6	0.034
Central offshore	44632	1	15.9	740.9	773.3	95.8	0.017
East offshore	55984	1	19.9	444.1	565.4	78.5	0.008
				3682.7	4620	79.7	

Allocation of acoustic backscatter to species category

The acoustic data were scrutinized using LSSS v1.3.2 of 2009 (Korneliussen *et al*. 2006)from the 38 kHz display only. The mean 1 nm area backscattering coefficient S_A (m^2/nm^2) was allocated to a predefined set of species groups on the basis of established echogram features. Acoustic groups and respective

species are listed in Table 2. Samples for species and group identification, and estimation of mean length and weight, were obtained by targeted pelagic trawling.

Table 2: Taxa (families) conventionally assigned to acoustic categories and the principal species identified in Pakistan waters

Acoustic category	Family	Principal species
Pelagic 1	*Clupeidae*	*Dussumieria acuta*
		Sardinella spp. (includes 3 species)
		Anaduntostoma chacunda
	Engraulidae	*Thryssa vitriorostris*
		Thryssa dussumieri
		(and 2 more species)
Pelagic 2	*Carangidae*	*Decapterus russelli*
		Decapterus spp. (2 more species)
		Carangoides spp. (5 species)
		Scomberoides commersonnianus
		Megalaspis cordyla
		Alectis spp. (2 species)
	Scombridae	*Scomberomorus guttatus*
		Scomberomorus spp. (2 more species)
		Rastrelliger kanagurta
	Sphyraenidae	*Sphyraena obtusta*
		Sphyraena putnamae
		Sphyraena jello
	Trichiuridae	*Lepturacanthus savala*
		(includes 2 more species)
Mesopelagics	*Myctophidae*	*Benthosema* spp.
	Champsodontidae	*Champsodon* spp.
	Bregmacerotidae	*Bregmaceros* spp.
	Myctophidae	*Diaphus* spp.
		(and 3 more species)
Demersals	*Nemipteridae*	*Nemipterus randalli*
		Nemipterus japonicus
		Parascolopsis spp. (includes 3 species)
	Haemulidae	*Pomadasys kakaan*
		Pomadasys maculatum
		Pomadasys stridens
		(and 3 more species)
		Priacanthus spp. (includes 2 species)
	Serranidae	*Epinephelus diacanthus*
	Sciaenidae	*Atrobucca alcocki*
		Johnius spp. (3 more species)
		Otolithes spp. (2 species)
	Ariidae	*Arius* spp. (include 5 species)
	Synodontidae	*Saurida* spp. (includes 3 species)
Plankton		*Plankton*
	Acropomatidae	*Synagrops adeni*
	Loliginidae	*Uroteuthis duvauceli*
	Sepiidae	*Sepia* spp. (includes 4 species)
		Jellyfish
	Portunidae	*Charybdis* spp.
		Charybdis feriata

The plankton acoustic category was allocated differently between day and night. During the night, when mesopelagic fish had migrated into the top 100 m, the plankton category was used for this region and hence is more accurately a mesopelagic/plankton mix categorisation. During the day, when the mesopelagic fish had migrated down to about 300 m, the surface plankton categorisation then only contained plankton and a separate mesopelagic category was used for the deeper mesopelagic layers.

Target strength data were collected on two occasions during the night when single targets were observed above strong scattering layers that were at 20 m depth. In both cases, the trawl samples gave mixed catches of jellyfish and myctophids.

Distribution

Distribution plots were post-stratified into areas of similar densities using the following pre-defined ranges:

1: S_A = 0–300;
2: S_A = 301–1 000;
3: S_A = 1 001–3 000;
4: S_A > 3 001 (m^2/nm^2).

The post stratification boundaries of classified fish aggregations were determined by means of manual contouring guided by the inner and outer zero-value limits of the transect lines using Nansis 1.5.1.

Estimation of biomass

Acoustic backscatter (S_A) was summed over all transects within the 5 pre-defined survey strata. Day/night and depth categories were assigned after inspection of echograms to determine the apparent boundaries. Classified S_A was partitioned into time-depth strata accordingly.

The target strength (TS) function used to convert mean area backscattering coefficient S_A (m^2/nm^2) at 38 kHz to number of fish is generalized as:

$$TS = C \log L - I \text{ (dB)} \qquad (1)$$

where L is the mean total fish length and the coefficient (C) and the intercept (I) are species dependent regression parameters. This target strength function with C=20.0 and I=-72.0 was originally established for North Sea herring, but has been widely applied to clupeids in general (Foote *et al*., 1986; Foote, 1987).

Although species-specific target strength data is not available for many species seen in Pakistan waters, a collection of target strength at length parameters from the literature was assembled for related and similar species (Annex 1). These were compiled into several classes based on shape and presence/absence of a swimbladder (Table 2) and the great majority of species/taxa observed in the catches were assigned parameters based on the most similar group. The mean length and mean weight in the catch was calculated for each species/taxon and the average TS for the taxon was calculated from equation 1. Each species/taxon was assigned into an acoustic category in Table 2 and the species and size specific TS estimates were averaged (weighted by numbers in the catch) into the species groups corresponding to the acoustic categories. The corresponding mean weight in the acoustic category was also calculated following Simmonds and MacLennan (2007). The group's mean target strength is then used in the conversion from TS to backscattering cross-section by:

$$\sigma_{bs} = 10^{TS/10}$$

which is then used with the mean weight in the category (w) to convert from S_A (m^2/nm^2) to areal density (kg/m^2) by:

$$\rho = \frac{s_A}{4\pi\sigma_{bs}} w .$$

Table 3: Coefficient and intercept of published target strength to length relationships

Shape	Swimbladder	Intercept	Coefficient	Fixed TS
perch	yes	-50	20	
eel	yes	-50	20	
eel	no	-93.1	30.6	
elongate	yes	-76	20	
flounder	no	-77	20	
tuna	yes	-50	20	
crustaceans	no	-70.3	9.45	-85.0
tapered	no	-77	20	
jelly	no			-64.7
tuna	no	-60	20	
chond	no	-77	20	
squid	no	-76.2	20	
puffer	yes	-50	20	

Demersal sampling and analysis

Design

Following Abildgaard *et al.* (1986) the shelf area from 10 m inshore contour to the 200 m contour was partitioned into eight strata (Figure 3). Each of the four coastal regions (Makran, Sonmiani, Sindh and Kori) was divided into an inshore (10–50 m) and an offshore (50–200 m) depth zone.

A total of 95 trawl stations (assuming 5 trawl sets per day for 19 days) were allocated proportional to stratum area (Table 4). A standard trawl tow was 30 minutes towing at 3.5 kts for a total of 1.75 nm distance (approximately 3.24 km; 1 km = 0.539957 nm). Stations were randomly selected by defining a 6 km grid overlaying the strata. A 10 percent random selection from the grid points produced 229 grid points (Figure 4). From the selected points within each stratum the required numbers of stations were randomly selected as primary sampling stations. The remaining stations were available as alternates.

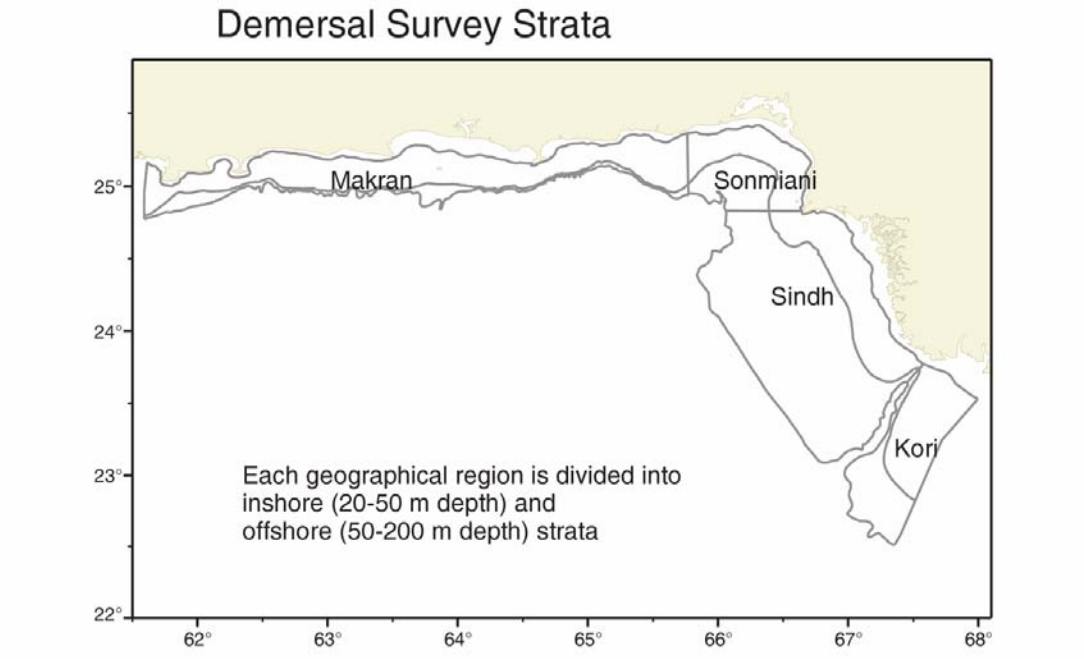

Figure 3: Demersal survey strata defined by geographical area and depth range

Table 4: Demersal stratum area and effort allocation

Statum	No	area-km	area-nmi	Stratum weight (W).	Sets
Makran inshore	9103	9482	2765	22.19%	21
Makran offshore	9104	1814	529	4.25%	4
Sonmiani inshore	9105	2917	850	6.83%	6
Sonmiani offshore	9106	2098	612	4.91%	5
Sindh inshore	9107	4747	1384	11.11%	11
Sindh offshore	9108	15269	4452	35.74%	34
Kori inshore	9109	3809	1111	8.92%	8
Kori offshore	9110	2587	754	6.06%	6
		42723	12456	100.00%	95

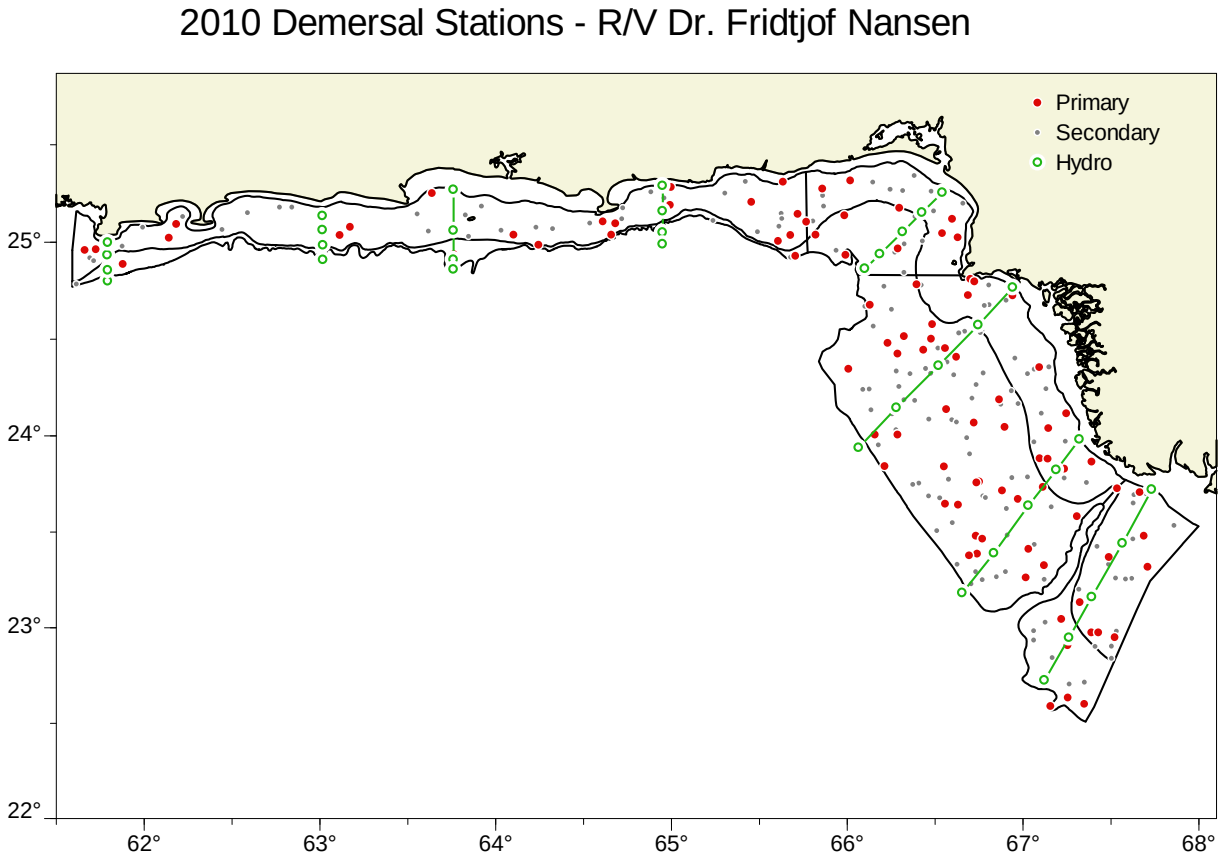

Figure 4: Demersal survey sampling stations randomly selected by strata. Oceanographic sampling stations are included

Biomass estimation

Swept area biomass estimates were computed using the standard stratified estimation (Cochrane, 1977). Catches in weight and numbers were standardized to a 1.75 nm tow by:

$$Y^{*}_{sih} = \frac{D_{ih}}{1.75} \cdot Y_{sih}$$

where D_{ih} is the distance (n. mi.) towed on the i^{th} set in stratum h and Y_{sih} is the observed catch (in weights or numbers) of species s in the given set. The stratified estimate of the mean catch per standard tow for species s is then given by:

$$\bar{Y}_S = \sum_h \frac{N_h}{N} \cdot \sum_i Y^{*}_{shi} = \sum_h W_h \cdot \sum_i Y^{*}_{shi}$$

where N_h is the stratum size and N is the total size of all strata i.e. W_h is the stratum weight given in Table 4.

Oceanographic sampling

The oceanographic tracks constituted transects with 4 in the offshore deep Arabian Sea consisting of 17 hydro-stations, and 8 shelf transects with 37 hydro-stations to cover the entire Pakistan EEZ of 240 000 square kilometres (Figure 5).

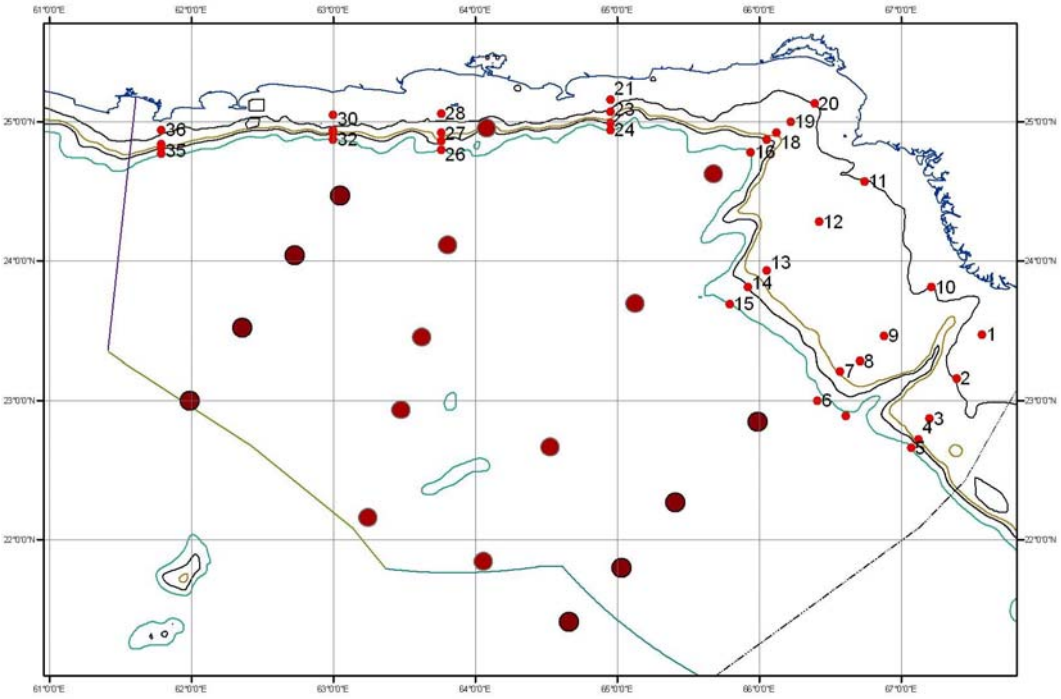

Figure 5: Locations of oceanographic stations with small circle denoting demersal stations and large circle denoting pelagic stations

At each of the hydro stations, a CTD rosette cast was completed for temperature, salinity, oxygen, fluorescence and water samples. Plankton net tows were also carried out. Almost all of the hydro stations were done in the night, keeping in view of the day-night variability, avoiding the transition periods of sunrise and sunset. Additional CTD casts were taken following each of the trawl stations, and an additional water sample was taken from the surface water to get chlorophyll observations for the day.

CTD

A Seabird 911+ CTD probe was used to obtain vertical profiles of the temperature, salinity and oxygen. Real time logging was carried out using the PC based Seabird Seasave software.

The casts were stopped a few meters above the bottom, and at a maximum of 1 500 m depth. The oxygen sensor has shown to be very stable, and bottle samples from all hydrocasts will be used for confirmation of the stability of the sensor. No calibration was conducted during the survey.

Attached to the CTD was also a Chelsea flourometer of the type Mk III Aquatrack. It measures chlorophyll A in $\mu gm\ l^{-1}$ with an uncertainty of 3 percent. Factory slope and offset was 0.921 and -0.02.

Thermosalinograph

The SBE 21 Seacat thermosalinograph was running routinely during the survey, obtaining samples of sea surface salinity and relative temperature and fluorescence (5 m depth) every 10 second. An attached in-line Turner Design SCUFA Fluorometer was continuously measuring Chlorophyll levels [RFU] at 5 m

below the sea surface while underway during the entire cruise. The instrument was configured with a bright blue photodiode, a 420 nm Excitation filter and a 680 nm Emission filter. It was calibrated against the secondary orange standard dye. The maximum output was equivalent to 5 Volt = 100 percent. It had a linear temperature compensation of 2.14 percent/°C.

Meteorological observations

Meteorological data logged from the Norwegian Meteorological Institute (DNMI) meteorological station included air temperature, humidity, air pressure, wind direction and speed, and sea surface temperature (SST). All data were averaged by unit distance sailed (1 nm).

Plankton

The zooplankton sampling was conducted by means of Hydrobios Multinet (5 nets of 405 µm), at three depths, 50, 100 and 200 m, at predetermined positions along the survey track. Data from the flow meter was recorded electronically from the Multinet receiver unit. A SCANMAR depth sensor gave real-time information of the depth. The nets were opened and closed remotely from the bridge of the vessel. The samples were preserved in 4 percent formalin.

A phytoplankton sample was taken at each predetermined hydro station with a vertical haul of a 50 µm ring net and preserved in 4 percent formalin.

Multibeam bathymetric data collection

The NIO requested two blocks for multibeam bathymetric survey, the near-shore end of the Indus Swatch and the western edge of the Murray Ridge. These were selected to extend existing Multibeam datasets.

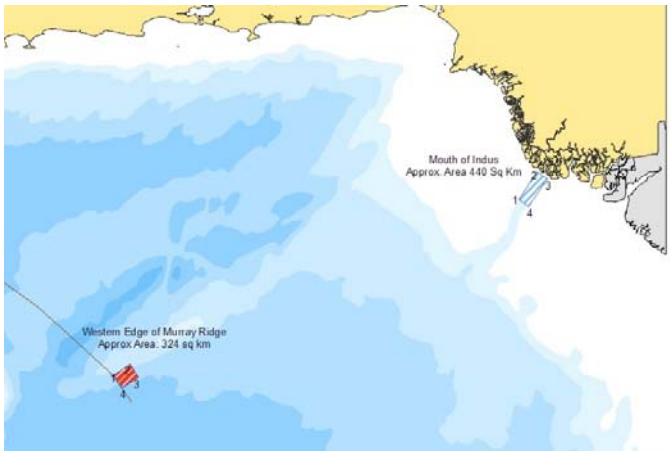

Figure 6: Preselected blocks for multibeam bathymetric survey

The vessel is equipped with the Kongsberg Marine EM 710 multibeam echosounder with the transducer array producing beams of 1°x2°. This is a high to very high resolution seabed mapping system which is interfaced with the ships OLEX chart mapping post-processing system. The system is rated to more than 2 000 m however increasing noise in the data at depths below 1 400 m made 1 400 m the functional limit recorded during the surveys. The multibeam was turned off in greater depths although single beam bottom depths from the ER60 sounder were recorded. The across track coverage (swath width) was approximately twice the water depth. Data from the OLEX system were edited at sea to remove spurious values and the results were provided in ASCII files in XYZ format.

3. PELAGIC SURVEY

Pelagic survey narrative

The vessel departed Karachi on 12 October 2010 at 13.00 hours local time (08.00 hours UTC). A planned acoustic calibration near Karachi was postponed due to excessive swell and the first acoustic transect was begun near dusk (14.00 hours UTC). The second transect had to be truncated due to Pakistan Navy exercises in the area.

The first survey region was the Sindh (eastern province of Pakistan) shelf from 20–500 m depth. The shelf regions were covered using parallel, evenly-spaced transects (28 km spacing, random starting track) perpendicular to the coast (Figure 2). Tracks were steamed 24 hours per day and pelagic trawl tows were made on selected acoustic targets. When the Sindh shelf region was completed the survey continued into the offshore Eastern, Central and Western strata and finally in the Balochistan shelf stratum.

The survey programme on the shelf at night was often hampered by fishing vessels and in particular by gillnets. This was most significant on the Balochistan shelf where night transects were simply not possible. As a result two transects were skipped completely and four others were truncated to less than 50 percent of the planned length resulting in about a 30 percent reduction in on-effort track in the stratum. This is not considered to impose any significant constraints on the analysis.

Survey effort

Three different trawls were used during the survey (Annex 1). Most of the trawl tows were with the "Harstadtrawl" pelagic trawl. A few tows were made with the larger "Åkrahamn" pelagic trawl. For shallow tows (<10 m below the surface) the "Harsadtrawl" was fitted with four floats (1 m diameter) on 1–10 m lines to limit depth near the surface. The bottom trawl ("Gisund Super") was also used as a pelagic trawl for shallow tows. Table 5 summarizes the survey effort by regions and Figure 7 shows the cruise tracks with fishing and hydrographic stations.

Table 5: Summary of survey effort by strata, including number of pelagic trawl hauls, CTD casts, plankton sampling stations (phytoplankton and 2–5 multinet zooplankton samples per station) and distance surveyed acoustically (nautical miles)

Area	Pelagic Trawls	CTD casts	Plankton stations	Plankton samples	Nautical miles	
					Total	Scrutinized
Balochistan Shelf -	5	6			576	496
Sindh Shelf -	12	11			720	634
Offshore West -	13	18	7	35	843	559
Offshore Central -	13	12	5	25	446	346
Offshore East -	2	7	5	25	561	445
Total	45	54	17	85	3146	2480

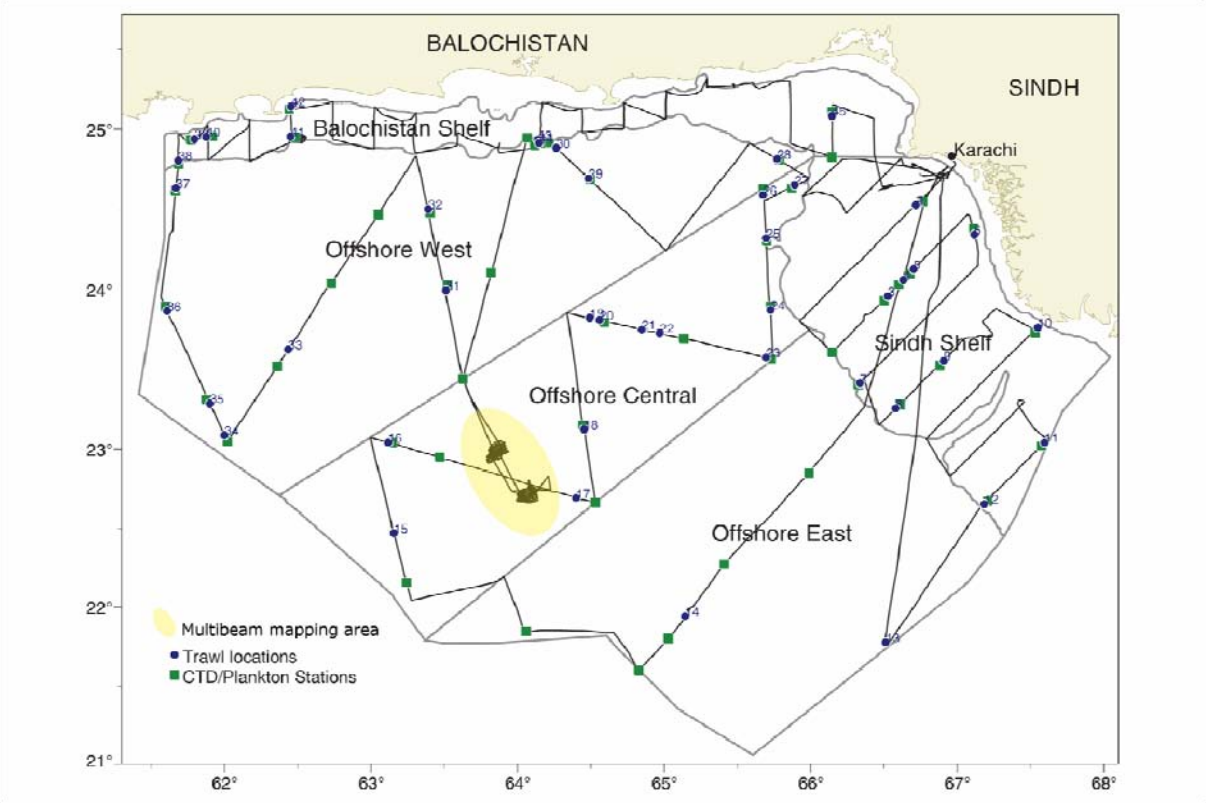

Figure 7: Survey track with hydrographic and trawl stations. Multibeam data was logged during all transects in depths <1400 m as well as on two sea mounts of the Murray Ridge

Results

Catch rate estimates

Catches from each set are included in the Nansis reporting format in Annex 2. In this case all catches are standardized by towing time to one hour rather than distance towed. The mean catch per hour towing is produced by the Nansis database based on species and taxa groupings specified. These were defined based on the observed catches and taxonomic relationships for the groups of greatest interest to fisheries. The set-by-set and stratum mean catches for these groups are included in Annex 3. The groups defined were *Benthosema* which includes *Benthsema pterotum* and *B. fibulatum*; Carangids all species in the family Carangidae; Cephalopods which includes squid and cuttlefish; Clupeoids which includes Clupeidae and Engraulidae; Trichurids all species in the family Trichuridae; Scombrids all species in the family Scombridae; Jellyfish which includes a wide range of gelatinous species; Other Mesopelagics includes Champsodontidae, Bregmacerotidae, Gempylidae, and Nomeidae; and all other groups are included in the category Others.

Distribution

The Sindh inshore strata contained a few concentrated schools and a widespread diffuse scattering layer. The Balochistan stratum contained the highest amount of backscatter from schools but extensive light scattering layers were also present (Figure 8) on the shelf areas.

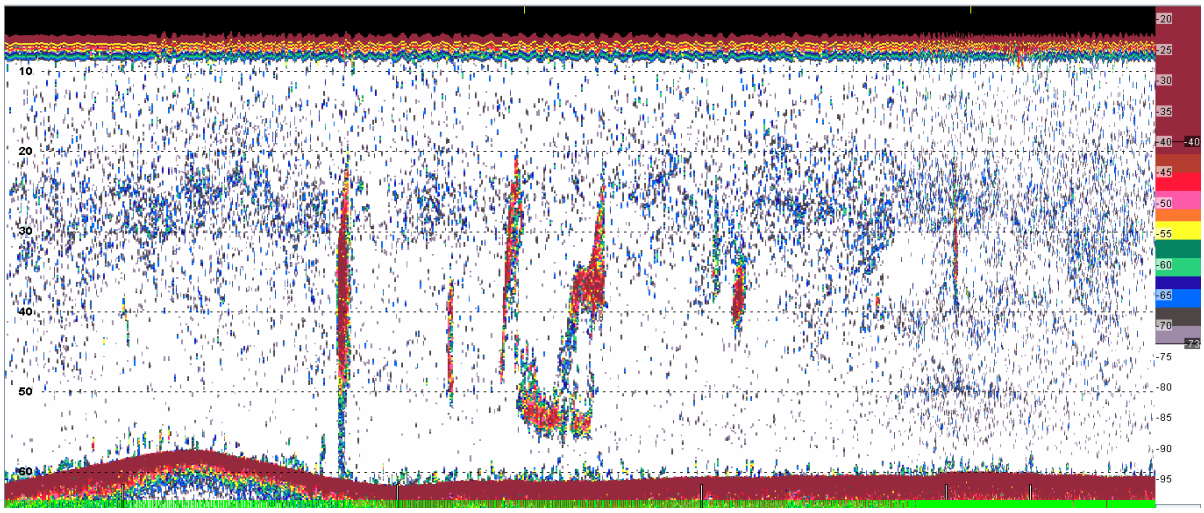

Figure 8: Example of dense pelagic schools and scattering layers in shallow water on the Balochistan shelf

Pelagic 1 (PEL-1) category marks were found over much of the inshore region, with a concentration in the western end of the Balochistan stratum (Figure 9). Pelagic 2 (PEL-2) category marks were weak with concentrations in the vicinity of Ormara and the Indus Delta (Figure 10). These results are based solely on acoustic classification and do not reflect any information from the trawl catches. No biomass estimates were made for these groups during the survey.

The offshore strata contained extensive scattering layers that migrated from mesopelagic depths to within 100 m of the surface during dusk and descended back to 300–700 m at dawn (Figure 11). This is characteristic of myctophids and other mesopelagic fish and was confirmed by trawling on the various layers. At times, dense clumps of myctophids were also observed (Figure 12) mostly near the continental shelf edge

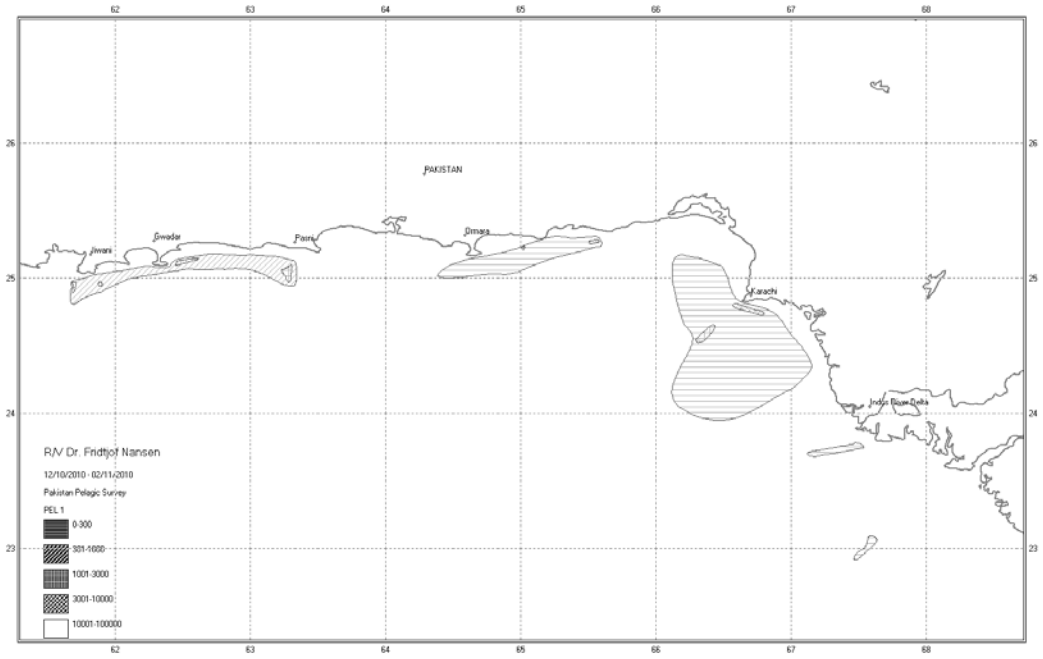

Figure 9: Distribution of acoustic backscatter assigned category PEL-1

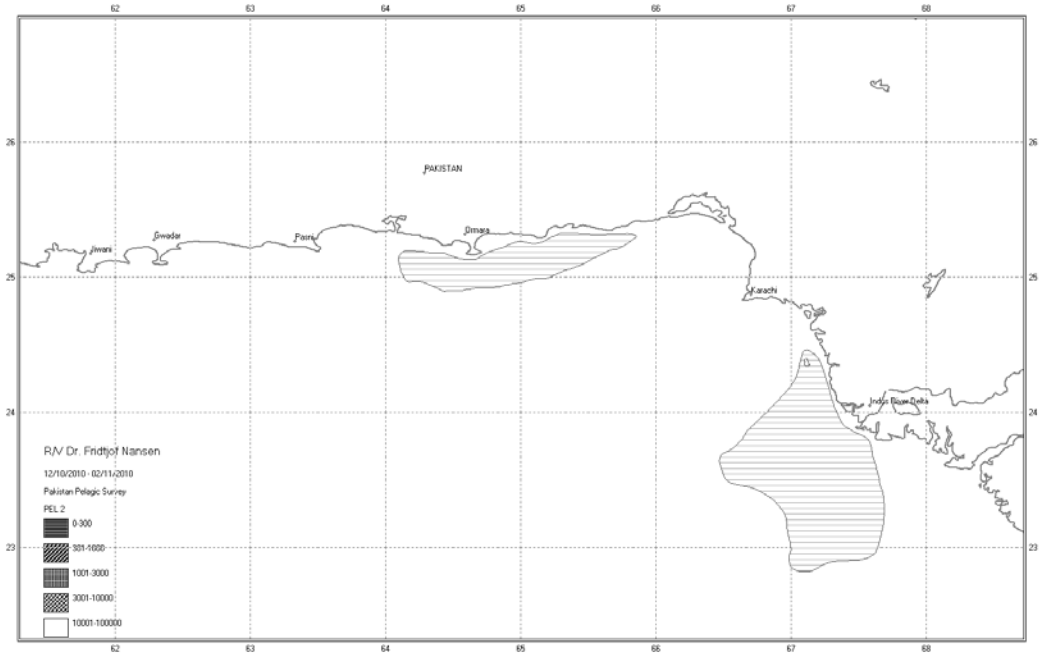

Figure 10: Distribution of acoustic backscatter assigned as category PEL-2

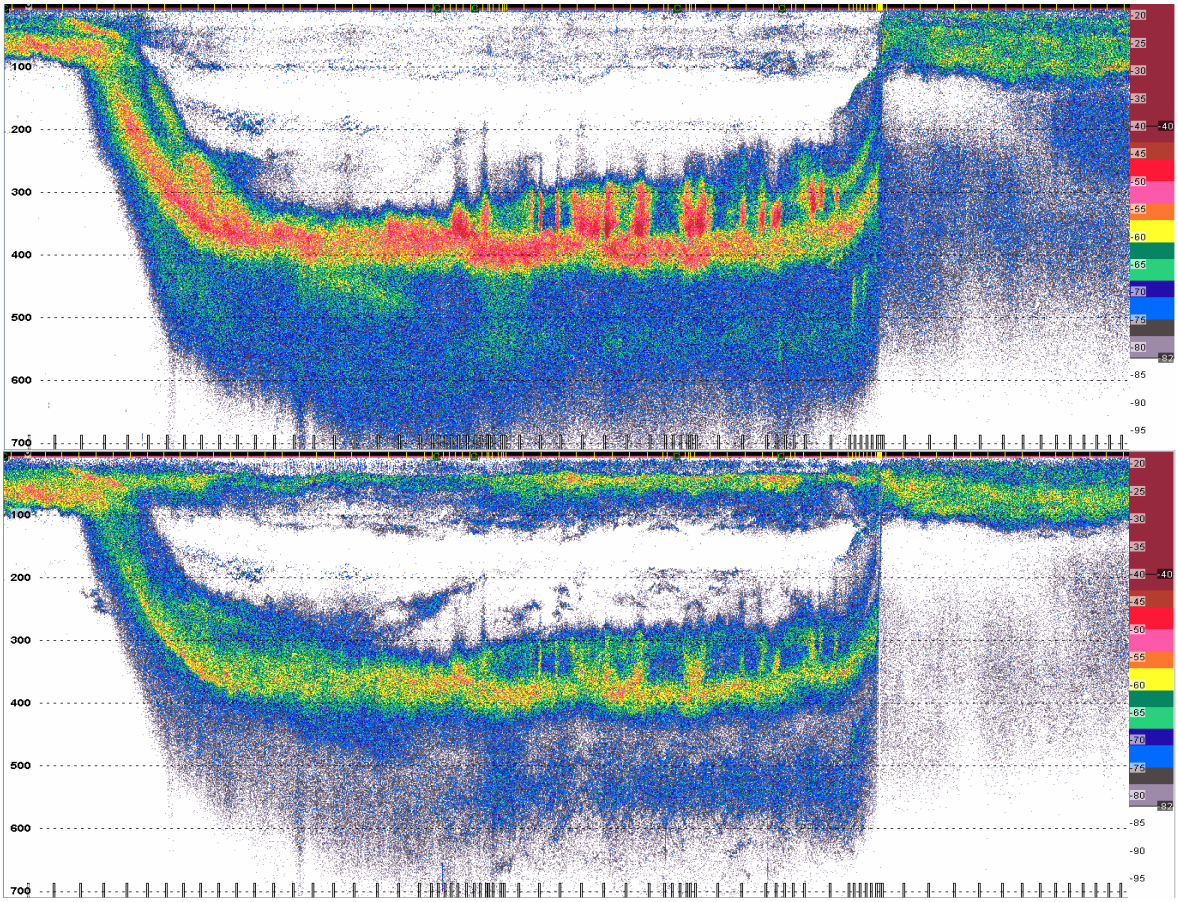

Figure 11: Diurnal migration of mesopelagic fish descending during dawn and ascending during dusk. Upper panel is 18 kHz, lower panel 38 kHz showing marked frequency-specific scattering

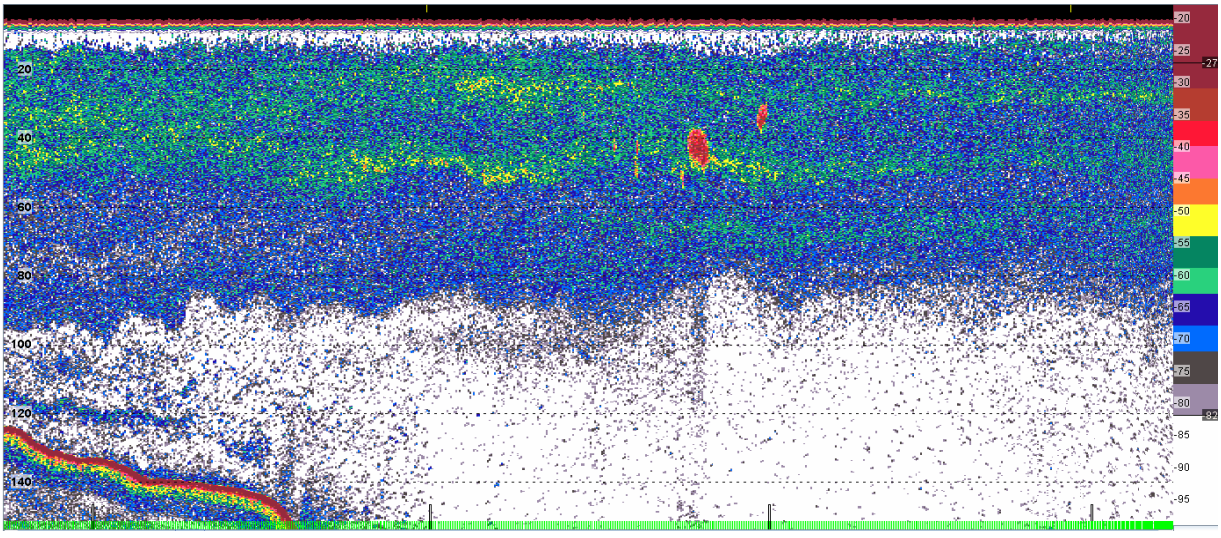

Figure 12: Example of dense clumps of myctophids off the Sindh shelf edge

The plankton-fish (PL-FI) category marks were evenly distributed over the entire survey area except for shallow inshore regions, approximately 25 m or less. The mesopelagic category (MESO) was only separate from the plankton-fish mixture at night and was included with the plankton-fish in the day. As a result the distribution of S_A classified as mesopelagic is discontinuous, depending on where the ship surveyed by day or night. In spite of this artefact, it is apparent that the mesopelagic biomass is present essentially uniformly over the offshore area. There is virtually no mesopelagic biomass on the shelf proper (<200 m water depth), day or night.

Mesopelagic biomass estimation

The scrutinized data from the three offshore strata were divided by depth zones and into day, night and the dawn/dusk intervals based on the mesopelagic species vertical migrations presented schematically in Figure 13. Approximate timing of the four periods (Table 6) was estimated by reviewing echograms to determine both timing of the migration and the depth intervals.

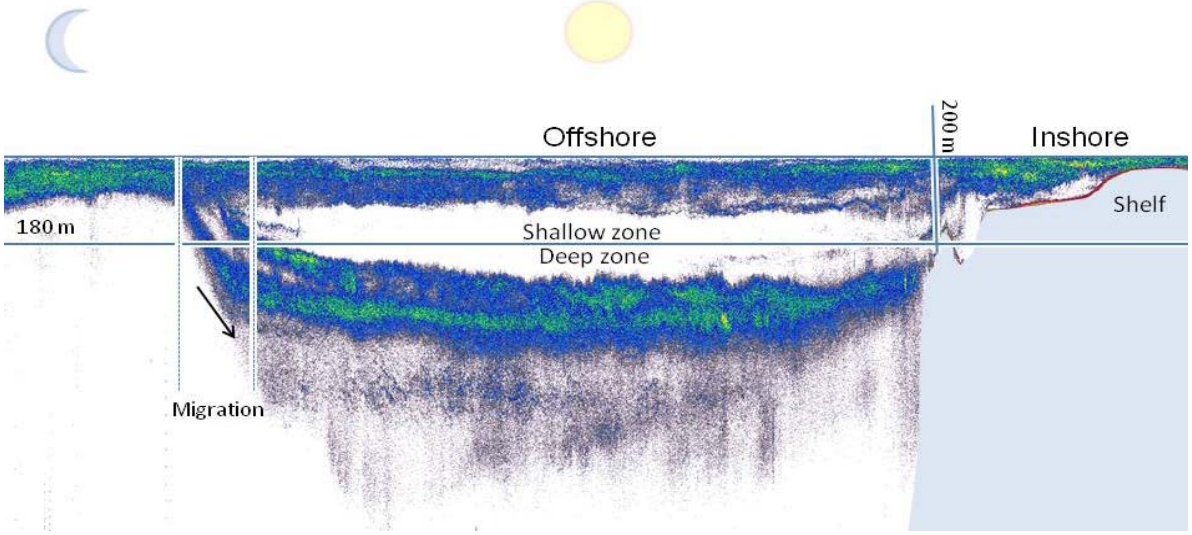

Figure 13: Post-stratification by day-night and depth for offshore strata. Inshore areas (<200 m) were not stratified by depth and day-night differences were smaller

Table 6: Timing (UTC) of day, night and migration intervals based on inspection of echograms. Local time was UTC+5 hours

Part of day	From	To	Duration	Nm
Migrates down	00:45	02:30	01:45	160
DAY	02:30	12:00	09:30	1054
Migrates up	12:00	14:00	02:00	253
NIGHT	14:00	00:45	10:45	1110
			Total	2577

For each depth zone offshore (above and below 180 m), the mean backscatter for plankton and mesopelagic fish from EK60 38 kHz were computed during daytime, night time and during the migration periods. Although the mesopelagic and plankton groups were generally acoustically indistinguishable in the night it is reasonable to assume that the actual total biomass of the two groups in the entire water column does not vary by time of day. This is apparent for daytime (MESO and PLANKTON separate) and the migration periods (groups mixed) but the mean S_A at night, when the two groups are largely mixed, is 15 percent higher. This difference may be due to changes in TS with depth.

Table 7: Mean backscattering area per track mile partitioned by depth and time of day intervals

Frequency	Depth	Area	Daytime			Migration	Nigthtime		
kHz	m		Meso	Plankton	Total	Mes/Pla	Meso	Plankton	Total
38	< 180	Offshore	2	560	562	2293	87	2642	2729
38	> 180	Offshore	1465	265	1730		0	117	117
		Total	1467	825	2292	2293	87	2759	2846

The daytime proportions of MESO in the total mean S_A (64 percent) was used to estimate the biomass of mesopelagic fish. The size-specific mean TS was -44.4299 for all species assigned to the MESO category weighted by abundance (>98 percent *Benthosema* spp.) and this was used to estimate the total number of mesopelagic fish. The mean individual weight, also weighted by numbers, of all species in the MESO category was 0.954 g which was applied to estimate biomass in t/nm^2 (Table 8).

Table 8: Estimation of mesopelagic biomass (t/nm^2) for the offshore strata

Frequency	Depth	Area	Daytime mesopelagic biomass		
kHz	m		S_A	Numbers	Biomass
38	< 180	Offshore	2	55 465	0.0529
38	> 180	Offshore	1 465	40 628 481	38.7708
Total			1 467	40 683 947	38.8238

Given the offshore stratum area of 165 847 km^2 (48 458 nm^2) the total biomass of mesopelagic fish is estimated to be 1 881 317 tonnes of which 1 846 254 tonnes would be *Benthosema* spp.

These results are more consistent with the adjusted estimate of 3 million tonnes given by Sætersdal *et al* (1999) than they are with the earlier estimates by Gjøsæter (1981) which were in the range of 5 to 8 million tonnes.

4. DEMERSAL SURVEY

Narrative

The demersal survey departed Karachi at 14.00 hourslocal time and steamed for the western part of the Makran shelf (Figure 3). Naval exercises prevented starting in the area nearest to Karachi. The Makran shelf area was surveyed first, followed by the near-shore portions of the shelf off Sindh and then the offshore portion of the Sindh shelf. The pre-selected stations for biomass estimation were all fished in daylight hours (tows starting between 06.45 and 17.45 hours local time). A subset of stations were fished twice, in the day and at night as well, to provide a data set of paired tows for day-night comparisons. These data were not used for biomass estimation.

Because of the daylight only limit on the trawl sampling for biomass estimation other sampling activities (oceanographic sampling, multibeam mapping) were concentrated in the night. As with the pelagic survey, the numerous boats and gear in the Balochistan inshore stratum limited night activities but it had less impact as the night-time sampling programme was more adaptable.

Survey effort

A total of 71 primary survey tows were completed out of a planned maximum of 95 (Figure 14, Table 9). Part of the shortfall was due to loss of a full day due to illness when two crew members had to be taken into hospital in Karachi. An additional 19 replicate tows were conducted at night on trawl locations previously sampled by day. The presence of fishing gear and boats at night limited operations, more seriously in Balochistan than in Sindh. Two nights were spent on multibeam mapping in the inner parts of the Swatch.

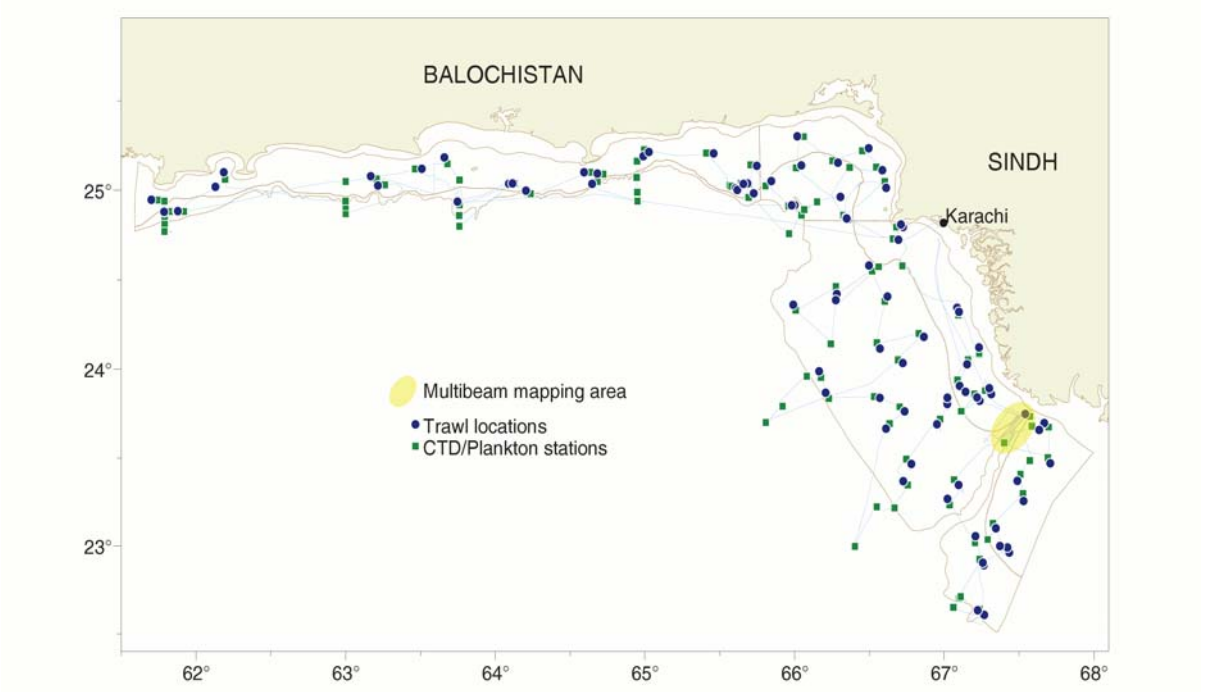

Figure 14: Cruise track and sampling locations during the 2010 demersal survey

Table 9: Demersal survey sampling effort by stratum

Area	Primary trawls	Night trawls	CTD casts	Plankton stations	Plankton samples
Makran inshore - 9103	19	3	22	4	14
Makran offshore - 9104	3	3	12	6	41
Sonmiani inshore - 9105	4	0	4		
Sonmiani offshore - 9106	6	3	9	5	24
Sindh inshore - 9107	11	3	8	1	3
Sindh offshore - 9108	16	4	24	6	33
Kori inshore - 9109	8	2	10	2	2
Kori offshore - 9110	4	1	6	2	14
Off-shelf			12	10	67
Total	71	19	107	36	198

Results

Catches from each set are included in the Nansis reporting format in Annex 4. In this case, all catches are standardized by towing time to one hour rather than distance towed. These results are summarized in the following sections.

Catch rate estimates

The mean catch per hour towing is produced by the Nansis database based on species and taxa groupings specified. These were defined based on the observed catches and taxonomic relationships for the groups of greatest interest to fisheries. The set-by-set catches for these groups are included in Annex 5. The groups defined were Carangids all species in the family *Carangidae*; Cephalopods which includes squid and cuttlefish; Clupeoids which includes *Clupeidae* and *Engraulidae*; Croakers the family *Sciaenidae*; Groupers the family *Serranidae*; Grunts the family *Haemulidae*; Scombrids the family *Scombridae*; Shrimps which includes all shrimp families, primarily *Penaeidae* and *Solenoceridae*; Soles which includes the families *Soleidae*, *Psettodidae*, *Bothidae* and *Cynoglossidae*; Threadfin breams which includes two species of Nemipterus; and all other groups are included in the category “Others”.

Stratum means and standard deviations are given in Table 10 as well as the stratified estimates of the catch rates and standard deviation for each group. Coefficients of variation are in the range 12–55 percent which is quite reasonable for demersal trawl surveys. Biomass estimates using swept area expansion are dependent on assumptions made concerning trawl catchability, *q* and the effective width of the swept area. Following the practice of previous Nansen surveys, *q* is assumed to be 1.0 and the swept area width is assumed equal to 18.5 m.

Distribution

The distribution and abundance of selected groups is given in the maps and tables in Annex 6. In each case, the standardized catches (adjusted to the standard distance of 1.75 nm) for groups of species are plotted as expanding pie charts.

Table 10: Demersal survey stratum and overall mean catch per hour with standard deviation and coefficient of variation (C.V.) and biomass estimates for selected species groupings

			Mean catch (kg) per hour											
Stratum	Weight	Stations	Carangids	Cephalopods	Clupeoids	Croakers	Groupers	Grunts	Scombrids	Shrimps	Soles	Threadfin breams	Other	Total
9103	22.19%	18	39.5	11.3	48.4	2	9	19.1	1.2	0.7	4.8	30.6	257.4	423.9
9104	4.25%	4	361	13.1	0.3	4.9	38.6		0.5	0.1	0.1	64.1	69.8	552.5
9105	6.83%	5	75.4	12.3	11	3.2	0.2	107.5	11.7		0.2	17.1	136.1	374.9
9106	4.91%	5	85.3	6.4	0.1	39.4	1.3	2.1	0.2	0.2	0.1	89.2	38.7	262.8
9107	11.11%	11	105.4	17.9	22.6	1.1	0.3	18.5	12.8	4.3	1.3	2.4	116.5	303.2
9108	35.74%	16	20.9	9.2	6.2	13.2	3.5	2.1	1	1.7	0.2	30	71.6	159.6
9109	8.92%	8	38.6	33.3	8.7	6.6	0.2	10.8	22.8	4.4	0.7	0.9	256.4	383.5
9010	6.06%	4	15.3	9.4	6	96.9	8.7		4	3.3	0.2	14.6	155.1	313.6
		Mean	57.0	13.0	17.4	14.1	5.5	15.5	5.2	1.8	1.4	27.0	142.1	300.0
			Standard deviation											
9103	22.19%	18	115.6	13.4	176.7	8.3	18.9	39.5	2.6	2.7	6.8	56.1	336.1	486.1
9104	4.25%	4	710.4	18.7	0.5	6	38.8		1.1	0.1	0.2	59.5	62	852.2
9105	6.83%	5	61.4	22.9	17.9	6.9	0.3	236.7	19.6		0.2	23.4	164.9	440.6
9106	4.91%	5	92.2	6.1	0.1	69.8	1.1	4.6	0.4	0.3	0.2	87.9	24.5	179
9107	11.11%	11	189.8	14.5	40.5	2.9	0.7	49.5	11.9	13.4	1.9	2.4	155.7	229.6
9108	35.74%	16	34.5	9.2	11	22.7	5.2	6.6	2.7	6.6	0.4	21.1	68.8	69.6
9109	8.92%	8	27.5	22.4	7.4	12	0.4	18.3	44.5	6.3	1.2	1.6	187.9	240.6
9010	6.06%	4	22.7	11.3	7.8	175.2	11.7		6	3.1	0.2	18.1	167.3	246.5
		Std.Dev	18.0	1.6	9.4	5.9	1.4	7.7	1.6	0.8	0.4	4.3	21.5	37.2
		C.V.	0.315	0.126	0.542	0.420	0.255	0.501	0.313	0.425	0.265	0.158	0.151	0.124
	Area (nm^2)		Biomass (tonnes)											
9103	2 765	18	3 124	894	3 828	158	712	1511	95	55	380	2 420	20 357	33 524
9104	529	4	5 462	198	5	74	584	0	8	2	2	970	1 056	8 360
9105	850	5	1 833	299	267	78	5	2614	284	0	5	416	3 309	9 115
9106	612	5	1 493	112	2	690	23	37	4	4	2	1 561	677	4 600
9107	1 384	11	4 172	709	895	44	12	732	507	170	51	95	4 612	12 002
9108	4 452	16	2 661	1 172	789	1 681	446	267	127	216	25	3 820	9 117	20 323
9109	1 111	8	1 227	1 058	276	210	6	343	725	140	22	29	8 148	12 187
9010	754	4	330	203	129	2 090	188	0	86	71	4	315	3 345	6 763
	12 456	Total	20 303	4 644	6 191	5 024	1 975	5 504	1 835	658	491	9 626	50 621	106 874

5. OCEANOGRAPHIC CONDITIONS

The oceanographic information collected on the two surveys (pelagic and demersal) have been combined with the offshelf areas covered in the pelagic survey (2010408) and the coastal/on shelf areas covered in the demersal survey (2010409). These two data sets have been combined to get four transects, extending from the shelf to the deep basins. They will be described as Transect A (offshore from Makran); Transect B (west of the Murray Ridge); Transect C (east of the Murray Ridge); Transect D (off Indus). Profiles from the four main CTD observations (temperature, salinity, oxygen, fluorescence) are reported here.

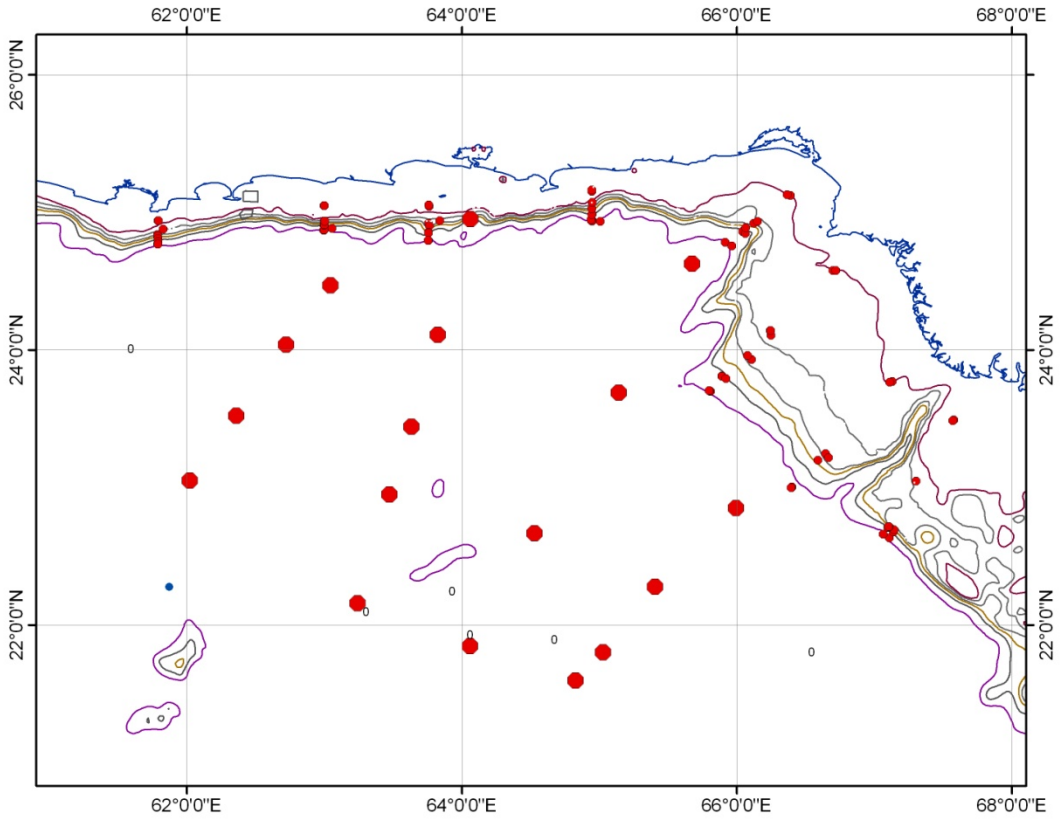

Figure 15: Oceanographic sampling stations completed as described in the results

Transect A (Shelf and deep offshore from Makran)

This westernmost area of the Pakistan coast has the narrowest shelf and steepest continental margin dropping to depths exceeding 3000 m very rapidly. The sections constructed from the four oceanographic profiles are given in Figure 16 (temperature, salinity, oxygen and fluorescence in order from top to bottom). The surface temperatures were more or less uniform and high at about 29 °C. The thermocline was observed as a sharp decline in the temperature (from 29 to 25 °C), generally around 54 m. The salinity was generally higher in the surface layers, especially closer to the shore. A low salinity area was observed at ~50–150 m depth at the outermost station. This was an interesting finding that was observed in the other transects as well, but was not so clear in the temperature profile and therefore needs further investigation. The oxygen near the surface (0–25 m) ranged between 3.90–4.49 ml L^{-1} and decreased with the depth. Low oxygen (<1 ml L^{-1}) was observed from depths between 60 and 100 m downwards. High fluorescence values were observed near the surface over and near the shelf while the Deep Chlorophyll Maximum (DCM) in the range 19–29 m depth was more pronounced in the deeper stations.

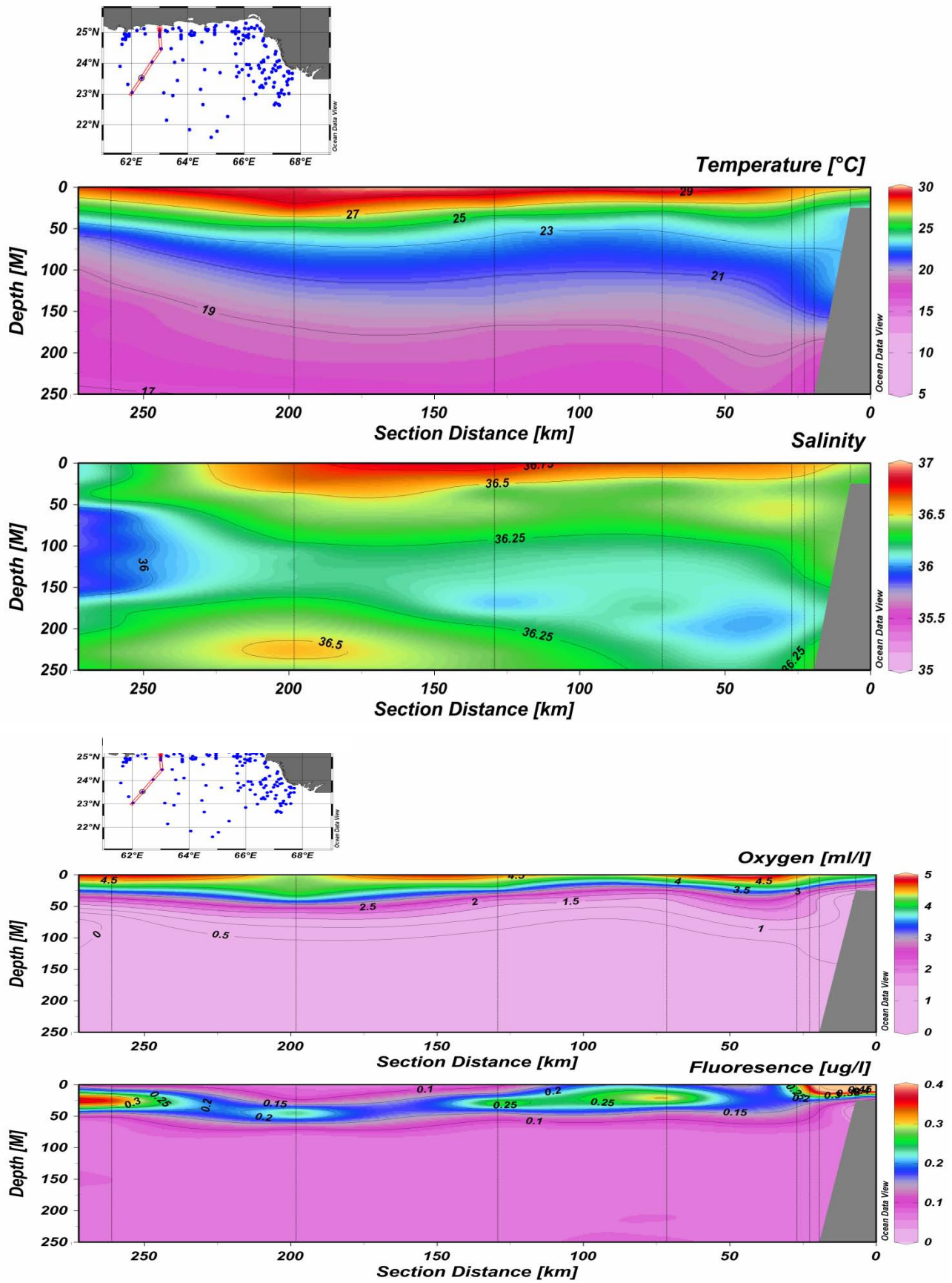

Figure 16: Oceanographic sections off Makran (Transect A)

The Murray Ridge divides the offshore Pakistan basin into two parts and the two transects B and C, run west and east of the Murray Ridge respectively.

Transect B (west of the Murray Ridge)

As with Transect A there is a narrow continental shelf and a steep continental margin in this area. The sections constructed from the four oceanographic profiles are given in Figure 17 (temperature, salinity, oxygen and fluorescence in order from top to bottom). The surface temperature ranged between 27–29 °C and the thermocline (~5 °C decrease in temperature) was observed between 23–60 m. Below the thermocline, the temperature gradually decreased to <17 °C at 250 m. The salinity was highest (~37) at the surface and the low salinity water mass at the outermost end was also observed in this transect between 100–180 m. The salinity of this water was similar to that further west which suggests that these may be an extension of the same water mass. Oxygen near the surface ranged from 4.12–4.61 ml L^{-1} and decreased to <1 ml L^{-1} at around 70 m and then declined to almost anoxic levels at 200 m. The peak fluorescence values were higher over the shelf and far offshore and lower in the intermediate areas. The DCM was shallower (~25 m) in the shelf area and deeper (~50 m) in the deep stations.

Transect C (east of the Murray Ridge)

The shelf is still relatively narrow in this area however the slope of the continental margin is more gradual. The sections constructed from the four oceanographic profiles are given in Figure 18 (temperature, salinity, oxygen and fluorescence in order from top to bottom). The surface temperature ranged between 27.5–29.5 °C. The thermocline was observed between at 30 m (29 °C) and 50 m (24.78 °C), below which the temperature gradually declined to 14 °C at 250 m. This section had generally higher surface temperatures with no strong differences between the shelf and offshore areas. Temperatures were somewhat lower in the deeper water. The surface salinity ranged between 36.4 and 37. The low salinity water mass observed at about 125 m depth in the outermost parts of the two western sections extends much closer to the continental shelf where a second low salinity (~36) water mass overlay the continental slope at about 200 m depth. Oxygen near the surface (0–50 m) ranged between 4.0 and 4.5 ml L^{-1} with little variation from the continental shelf edge outwards. Low oxygen levels (<1 ml L^{-1}) were found below 100 m depth across the entire section. The DCM varied between 30 and 50 m over deep waters and was shallower near the shelf edge and over the shelf. Fluorescence was more intense in the deep areas.

Transect D (off Indus)

The shelf is widest in this area and the slope of the continental margin is quite gradual. The sections constructed from the four oceanographic profiles are given in Figure 19 (temperature, salinity, oxygen and fluorescence in order from top to bottom). The temperature generally increased from the shelf to the offshore stations ranging between 25 and 29 °C. In deep waters, the thermocline was relatively uniform between 25 and 50 m but was much weaker over the continental slope and shelf.. The salinity generally ranged between 36.5 and 38 although a low salinity water mass was observed between 100–200 m near the continental margin. This may reflect low temperature water sinking to the same low salinity water mass observed to the west and further diluting the salinity to ~35, a decrease of ~2 units. Patches of low salinity water were also seen at the surface over the shelf and at about 200 km offshore. These various low salinity observations may all be linked to the recent floods in Pakistan and resulting peak in fresh water outflow through the Indus. This area is of particular interest with reference to the oxygen minimum zone in the Pakistan waters. The oxygen concentrations over the shelf were less than 4 ml L^{-1} and on the bottom it was below 3 ml L^{-1}. Low oxygen (<1 ml L^{-1}) was observed below 65–100 m. The DCM was observed at 40–50 m in the offshelf area. However, over the shelf productivity was very high at the surface corresponding to the slug of low temperature, low salinity water perhaps linked to the influx of floodwaters entering from the Indus creek system.

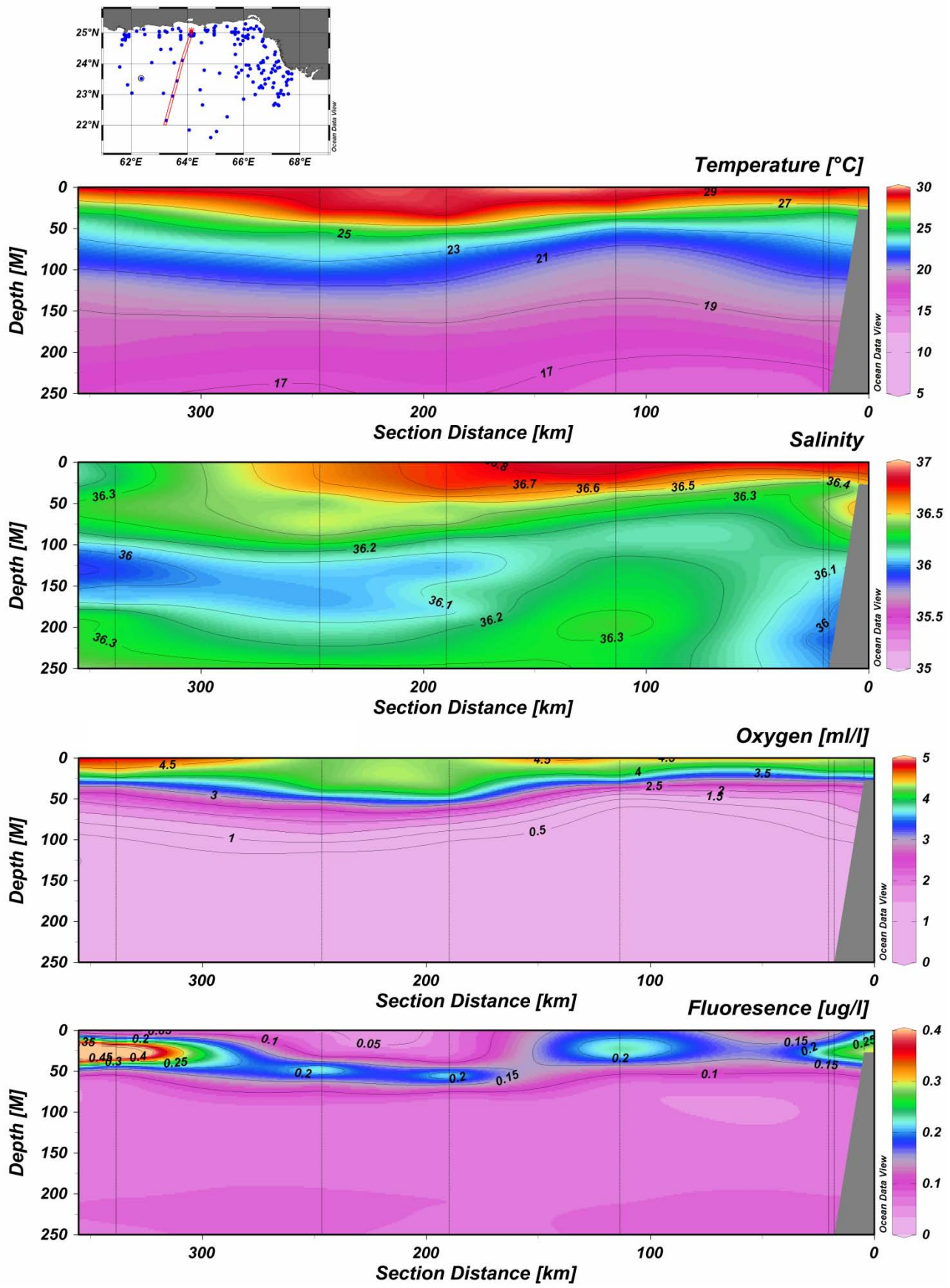

Figure 17: Oceanographic sections west of Murray Ridge (Transect B)

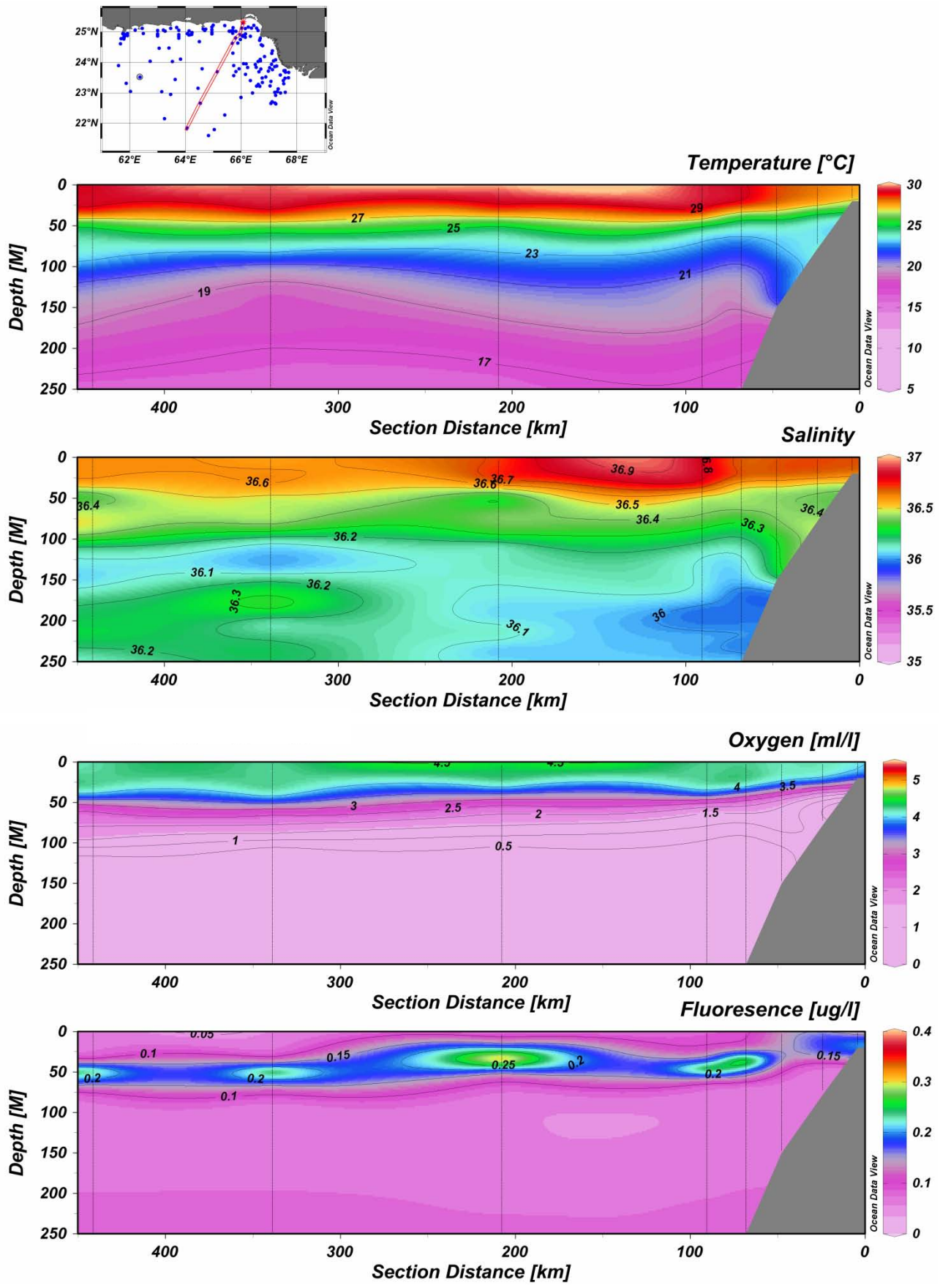

Figure 18: Oceanographic sections east of Murray Ridge (Transect C)

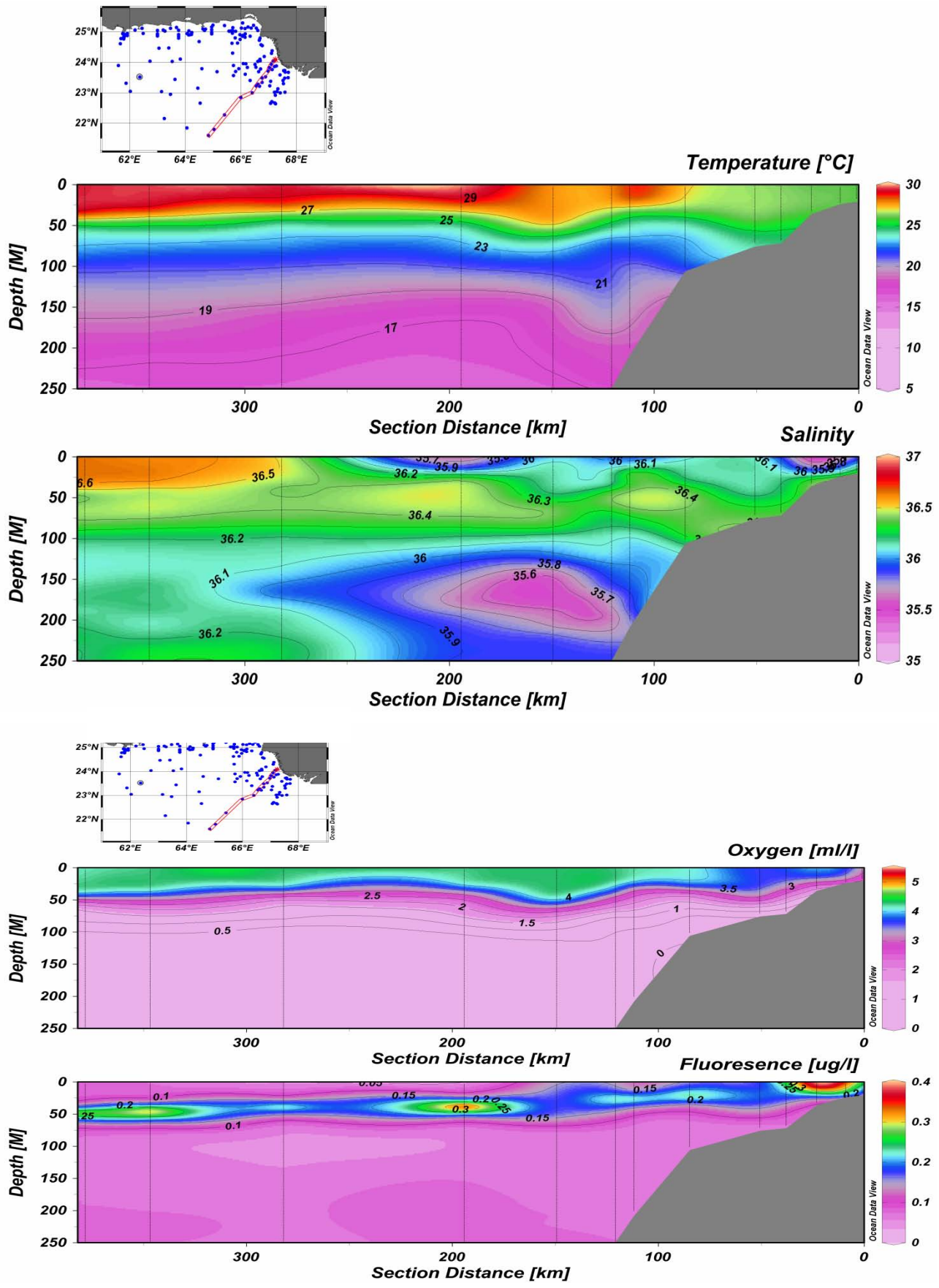

Figure 19: Oceanographic sections off Indus (Transect D)

6. MULTIBEAM BATHYMETRY

Multibeam bathymetry data were collected whenever the water depth was less than approximately 1 400 m throughout both surveys using the Kongsberg EM710 echosounder. When depths exceeded 1 400 m, the single beam bottom track was recorded from the ER60. In addition to the tracks covered during the course of the fisheries survey operations, there were two blocks of dedicated bottom surveying using the multibeam system one block on each survey leg.

During the pelagic survey (2010408), the pre-selected block west of the Murray Ridge was found to be almost entirely below 1 400 m, the effective depth limit for data quality reasons. An alternative area on the central seamounts of the Murray Ridge was selected and surveyed.

On the demersal survey, the selected area was surveyed although the shallow water meant the swath width was quite narrow and because of time constraints the survey was only able to cover a relatively small area. Effort was concentrated on the central canyon and high relief portions of the block.

Post-processing using OLEX removed spurious data and provided both shaded 3D and contoured visualization of the multibeam data. Sample OLEX results for the Indus Swatch area are shown in 3D and contoured format in Figure 20 left and right respectively.

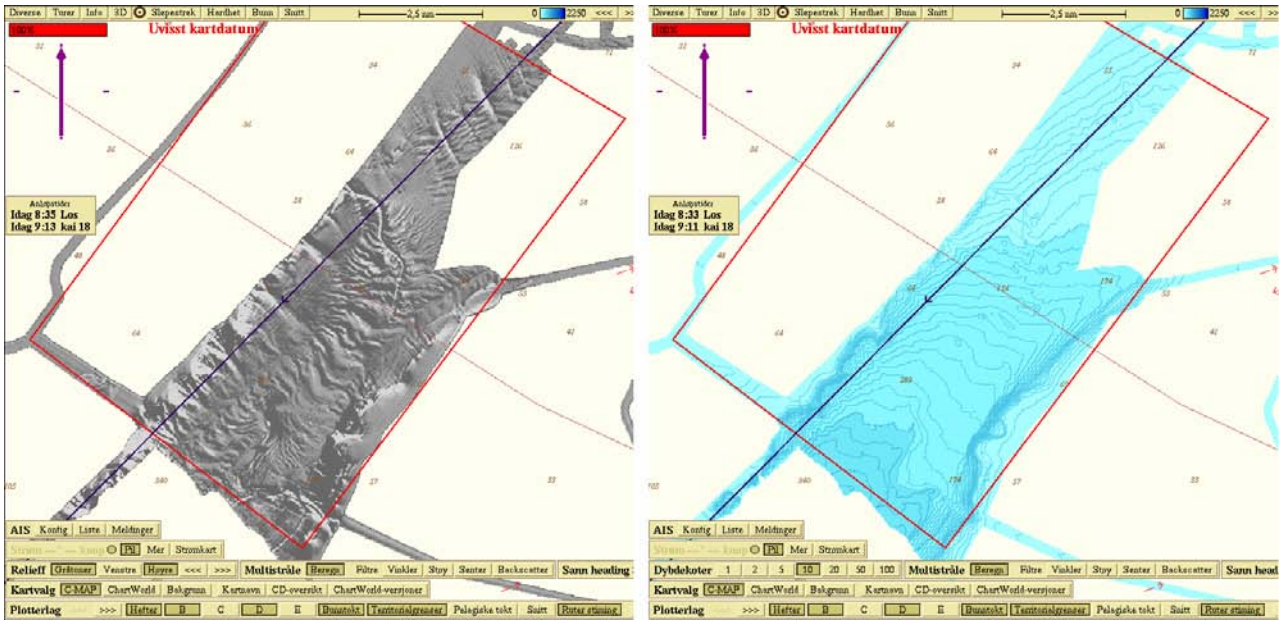

Figure 20: OLEX visualizations of multibeam survey of the Swatch in shaded 3D (left) and contours (right)

The resulting XYZ dataset (ASCII format file of longitude, latitude and depth) is over 800 Gb in compressed format. These data are held at the NIO National Oceanographic Data Centre. Incorporation of these data with pre-existing multibeam survey data will extend the overall bathymetric coverage of Pakistan's shelf.

7. REFERENCES

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ANNEX 1

Instruments and fishing gear used

Echosounder

The Simrad ER60 scientific sounder was run during the survey for acoustic recordings. The technical specifications and operational settings of the echosounder used during the survey are given in Table 1a. Acoustic data were logged and post-processed using version 1.3.2 of the Large Scale Survey System (LSSS) post-processing software. These were based on the last standard sphere calibrations, carried out on 7 March 2010 in Baia dos Elefantes, using Cu-64, Cu-60, WC-38.1 and WC-38.1 spheres for 18, 38, 120 and 200 kHz, respectively.

Table 1a: Echosounder parameters in effect during both the pelagic and demersal surveys

Frequency (kHz)	18	38	120	200
Parameter				
Transducer depth (m)	5.5	5.5	5.5	5.5
Absorption (dB/km)	2.15	8.39	44.55	68.11
Pulse length (ms)	1.024	1.024	1.024	1.024
Bandwidth (Hz)	1574	2425	3026	3088
Transmit power (W)	2000	2000	250	150
2-way beam angle (dB)	–17.0	–20.6	–20.8	–20.7
Gain (dB)	23.13	25.99	25.00	25.38
Sa correction (dB)	–0.70	–0.59	–0.31	–0.24
Angle sensitivity (alongship/athwartship)	13.90/13.90	21.9/21.9	21.0/21.0	23.0/23.0
3dB beamwidth (°) (alongship/athwartship)	10.55/10.50	6.74/6.77	7.37/7.46	6.15/6.27
Alongship angle (°) (alongship/athwartship)	0.14/0.01	0.13/0.04	–0.08/0.00	0.14/0.01

Acoustic target strength (TS) regressions used

The source citations of TS at length relations for species and groups of interest are given in Table 1b and the individual regressions were averaged to estimate TS for each morphological group as listed in Table 1c.

Table 1b: Sources of published estimates of acoustic target strength used

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12 **Kang, D.** 2004. Target strength estimation of black porgy *Acanthopagrus schlegeli* using acoustic measurements and a scattering model. *Fisheries Science 70*: 819-828.

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16 **Lucifredi, I. & Stein, P.J.** 2007. Gray whale target strength measurements and the analysis of the backscattered response. *Journal of the Acoustical Society of America 121* (*3*): 1383-1391.

18 **Macaulay, G.J.** 2004. The acoustic response of orange roughy and associated species from numerical models. Final Research Report to the Ministry of Fisheries Project ORH2001/01 Objective 3. 11 p.

17 **Macaulay, G.J., Hart, A.C., Grimes, P., Diggles B. & Bull, B.** 2002. *Target strength estimates of hoki and associated species*. Final Research Report for Ministry of Fisheries Research Project HOK2000/03 Objective 3. 38 pp.

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26 **Zwolinski, J., Morais, A., Marques, V., Stratoudakis, Y. & Fernandes, P. G.** 2007. *Diel variation in the vertical distribution and schooling behaviour of sardine (Sardina pilchardus) off Portugal*. ICES J. Mar. Sci. 64:963-972.

Table 1c: Acoustic target strength regressions used to estimate mean TS

Swim-bladder	Shape	Species group	Species	intercept	slope	mean len	mean wt	mean TS	Source
no	chond	Shark/Rays	Chondrichthians	-77	20				6
no	crust	Crabs	Ovalipes catharus	-70.3	9.45				20
no	crust	Shrimps/prawns	Euphausia superba					-85	10
no	jelly	jellies	Aequorea aequorea				60	-66.3	3
no	jelly	jellies	Aurelia auratus			15		-63.2	4
no	mammal	Grey whale	Eschrichtius robustus			16 m		-8	16
no	mammal	Sperm whale	Physeter catodon			20 m		-8	16
no	perch	silver promfret	Pampus argenteus	-69	20				19
no	perch		no swimbladder	~~-84.9~~	~~20~~				8
no	perch		no swimbladder	-77	20				5
no	squid		Squid-like	-75.4	20				2
no	squid		Squid-like	-77.8	20				1
no	tapered	Cutlassfish	Lepidopus caudatus	-93.1	30.6				17
no	tapered	Hairtail	Trichiurus haumela	-68.3	20	89.8mm		-49.2	25
no	tuna	atlantic mackerel	Scomber scombrus	-71	20				19
no	tuna	chub mackerel	Scomber japonicus	-60	20				19
no	tuna	spotted mackerel	Scomber australasicus	-59	20				19
yes	eel	basketwork eel	Diastobranchus capensis	-76.7	23.3				5
yes	elongate	Anchovies	Eagraulis capensis	-76.1	20				22
yes	elongate	anchovy	Anchoa mitchilli	-63.5	20				19
yes	elongate	capelin	Mallotus villosus	-77.1	23.3	5.1		-61	21
yes	elongate	silverside	Menidia menidia	-64.5	20				19
yes	elongate	Southern blue whiting	Micromesistius poutassou	-97	38				7
yes	myctophid	Myctophid	Lampanyctodes hectoris	-70.2	20	62.1mm		-54.3	23
yes	myctophid	Myctophid	Lampanyctodes hectoris	-73.1	20	73.3mm		-55.8	23
no	myctophid	Myctophids	Stenobrachius luecopsarus	-64.1	32.1				24
yes	perch	atlantic cod	Gadus morhua	-61	20				19
yes	perch	belenger's jewfish	Johnius belengerii	-62	20				19
yes	perch	black oreo	Allocyttus niger	-78.1	25.2				5
yes	perch	black scraper	Thamnaconus modestus	-63	20				19
yes	perch	Boops lineatus	Sebastes schelegelii	-67.7	20				14
yes	perch	Breams/Trevallies	Acanthopagrus schlegeli	-64.6	20				12
yes	perch	brown croaker	Miichthys miiuy	-61	20				19
yes	perch	crappie	Pomoxis nigromaculatus	-65	20				19
yes	perch	Gadoids	Gadoids	-67.5	20				9
yes	perch	goldfish	Carassius auratus	-67	20				19
yes	perch	japanese butterfish	Psenopsis anomala	-62	20				19
yes	perch	Johnson's cod	Halargyreus johnsonii	-74	24.7				5
yes	perch	kandari	Collichthys lucidus	-63	20				19
yes	perch	killfish	Fundulus majalis	-62	20				19
yes	perch	mummichog	Fundulus heteroclitus	-61.5	20				19
yes	perch	pollack	Pollachius pollachius	-61	20				19
yes	perch	Ribaldo	Mora moro	-66.7	21.7				5
yes	perch	Robust cardinalfish	Epigonus robustus	-70	23.2				5
yes	perch	saithe	Pollachius virens	-60	20				19
yes	perch	sea trout	Cynoscion nebulosus	-66	20				19
yes	perch	Smooth oreo	Pseudocyttus maculates	-82.2	24.6				5
yes	perch	whitefin crevalle	Kaiwarinus equula	-65	20				19
yes	perch	yellow sea bream	Dentex tumifrons	-62	20				19
yes	perch		Physostomous	-71.9	20				9
yes	perch		Physoclistous	-67.4	20				9
yes	perch		cod-like	-67.5	20				5
yes	perch		deep water swimbladdered	-79.4	20				5
yes	tapered	black javelinfish	Mesobius antipodum	-70.6	17.8				5
yes	tapered	four-rayed rattail	Coryphaenoides subserrulatus	-92.5	31.8				5
yes	tapered	hoki	Macruronus novaezelandiae	-74	18				5
yes	tapered	javelinfish	Lepidorhynchus denticulatus	-73.5	20				5
yes	tapered	Notable rattail	Coelorinchus innotabilis	-107.8	44.9				5
yes	tapered	Ridge scaled rattail	Macrourus carinatus	-95.5	35.6				5
yes	tapered	Serrulate rattail	Coryphaenoides serrulatus	-135	59.7				5
yes	tapered	White rattail	Trachyrincus aphyodes	-62.1	18.1				5
yes	tapered	Catfish	Genypterus blacodes	-68.5	20.6				18
yes	tuna	Clupeids	Clupeids	-71.2	20				13
yes	tuna	herring	Clupea harengus	-64	20				19
yes	tuna	horse mackerel	Trachurus trachurus	-67	20				19
yes	tuna	Sardines	Sardinella pilchardus	-72.6	20				26
yes	tuna	shrimp scad	Trachurus symmetricus	-68.91	20				15
yes	tuna	sprat	Sprattus sprattus	-64	20				19
yes	tuna	yellowfin horse mackerel	Trachurus japonicus	-61	20				19
yes	tuna	yellowtail	Seriola quinqueradiata	-60	20				19

Fishing gear

The vessel has two different sized pelagic trawls, the smaller “Harsadtrawl” (Figure 1a) and the larger "Åkrahamn" (Figure 1b) and the "Super Gisund” bottom trawl (Figure 1c).

The bottom trawl has a headline of 31 m, footrope 47 m and 20 mm mesh size in the codend with an inner net of 10 mm mesh size. The trawl height was about 4.5 m and distance between wings during towing about 21 m. The sweeps are 40 m long. The trawl is equipped with a 12" rubber bobbins gear. Since 2008, the newer and heavier “Thyborøn” combi trawl doors (7.41 m^2, 1720 kg) have been used for all three trawls. During the demersal survey, the door distance was kept nearly constant at about 50 m at all depths by the use of a 9 m strap between the wires at 120 m distance from the doors.

The SCANMAR system was used on all trawl hauls. This equipment consists of sensors, a hydrophone, a receiver, a display unit and a battery charger. Communication between sensors and ship is based on acoustic transmission. The doors are fitted with sensors to provide information on their distance, and the trawl was equipped with a trawl eye that provides information about the trawl opening. A catch sensor on the cod-end indicated the size of the catch.

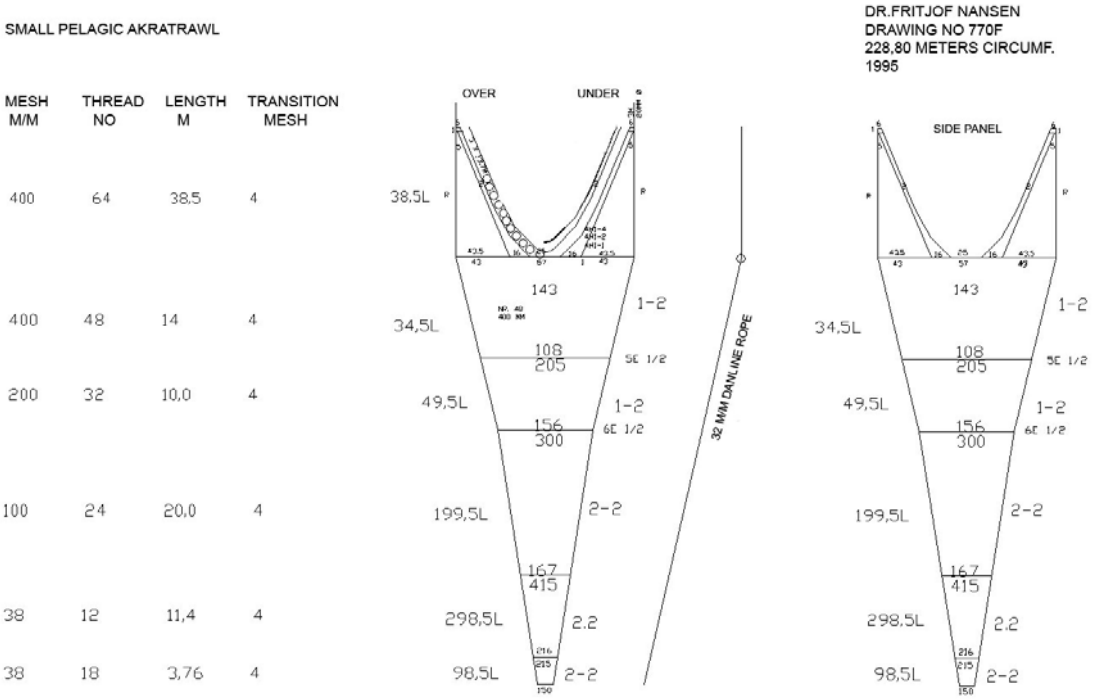

Figure 1a: Small Pelagic Harsadtrawl drawings and measurements.

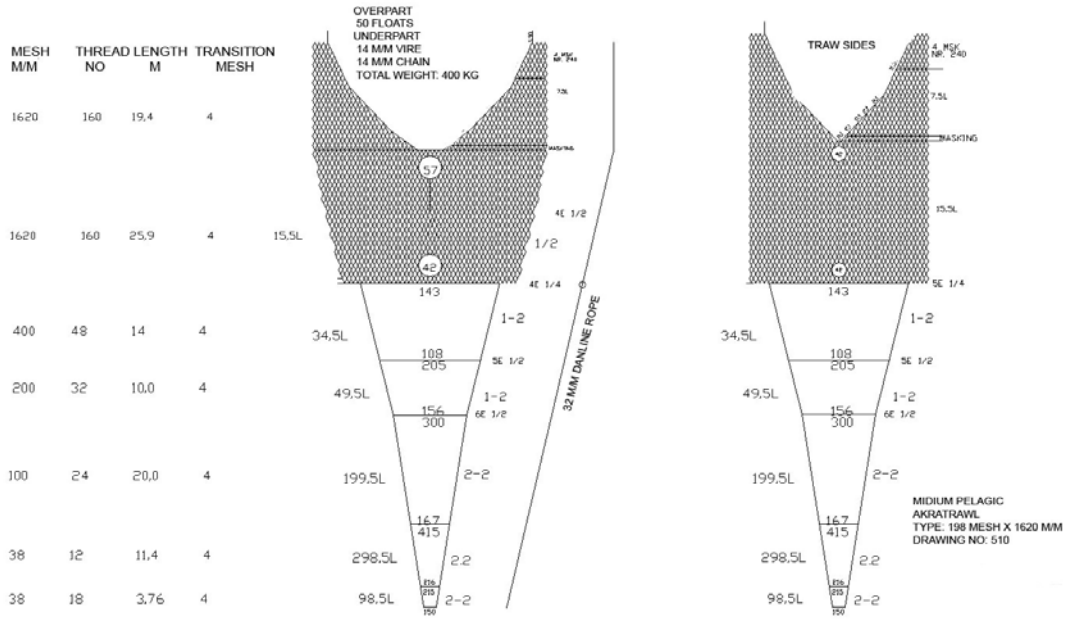

Figure 1b: Medium pelagic Åkrahamntrawl's drawings and measurements

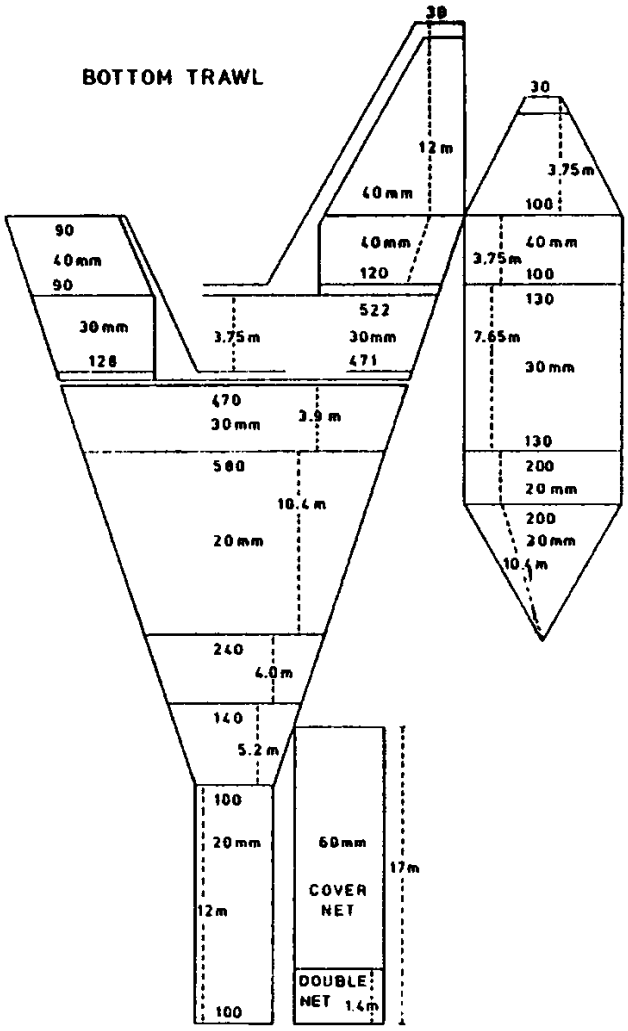

Figure 1c: Super Gisund bottom trawl drawings and measurements

ANNEX 2

Records of pelagic fishing stations

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 1
DATE :13.10.2010 GEAR TYPE: PT NO: 4 POSITION:Lat N 24°32.12
start stop duration Lon E 66°43.90
TIME :05:36:41 06:07:14 30.6 (min) Purpose : 1
LOG : 8095.33 8097.10 1.8 Region : 9124
FDEPTH: 15 15 Gear cond.: 0
BDEPTH: 62 56 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.5 kn
Sorted : 0 Total catch: 19.53 Catch/hour: 38.36

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
J E L L Y F I S H	37.12	6187	96.76	
Uroteuthis duvaucelii	1.11	14	2.89	5
Tentoriceps cristatus	0.09	4	0.25	6
Ancistrocheirus sp.	0.03	2	0.08	7
SYNGNATHIDAE	0.00	2	0.01	55
Fistularia sp.	0.00	2	0.01	280
Total	38.36		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 2
DATE :13.10.2010 GEAR TYPE: PT NO: 1 POSITION:Lat N 24°31.82
start stop duration Lon E 66°43.08
TIME :07:27:56 07:57:52 29.9 (min) Purpose : 1
LOG : 8103.27 8105.10 1.8 Region : 9124
FDEPTH: 40 45 Gear cond.: 0
BDEPTH: 64 59 Validity : 0
Towing dir: 0° Wire out : 130 m Speed : 3.7 kn
Sorted : 0 Total catch: 3.64 Catch/hour: 7.30

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
J E L L Y F I S H	6.41	1068	87.86	
Sepiella sp.	0.80	22	10.98	9
Leptocephalus	0.06	40	0.77	
Tentoriceps cristatus	0.01	6	0.19	284
SYNGNATHIDAE	0.01	2	0.08	84
Decapterus sp.	0.00	16	0.05	
Laeops sp.	0.00	2	0.05	8
Total	7.30		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 3
DATE :13.10.2010 GEAR TYPE: PT NO: 1 POSITION:Lat N 23°57.66
start stop duration Lon E 66°31.65
TIME :19:58:41 20:27:58 29.3 (min) Purpose : 1
LOG : 8218.73 8220.38 1.7 Region : 9124
FDEPTH: 35 40 Gear cond.: 0
BDEPTH: 95 98 Validity : 0
Towing dir: 0° Wire out : 90 m Speed : 3.4 kn
Sorted : 0 Total catch: 18.28 Catch/hour: 37.44

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Lagocephalus spadiceus	15.88	195	42.40	10
J E L L Y F I S H	13.32	2219	35.56	
Echeneis naucrates	2.27	2	6.06	63
Champsodon sp.	1.64	955	4.38	11
Bregmaceros sp.	1.32	940	3.52	3
Saurida undosquamis	0.82	37	2.19	12
SNAKE	0.78	6	2.08	
Scylla serrata	0.63	2	1.69	
Synagrops adeni	0.51	677	1.37	4
Cubiceps whiteleggii	0.10	100	0.27	286
Ancistrocheirus sp.	0.08	4	0.22	287
Cyclichthys spilostylus	0.07	2	0.18	285
Leptocephalus	0.03	29	0.08	
Total	37.44		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 4
DATE :13.10.2010 GEAR TYPE: PT NO: 1 POSITION:Lat N 24°3.75
start stop duration Lon E 66°37.92
TIME :22:42:03 23:12:16 30.2 (min) Purpose : 1
LOG : 8233.72 8235.53 1.8 Region : 9124
FDEPTH: 35 35 Gear cond.: 0
BDEPTH: 88 90 Validity : 0
Towing dir: 0° Wire out : 90 m Speed : 3.6 kn
Sorted : 0 Total catch: 2.18 Catch/hour: 4.33

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
J E L L Y F I S H	1.88	314	43.43	
Bregmaceros sp.	1.02	909	23.64	17
Lepturacanthus savala	0.90	14	20.66	85
Champsodon sp.	0.25	161	5.77	16
Lagocephalus spadiceus	0.13	2	2.98	13
Ancistrocheirus sp.	0.08	2	1.79	18
Saurida undosquamis	0.05	2	1.19	14
Cociella crocodilus	0.02	4	0.55	15
Total	4.33		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 5
DATE :14.10.2010 GEAR TYPE: PT NO: 4 POSITION:Lat N 24°7.83
start stop duration Lon E 66°42.17
TIME :00:41:27 01:10:44 29.3 (min) Purpose : 1
LOG : 8245.42 8247.05 1.6 Region : 9124
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 65 67 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.3 kn
Sorted : 0 Total catch: 3.59 Catch/hour: 7.35

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
SNAKE	2.34	23	31.76	
J E L L Y F I S H	2.21	369	30.09	
Echeneis naucrates	1.19	4	16.16	288
Tentoriceps cristatus	0.77	2	10.45	
Lagocephalus spadiceus	0.45	4	6.13	
Uroteuthis duvaucelii	0.16	14	2.15	22
Bregmaceros sp.	0.12	92	1.62	19
Cyclichthys spilostylus	0.05	2	0.70	196
Saurida undosquamis	0.03	2	0.39	20
Synagrops adeni	0.02	49	0.33	178
Champsodon sp.	0.01	2	0.14	54
Gnathanodon speciosus	0.01	2	0.08	21
Total	7.35		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 6
DATE :14.10.2010 GEAR TYPE: PT NO: 7 POSITION:Lat N 24°20.75
start stop duration Lon E 67°7.01
TIME :05:53:57 06:24:54 31.0 (min) Purpose : 1

LOG : 8288.71 8290.52 1.8 Region : 9124
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 20 20 Validity : 0
Towing dir: 0° Wire out : 100 m Speed : 3.5 kn
Sorted : 0 Total catch: 12.75 Catch/hour: 24.72

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
J E L L Y F I S H	9.79	1632	39.61	
Rastrelliger kanagurta	7.37	541	29.81	27
Scomberomorus commerson	4.36	2	17.65	23
Sardinella sp.	2.24	173	9.08	26
Decapterus russelli	0.41	273	1.66	
Stolephorus sp.	0.28	56	1.14	28
Epinephelus diacanthus	0.10	37	0.41	29
Sepiella sp.	0.09	2	0.35	30
Sepiella inermis	0.06	2	0.25	25
Decapterus macarellus	0.01	2	0.05	24
Total	24.72		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 7
DATE :14.10.2010 GEAR TYPE: PT NO: 1 POSITION:Lat N 23°25.02
start stop duration Lon E 66°20.18
TIME :14:55:22 15:23:53 28.5 (min) Purpose : 1
LOG : 8369.77 8371.41 1.6 Region : 9124
FDEPTH: 45 45 Gear cond.: 0
BDEPTH: 339 302 Validity : 0
Towing dir: 0° Wire out : 100 m Speed : 3.5 kn
Sorted : 0 Total catch: 8.25 Catch/hour: 17.35

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Benthosema fibulatum	6.73	7285	38.81	282
J E L L Y F I S H	6.63	48	38.20	
Cubiceps whiteleggii	1.40	114	8.09	36
Neoepinnula orientalis	1.05	149	6.04	31
Synagrops adeni	0.49	80	2.84	175
Selar crumenophthalmus	0.36	2	2.06	33
SNAKE	0.36	4	2.06	
Bregmaceros sp.	0.17	210	0.96	35
Ancistrocheirus sp.	0.09	4	0.51	34
Champsodon sp.	0.05	13	0.29	32
Leptocephalus	0.03	29	0.15	
Total	17.35		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 8
DATE :14.10.2010 GEAR TYPE: PT NO: 1 POSITION:Lat N 23°15.39
start stop duration Lon E 66°34.76
TIME :18:32:41 19:02:17 29.6 (min) Purpose : 1
LOG : 8399.09 8400.74 1.7 Region : 9124
FDEPTH: 145 150 Gear cond.: 0
BDEPTH: 261 224 Validity : 0
Towing dir: 0° Wire out : 362 m Speed : 3.3 kn
Sorted : 0 Total catch: 3.17 Catch/hour: 6.42

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
J E L L Y F I S H	3.14	300	48.96	
Synagrops adeni	0.72	140	11.28	176
Champsodon sp.	0.72	126	11.24	37
Neoepinnula orientalis	0.43	4	6.63	39
Solenocera sp.	0.42	180	6.51	
Harpadon nehereus	0.42	20	6.48	262
Bregmaceros sp.	0.29	180	4.45	40
Benthosema fibulatum	0.20	302	3.19	281
Cubiceps whiteleggii	0.08	18	1.26	38
Total	6.42		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 9
DATE :14.10.2010 GEAR TYPE: PT NO: 1 POSITION:Lat N 23°33.35
start stop duration Lon E 66°54.49
TIME :22:09:54 22:40:27 30.5 (min) Purpose : 1
LOG : 8426.14 8427.89 1.8 Region : 9124
FDEPTH: 50 65 Gear cond.: 0
BDEPTH: 95 97 Validity : 0
Towing dir: 0° Wire out : 165 m Speed : 3.4 kn
Sorted : 0 Total catch: 7.25 Catch/hour: 14.24

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
J E L L Y F I S H	7.39	1231	51.88	
Nemipterus randalli	1.04	24	7.31	41
Champsodon sp.	0.84	165	5.88	48
Bregmaceros sp.	0.84	759	5.88	44
Sepia latimanus	0.83	14	5.86	52
Sorsogna tuberculata	0.73	53	5.12	49
Acropoma japonicum	0.65	53	4.57	47
Sepia kobiensis	0.60	8	4.22	51
Saurida undosquamis	0.47	26	3.31	46
SNAKE	0.21	2	1.48	
Uranscopus marmoratus	0.18	2	1.24	50
Lepturacanthus savala	0.14	4	0.99	42
Lagocephalus spadiceus	0.09	2	0.62	43
Cyclichthys spilostylus	0.07	2	0.52	197
CONGER SP	0.06	2	0.40	45
Solenocera choprai	0.04	6	0.28	
Minous monodactylus	0.04	2	0.26	297
Solenocera hextii	0.01	8	0.10	
Cubiceps whiteleggii	0.01	14	0.07	53
Total	14.24		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 10
DATE :15.10.2010 GEAR TYPE: PT NO: 7 POSITION:Lat N 23°45.83
start stop duration Lon E 67°33.02
TIME :05:03:39 05:33:11 29.5 (min) Purpose : 1
LOG : 8487.32 8488.83 1.5 Region : 9124
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 28 53 Validity : 0
Towing dir: 0° Wire out : 85 m Speed : 3.1 kn
Sorted : 0 Total catch: 102.03 Catch/hour: 207.31

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
J E L L Y F I S H	203.18	33864	98.01	
Loligo sp.	1.45	966	0.70	59
Pterois russelii	1.44	12	0.70	62
Lepturacanthus savala	0.83	134	0.40	86
Sepiella sp.	0.22	16	0.11	60
Gazza minuta	0.07	12	0.03	56
Sepiella inermis	0.05	2	0.02	61
Laeops sp.	0.02	6	0.01	2
Squilla sp.	0.02	6	0.01	
Decapterus russelli	0.01	14	0.01	57
Saurida tumbil	0.01	6	0.00	58
Rastrelliger kanagurta	0.00	2	0.00	
Total	207.31		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 11
DATE :15.10.2010 GEAR TYPE: PT NO: 7 POSITION:Lat N 23°2.48
start stop duration Lon E 67°35.79
TIME :20:44:05 21:14:12 30.1 (min) Purpose : 1
LOG : 8629.55 8631.08 1.5 Region : 9124
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 29 30 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.1 kn
Sorted : 0 Total catch: 6.79 Catch/hour: 13.52

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
J E L L Y F I S H	7.86	1311	58.19	
Saurida undosquamis	2.30	60	17.01	67
Uroteuthis duvaucelii	1.73	129	12.79	66
Decapterus russelli	1.17	663	8.67	64
Sphyraena putnamae	0.07	18	0.55	70
Lepturacanthus savala	0.07	20	0.55	69
Parastromateus niger	0.06	10	0.47	77
Bregmaceros sp.	0.06	98	0.44	68
Sepiella inermis	0.06	2	0.44	72
Gazza minuta	0.04	8	0.27	78
Sepiella sp.	0.03	2	0.25	73
Laeops sp.	0.02	2	0.15	74
Rachycentron canadum	0.02	2	0.12	65
Nemipterus randalli	0.01	10	0.04	71
Portunus sanguinolentus	0.01	2	0.04	75
Charybdis feriata	0.00	2	0.03	76
Total	13.52		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 12
DATE :16.10.2010 GEAR TYPE: PT NO: 1 POSITION:Lat N 22°39.21
start stop duration Lon E 67°11.02
TIME :00:59:28 01:20:34 21.1 (min) Purpose : 1
LOG : 8664.25 8665.58 1.3 Region : 9124
FDEPTH: 43 55 Gear cond.: 0
BDEPTH: 229 173 Validity : 0
Towing dir: 0° Wire out : 160 m Speed : 3.8 kn
Sorted : 0 Total catch: 203.30 Catch/hour: 578.10

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Benthosema fibulatum	578.10	477165	100.00	80
Total	578.10		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 13
DATE :16.10.2010 GEAR TYPE: PT NO: 2 POSITION:Lat N 21°46.58
start stop duration Lon E 66°30.72
TIME :08:56:25 09:26:30 30.1 (min) Purpose : 1
LOG : 8734.84 8736.37 1.5 Region : 9125
FDEPTH: 380 273 Gear cond.: 0
BDEPTH: 2133 2153 Validity : 0
Towing dir: 0° Wire out : 620 m Speed : 3.0 kn
Sorted : 0 Total catch: 5.23 Catch/hour: 10.44

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Benthosema fibulatum	8.58	10070	82.19	79
Heterocarpus sp.	1.78	4	17.01	
Leptocephalus	0.05	26	0.44	
GONOSTOMATIDAE	0.04	88	0.36	81
Total	10.44		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 14
DATE :18.10.2010 GEAR TYPE: PT NO: 1 POSITION:Lat N 21°56.57
start stop duration Lon E 65°8.59
TIME :09:46:52 10:06:33 19.7 (min) Purpose : 1
LOG : 9121.07 9122.06 1.0 Region : 9125
FDEPTH: 315 314 Gear cond.: 0
BDEPTH: 2800 2823 Validity : 0
Towing dir: 0° Wire out : 0 m Speed : 3.0 kn
Sorted : 0 Total catch: 0.89 Catch/hour: 2.70

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
J E L L Y F I S H	1.10	183	40.63	
GONOSTOMATIDAE	1.05	2964	38.94	83
Benthosema fibulatum	0.49	457	18.06	82
Leptocephalus	0.06	24	2.37	
Total	2.70		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 15
DATE :19.10.2010 GEAR TYPE: PT NO: 2 POSITION:Lat N 22°28.18
start stop duration Lon E 63°9.40
TIME :15:02:07 15:23:11 21.1 (min) Purpose : 1
LOG : 9290.92 9292.33 1.4 Region : 9123
FDEPTH: 48 44 Gear cond.: 0
BDEPTH: 2424 2721 Validity : 0
Towing dir: 0° Wire out : 85 m Speed : 4.0 kn
Sorted : 0 Total catch: 27.01 Catch/hour: 76.95

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Benthosema fibulatum	39.72	33324	51.61	97
Ancistrocheirus sp.	16.24	26	21.10	95
Benthosema pterotum	9.06	5278	11.77	96
Cubiceps whiteleggii	4.42	197	5.74	88
Charybdis sp.	3.38	88	4.39	
Neoepinnula orientalis	1.57	91	2.04	87
OMMASTREPHIDAE	0.64	6	0.83	94
Bregmaceros sp.	0.57	256	0.74	90
Leptocephalus	0.54	313	0.70	
Abralia sp.	0.43	251	0.56	93
GONOSTOMATIDAE	0.23	416	0.30	89
ASTRONESTHIDAE	0.08	20	0.10	91
Loligo sp.	0.06	26	0.07	
PARALEPIDIDAE	0.03	6	0.04	92
Total	76.95		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 16
DATE :19.10.2010 GEAR TYPE: PT NO: 1 POSITION:Lat N 23°2.52
start stop duration Lon E 63°7.04
TIME :20:10:15 20:30:14 20.0 (min) Purpose : 1
LOG : 9335.29 9336.29 1.0 Region : 9123
FDEPTH: 220 216 Gear cond.: 0
BDEPTH: 2852 2853 Validity : 0
Towing dir: 0° Wire out : 460 m Speed : 3.0 kn
Sorted : 0 Total catch: 2.46 Catch/hour: 7.39

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
OMMASTREPHIDAE	2.08	3	28.19	105
Benthosema fibulatum	2.01	670	27.17	107
Charybdis sp.	1.66	33	22.50	
Gavaliceps taeniola	0.38	18	5.12	125
Harpadon nehereus	0.31	30	4.18	263
Bregmaceros sp.	0.25	327	3.37	99
STERNOPTYCHIDAE	0.22	18	2.97	101
Neoepinnula orientalis	0.14	9	1.87	103
Sergestes sp.	0.10	150	1.38	
Benthosema pterotum	0.07	18	0.89	100
GONOSTOMATIDAE	0.06	213	0.77	137
Leptocephalus	0.04	18	0.53	
Synagrops adeni	0.03	3	0.37	177
Champsodon sp.	0.02	9	0.28	104
Abralia sp.	0.02	12	0.28	102
CHAULIODONTIDAE	0.01	9	0.08	98
DIRETMIDAE	0.00	3	0.04	106
Total	7.39		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 17
DATE :20.10.2010 GEAR TYPE: PT NO: 1 POSITION:Lat N 22°41.55
start stop duration Lon E 64°23.97
TIME :15:34:00 15:49:00 15.0 (min) Purpose : 1
LOG : 9495.80 9496.60 0.8 Region : 9123
FDEPTH: 45 45 Gear cond.: 0
BDEPTH: 1820 1967 Validity : 0
Towing dir: 0° Wire out : 100 m Speed : 3.2 kn
Sorted : 0 Total catch: 17.97 Catch/hour: 71.89

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Benthosema fibulatum	30.81	28458	42.85	114
Benthosema pterotum	17.75	19256	24.69	115
Auxis rochei	9.84	56	13.68	108
OMMASTREPHIDAE	5.44	44	7.57	111
Cubiceps whiteleggii	2.97	212	4.13	110
Charybdis sp.	2.18	68	3.03	
J E L L Y F I S H	1.73	288	2.40	
GONOSTOMATIDAE	0.64	2640	0.90	113
Leptocephalus	0.39	212	0.55	
Neoepinnula orientalis	0.09	24	0.13	109
Ancistrocheirus sp.	0.03	16	0.04	112
SYNGNATHIDAE	0.02	4	0.03	
Total	71.89		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 18
DATE :20.10.2010 GEAR TYPE: PT NO: 1 POSITION:Lat N 23°7.52
start stop duration Lon E 64°27.28
TIME :22:08:43 22:28:52 20.2 (min) Purpose : 1
LOG : 9531.80 9532.87 1.1 Region : 9123
FDEPTH: 300 300 Gear cond.: 0
BDEPTH: 3073 3049 Validity : 0
Towing dir: 0° Wire out : 670 m Speed : 3.2 kn
Sorted : 0 Total catch: 0.87 Catch/hour: 2.58

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Benthosema fibulatum	1.23	2055	47.75	116
J E L L Y F I S H	0.72	120	27.91	
Neoepinnula orientalis	0.11	9	4.38	118
Bregmaceros sp.	0.11	140	4.38	117
Benthosema pterotum	0.11	21	4.15	121
GONOSTOMATIDAE	0.10	152	3.69	122
Charybdis sp.	0.10	3	3.69	
Leptocephalus	0.04	24	1.38	
Cubiceps whiteleggii	0.04	3	1.38	119
OMMASTREPHIDAE	0.03	12	1.04	120
Harpadon nehereus	0.01	3	0.23	264
Total	2.58		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 19
DATE :21.10.2010 GEAR TYPE: PT NO: 1 POSITION:Lat N 23°49.48
start stop duration Lon E 64°29.54
TIME :04:24:07 04:43:41 19.6 (min) Purpose : 1
LOG : 9585.06 9586.22 1.2 Region : 9123
FDEPTH: 43 45 Gear cond.: 0
BDEPTH: 2125 2103 Validity : 0
Towing dir: 0° Wire out : 85 m Speed : 3.6 kn
Sorted : 0 Total catch: 1.11 Catch/hour: 3.40

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Charybdis sp.	3.37	110	99.10	123
Cubiceps whiteleggii	0.03	3	0.90	124
Total	3.40		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 20
DATE :21.10.2010 GEAR TYPE: PT NO: 1 POSITION:Lat N 23°48.73
start stop duration Lon E 64°33.60
TIME :05:23:14 05:43:53 20.6 (min) Purpose : 1
LOG : 9588.82 9589.96 1.1 Region : 9123
FDEPTH: 330 350 Gear cond.: 0
BDEPTH: 2080 2123 Validity : 0
Towing dir: 0° Wire out : 840 m Speed : 3.3 kn
Sorted : 0 Total catch: 0.67 Catch/hour: 1.94

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Charybdis sp.	0.78	26	40.36	129
J E L L Y F I S H	0.55	91	28.10	
GONOSTOMATIDAE	0.53	1558	27.06	128
Benthosema fibulatum	0.05	26	2.39	126
Neoepinnula orientalis	0.02	6	1.05	127
Leptocephalus	0.02	15	1.05	
Total	1.94		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 21
DATE :21.10.2010 GEAR TYPE: PT NO: 1 POSITION:Lat N 23°45.05
start stop duration Lon E 64°50.82
TIME :08:41:12 09:00:41 19.5 (min) Purpose : 1
LOG : 9608.93 9609.96 1.0 Region : 9123
FDEPTH: 390 380 Gear cond.: 0
BDEPTH: 2600 2578 Validity : 0
Towing dir: 0° Wire out : 860 m Speed : 3.2 kn
Sorted : 0 Total catch: 3.94 Catch/hour: 12.14

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Benthosema fibulatum	11.02	21440	90.75	289
Neoepinnula orientalis	0.88	25	7.28	130
J E L L Y F I S H	0.09	15	0.74	
Leptocephalus	0.08	49	0.63	
GONOSTOMATIDAE	0.03	86	0.23	131
Harpadon nehereus	0.02	28	0.20	265
PASIPHAEIDAE	0.01	6	0.10	290
ARISTEIDAE	0.01	9	0.05	133
Bregmaceros sp.	0.00	3	0.03	132
Total	12.14		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 22
DATE :21.10.2010 GEAR TYPE: PT NO: 1 POSITION:Lat N 23°43.84
start stop duration Lon E 64°58.20
TIME :10:31:19 10:50:53 19.6 (min) Purpose : 1
LOG : 9619.28 9620.47 1.2 Region : 9123
FDEPTH: 38 37 Gear cond.: 0
BDEPTH: 2901 3018 Validity : 0
Towing dir: 0° Wire out : 100 m Speed : 3.6 kn
Sorted : 0 Total catch: 0.36 Catch/hour: 1.10

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Champsodon sp.	0.00	3	0.00	136
Cyclichthys spilostylus	0.76	3	0.00	198
GONOSTOMATIDAE	0.01	18	0.00	134
J E L L Y F I S H	0.28	46	0.00	
Benthosema fibulatum	0.04	104	0.00	135
Harpadon nehereus	0.00	3	0.00	266
Leptocephalus	0.01	6	0.00	
Total	1.10		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 23
DATE :21.10.2010 GEAR TYPE: PT NO: 1 POSITION:Lat N 23°34.62
start stop duration Lon E 65°41.71
TIME :17:19:53 17:39:38 19.7 (min) Purpose : 1
LOG : 9660.55 9661.61 1.1 Region : 9123
FDEPTH: 328 302 Gear cond.: 0
BDEPTH: 1261 1259 Validity : 0
Towing dir: 0° Wire out : 710 m Speed : 3.2 kn
Sorted : 0 Total catch: 2.75 Catch/hour: 8.35

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Benthosema fibulatum	4.81	4959	57.55	142
J E L L Y F I S H	1.65	276	19.80	
Benthosema pterotum	1.12	783	13.43	143
Leptocephalus	0.24	125	2.84	
GONOSTOMATIDAE	0.18	462	2.18	139
Bregmaceros sp.	0.13	158	1.60	138
Synagrops adeni	0.07	9	0.87	179
Cubiceps whiteleggii	0.07	3	0.84	141
Champsodon sp.	0.03	15	0.33	140
Neoepinnula orientalis	0.02	6	0.29	291
Harpadon nehereus	0.02	12	0.25	267
Total	8.35		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 24
DATE :21.10.2010 GEAR TYPE: PT NO: 4 POSITION:Lat N 23°52.49
start stop duration Lon E 65°43.60
TIME :20:35:16 20:55:04 19.8 (min) Purpose : 1
LOG : 9681.75 9682.78 1.0 Region : 9123
FDEPTH: 50 50 Gear cond.: 0
BDEPTH: 659 1078 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.1 kn
Sorted : 0 Total catch: 7.53 Catch/hour: 22.83

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Cubiceps whiteleggii	8.62	464	37.76	150
Benthosema fibulatum	8.39	14060	36.76	148
Champsodon sp.	1.50	1128	6.56	146
Benthosema pterotum	1.21	412	5.28	145
J E L L Y F I S H	1.02	170	4.49	
Neoepinnula orientalis	0.51	55	2.23	144
Synagrops adeni	0.49	94	2.14	180
Leptocephalus	0.44	309	1.92	
Bregmaceros sp.	0.31	433	1.37	151
GONOSTOMATIDAE	0.19	769	0.82	158
Abralia sp.	0.13	79	0.56	149
SYNGNATHIDAE	0.03	6	0.12	147
Total	22.83		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 25
DATE :22.10.2010 GEAR TYPE: PT NO: 4 POSITION:Lat N 24°19.47
start stop duration Lon E 65°41.74
TIME :00:30:12 00:42:46 12.6 (min) Purpose : 1
LOG : 9710.67 9711.33 0.7 Region : 9123
FDEPTH: 40 45 Gear cond.: 0
BDEPTH: 930 606 Validity : 0
Towing dir: 0° Wire out : 100 m Speed : 3.1 kn
Sorted : 0 Total catch: 146.06 Catch/hour: 698.28

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Benthosema fibulatum	577.53	659347	82.71	153
Ancistrocheirus sp.	84.62	91	12.12	156
OMMASTREPHIDAE	15.41	65	2.21	157
Neoepinnula orientalis	9.01	1368	1.29	155
Cubiceps whiteleggii	7.69	478	1.10	294
Champsodon sp.	2.04	1368	0.29	152
Synagrops adeni	1.74	347	0.25	181
Bregmaceros sp.	0.17	280	0.02	154
Abralia sp.	0.04	24	0.01	
Leptocephalus	0.02	43	0.00	
Total	698.28		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 26
DATE :22.10.2010 GEAR TYPE: PT NO: 1 POSITION:Lat N 24°35.53
start stop duration Lon E 65°40.53
TIME :06:01:30 06:24:30 23.0 (min) Purpose : 1
LOG : 9735.26 9736.49 1.2 Region : 9123
FDEPTH: 390 390 Gear cond.: 0
BDEPTH: 1886 1731 Validity : 0
Towing dir: 0° Wire out : 894 m Speed : 3.2 kn
Sorted : 0 Total catch: 12.61 Catch/hour: 32.90

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Benthosema fibulatum	25.30	28224	76.92	159
J E L L Y F I S H	2.30	383	6.98	
Harpadon nehereus	1.63	177	4.95	268
Neoepinnula orientalis	1.60	279	4.88	163
Champsodon sp.	1.42	830	4.31	164
Cubiceps whiteleggii	0.44	23	1.32	160
Synagrops adeni	0.14	21	0.41	182
Leptocephalus	0.04	16	0.11	
Solenocera sp.	0.02	10	0.06	161
Benthosema pterotum	0.02	8	0.05	162
Bregmaceros sp.	0.00	3	0.01	165
Total	32.90		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 27
DATE :22.10.2010 GEAR TYPE: PT NO: 1 POSITION:Lat N 24°39.34
start stop duration Lon E 65°53.45
TIME :08:38:55 08:58:10 19.2 (min) Purpose : 1
LOG : 9752.14 9753.20 1.1 Region : 9123
FDEPTH: 340 340 Gear cond.: 0
BDEPTH: 1114 1153 Validity : 0
Towing dir: 0° Wire out : 810 m Speed : 3.3 kn
Sorted : 0 Total catch: 36.10 Catch/hour: 112.59

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Benthosema fibulatum	110.71	119683	98.33	170
J E L L Y F I S H	1.60	267	1.42	
Harpadon nehereus	0.16	9	0.14	269
Neoepinnula orientalis	0.04	6	0.04	168
Leptocephalus	0.03	12	0.03	
Synagrops adeni	0.03	6	0.02	169
Solenocera sp.	0.01	6	0.01	171
Champsodon sp.	0.01	3	0.01	166
Bregmaceros sp.	0.00	3	0.00	167
Total	112.59		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 28
DATE :22.10.2010 GEAR TYPE: PT NO: 1 POSITION:Lat N 24°49.04
start stop duration Lon E 65°46.31
TIME :12:20:35 12:26:04 5.5 (min) Purpose : 1
LOG : 9777.58 9777.89 0.3 Region : 9122
FDEPTH: 130 128 Gear cond.: 0
BDEPTH: 938 1009 Validity : 0
Towing dir: 0° Wire out : 320 m Speed : 3.4 kn
Sorted : 0 Total catch: 25.67 Catch/hour: 281.06

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Benthosema fibulatum	279.20	318502	99.34	172
Gavialiceps taeniola	0.92	22	0.33	174
J E L L Y F I S H	0.71	119	0.25	
Leptocephalus	0.15	99	0.05	
Neoepinnula orientalis	0.08	22	0.03	173
Total	281.06		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 29
DATE :22.10.2010 GEAR TYPE: PT NO: 4 POSITION:Lat N 24°41.81
start stop duration Lon E 64°29.06
TIME :23:34:10 23:44:39 10.5 (min) Purpose : 1
LOG : 9883.14 9883.68 0.6 Region : 9122
FDEPTH: 35 35 Gear cond.: 0
BDEPTH: 1396 1396 Validity : 0
Towing dir: 0° Wire out : 100 m Speed : 3.1 kn
Sorted : 0 Total catch: 18.30 Catch/hour: 104.67

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Benthosema fibulatum	60.63	113223	57.93	183
Cubiceps whiteleggii	30.03	1641	28.69	189
Neoepinnula orientalis	7.72	480	7.38	185
Desmodema polystictum	2.43	6	2.32	190
J E L L Y F I S H	1.90	317	1.82	
GONOSTOMATIDAE	1.14	4576	1.09	184
Synagrops adeni	0.55	92	0.52	186
Leptocephalus	0.18	86	0.17	
Abralia sp.	0.07	46	0.07	187
Champsodon sp.	0.01	11	0.01	188
Charybdis sp.	0.01	11	0.01	
Total	104.67		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 30
DATE :23.10.2010 GEAR TYPE: PT NO: 1 POSITION:Lat N 24°53.11
start stop duration Lon E 64°15.87
TIME :06:35:29 07:17:13 41.7 (min) Purpose : 1
LOG : 9929.29 9931.56 2.3 Region : 9122
FDEPTH: 295 295 Gear cond.: 0
BDEPTH: 628 858 Validity : 0
Towing dir: 0° Wire out : 690 m Speed : 3.3 kn
Sorted : 0 Total catch: 33.45 Catch/hour: 48.08

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Benthosema fibulatum	46.50	60840 96.72	195
J E L L Y F I S H	1.41	235 2.93	
Cubiceps whiteleggii	0.11	6 0.22	192
Leptocephalus	0.04	29 0.08	
Synagrops adeni	0.01	1 0.02	191
SYNGNATHIDAE	0.01	1 0.01	193
Abralia sp.	0.01	4 0.01	194
Total	48.08	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 31
DATE :25.10.2010 GEAR TYPE: PT NO: 1 POSITION:Lat N 23°59.85
start stop duration Lon E 63°30.69
TIME :03:35:46 04:05:34 29.8 (min) Purpose : 1
LOG : 301.94 303.53 1.6 Region : 9122
FDEPTH: 494 499 Gear cond.: 0
BDEPTH: 3255 3250 Validity : 0
Towing dir: 0° Wire out : 1190 m Speed : 3.2 kn
Sorted : 0 Total catch: 1.41 Catch/hour: 2.84

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Benthosema fibulatum	1.32	286 46.56	199
J E L L Y F I S H	1.13	189 39.90	
Cubiceps whiteleggii	0.14	14 4.82	200
Neoepinnula orientalis	0.09	14 3.33	201
Synagrops adeni	0.08	12 2.69	202
Bregmaceros sp.	0.04	72 1.42	203
PASIPHAEIDAE	0.01	4 0.35	
Leptocephalus	0.01	10 0.35	
Abralia sp.	0.01	4 0.21	205
Champsodon sp.	0.00	4 0.14	204
SERGESTIDAE	0.00	14 0.07	
Harpadon nehereus	0.00	2 0.07	283
GONOSTOMATIDAE	0.00	6 0.07	206
Total	2.84	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 32
DATE :25.10.2010 GEAR TYPE: PT NO: 1 POSITION:Lat N 24°30.24
start stop duration Lon E 63°23.44
TIME :08:46:39 09:01:38 15.0 (min) Purpose : 1
LOG : 337.22 338.04 0.8 Region : 9122
FDEPTH: 320 335 Gear cond.: 0
BDEPTH: 1997 2016 Validity : 0
Towing dir: 0° Wire out : 740 m Speed : 3.3 kn
Sorted : 0 Total catch: 43.72 Catch/hour: 175.13

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Benthosema fibulatum	169.43	189449 96.74	209
J E L L Y F I S H	5.33	889 3.04	
Gavialiceps taeniola	0.18	4 0.11	270
Neoepinnula orientalis	0.12	8 0.07	208
Synagrops adeni	0.05	8 0.03	207
PASIPHAEIDAE	0.01	4 0.00	295
Leptocephalus	0.01	12 0.00	
ARISTEIDAE	0.00	12 0.00	210
Total	175.13	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 33
DATE :26.10.2010 GEAR TYPE: PT NO: 4 POSITION:Lat N 23°37.60
start stop duration Lon E 62°26.09
TIME :00:46:28 01:06:33 20.1 (min) Purpose : 1
LOG : 448.70 449.66 1.0 Region : 9122
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 3369 3370 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 2.9 kn
Sorted : 0 Total catch: 0.49 Catch/hour: 1.46

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Charybdis sp.	1.46	51 0.00	211
Leptocephalus	0.01	3 0.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 34
DATE :26.10.2010 GEAR TYPE: PT NO: 1 POSITION:Lat N 23°5.29
start stop duration Lon E 62°0.00
TIME :09:55:26 10:25:18 29.9 (min) Purpose : 1
LOG : 494.08 495.92 1.8 Region : 9122
FDEPTH: 99 107 Gear cond.: 0
BDEPTH: 3284 3321 Validity : 0
Towing dir: 0° Wire out : 200 m Speed : 3.7 kn
Sorted : 0 Total catch: 1.13 Catch/hour: 2.26

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Charybdis sp.	2.26	68 100.00	293
Total	2.26	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 35
DATE :26.10.2010 GEAR TYPE: PT NO: 1 POSITION:Lat N 23°17.26
start stop duration Lon E 61°54.07
TIME :11:52:22 12:12:35 20.2 (min) Purpose : 1
LOG : 507.17 508.36 1.2 Region : 9122
FDEPTH: 308 296 Gear cond.: 0
BDEPTH: 3389 3389 Validity : 0
Towing dir: 0° Wire out : 720 m Speed : 3.5 kn
Sorted : 0 Total catch: 2.70 Catch/hour: 8.02

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Charybdis sp.	5.35	163 66.77	213
GONOSTOMATIDAE	1.16	3319 14.45	217
Ancistrocheirus sp.	0.59	3 7.41	219
Neoepinnula orientalis	0.39	12 4.85	218
STERNOPTYCHIDAE	0.21	134 2.59	214
Abralia sp.	0.14	68 1.70	215
Benthosema fibulatum	0.12	89 1.48	216
J E L L Y F I S H	0.04	7 0.52	
Leptocephalus	0.01	3 0.07	
ARISTEIDAE	0.01	56 0.07	
BOTHIDAE	0.00	3 0.04	
Bregmaceros sp.	0.00	3 0.04	212
Total	8.02	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 36
DATE :26.10.2010 GEAR TYPE: PT NO: 1 POSITION:Lat N 23°52.04
start stop duration Lon E 61°36.57
TIME :16:45:01 17:05:30 20.5 (min) Purpose : 1
LOG : 545.96 547.21 1.3 Region : 9122
FDEPTH: 52 53 Gear cond.: 0
BDEPTH: 3390 3390 Validity : 0
Towing dir: 0° Wire out : 80 m Speed : 3.6 kn
Sorted : 0 Total catch: 11.83 Catch/hour: 34.64

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Benthosema fibulatum	22.78	34861 65.76	220
Charybdis sp.	7.03	240 20.29	226
Neoepinnula orientalis	2.11	252 6.08	221
Cubiceps whiteleggii	0.90	41 2.60	225
J E L L Y F I S H	0.56	93 1.61	
Benthosema pterotum	0.40	120 1.14	228
Abralia sp.	0.39	222 1.12	227
Leptocephalus	0.17	187 0.50	
GONOSTOMATIDAE	0.15	325 0.42	222
Ommastrephes sp.	0.10	6 0.30	224
HISTIOTEUTHIDAE	0.05	6 0.15	278
Bregmaceros sp.	0.01	29 0.03	223
BOTHIDAE	0.00	9 0.01	
ARISTEIDAE	0.00	23 0.01	
Total	34.64	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 37
DATE :26.10.2010 GEAR TYPE: PT NO: 4 POSITION:Lat N 24°38.14
start stop duration Lon E 61°40.14
TIME :22:29:39 22:40:21 10.7 (min) Purpose : 1
LOG : 593.74 594.33 0.6 Region : 9122
FDEPTH: 30 30 Gear cond.: 0
BDEPTH: 1407 1465 Validity : 0
Towing dir: 0° Wire out : 90 m Speed : 3.3 kn
Sorted : 0 Total catch: 45.50 Catch/hour: 255.63

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Benthosema fibulatum	251.12	289390 98.24	229
Ommastrephes sp.	2.58	22 1.01	231
Neoepinnula orientalis	1.51	258 0.59	230
Charybdis sp.	0.33	11 0.13	233
Abralia sp.	0.07	45 0.03	232
Leptocephalus	0.02	22 0.01	
Total	255.63	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 38
DATE :27.10.2010 GEAR TYPE: PT NO: 4 POSITION:Lat N 24°48.42
start stop duration Lon E 61°41.14
TIME :00:38:49 00:53:07 14.3 (min) Purpose : 1
LOG : 607.48 608.33 0.9 Region : 9121
FDEPTH: 30 30 Gear cond.: 0
BDEPTH: 191 370 Validity : 0
Towing dir: 0° Wire out : 90 m Speed : 3.5 kn
Sorted : 0 Total catch: 345.29 Catch/hour: 1448.78

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Benthosema fibulatum	1292.31	1351953 89.20	238
Chelonia mydas	134.27	4 9.27	
Neoepinnula orientalis	16.78	2707 1.16	234
Synagrops adeni	4.32	1621 0.30	236
Abralia sp.	1.08	541 0.07	235
SYNGNATHIDAE	0.02	4 0.00	237
Total	1448.78	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 39
DATE :27.10.2010 GEAR TYPE: PT NO: 4 POSITION:Lat N 24°56.42
start stop duration Lon E 61°47.77
TIME :04:58:42 05:18:29 19.8 (min) Purpose : 1
LOG : 628.59 629.64 1.1 Region : 9121
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 44 34 Validity : 0
Towing dir: 0° Wire out : 85 m Speed : 3.2 kn
Sorted : 0 Total catch: 8.42 Catch/hour: 25.52

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
J E L L Y F I S H	15.01	2501 58.82	
Dussumieria acuta	3.44	106 13.49	239
SNAKE	3.30	12 12.95	
Uroteuthis duvaucelii	2.60	467 10.18	245
Decapterus russelli	0.69	606 2.71	244
Lepturacanthus savala	0.23	9 0.89	240
Abralia sp.	0.09	61 0.37	243
Carangoides sp.	0.08	136 0.33	241
Stolephorus sp.	0.03	12 0.12	242
SYNGNATHIDAE	0.01	3 0.05	
Sardinella sp.	0.01	3 0.04	
Fistularia petimba	0.01	3 0.02	279
Cubiceps whiteleggii	0.01	3 0.02	
Rastrelliger kanagurta	0.00	3 0.01	
Total	25.52	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 40
DATE :27.10.2010 GEAR TYPE: PT NO: 4 POSITION:Lat N 24°57.27
start stop duration Lon E 61°52.58
TIME :08:25:37 08:55:04 29.5 (min) Purpose : 1
LOG : 648.92 650.74 1.8 Region : 9121
FDEPTH: 30 38 Gear cond.: 0
BDEPTH: 60 61 Validity : 0
Towing dir: 0° Wire out : 0 m Speed : 3.7 kn
Sorted : 0 Total catch: 754.35 Catch/hour: 1536.88

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Dussumieria acuta	780.31	20455 50.77	249
Sardinella sp.	543.97	11626 35.39	250
Sardinella longiceps	191.10	2642 12.43	247
Decapterus russelli	20.07	309 1.31	248
Fistularia petimba	1.43	6 0.09	246
Total	1536.88	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 41
DATE :27.10.2010 GEAR TYPE: PT NO: 4 POSITION:Lat N 24°57.40
start stop duration Lon E 62°27.10
TIME :22:13:37 22:33:11 19.6 (min) Purpose : 1
LOG : 740.11 741.18 1.1 Region : 9121
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 766 816 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.3 kn
Sorted : 0 Total catch: 86.39 Catch/hour: 264.87

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Benthosema fibulatum	253.12	273171	95.56	1
Neoepinnula orientalis	9.89	1263	3.74	251
Cubiceps whiteleggii	1.16	311	0.44	252
Leptocephalus	0.44	319	0.17	
Abralia sp.	0.20	120	0.08	296
Paralepis sp.	0.06	10	0.02	253
Total	264.87		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 42
DATE :28.10.2010 GEAR TYPE: PT NO: 7 POSITION:Lat N 25°8.55
start stop duration Lon E 62°27.27
TIME :03:33:15 03:55:28 22.2 (min) Purpose : 1
LOG : 770.37 771.55 1.2 Region : 9121
FDEPTH: 2 2 Gear cond.: 0
BDEPTH: 19 22 Validity : 0
Towing dir: 0° Wire out : 85 m Speed : 3.2 kn
Sorted : 0 Total catch: 277.57 Catch/hour: 749.52

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dussumieria acuta	433.67	21077	57.86	256
Lepturacanthus savala	155.94	135	20.81	259
Pomadasys stridens	47.31	638	6.31	257
Sardinella sp.	37.17	1622	4.96	258
Trichiurus lepturus	33.62	32	4.49	260
Rastrelliger kanagurta	12.12	286	1.62	255
SNAKE	12.01	22	1.60	
Lagocephalus spadiceus	9.57	30	1.28	261
Gymnura poecilura	3.43	3	0.46	298
Decapterus russelli	3.04	68	0.41	254
Uroteuthis duvaucelii	1.64	23	0.22	292
Total	749.52		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 43
DATE :28.10.2010 GEAR TYPE: PT NO: 7 POSITION:Lat N 24°56.19
start stop duration Lon E 64°8.24
TIME :21:56:33 22:26:32 30.0 (min) Purpose : 1
LOG : 933.52 934.90 1.4 Region : 9122
FDEPTH: 5 5 Gear cond.: 0
BDEPTH: 927 855 Validity : 0
Towing dir: 0° Wire out : 90 m Speed : 2.8 kn
Sorted : 0 Total catch: 1.26 Catch/hour: 2.52

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
J E L L Y F I S H	1.85	308	73.31	
Benthosema fibulatum	0.46	401	18.19	271
GONOSTOMATIDAE	0.13	363	5.24	274
Leptocephalus	0.08	60	3.02	
Abralia sp.	0.00	2	0.16	272
Cubiceps whiteleggii	0.00	2	0.08	273
Total	2.52		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 44
DATE :29.10.2010 GEAR TYPE: PT NO: 4 POSITION:Lat N 24°54.96
start stop duration Lon E 64°8.81
TIME :00:39:34 00:58:44 19.2 (min) Purpose : 1
LOG : 937.81 939.08 1.3 Region : 9122
FDEPTH: 0 0 Gear cond.: 0
BDEPTH: 1009 915 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 4.0 kn
Sorted : 0 Total catch: 2.28 Catch/hour: 7.14

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
GONOSTOMATIDAE	4.00	12107	56.00	275
Thunnus alalunga	1.58	3	22.17	276
Leptocephalus	1.10	980	15.34	
Auxis thazard	0.36	3	5.04	277
J E L L Y F I S H	0.10	17	1.45	
Total	7.14		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 45
DATE :30.10.2010 GEAR TYPE: PT NO: 4 POSITION:Lat N 25°5.06
start stop duration Lon E 66°8.76
TIME :09:07:48 09:27:37 19.8 (min) Purpose : 1
LOG : 1149.01 1150.22 1.2 Region : 9122
FDEPTH: 20 24 Gear cond.: 0
BDEPTH: 92 89 Validity : 0
Towing dir: 0° Wire out : 70 m Speed : 3.7 kn
Sorted : 0 Total catch: 105.70 Catch/hour: 319.98

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
J E L L Y F I S H	319.98	30475	100.00	
Total	319.98		100.00	

Pelagic stratum catch rates

Groups based on taxonomic families include *Carangidae, Trichuridae* and *Scombridae,* the groups not based on taxonomic families are defined as:

Benthosema: *Benthosema pterotum* and *B. fibulatum*.
Cephalopods: squids and cuttlefish.
Clupeiods: *Clupeidae* and *Engraulidae*.
Other mesopelagic: *Champsodontidae, Bregmacerotidae, Gempylidae, Nomeidae*
Other: all groups not included in indicated families or above.

Regions are as defined in Figure 2 in the main report.

Table 3a: Catch rates (kg/hour) by main groups caught in pelagic trawl hauls. Offshore West region.

Station	Gear depth	Bentho-sema	Carangids	Cephal-opods	Clupeoids	Trichurids	Scombrids	Jellyfish	Other mesopelagic	Other	Total
28.0	129.0	279.2						0.7		1.1	281.1
29.0	35.0	60.6		0.1				1.9		42.1	104.7
30.0	295.0	46.5						1.4		0.2	48.1
31.0	496.5	1.3						1.1		0.3	2.8
32.0	327.5	169.4						5.3		0.4	175.1
33.0	10.0									1.5	1.5
34.0	103.0									2.3	2.3
35.0	302.0	0.1		0.7						7.1	8.0
36.0	52.5	22.8		0.5				0.6		10.8	34.6
37.0	30.0	251.1		2.7						1.9	255.6
43.0	5.0	0.5						1.8		0.2	2.5
44.0	0.0						1.9	0.1		5.1	7.1
45.0	22.0							320.0			320.0
Mean	139.0	64.0		0.3			0.1	25.6		5.6	95.6
Std		101.2		0.7			0.5	88.5		11.4	120.1
%Catch		66.9		0.3			0.1	26.8		5.9	

Catch rates (kg/hour) by main groups caught in pelagic trawl hauls. Offshore Central region.

Station	Gear depth	Bentho-sema	Carangids	Cephal-opods	Clupeoids	Trichurids	Scombrids	Jellyfish	Other mesopelagic	Other	Total
15	46.0	39.7		17.4					0.6	19.3	77.0
16	218.0	2.0		2.1					0.3	3.0	7.4
17	45.0	30.8		5.5			9.8	1.7		24.0	71.9
18	300.0	1.2						0.7	0.1	0.5	2.6
19	44.0									3.4	3.4
20	340.0							0.5		1.4	1.9
21	385.0	11.0						0.1		1.0	12.1
22	37.5							0.3		0.8	1.1
23	315.0	4.8						1.7	0.2	1.7	8.3
24	50.0	8.4		0.1				1.0	1.8	11.5	22.8
25	42.5	577.5		100.1					2.2	18.5	698.3
26	390.0	25.3						2.3	1.4	3.9	32.9
27	340.0	110.7						1.6		0.3	112.6
Mean	196.4	62.4		9.6			0.8	0.8	0.5	6.9	81.0
Std dev		157.7		27.6			2.7	0.8	0.8	8.4	188.9
%Catch		77.0		11.9			1.0	1.0	0.6	8.5	

Catch rates (kg/hour) by main groups caught in pelagic trawl hauls. Offshore East region.

Station	Gear depth	Bentho-sema	Carangids	Cephal-opods	Clupeoids	Trichurids	Scombrids	Jellyfish	Other mesopelagic	Other	Total
13	326.5	8.6								1.9	10.4
14	314.5	0.5						1.1		1.1	2.7
Mean	320.5	4.5						0.5		1.5	6.6
Std dev		5.7						0.8		0.5	5.5
%Catch		68.2						7.6		22.7	

Catch rates (kg/hour) by main groups caught in pelagic trawl hauls. Makran shelf region.

Station	Gear depth	Bentho-sema	Carangids	Cephal-opods	Clupeoids	Trichurids	Scombrids	Jellyfish	Other mesopelagic	Other	Total
38.0	30.0	1292.3		1.1						155.4	1448.8
39.0	10.0		0.8	2.7	3.5	0.2		15.0		3.3	25.5
40.0	34.0		20.1		1515.4					1.4	1536.9
41.0	10.0	253.1		0.2						11.6	264.9
42.0	2.0		3.0	1.6	470.8	189.6	12.1			72.3	749.5
Mean	17.2	309.1	4.8	1.1	397.9	38.0	2.4	3.0		48.8	805.1
Std dev		560.5	8.6	1.1	656.9	84.7	5.4	6.7		66.4	680.5
%Catch		38.4	0.6	0.1	49.4	4.7	0.3	0.4		6.1	

Catch rates (kg/hour) by main groups caught in pelagic trawl hauls. Sindh shelf region.

Station	Gear depth	Bentho-sema	Carangids	Cephal-opods	Clupeoids	Trichurids	Scombrids	Jellyfish	Other mesopelagic	Other	Total
1	15.0			1.1		0.1		37.1			38.4
2	42.5			0.8				6.4		0.1	7.3
3	37.5			0.1				13.3	3.0	21.1	37.4
4	35.0			0.1		0.9		1.9	1.3	0.2	4.3
5	10.0			0.2		0.8		2.2	0.1	4.1	7.4
6	10.0		0.4	0.1	2.5		11.7	9.8		0.1	24.7
7	45.0	6.7	0.4	0.1				6.6	0.2	3.3	17.3
8	147.5	0.2						3.1	1.0	2.1	6.4
9	57.5			1.4		0.1		7.4	1.7	3.6	14.2
10	10.0			1.7		0.8		203.2		1.6	207.3
11	10.0		1.2	1.8		0.1		7.9	0.1	2.5	13.5
12	49.0	578.1									578.1
Mean	39.1	48.8	0.2	0.6	0.2	0.2	1.0	24.9	0.6	3.2	79.7
Std dev		166.7	0.4	0.7	0.7	0.4	3.4	57.0	0.9	5.8	166.6
%Catch		61.2	0.3	0.8	0.3	0.3	1.3	31.2	0.8	4.0	

ANNEX 4

Records of demersal fishing stations

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 1
DATE :03.11.2010 GEAR TYPE: BT NO: 21 POSITION:Lat N 25°2.21
start stop duration Lon E 64°38.83
TIME :02:12:08 02:42:22 30.3 (min) Purpose : 3
LOG : 1384.54 1386.08 1.5 Region : 9103
FDEPTH: 32 46 Gear cond.: 0
BDEPTH: 32 46 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.0 kn
Sorted : 0 Total catch: 66.39 Catch/hour: 131.67

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Megalaspis cordyla	38.98	95	29.60	175
J E L L Y F I S H	36.60	0	27.79	
Nemipterus japonicus	30.45	418	23.12	179
Nemipterus randalli	8.53	143	6.48	180
Decapterus russelli	3.28	50	2.49	174
Saurida tumbil	2.60	16	1.97	187
Octopus sp.	1.89	6	1.43	
Sphyraena putnamae	1.56	10	1.18	184
Sand dollar	1.52	0	1.16	
Trichiurus lepturus	1.27	40	0.96	188
MURICIDAE	1.05	101	0.80	
Pseudorhombus elevatus	0.74	28	0.56	173
Grammoplites suppositus	0.60	12	0.46	181
Sphyraena obtusata	0.58	8	0.44	87
Sea cucumbers	0.44	58	0.34	
Muraenesox cinereus	0.44	2	0.33	178
Thenus orientalis	0.28	2	0.21	177
Charybdis sp.	0.23	65	0.18	
Epinephelus diacanthus	0.15	28	0.12	183
Laeops parviceps	0.12	10	0.09	172
Cynoglossus sp.	0.11	8	0.08	176
Gazza minuta	0.10	18	0.08	57
Metapenaeus monoceros	0.06	2	0.05	5
Minous dempsterae	0.04	4	0.03	182
Sepiella sp.	0.03	2	0.02	185
Charybdis feriata	0.01	16	0.01	
SYNGNATHIDAE	0.01	2	0.01	186
Total	131.67		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 2
DATE :03.11.2010 GEAR TYPE: BT NO: 21 POSITION:Lat N 25°5.66
start stop duration Lon E 64°40.93
TIME :03:47:18 04:17:34 30.3 (min) Purpose : 3
LOG : 1391.61 1393.37 1.8 Region : 9103
FDEPTH: 20 22 Gear cond.: 0
BDEPTH: 20 22 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.5 kn
Sorted : 0 Total catch: 249.70 Catch/hour: 494.95

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
J E L L Y F I S H	232.31	0	46.94	
Nemipterus randalli	132.43	453	26.76	54
Nemipterus japonicus	90.60	1513	18.31	195
Pseudorhombus arsius	12.82	197	2.59	190
Epinephelus diacanthus	8.25	1365	1.67	198
Pseudorhombus elevatus	3.89	134	0.78	189
Sea cucumbers	3.65	285	0.74	
Zebrias synapturoides	2.05	64	0.41	199
G A S T R O P O D S	1.45	103	0.29	
SNAKE	1.19	2	0.24	
Sphyraena putnamae	0.91	6	0.18	200
Saurida undosquamis	0.86	12	0.17	203
Decapterus russelli	0.85	35	0.17	191
Saurida tumbil	0.68	6	0.14	202
Cociella crocodilus	0.67	23	0.14	196
Grammoplites suppositus	0.61	6	0.12	102
Cynoglossus sp.	0.44	35	0.09	192
Upeneus vittatus	0.41	6	0.08	194
Sepiella sp.	0.26	6	0.05	201
Sorsogna tuberculata	0.14	6	0.03	197
Charybdis sp.	0.13	52	0.03	
Squilla sp.	0.11	36	0.02	
DORIPPIDAE	0.09	12	0.02	
Charybdis feriata	0.06	36	0.01	
Gazza minuta	0.04	6	0.01	193
Starfish	0.04	36	0.01	
Philyra sp.	0.01	12	0.00	
Total	494.95		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 3
DATE :03.11.2010 GEAR TYPE: BT NO: 21 POSITION:Lat N 25°6.10
start stop duration Lon E 64°35.60
TIME :05:31:32 06:01:24 29.9 (min) Purpose : 3
LOG : 1402.06 1403.68 1.6 Region : 9103
FDEPTH: 18 17 Gear cond.: 0
BDEPTH: 18 17 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.2 kn
Sorted : 0 Total catch: 349.86 Catch/hour: 703.00

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Upeneus vittatus	627.41	25935	89.25	120
J E L L Y F I S H	32.61	0	4.64	
Epinephelus diacanthus	27.05	6054	3.85	147
Decapterus russelli	12.73	239	1.81	149
Cociella crocodilus	1.13	16	0.16	148
Saurida tumbil	0.94	8	0.13	151
Cynoglossus sp.	0.65	71	0.09	150
Sea cucumbers	0.26	30	0.04	
Pseudorhombus elevatus	0.19	8	0.03	121
Philyra sp.	0.02	14	0.00	
Metapenaeus stridulens	0.01	6	0.00	
Charybdis feriata	0.01	6	0.00	
Total	703.00		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 4
DATE :03.11.2010 GEAR TYPE: BT NO: 21 POSITION:Lat N 24°59.92
start stop duration Lon E 64°12.30
TIME :08:55:18 09:25:26 30.1 (min) Purpose : 3
LOG : 1430.62 1432.33 1.7 Region : 9103
FDEPTH: 31 36 Gear cond.: 0
BDEPTH: 31 36 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.4 kn
Sorted : 0 Total catch: 72.67 Catch/hour: 144.66

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Plotosus lineatus	42.60	1470	29.45	159
Lagocephalus spadiceus	37.03	127	25.60	164
J E L L Y F I S H	27.87	0	19.27	
Uroteuthis duvauceli	12.74	247	8.81	160
Decapterus russelli	6.57	139	4.54	163
Carangoides malabaricus	4.73	28	3.27	161
Megalaspis cordyla	3.00	52	2.07	162
Rhinobatos annandalei	2.59	2	1.79	474
Fistularia petimba	1.89	8	1.31	158
Nemipterus randalli	1.83	62	1.27	157
Sepia latimanus	0.59	4	0.41	169
Upeneus vittatus	0.54	14	0.38	171
Pseudorhombus elevatus	0.42	16	0.29	168
Selar crumenophthalmus	0.37	2	0.26	167
E C H I N O D E R M A T A	0.33	50	0.23	
Nemipterus japonicus	0.31	4	0.22	156
Carangoides fulvoguttatus	0.21	4	0.15	166
Saurida undosquamis	0.21	4	0.14	154
Sand dollar	0.19	40	0.13	
Laeops parviceps	0.14	10	0.09	155
Cynoglossus sp.	0.12	10	0.08	170
Grammoplites suppositus	0.08	4	0.05	153
Metapenaeus monoceros	0.08	2	0.05	38
Cociella crocodilus	0.07	4	0.05	152
MURICIDAE	0.07	4	0.05	
Epinephelus diacanthus	0.03	6	0.02	165
Charybdis sp.	0.02	4	0.02	
Cryptopodia fornicata	0.02	2	0.01	
DORIPPIDAE	0.01	2	0.01	
Philyra sp.	0.00	2	0.00	
Total	144.66		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 5
DATE :03.11.2010 GEAR TYPE: BT NO: 21 POSITION:Lat N 25°2.24
start stop duration Lon E 64°5.44
TIME :10:53:41 11:23:38 30.0 (min) Purpose : 3
LOG : 1442.65 1444.37 1.7 Region : 9103
FDEPTH: 29 27 Gear cond.: 0
BDEPTH: 29 27 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.4 kn
Sorted : 0 Total catch: 69.68 Catch/hour: 139.55

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Nemipterus japonicus	30.04	469	21.53	209
Lagocephalus spadiceus	19.43	56	13.92	216
Sphyraena putnamae	18.83	14	13.49	204
J E L L Y F I S H	15.52	0	11.12	
Thenus orientalis	9.31	74	6.67	218
Uroteuthis duvauceli	8.11	120	5.81	208
Nemipterus randalli	6.81	126	4.88	215
Cynoglossus sp.	3.69	442	2.64	212
Saurida tumbil	3.50	28	2.51	213
Grammoplites suppositus	2.86	88	2.05	210
SNAKE	2.60	4	1.87	
Sepia latimanus	1.90	370	1.36	207
Argyrops spinifer	1.90	6	1.36	230
MURICIDAE	1.65	120	1.18	
Sepiella sp.	1.50	30	1.07	206
Seriolina nigrofasciata	1.41	2	1.01	229
Fistularia petimba	1.40	8	1.00	217
Octopus sp.	1.28	2	0.92	
Sepia pharaonis	1.16	4	0.83	231
Pseudorhombus arsius	0.98	43	0.70	214
Sea cucumbers	0.88	124	0.63	
Pseudorhombus elevatus	0.71	142	0.51	55
Sorsogna tuberculata	0.68	60	0.49	205
Apogon lineatus	0.63	88	0.45	211
Sepia prashadi	0.43	2	0.31	232
Rastrelliger kanagurta	0.39	2	0.28	228
Decapterus russelli	0.37	10	0.26	226
Uranscopus marmoratus	0.27	2	0.19	225
Epinephelus diacanthus	0.24	2	0.17	219
Zebrias synapturoides	0.15	4	0.11	227
Calappa lophos	0.13	2	0.10	
Pterois russelii	0.13	8	0.09	234
Metapenaeus monoceros	0.11	4	0.08	4
Laeops parviceps	0.10	4	0.07	223
Saurida undosquamis	0.09	2	0.06	224
Sepia omani	0.07	2	0.05	56
Lepidotrigla bispinosa	0.07	2	0.05	222
Choridactylus multibartus	0.06	4	0.04	221
Sand dollar	0.04	14	0.03	
Charybdis sp.	0.03	8	0.02	
DORIPPIDAE	0.03	4	0.02	
Minous dempsterae	0.01	2	0.01	233
SYNGNATHIDAE	0.01	4	0.01	3
Hermits, mixed	0.01	2	0.01	
Cryptopodia fornicata	0.01	2	0.01	
Champsodon sp.	0.00	2	0.00	220
CALLIONYMIDAE	0.00	2	0.00	238
Total	139.55		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 6
DATE :03.11.2010 GEAR TYPE: BT NO: 21 POSITION:Lat N 24°56.27
start stop duration Lon E 63°44.69
TIME :15:24:29 15:54:29 30.0 (min) Purpose : 2
LOG : 1470.33 1471.62 1.3 Region : 9104
FDEPTH: 117 115 Gear cond.: 0
BDEPTH: 117 115 Validity : 0
Towing dir: 0° Wire out : 290 m Speed : 2.6 kn
Sorted : 0 Total catch: 46.12 Catch/hour: 92.22

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Parascolopsis eriomma	27.39	234	29.70	242
Epinephelus diacanthus	12.70	84	13.77	250
Muraenesox cinereus	10.70	2	11.60	252
Nemipterus randalli	9.60	214	10.41	239
Atrobucca alcocki	7.32	20	7.94	249
J E L L Y F I S H	4.41	0	4.78	
CONGER SP	3.64	100	3.95	251
CALLIONYMIDAE	2.54	172	2.75	315
SNAKE	2.10	2	2.28	
Aseraggodes sp.	1.54	166	1.67	41
Saurida longimanus	1.45	38	1.57	236
Cepola sp.	1.26	16	1.36	241
Cynoglossus sp.	1.22	60	1.33	244
Sepia kobiensis	1.22	18	1.32	247
Laeops parviceps	1.10	122	1.19	235
MURICIDAE	0.93	116	1.01	
Parascolopsis aspinosa	0.80	8	0.87	237
Champsodon sp.	0.70	252	0.76	248
Pristipomoides multidens	0.62	20	0.67	243
OPHIDIIDAE	0.45	2	0.49	240
Lepturacanthus savala	0.31	4	0.34	246
Charybdis sp.	0.08	30	0.09	
Pseudorhombus elevatus	0.07	4	0.08	245
Squilla sp.	0.06	34	0.07	
Starfish	0.03	20	0.03	
Total	92.22		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 7
DATE :03.11.2010 GEAR TYPE: BT NO: 21 POSITION:Lat N 25°2.35
start stop duration Lon E 64°6.90
TIME :23:36:00 00:06:40 30.7 (min) Purpose : 2
LOG : 1506.99 1508.86 1.9 Region : 9103
FDEPTH: 28 31 Gear cond.: 0
BDEPTH: 28 31 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.7 kn
Sorted : 0 Total catch: 75.46 Catch/hour: 147.67

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nemipterus japonicus	30.43	421	20.61	262
Nemipterus randalli	25.64	3824	17.36	253
Chaenogaleus macrostoma	13.50	51	9.14	311
Grammoplites suppositus	10.40	320	7.04	278
J E L L Y F I S H	9.65	0	6.54	
Thenus orientalis	7.34	74	4.97	281
Parastromateus niger	7.30	10	4.94	312
Saurida tumbil	6.82	45	4.62	276
Pseudorhombus arsius	4.68	65	3.17	277
Sepia latimanus	3.94	31	2.67	261
Cynoglossus sp.	3.41	355	2.31	275
Metapenaeus monoceros	3.06	102	2.07	2
Sorsogna tuberculata	3.06	255	2.07	255
Sepia pharaonis	2.80	6	1.90	271
Argyrops spinifer	1.82	6	1.23	263
Pseudorhombus elevatus	1.74	104	1.18	254
Charybdis sp.	1.52	313	1.03	
Uranscopus marmoratus	1.44	10	0.97	256
MURICIDAE	1.27	82	0.86	
Pterois russelii	1.12	37	0.76	259
OPHICHTHIDAE	0.98	2	0.66	282
Lepidotrigla bispinosa	0.96	41	0.65	273
Sepiella sp.	0.92	18	0.62	260
Decapterus russelli	0.50	20	0.34	52
Apogon lineatus	0.49	61	0.33	258
Uroteuthis duvauceli	0.38	10	0.25	266
Charybdis feriata	0.33	4	0.22	
E C H I N O D E R M A T A	0.31	43	0.21	
Apogon queketti	0.27	27	0.19	
Laeops parviceps	0.27	27	0.18	274
Minous dempsterae	0.22	16	0.15	257
SYNGNATHIDAE	0.20	51	0.13	269
Carangoides malabaricus	0.14	2	0.10	265
Fistularia petimba	0.13	4	0.09	264
CONGER SP	0.08	2	0.06	272
Solenocera choprai	0.08	8	0.06	40
Epinephelus diacanthus	0.08	18	0.06	270
CALLIONYMIDAE	0.08	12	0.05	316
Octopus sp.	0.08	4	0.05	
Choridactylus multibartus	0.05	4	0.04	283
MURAENIDAE	0.05	2	0.03	268
Cryptopodia fornicata	0.04	4	0.03	
Acreichthys tomentosus	0.04	2	0.02	313
Bregmaceros sp.	0.02	14	0.01	267
Pomacanthus sp.	0.02	2	0.01	279
Champsodon sp.	0.01	14	0.01	280
Calappa sp.	0.01	8	0.01	
Total	147.67		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 8
DATE :04.11.2010 GEAR TYPE: BT NO: 21 POSITION:Lat N 24°56.24
start stop duration Lon E 63°44.86
TIME :02:38:08 03:09:33 31.4 (min) Purpose : 3
LOG : 1530.47 1532.08 1.6 Region : 9104
FDEPTH: 117 114 Gear cond.: 0
BDEPTH: 117 114 Validity : 0
Towing dir: 0° Wire out : 310 m Speed : 3.1 kn
Sorted : 0 Total catch: 80.83 Catch/hour: 154.41

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Epinephelus diacanthus	72.66	115	47.06	309
Nemipterus randalli	17.29	0	11.20	
Parascolopsis eriomma	13.28	143	8.60	97
Atrobucca alcocki	13.07	36	8.46	301
Aluterus monoceros	10.32	6	6.68	299
Chaenogaleus macrostoma	9.74	32	6.31	308
Sepia kobiensis	5.83	76	3.77	96
Selar crumenophthalmus	3.63	15	2.35	300
J E L L Y F I S H	1.64	0	1.07	
Cepola sp.	1.52	17	0.99	90
Saurida longimanus	1.51	36	0.98	95
Cynoglossus sp.	0.83	99	0.54	93
Parascolopsis aspinosa	0.47	6	0.31	91
Lepturacanthus savala	0.45	6	0.29	307
Carangoides malabaricus	0.36	2	0.23	92
Pseudorhombus elevatus	0.30	17	0.19	98
Charybdis sp.	0.22	38	0.14	
Champsodon sp.	0.21	92	0.14	94
G A S T R O P O D S	0.20	31	0.13	
CALLIONYMIDAE	0.16	11	0.10	99
Pristipomoides multidens	0.14	4	0.09	302
Pseudorhombus arsius	0.11	2	0.07	305
E C H I N O D E R M A T A	0.07	13	0.05	
Pterois russelii	0.07	2	0.05	303
Metapenaeus monoceros	0.06	2	0.04	39
Pterygotrigla hemisticta	0.06	2	0.04	304
SYNGNATHIDAE	0.05	11	0.03	101
Squilla sp.	0.04	2	0.03	
Laeops parviceps	0.04	6	0.02	89
CONGER SP	0.04	2	0.02	306
Cryptopodia fornicata	0.02	4	0.01	
Aseraggodes sp.	0.02	2	0.01	42
Bregmaceros sp.	0.01	10	0.01	88
Total	154.41		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 9
DATE :04.11.2010 GEAR TYPE: BT NO: 21 POSITION:Lat N 25°11.07
start stop duration Lon E 63°39.59
TIME :06:09:26 06:39:45 30.3 (min) Purpose : 3
LOG : 1553.09 1554.94 1.9 Region : 9103
FDEPTH: 17 18 Gear cond.: 0
BDEPTH: 17 18 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.7 kn
Sorted : 0 Total catch: 690.68 Catch/hour: 1367.24

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
J E L L Y F I S H	1319.56	0	96.51	
Pomadasys maculatus	11.78	168	0.86	291
Pomadasys stridens	11.38	168	0.83	296
SNAKE	9.80	32	0.72	
Parastromateus niger	7.87	8	0.58	292
Nemipterus japonicus	1.30	24	0.09	284
Parapercis sp.	1.04	22	0.08	298
Stephanolepis diaspros	0.91	10	0.07	285
Epinephelus diacanthus	0.89	6	0.07	293
Cynoglossus sp.	0.74	48	0.05	294
G A S T R O P O D S	0.72	36	0.05	
Antennarius sp.	0.31	2	0.02	286
Starfish	0.21	53	0.02	
Cociella crocodilus	0.18	6	0.01	295
Lepturacanthus savala	0.16	2	0.01	290
Torpedo sp.	0.12	2	0.01	475
Uroteuthis duvauceli	0.08	2	0.01	289
Minous monodactylus	0.06	4	0.00	310
Pseudorhombus elevatus	0.03	2	0.00	287
Apogon quadrifasciatus	0.03	2	0.00	288
E C H I N O D E R M A T A	0.03	20	0.00	
Charybdis feriata	0.02	14	0.00	
Champsodon sp.	0.01	6	0.00	297
Total	1367.24		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 10
DATE :04.11.2010 GEAR TYPE: BT NO: 21 POSITION:Lat N 25°4.77
start stop duration Lon E 63°10.07
TIME :11:07:46 11:38:34 30.8 (min) Purpose : 3
LOG : 1595.48 1597.39 1.9 Region : 9103
FDEPTH: 20 20 Gear cond.: 0
BDEPTH: 20 20 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.7 kn
Sorted : 0 Total catch: 83.43 Catch/hour: 162.57

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
J E L L Y F I S H	58.66	0	36.08	
MURICIDAE	33.91	624	20.86	
Himantura bleekeri	17.93	4	11.03	472
Decapterus russelli	15.00	291	9.23	115
Dussumieria acuta	11.11	470	6.83	113
Sphyraena jello	8.77	2	5.39	119
SNAKE	6.14	0	3.78	
Epinephelus diacanthus	3.70	4	2.28	104
Grammoplites suppositus	2.49	187	1.53	116
Cociella crocodilus	1.06	37	0.65	117
Stephanolepis diaspros	1.02	14	0.63	114
Cynoglossus sp.	0.96	88	0.59	111
Nemipterus japonicus	0.50	54	0.31	118
Sepiella sp.	0.47	18	0.29	105
Sea cucumbers	0.26	49	0.16	
Sepia latimanus	0.16	2	0.10	106
Choridactylus multibartus	0.08	4	0.05	112
Metapenaeus monoceros	0.07	2	0.05	314
Saurida undosquamis	0.07	2	0.04	107
Lactarius lactarius	0.06	4	0.04	103
Sphyraena putnamae	0.04	4	0.03	109
SYNGNATHIDAE	0.04	8	0.02	
Starfish	0.03	10	0.02	
Squilla sp.	0.01	4	0.01	
Champsodon sp.	0.01	18	0.01	108
Charybdis feriata	0.01	4	0.00	
PORTUNIDAE	0.00	4	0.00	
Zebrias synapturoides	0.00	2	0.00	110
Total	162.57		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 11
DATE :04.11.2010 GEAR TYPE: BT NO: 21 POSITION:Lat N 25°1.64
start stop duration Lon E 63°12.95
TIME :12:56:46 13:26:11 29.4 (min) Purpose : 3
LOG : 1606.34 1608.15 1.8 Region : 9103
FDEPTH: 27 27 Gear cond.: 0
BDEPTH: 27 27 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.7 kn
Sorted : 0 Total catch: 472.56 Catch/hour: 963.76

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus russelli	500.11	10609	51.89	133
Upeneus vittatus	82.60	1179	8.57	319
Sphyraena putnamae	70.16	94	7.28	123
Nemipterus japonicus	66.68	1284	6.92	132
Pomadasys argenteus	41.81	31	4.34	122

Nemipterus randalli	38.81	4126	4.03	318
Uroteuthis duvauceli	29.08	189	3.02	134
Torpedo sp.	24.90	20	2.58	473
J E L L Y F I S H	15.26	0	1.58	
G A S T R O P O D S	14.30	128	1.48	
Himantura bleekeri	12.95	2	1.34	476
Dussumieria acuta	8.35	388	0.87	125
Thenus orientalis	7.98	50	0.83	124
Rastrelliger kanagurta	7.72	70	0.80	137
Grammoplites suppositus	6.62	309	0.69	130
Pseudorhombus arsius	4.97	70	0.52	135
Cheimerius nufar	3.65	20	0.38	145
Sepiella sp.	3.54	90	0.37	139
Arius thalassinus*	3.49	10	0.36	142
Saurida tumbil	3.36	0	0.35	127
Pseudorhombus elevatus	2.28	179	0.24	129
Sorsogna tuberculata	2.17	209	0.22	146
Himantura gerrardi	1.94	2	0.20	477
Cociella crocodilus	1.85	70	0.19	136
Cynoglossus sp.	1.38	189	0.14	138
Cynoglossus arel	1.20	10	0.12	141
Apogon queketti	1.17	159	0.12	131
Stephanolepis diaspros	1.00	10	0.10	317
Zebrias synapturoides	0.93	56	0.10	126
Sepia latimanus	0.90	1	0.09	320
CONGER SP	0.86	20	0.09	144
Minous monodactylus	0.73	80	0.08	140
Saurida undosquamis	0.41	10	0.04	128
Apogon quadrifasciatus	0.24	20	0.02	143
Metapenaeus monoceros	0.18	8	0.02	
Leiognathus bindus	0.10	20	0.01	45
Squilla sp.	0.08	8	0.01	
Leiognathus lineolatus	0.02	9	0.00	321
Total	963.76		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 12
DATE :05.11.2010 GEAR TYPE: BT NO: 21 POSITION:Lat N 25°6.10
start stop duration Lon E 62°11.13
TIME :04:19:23 04:49:33 30.2 (min) Purpose : 3
LOG : 1697.83 1699.76 1.9 Region : 9103
FDEPTH: 19 21 Gear cond.: 0
BDEPTH: 19 21 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.9 kn
Sorted : 0 Total catch: 168.81 Catch/hour: 335.83

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
J E L L Y F I S H	80.27	0	23.90	
Saurida tumbil	48.14	272	14.34	354
Sepia pharaonis	22.08	76	6.58	358
Nemipterus japonicus	18.80	328	5.60	356
Pseudorhombus elevatus	16.14	954	4.81	355
Himantura gerrardi	15.12	12	4.50	480
Cynoglossus sp.	14.32	1432	4.27	369
SNAKE	14.03	0	4.18	
Thenus orientalis	13.83	113	4.12	
Parastromateus niger	7.76	14	2.31	374
Uroteuthis duvauceli	6.56	318	1.95	357
Pseudorhombus arsius	5.92	107	1.76	368
Argyrops spinifer	5.32	16	1.58	375
Torpedo sp.	4.38	14	1.30	479
G A S T R O P O D S	2.98	107	0.89	
Decapterus russelli	2.49	46	0.74	367
NARCINIDAE	2.19	20	0.65	478
Alectis indicus	1.96	6	0.58	377
Pomadasys argenteus	1.89	2	0.56	376
Zebrias synapturoides	1.84	70	0.55	349
Lagocephalus spadiceus	1.73	6	0.52	351
Pterois russelii	1.69	99	0.50	50
Grammoplites suppositus	1.63	40	0.48	352
Drepane longimana	1.43	8	0.43	343
Sepia latimanus	1.19	16	0.35	359
Carangoides sp.	0.82	4	0.24	344
Sepiella sp.	0.79	22	0.24	360
Tetrosomus gibbosus	0.71	2	0.21	353
Dactyloptena orientalis	0.67	20	0.20	350
Fistularia petimba	0.48	16	0.14	347
Minous monodactylus	0.43	40	0.13	362
Saurida undosquamis	0.38	4	0.11	345
Metapenaeus monoceros	0.27	10	0.08	373
Cociella crocodilus	0.22	6	0.07	361
Charybdis feriata	0.22	2	0.07	
Octopus sp.	0.21	6	0.06	
Lepidotrigla bispinosa	0.20	10	0.06	364
Sorsogna tuberculata	0.20	18	0.06	363
Apistus carinatus	0.15	6	0.05	366
C R A B S	0.13	2	0.04	
Minous dempsterae	0.10	4	0.03	348
Parapercis sp.	0.07	2	0.02	346
Cryptopodia fornicata	0.04	4	0.01	
Apogon queketti	0.04	4	0.01	370
Sphyraena obtusata	0.04	2	0.01	371
Laeops parviceps	0.04	4	0.01	365
Nemipterus randalli	0.04	2	0.01	372
Doclea sp.	0.04	2	0.01	
Solea sp.	0.03	2	0.01	
Sea cucumbers	0.03	44	0.01	
Philyra sp.	0.01	2	0.00	
SYNGNATHIDAE	0.01	2	0.00	546
Total	300.06		89.35	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 13
DATE :05.11.2010 GEAR TYPE: BT NO: 21 POSITION:Lat N 25°1.21
start stop duration Lon E 62°7.78
TIME :05:55:12 06:06:26 11.2 (min) Purpose : 3
LOG : 1706.41 1707.06 0.7 Region : 9103
FDEPTH: 30 29 Gear cond.: 8
BDEPTH: 30 29 Validity : 4
Towing dir: 0° Wire out : 120 m Speed : 3.5 kn
Sorted : 0 Total catch: 55.41 Catch/hour: 295.79

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Epinephelus diacanthus	72.60	91	24.54	322
Himantura gerrardi	58.72	5	19.85	
Cynoglossus sp.	52.05	4270	17.60	
Himantura bleekeri	51.51	5	17.42	
Sepia prashadi	27.76	149	9.38	
G A S T R O P O D S	6.41	320	2.17	
Pseudorhombus elevatus	4.80	294	1.62	
Sepia latimanus	3.20	32	1.08	
Sepia kobiensis	3.20	43	1.08	
Sorsogna tuberculata	2.94	230	0.99	
Starfish	2.67	294	0.90	
Nemipterus randalli	2.67	91	0.90	
Grammoplites suppositus	1.60	48	0.54	
Nemipterus japonicus	1.33	5	0.45	
Pseudorhombus arsius	1.07	16	0.36	
Pterois russelii	0.80	64	0.27	
Zebrias synapturoides	0.53	27	0.18	
Charybdis lucifera	0.53	11	0.18	
Uranscopus marmoratus	0.53	5	0.18	
Torpedo sp.	0.27	5	0.09	
Antennarius sp.	0.27	5	0.09	
Uroteuthis duvauceli	0.27	5	0.09	
SYNGNATHIDAE	0.05	11	0.02	
Apogon quadrifasciatus	0.01	5	0.00	
Total	295.79		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 14
DATE :05.11.2010 GEAR TYPE: BT NO: 21 POSITION:Lat N 24°53.12
start stop duration Lon E 61°52.32
TIME :08:31:49 09:02:41 30.9 (min) Purpose : 3
LOG : 1726.86 1728.42 1.6 Region : 9104
FDEPTH: 103 105 Gear cond.: 0
BDEPTH: 103 105 Validity : 0
Towing dir: 0° Wire out : 260 m Speed : 3.0 kn
Sorted : 0 Total catch: 71.85 Catch/hour: 139.65

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nemipterus randalli	85.42	1758	61.17	333
Chaenogaleus macrostoma	12.54	124	8.98	332
Decapterus russelli	11.56	93	8.28	325
Epinephelus diacanthus	9.43	35	6.75	324
Parascolopsis eriomma	7.72	361	5.53	323
Sepia kobiensis	5.83	80	4.17	334
Saurida tumbil	1.03	21	0.74	328
Starfish	0.97	87	0.70	
J E L L Y F I S H	0.93	0	0.67	
Pristipomoides multidens	0.87	16	0.62	331
Charybdis sp.	0.80	21	0.57	
Atrobucca alcocki	0.79	2	0.57	335
Acropoma japonicum	0.74	27	0.53	326
Epinephelus latifasciatus	0.42	2	0.30	330
CONGER SP	0.25	2	0.18	336
Cepola sp.	0.18	2	0.13	327
Sphyraena obtusata	0.14	2	0.10	329
G A S T R O P O D S	0.03	4	0.03	
Champsodon sp.	0.00	2	0.00	
Total	139.65		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 15
DATE :05.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 24°52.75
start stop duration Lon E 61°47.21
TIME :10:33:14 11:04:19 31.1 (min) Purpose : 3
LOG : 1737.57 1739.13 1.6 Region : 9104
FDEPTH: 94 97 Gear cond.: 0
BDEPTH: 94 97 Validity : 0
Towing dir: 0° Wire out : 255 m Speed : 3.0 kn
Sorted : 0 Total catch: 948.27 Catch/hour: 1830.05

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus russelli	1252.88	19820	68.46	341
Uraspis secunda	173.69	961	9.49	337
Sphyraena obtusata	139.53	2077	7.62	340
Nemipterus randalli	128.72	3257	7.03	338
Epinephelus diacanthus	71.41	310	3.90	342
Uroteuthis duvauceli	40.91	712	2.24	49
Acropoma japonicum	6.75	344	0.37	48
Atrobucca alcocki	5.60	32	0.31	71
Saurida undosquamis	4.25	92	0.23	46
Parascolopsis aspinosa	2.51	31	0.14	47
G A S T R O P O D S	1.83	0	0.10	
Charybdis sp.	1.16	0	0.06	
Parascolopsis eriomma	0.81	62	0.04	339
Total	1830.05		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 16
DATE :05.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 24°56.86
start stop duration Lon E 61°42.10
TIME :12:36:39 13:06:26 29.8 (min) Purpose : 3
LOG : 1748.98 1750.77 1.8 Region : 9103
FDEPTH: 17 19 Gear cond.: 0
BDEPTH: 17 19 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.6 kn
Sorted : 0 Total catch: 887.38 Catch/hour: 1787.28

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Thryssa vitrirostris	498.43	70279	27.89	392
Arius tenuispinis*	290.03	1858	16.23	386
Thryssa dussumieri	233.64	25623	13.07	51
Trichiurus lepturus	233.64	1970	13.07	381
Pomadasys maculatus	152.47	2141	8.53	380
Gymnura poecilura	45.62	6	2.55	483
Parastromateus niger	41.11	56	2.30	434
Himantura gerrardi	36.07	113	2.02	481
Himantura bleekeri	30.41	6	1.70	484
Sphyraena putnamae	26.99	56	1.51	435
Otolithes cuvieri	24.43	281	1.37	387
Muraenesox cinereus	23.67	6	1.32	429
Ilisha sp.	18.75	619	1.05	378
Nemipterus japonicus	13.94	253	0.78	383
Uroteuthis duvauceli	12.92	394	0.72	390
Leiognathus bindus	10.90	929	0.61	389
Polynemus heptadactylus*	10.53	225	0.59	384
Johnius sp.	8.84	113	0.49	388
SNAKE	8.06	0	0.45	
Grammoplites suppositus	7.88	282	0.44	443
Metapenaeus monoceros	7.55	197	0.42	436
Rhizoprionodon acutus	6.89	6	0.39	431
Pseudorhombus elevatus	6.45	366	0.36	385
Lactarius lactarius	6.18	365	0.35	379
G A S T R O P O D S	4.39	24	0.25	
Drepane longimana	4.28	28	0.24	53
Penaeus semisulcatus	3.75	56	0.21	437
Gerres filamentosus	3.18	28	0.18	442
OPHICHTHIDAE	2.22	4	0.12	444
Acanthopagrus latus	2.19	2	0.12	433
Otolithes ruber	2.01	6	0.11	432
Rhizoprionodon oligolinx	1.59	2	0.09	430
E C H I N O D E R M A T A	1.01	10	0.06	
Portunus sanguinolentus	0.90	28	0.05	438
Cynoglossus sp.	0.90	33	0.05	440
Pterois russelii	0.87	28	0.05	441
Opisthopterus tardoore	0.84	84	0.05	391
Zebrias synapturoides	0.76	0	0.04	
Torpedo sp.	0.73	28	0.04	485
Charybdis sp.	0.56	12	0.03	
Squilla sp.	0.56	8	0.03	
Octopus sp.	0.42	2	0.02	
Thryssa setirostris	0.42	28	0.02	382
Sepiella sp.	0.17	28	0.01	439
Trachypenaeus curvirostris	0.14	4	0.01	
Total	1787.28		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 17
DATE :05.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 24°52.84
start stop duration Lon E 61°47.21
TIME :15:10:54 15:40:55 30.0 (min) Purpose : 2
LOG : 1759.40 1760.90 1.5 Region : 9104
FDEPTH: 95 101 Gear cond.: 0
BDEPTH: 95 101 Validity : 0
Towing dir: 0° Wire out : 240 m Speed : 3.0 kn
Sorted : 0 Total catch: 105.22 Catch/hour: 210.38

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nemipterus randalli	96.87	2621	46.04	395
Chaenogaleus macrostoma	43.89	280	20.86	408
Epinephelus diacanthus	10.92	60	5.19	394
Rhizoprionodon acutus	10.90	6	5.18	393
Decapterus russelli	6.74	106	3.20	409
Thryssa dussumieri	6.49	789	3.08	404
Arius tenuispinis*	6.08	30	2.89	396
Atrobucca alcocki	5.95	16	2.83	410
CONGER SP	3.80	86	1.81	414
Thryssa vitrirostris	3.75	509	1.78	403
CALLIONYMIDAE	2.30	176	1.09	402
Charybdis sp.	2.01	1571	0.96	
Parastromateus niger	1.21	2	0.57	72
G A S T R O P O D S	1.10	66	0.52	
Cepola sp.	1.03	10	0.49	411
Trichiurus lepturus	0.97	10	0.46	397
Uraspis secunda	0.95	6	0.45	412
Saurida undosquamis	0.72	20	0.34	405
Acropoma japonicum	0.66	36	0.31	401
Brotula multibarbata	0.60	2	0.29	398
Sepia kobiensis	0.58	8	0.28	423
Calappa sp.	0.52	2	0.25	426
Parascolopsis eriomma	0.43	26	0.20	421
Cynoglossus sp.	0.29	20	0.14	417
Pristipomoides multidens	0.26	8	0.12	400
Ilisha sp.	0.22	6	0.11	399
Solea sp.	0.20	24	0.10	43
J E L L Y F I S H	0.18	0	0.09	
Sepiella sp.	0.13	16	0.06	424
Pseudorhombus elevatus	0.11	8	0.05	418
Uroteuthis duvauceli	0.11	2	0.05	100
Torpedo sp.	0.07	2	0.03	482
Pomadasys maculatus	0.06	2	0.03	419
Grammoplites suppositus	0.05	4	0.02	413
Lepidotrigla bispinosa	0.04	4	0.02	420
Minous monodactylus	0.04	6	0.02	407
Metapenaeus monoceros	0.04	2	0.02	427
Bregmaceros sp.	0.04	34	0.02	422
Leiognathus bindus	0.02	20	0.01	416
Laeops parviceps	0.02	6	0.01	415
Plotosus lineatus	0.01	2	0.01	406
Solenocera sp.	0.01	4	0.01	428
Champsodon sp.	0.01	6	0.01	425
Benthosema fibulatum	0.01	6	0.00	
Total	210.38		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 18
DATE :06.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 24°53.06
start stop duration Lon E 61°52.71
TIME :00:19:16 00:49:20 30.1 (min) Purpose : 2
LOG : 1788.71 1790.26 1.6 Region : 9104
FDEPTH: 105 107 Gear cond.: 0
BDEPTH: 105 107 Validity : 0
Towing dir: 0° Wire out : 260 m Speed : 3.1 kn
Sorted : 0 Total catch: 141.95 Catch/hour: 283.24

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nemipterus randalli	135.98	3373	48.01	1
Chaenogaleus macrostoma	61.92	602	21.86	445
Decapterus russelli	15.28	197	5.39	79
CALLIONYMIDAE	14.26	608	5.03	78
Parascolopsis eriomma	12.01	608	4.24	76
Epinephelus diacanthus	7.34	23	2.59	74
Charybdis sp.	6.94	597	2.45	
CONGER SP	6.42	122	2.27	81
Acanthocepola limbata	6.32	69	2.23	73
Sepia kobiensis	6.26	87	2.21	85
OPHICHTHIDAE	3.47	6	1.23	86
Saurida longimanus	2.50	93	0.88	75
Acropoma japonicum	0.99	52	0.35	77
Sphyraena obtusata	0.84	12	0.30	83
Starfish	0.73	219	0.26	
G A S T R O P O D S	0.69	110	0.24	
Uroteuthis duvauceli	0.59	12	0.21	84
Pristipomoides multidens	0.36	12	0.13	82
Parascolopsis aspinosa	0.25	6	0.09	37
Aseraggodes sp.	0.10	17	0.03	44
Total	283.24		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 19
DATE :06.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 25°7.26
start stop duration Lon E 63°30.54
TIME :10:53:44 11:23:48 30.1 (min) Purpose : 3
LOG : 1882.57 1884.49 1.9 Region : 9103
FDEPTH: 18 17 Gear cond.: 0
BDEPTH: 18 17 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.8 kn
Sorted : 0 Total catch: 75.57 Catch/hour: 150.80

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
J E L L Y F I S H	61.26	0	40.62	
Nemipterus japonicus	22.35	447	14.82	456
Epinephelus diacanthus	12.27	34	8.14	455
Sardinella gibbosa	11.87	329	7.87	470
Parastromateus niger	8.68	4	5.76	446
Sphyraena putnamae	7.98	10	5.29	450
Charybdis sp.	4.09	106	2.71	
Dussumieria acuta	3.39	194	2.25	457
Pomadasys olivaceus	2.99	18	1.98	461
Decapterus russelli	2.72	38	1.80	449
Lepturacanthus savala	1.47	18	0.98	469
Sphyraena obtusata	1.32	14	0.87	458
Pomadasys kaakan	1.14	2	0.75	468
Pomadasys stridens	1.09	18	0.72	448
Parapercis sp.	1.00	22	0.66	447
G A S T R O P O D S	0.98	50	0.65	
CALLIONYMIDAE	0.92	72	0.61	460
Lactarius lactarius	0.92	64	0.61	452
Cociella crocodilus	0.85	20	0.56	454
Pseudorhombus arsius	0.63	24	0.42	463
NARCINIDAE	0.58	6	0.39	486
Nemipterus randalli	0.57	12	0.38	459
Acreichthys tomentosus	0.50	6	0.33	451
Leiognathus lineolatus	0.37	90	0.25	464
Sepiella sp.	0.29	8	0.19	465
Grammoplites suppositus	0.27	18	0.18	453
Pseudorhombus elevatus	0.11	6	0.07	462
Zebrias synapturoides	0.10	6	0.06	466
Cynoglossus sp.	0.05	2	0.03	467
Charybdis feriata	0.03	18	0.02	
CONGER SP	0.01	2	0.00	471
Total	150.80		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 20
DATE :07.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 25°11.48
start stop duration Lon E 64°59.37
TIME :05:20:31 05:50:53 30.4 (min) Purpose : 3
LOG : 2000.68 2002.51 1.8 Region : 9103
FDEPTH: 23 24 Gear cond.: 0
BDEPTH: 23 24 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.6 kn
Sorted : 0 Total catch: 166.11 Catch/hour: 328.17

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Sardinella sp.	83.84	8859	25.55	539
Nemipterus japonicus	73.99	1207	22.55	538
Sphyraena putnamae	65.69	43	20.02	537
J E L L Y F I S H	20.84	0	6.35	
Himantura bleekeri	12.55	4	3.82	528
Alectis ciliaris	10.07	29	3.07	534
Pseudorhombus elevatus	9.66	121	2.95	536
Scomberomorus commerson	7.21	2	2.20	535
Pseudorhombus arsius	7.02	80	2.14	544
G A S T R O P O D S	6.53	152	1.99	
Sepia pharaonis	6.22	4	1.90	541
Grammoplites suppositus	3.81	211	1.16	526
Decapterus russelli	3.51	248	1.07	530
Carangoides chrysophrys	3.36	2	1.02	529
Acreichthys tomentosus	3.09	22	0.94	533
Pomadasys argenteus	2.57	2	0.78	542
Uroteuthis duvauceli	2.31	22	0.70	532
Saurida tumbil	2.01	7	0.61	543
SNAKE	1.98	4	0.60	
Rastrelliger kanagurta	0.72	22	0.22	531
Sepia latimanus	0.52	7	0.16	527
Cynoglossus sp.	0.52	58	0.16	545
Sardinella longiceps	0.10	7	0.03	540
Charybdis feriata	0.04	6	0.01	
Philyra sp.	0.03	4	0.01	
Total	328.17		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 21
DATE :07.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 25°12.88
start stop duration Lon E 65°1.59
TIME :07:13:42 07:43:35 29.9 (min) Purpose : 3
LOG : 2011.33 2012.92 1.6 Region : 9103
FDEPTH: 22 20 Gear cond.: 0
BDEPTH: 22 20 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.2 kn
Sorted : 0 Total catch: 129.01 Catch/hour: 258.97

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
J E L L Y F I S H	42.66	0	16.47	
Sepia pharaonis	35.03	20	13.53	504
Hypolophus sephen	29.51	2	11.39	505
Sphyraena jello	20.37	6	7.87	495
Scomberoides commersonianus	14.55	20	5.62	517
Pomadasys commersonni	11.94	8	4.61	494
Upeneus vittatus	11.24	496	4.34	499
Sphyraena putnamae	9.33	8	3.60	498
Himantura gerrardi	8.03	4	3.10	502
Drepane punctata	7.73	4	2.98	490
Pomadasys kaakan	6.93	8	2.67	496
Rhabdosargus sarba	6.93	8	2.67	497
G A S T R O P O D S	6.79	209	2.62	
Drepane longimana	6.52	6	2.52	491
Gymnura poecilura	6.12	2	2.36	518
Himantura bleekeri	5.48	2	2.12	503
Arius dussumieri	5.04	10	1.95	488
Nemipterus japonicus	4.42	68	1.71	500
Pseudorhombus elevatus	2.99	132	1.16	501
Pomadasys maculatus	2.71	52	1.05	506
Alectis indicus	2.09	2	0.81	493
Lagocephalus spadiceus	1.81	4	0.70	492
Grammoplites suppositus	1.75	78	0.68	515
Eleutheronema tetradactylum	1.56	2	0.60	487
Pseudorhombus arsius	1.33	26	0.51	509
Acreichthys tomentosus	1.24	8	0.48	519
Himantura walga	1.13	4	0.44	513
Gerres filamentosus	1.12	4	0.43	489
Uroteuthis duvauceli	0.67	6	0.26	514
SNAKE	0.60	2	0.23	
Zebrias synapturoides	0.52	16	0.20	508
Cynoglossus sp.	0.39	32	0.15	511
Alectis ciliaris	0.26	2	0.10	507
Sardinella gibbosa	0.09	2	0.03	512
E C H I N O D E R M A T A	0.04	6	0.02	
Cociella crocodilus	0.03	2	0.01	516
Epinephelus diacanthus	0.02	6	0.01	510
Total	258.97		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 22
DATE :07.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 25°12.41
start stop duration Lon E 65°27.54
TIME :10:54:14 11:24:04 29.8 (min) Purpose : 3
LOG : 2040.15 2042.25 2.1 Region : 9103
FDEPTH: 22 21 Gear cond.: 0
BDEPTH: 22 21 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 4.2 kn
Sorted : 0 Total catch: 24.82 Catch/hour: 49.94

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Epinephelus diacanthus	36.12	6665	72.32	522
G A S T R O P O D S	4.83	151	9.67	
J E L L Y F I S H	4.43	0	8.86	
SNAKE	3.02	8	6.04	
Acreichthys tomentosus	0.77	4	1.55	520
Decapterus russelli	0.46	6	0.91	521
Pseudorhombus elevatus	0.21	10	0.41	525
Pseudorhombus arsius	0.06	2	0.12	524
Cociella crocodilus	0.05	2	0.10	523
Total	49.94		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 23
DATE :07.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 25°0.70
start stop duration Lon E 65°36.37
TIME :13:42:57 14:12:29 29.5 (min) Purpose : 2
LOG : 2060.57 2062.48 1.9 Region : 9103
FDEPTH: 31 31 Gear cond.: 0
BDEPTH: 31 31 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.9 kn
Sorted : 0 Total catch: 88.38 Catch/hour: 179.64

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nemipterus randalli	44.49	1896	24.77	566
Grammoplites suppositus	40.14	1457	22.35	553
Lagocephalus spadiceus	14.48	67	8.06	551
Pomadasys kaakan	12.21	6	6.80	547
Sepia pharaonis	7.58	7	4.22	550
Muraenesox cinereus	5.06	8	2.82	578
Arius thalassinus*	4.47	2	2.49	549
Scomberoides commersonianus	4.17	4	2.32	568
Saurida tumbil	3.87	61	2.16	558
Bregmaceros sp.	3.64	3415	2.03	571
Lepturacanthus savala	3.14	18	1.75	552
G A S T R O P O D S	2.94	124	1.63	
Epinephelus diacanthus	2.79	495	1.55	570
Cynoglossus sp.	2.76	271	1.54	563
OPHICHTHIDAE	2.64	6	1.47	579
Aluterus monoceros	2.62	2	1.46	548
Saurida undosquamis	2.41	71	1.34	557
Sepia latimanus	2.38	16	1.32	555
Uranscopus marmoratus	2.25	14	1.25	556
Zebrias synapturoides	2.17	57	1.21	561
Pseudorhombus elevatus	2.07	110	1.15	559
J E L L Y F I S H	1.96	0	1.09	
Squilla sp.	1.74	159	0.97	
Alectis indicus	1.25	2	0.69	567
CONGER SP	0.80	22	0.44	554
Nemipterus japonicus	0.79	14	0.44	562
Psettodes erumei	0.75	2	0.42	575
E C H I N O D E R M A T A	0.72	142	0.40	
Pseudorhombus arsius	0.64	4	0.36	560
Lepidotrigla spiloptera	0.47	11	0.26	574
Thenus orientalis	0.47	4	0.26	569
Charybdis feriata	0.44	2	0.24	
Calappa sp.	0.18	2	0.10	
Sorsogna tuberculata	0.15	12	0.08	572
Metapenaeus monoceros	0.15	4	0.08	577
Pterois russelii	0.15	2	0.08	573
Apogon queketti	0.12	12	0.07	564
Sepiella sp.	0.10	2	0.06	576
Solenocera sp.	0.10	118	0.06	
Charybdis sp.	0.09	0	0.05	
Choridactylus multibartus	0.07	4	0.04	65
SNAKE	0.06	2	0.04	
Doclea sp.	0.06	2	0.03	
Cryptopodia fornicata	0.05	4	0.03	
Fistularia petimba	0.02	2	0.01	565
DORIPPIDAE	0.02	2	0.01	
Total	179.64		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 24
DATE :07.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 25°2.34
start stop duration Lon E 65°41.11
TIME :15:30:53 16:00:42 29.8 (min) Purpose : 2
LOG : 2071.18 2073.09 1.9 Region : 9103
FDEPTH: 28 28 Gear cond.: 0
BDEPTH: 28 28 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.9 kn
Sorted : 0 Total catch: 62.43 Catch/hour: 125.66

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pomadasys kaakan	20.13	14	16.02	60
Grammoplites suppositus	19.83	783	15.78	593
Bregmaceros sp.	17.21	13288	13.70	64
Muraenesox cinereus	15.40	14	12.25	63
Arius thalassinus*	6.98	4	5.56	61
E C H I N O D E R M A T A	6.05	1260	4.81	
Scomberoides commersonianus	5.43	7	4.32	601
Nemipterus japonicus	4.73	141	3.76	588
Pseudorhombus elevatus	3.74	201	2.98	604
Lagocephalus spadiceus	3.42	10	2.72	602
Rachycentron canadum	3.12	2	2.48	590
Cynoglossus sp.	2.51	232	2.00	603
G A S T R O P O D S	2.29	159	1.83	
Sepia pharaonis	2.07	2	1.64	595
Nemipterus randalli	2.01	76	1.60	589
J E L L Y F I S H	1.79	0	1.42	
Zebrias synapturoides	1.57	44	1.25	598
Decapterus russelli	1.29	16	1.03	581
CONGER SP	1.18	16	0.94	594
Saurida undosquamis	1.03	24	0.82	582
Uranscopus marmoratus	0.67	2	0.53	580
Lepturacanthus savala	0.66	4	0.52	596
Metapenaeus monoceros	0.65	83	0.52	59
Sorsogna tuberculata	0.37	24	0.30	584
Pseudorhombus arsius	0.35	6	0.28	599
Sphyraena obtusata	0.25	2	0.20	597
Saurida tumbil	0.18	2	0.14	583
Nemipterus sp.	0.12	147	0.10	58
Minous monodactylus	0.11	6	0.09	591
Epinephelus diacanthus	0.11	24	0.09	585
Solenocera sp.	0.10	119	0.08	
Cryptopodia fornicata	0.08	6	0.06	
Charybdis sp.	0.08	20	0.06	
Sepiella sp.	0.08	2	0.06	592
Apogon quadrifasciatus	0.02	2	0.02	62
Squilla sp.	0.02	2	0.02	
Apogon queketti	0.01	2	0.01	587
Champsodon sp.	0.01	8	0.01	600
GOBIIDAE	0.01	2	0.01	586
Total	125.66		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 25
DATE :08.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 24°55.07
start stop duration Lon E 66°0.06
TIME :01:50:16 02:20:32 30.3 (min) Purpose : 3
LOG : 2123.54 2125.24 1.7 Region : 9100
FDEPTH: 146 148 Gear cond.: 0
BDEPTH: 146 148 Validity : 0
Towing dir: 0° Wire out : 380 m Speed : 3.4 kn
Sorted : 0 Total catch: 243.94 Catch/hour: 483.69

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nemipterus randalli	182.00	4388	37.63	618
Atrobucca alcocki	161.12	1664	33.31	617
Parascolopsis eriomma	48.14	2105	9.95	619
Lepturacanthus savala	22.84	344	4.72	610
Decapterus russelli	21.37	123	4.42	621
Chaenogaleus macrostoma	12.99	17	2.69	66
Sepia kobiensis	6.79	108	1.40	607
G A S T R O P O D S	4.38	462	0.91	
Saurida longimanus	3.82	152	0.79	620
Uraspis secunda	3.69	15	0.76	615
Saurida tumbil	2.55	20	0.53	67
OPHICHTHIDAE	1.96	5	0.41	622
E C H I N O D E R M A T A	1.96	531	0.41	
MUGILIDAE	1.76	0	0.36	
Muraenesox cinereus	1.54	5	0.32	68
Epinephelus diacanthus	1.08	5	0.22	614
J E L L Y F I S H	1.02	0	0.21	
CONGER SP	0.99	44	0.20	70
Pristipomoides multidens	0.65	15	0.14	608
Synagrops japonicus	0.62	141	0.13	612
Bregmaceros sp.	0.47	474	0.10	616
Grammoplites suppositus	0.42	5	0.09	80
Pseudorhombus elevatus	0.37	25	0.08	611
Champsodon sp.	0.33	222	0.07	613
Minous dempsterae	0.31	15	0.06	606
Parapercis sp.	0.17	5	0.04	605
Solenocera hextii	0.15	157	0.03	
Acropoma japonicum	0.08	5	0.02	609
Charybdis sp.	0.05	14	0.01	
Philyra sp.	0.04	10	0.01	
GOBIIDAE	0.02	18	0.00	69
Total	483.69		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 26
DATE :08.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 24°59.03
start stop duration Lon E 65°43.62
TIME :04:59:57 05:29:59 30.0 (min) Purpose : 3
LOG : 2145.55 2147.43 1.9 Region : 9100
FDEPTH: 53 63 Gear cond.: 0
BDEPTH: 53 63 Validity : 0
Towing dir: 0° Wire out : 150 m Speed : 3.7 kn
Sorted : 0 Total catch: 42.94 Catch/hour: 85.77

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
J E L L Y F I S H	72.20	0	84.18	
Lepturacanthus savala	3.12	12	3.64	624
Scomberomorus koreanus	2.06	2	2.41	628
G A S T R O P O D S	2.04	242	2.38	
Decapterus russelli	1.94	22	2.26	633
Dussumieria acuta	1.02	16	1.19	623
Saurida tumbil	0.85	4	0.99	632
Grammoplites suppositus	0.67	18	0.78	625
Saurida undosquamis	0.43	8	0.50	627
Epinephelus diacanthus	0.37	12	0.43	630
Lagocephalus spadiceus	0.36	1	0.42	634
Nemipterus randalli	0.24	0	0.28	
Uranscopus marmoratus	0.12	2	0.14	631
Metapenaeus monoceros	0.12	2	0.14	635
Nemipterus japonicus	0.11	8	0.13	626
E C H I N O D E R M A T A	0.07	12	0.08	
Champsodon sp.	0.02	1	0.03	629
Squilla sp.	0.01	2	0.01	
Charybdis sp.	0.01	2	0.01	
Total	85.77		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 27
DATE :08.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 25°0.16
start stop duration Lon E 65°37.05
TIME :06:22:46 06:52:48 30.0 (min) Purpose : 3
LOG : 2152.69 2154.55 1.9 Region : 9100
FDEPTH: 33 33 Gear cond.: 0
BDEPTH: 33 33 Validity : 0
Towing dir: 0° Wire out : 130 m Speed : 3.7 kn
Sorted : 0 Total catch: 110.93 Catch/hour: 221.63

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pomadasys kaakan	83.32	42	37.59	10
Lagocephalus spadiceus	58.54	262	26.41	13
Arius thalassinus*	25.97	14	11.72	9
Sphyraena jello	15.58	2	7.03	14
J E L L Y F I S H	15.28	0	6.90	
Scomberoides commersonianus	7.49	10	3.38	12
Scomberomorus commerson	3.00	2	1.35	11
Sepia pharaonis	2.54	4	1.15	20
G A S T R O P O D S	2.42	78	1.09	
Nemipterus randalli	2.27	44	1.02	19
Epinephelus diacanthus	0.90	6	0.40	15
Chirocentrus nudus	0.71	2	0.32	23
Grammoplites suppositus	0.69	18	0.31	18
E C H I N O D E R M A T A	0.65	0	0.29	
Alectis ciliaris	0.49	2	0.22	8
Saurida undosquamis	0.38	6	0.17	17
Carangoides malabaricus	0.38	2	0.17	7
Sepia latimanus	0.33	4	0.15	22
Pseudorhombus elevatus	0.25	14	0.11	16
Fistularia petimba	0.16	2	0.07	6
Thenus orientalis	0.14	2	0.06	21
Calappa sp.	0.13	2	0.06	
DORIPPIDAE	0.02	2	0.01	
Total	221.63		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 28
DATE :08.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 25°2.20
start stop duration Lon E 65°39.50
TIME :07:59:20 08:29:59 30.6 (min) Purpose : 3
LOG : 2159.92 2161.60 1.7 Region : 9100
FDEPTH: 28 29 Gear cond.: 0
BDEPTH: 28 29 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.3 kn
Sorted : 0 Total catch: 33.98 Catch/hour: 66.54

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
E C H I N O D E R M A T A	18.60	2546	27.96	
J E L L Y F I S H	15.86	0	23.84	
Lagocephalus spadiceus	8.93	37	13.42	32
Pomadasys kaakan	8.71	6	13.10	
Aluterus monoceros	3.77	2	5.66	34
Scomberomorus commerson	1.79	2	2.70	33
Scomberoides commersonianus	1.53	2	2.29	35
Grammoplites suppositus	1.51	45	2.27	36
Pseudorhombus elevatus	1.15	61	1.73	31
G A S T R O P O D S	1.10	57	1.66	
Nemipterus japonicus	1.09	22	1.63	27
Cynoglossus sp.	0.62	53	0.94	636
Saurida tumbil	0.35	2	0.53	24
Saurida undosquamis	0.27	10	0.41	25
Nemipterus randalli	0.26	8	0.39	26
Carangoides malabaricus	0.17	2	0.26	
Sorsogna tuberculata	0.14	6	0.22	637
Uroteuthis duvauceli	0.14	2	0.21	639
Thenus orientalis	0.13	0	0.20	640
Calappa sp.	0.13	2	0.20	
Decapterus russelli	0.11	2	0.16	28
Epinephelus diacanthus	0.06	10	0.09	30
Zebrias synapturoides	0.05	2	0.08	29
Apogon quadrifasciatus	0.01	2	0.02	638
DORIPPIDAE	0.01	2	0.02	
Metapenaeus monoceros	0.01	2	0.01	641
Charybdis sp.	0.01	2	0.01	
Total	66.54		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 29
DATE :08.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 25°8.25
start stop duration Lon E 65°44.86
TIME :09:53:56 10:24:37 30.7 (min) Purpose : 3
LOG : 2171.53 2173.32 1.8 Region : 9100
FDEPTH: 25 24 Gear cond.: 0
BDEPTH: 25 24 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.5 kn
Sorted : 0 Total catch: 32.28 Catch/hour: 63.11

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
J E L L Y F I S H	28.54	0	45.23	
Sepia pharaonis	11.24	8	17.81	741
G A S T R O P O D S	5.67	235	8.98	
Lagocephalus spadiceus	3.90	12	6.17	26
Scomberoides commersonianus	3.48	2	5.52	25
Pomadasys argenteus	3.42	2	5.42	740
Alectis ciliaris	1.20	4	1.91	28
Grammoplites suppositus	1.19	25	1.89	27
E C H I N O D E R M A T A	1.04	205	1.65	
Nemipterus randalli	0.81	27	1.29	738
Saurida undosquamis	0.56	10	0.88	737
Pseudorhombus elevatus	0.52	27	0.82	24
Decapterus russelli	0.44	7	0.70	23
Sepia latimanus	0.24	2	0.38	735
Saurida tumbil	0.23	2	0.37	20
Uroteuthis duvaucelii	0.23	2	0.37	22
Epinephelus diacanthus	0.17	35	0.27	739
Zebrias synapturoides	0.12	4	0.19	21
Nemipterus japonicus	0.10	2	0.15	736
Total	63.11		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 30
DATE :08.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 25°3.14
start stop duration Lon E 65°50.67
TIME :12:03:04 12:33:26 30.4 (min) Purpose : 3
LOG : 2185.57 2187.54 2.0 Region : 9100
FDEPTH: 77 79 Gear cond.: 0
BDEPTH: 77 79 Validity : 0
Towing dir: 0° Wire out : 210 m Speed : 3.9 kn
Sorted : 0 Total catch: 62.53 Catch/hour: 123.54

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus russelli	70.83	960	57.33	723
Nemipterus randalli	33.59	866	27.19	724
Sphyraena obtusata	4.81	55	3.90	715
Lepturacanthus savala	2.88	20	2.33	716
J E L L Y F I S H	2.64	0	2.13	
Saurida tumbil	2.01	12	1.62	719
G A S T R O P O D S	1.99	223	1.61	
Saurida undosquamis	1.91	53	1.55	717
Uraspis secunda	0.87	4	0.70	720
Saurida longimanus	0.70	32	0.57	718
Epinephelus diacanthus	0.51	32	0.41	721
Lagocephalus spadiceus	0.38	4	0.31	725
Champsodon sp.	0.17	85	0.14	728
Uroteuthis duvaucelii	0.12	4	0.10	726
Pseudorhombus elevatus	0.07	4	0.06	727
E C H I N O D E R M A T A	0.07	26	0.05	
Aseraggodes sp.	0.00	2	0.00	722
Philyra sp.	0.00	2	0.00	
Total	123.54		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 31
DATE :08.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 24°55.01
start stop duration Lon E 65°58.84
TIME :14:24:56 14:54:45 29.8 (min) Purpose : 2
LOG : 2200.28 2201.86 1.6 Region : 9100
FDEPTH: 144 145 Gear cond.: 0
BDEPTH: 144 145 Validity : 0
Towing dir: 0° Wire out : 370 m Speed : 3.2 kn
Sorted : 0 Total catch: 142.84 Catch/hour: 287.49

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nemipterus randalli	147.41	3276	51.27	17
Atrobucca alcocki	82.74	656	28.78	18
Parascolopsis eriomma	35.52	1607	12.35	19
Decapterus russelli	4.56	62	1.59	730
Chaenogaleus macrostoma	4.45	16	1.55	8
Saurida longimanus	2.30	99	0.80	732
Epinephelus diacanthus	1.50	8	0.52	734
Saurida undosquamis	1.47	12	0.51	733
Sepia kobiensis	1.44	25	0.50	11
Lepturacanthus savala	1.24	29	0.43	10
J E L L Y F I S H	0.96	0	0.33	
Parascolopsis aspinosa	0.84	12	0.29	729
Solenocera hextii	0.77	739	0.27	
Selar crumenophthalmus	0.71	4	0.25	731
Bregmaceros sp.	0.37	233	0.13	16
G A S T R O P O D S	0.32	54	0.11	
CONGER SP	0.24	8	0.08	15
Pristipomoides multidens	0.19	4	0.07	9
E C H I N O D E R M A T A	0.15	52	0.05	
Charybdis sp.	0.13	4	0.04	
Cynoglossus sp.	0.09	4	0.03	12
Synagrops japonicus	0.06	36	0.02	14
Champsodon sp.	0.04	32	0.02	13
Hermits, mixed	0.01	4	0.00	
Total	287.49		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 32
DATE :08.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 24°57.84
start stop duration Lon E 66°18.39
TIME :21:06:55 21:36:59 30.1 (min) Purpose : 3
LOG : 2231.78 2233.53 1.8 Region : 9100
FDEPTH: 76 83 Gear cond.: 0
BDEPTH: 76 83 Validity : 0
Towing dir: 0° Wire out : 200 m Speed : 3.5 kn
Sorted : 0 Total catch: 30.25 Catch/hour: 60.35

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nemipterus randalli	37.11	861	61.49	31
Grammoplites suppositus	3.23	184	5.36	34
Sepia latimanus	2.99	36	4.96	750
Decapterus russelli	2.49	34	4.13	745
Atrobucca alcocki	2.12	14	3.50	40
Nemipterus japonicus	2.02	16	3.34	36
J E L L Y F I S H	2.00	0	3.31	
Bregmaceros sp.	1.49	1301	2.46	33
Metapenaeus monoceros	1.08	96	1.79	752
Lagocephalus spadiceus	0.86	4	1.42	37
Solenocera sp.	0.86	321	1.42	751
CONGER SP	0.85	34	1.41	749
Nemipterus sp.	0.83	636	1.37	753
Saurida tumbil	0.62	2	1.02	39
G A S T R O P O D S	0.31	24	0.51	

Saurida undosquamis	0.28	10	0.46	744
Charybdis sp.	0.24	142	0.39	
Uranscopus marmoratus	0.22	2	0.36	38
Champsodon sp.	0.19	98	0.31	32
Sepiella sp.	0.17	22	0.27	35
Lepturacanthus savala	0.09	2	0.14	42
Solea sp.	0.05	8	0.09	748
Sicyonia sp.	0.05	110	0.09	
Epinephelus diacanthus	0.05	8	0.09	743
Apogon queketti	0.04	4	0.06	746
Sorsogna tuberculata	0.04	4	0.06	41
Parapercis sp.	0.03	2	0.06	747
Minous dempsterae	0.02	2	0.04	30
Minous monodactylus	0.02	2	0.04	29
Laeops parviceps	0.02	4	0.03	43
CALLIONYMIDAE	0.01	4	0.01	742
Squilla sp.	0.00	2	0.01	
Total	60.35		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 33
DATE :09.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 25°8.40
start stop duration Lon E 66°2.72
TIME :01:49:04 02:19:06 30.0 (min) Purpose : 3
LOG : 2262.07 2263.77 1.7 Region : 9100
FDEPTH: 79 79 Gear cond.: 0
BDEPTH: 79 79 Validity : 0
Towing dir: 0° Wire out : 210 m Speed : 3.4 kn
Sorted : 0 Total catch: 188.22 Catch/hour: 376.07

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus russelli	234.31	3360	62.31	70
Nemipterus randalli	47.04	911	12.51	79
Atrobucca alcocki	35.96	131	9.56	78
Sphyraena obtusata	14.66	179	3.90	71
Saurida tumbil	11.11	40	2.95	73
Uraspis secunda	8.63	31	2.30	81
Torpedo sp.	8.19	2	2.18	90
Nemipterus japonicus	2.60	22	0.69	72
Lepturacanthus savala	2.52	22	0.67	80
G A S T R O P O D S	2.45	62	0.65	
Sepia latimanus	1.85	26	0.49	84
Muraenesox cinereus	1.54	4	0.41	85
Saurida undosquamis	1.42	22	0.38	74
Epinephelus diacanthus	0.83	17	0.22	83
Lagocephalus spadiceus	0.72	9	0.19	82
J E L L Y F I S H	0.58	0	0.15	
Uranscopus marmoratus	0.56	4	0.15	75
Champsodon sp.	0.51	205	0.14	76
Sepia omani	0.20	4	0.05	86
Grammoplites suppositus	0.12	9	0.03	87
Lepidotrigla bispinosa	0.11	4	0.03	89
Uroteuthis duvaucelii	0.05	0	0.01	88
Charybdis sp.	0.04	20	0.01	
Aseraggodes sp.	0.03	4	0.01	77
Sea cucumbers	0.01	2	0.00	
Sicyonia sp.	0.01	8	0.00	
Solenocera sp.	0.00	2	0.00	
Total	376.07		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 34
DATE :09.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 25°18.14
start stop duration Lon E 66°1.08
TIME :04:15:29 04:45:43 30.2 (min) Purpose : 3
LOG : 2276.80 2278.72 1.9 Region : 9100
FDEPTH: 18 20 Gear cond.: 0
BDEPTH: 18 20 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.8 kn
Sorted : 0 Total catch: 75.38 Catch/hour: 149.62

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
J E L L Y F I S H	46.15	0	30.84	
Alepes djedaba	14.59	327	9.75	106
Sardinella albella	10.92	1160	7.30	772
Sphyraena putnamae	10.52	14	7.03	756
Parastromateus niger	10.22	8	6.83	754
Arius dussumieri	8.14	163	5.44	105
Arius maculatus	7.05	40	4.71	759
Scomberomorus koreanus	6.85	10	4.58	755
Terapon jarbua	5.36	26	3.58	760
SNAKE	4.37	0	2.92	
Lepturacanthus savala	2.78	10	1.86	763
Scomberoides commersonianus	2.48	0	1.66	
Pomadasys maculatus	1.91	46	1.28	771
Sepia pharaonis	1.69	2	1.13	789
Sardinella gibbosa	1.59	30	1.06	777
Chirocentrus nudus	1.39	4	0.93	762
Decapterus russelli	1.09	14	0.73	761
G A S T R O P O D S	1.00	48	0.67	
Rastrelliger kanagurta	1.00	6	0.67	770
Rhabdosargus sarba	0.99	2	0.66	758
Lagocephalus spadiceus	0.93	4	0.62	764
Pomadasys stridens	0.92	28	0.62	766
Nemipterus japonicus	0.83	14	0.55	768
Pomadasys kaakan	0.79	2	0.53	757
Atropus atropos	0.74	4	0.50	783
Thryssa dussumieri	0.63	54	0.42	778
Grammoplites suppositus	0.63	34	0.42	765
Upeneus vittatus	0.63	12	0.42	769
Gerres filamentosus	0.61	8	0.41	775
Uroteuthis duvaucelii	0.50	8	0.33	774
Drepane longimana	0.47	8	0.31	784
Carangoides armatus	0.33	0	0.22	782
Pennahia macrophthalmus *	0.29	2	0.19	779
Dussumieria acuta	0.28	11	0.19	773
Cynoglossus arel	0.22	2	0.15	776
Johnius sp.	0.19	2	0.13	781
Cynoglossus sp.	0.15	8	0.10	786
Sphyraena obtusata	0.14	2	0.09	780
Arius thalassinus*	0.14	2	0.09	767
Pseudorhombus arsius	0.08	2	0.06	787
Champsodon sp.	0.03	18	0.02	788
Epinephelus diacanthus	0.01	4	0.01	785
E C H I N O D E R M A T A	0.01	0	0.01	
Total	149.62		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 35
DATE :09.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 25°9.31
start stop duration Lon E 66°17.40
TIME :06:58:00 07:28:13 30.2 (min) Purpose : 3
LOG : 2296.26 2297.88 1.6 Region : 9100
FDEPTH: 68 70 Gear cond.: 0
BDEPTH: 68 70 Validity : 0
Towing dir: 0° Wire out : 180 m Speed : 3.2 kn
Sorted : 0 Total catch: 23.63 Catch/hour: 46.91

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nemipterus randalli	14.59	275	31.11	102
Decapterus russelli	12.01	186	25.61	101
Sepia kobiensis	5.93	83	12.63	97
J E L L Y F I S H	3.67	0	7.83	
Epinephelus diacanthus	3.18	68	6.77	94
G A S T R O P O D S	2.57	99	5.48	
Sepia latimanus	1.34	16	2.85	96
Scomberoides commersonianus	1.01	2	2.15	98
Champsodon sp.	0.82	368	1.76	103
Terapon jarbua	0.80	4	1.71	91
Scylla serrata	0.43	2	0.91	
Pseudotriacanthus strigilifer	0.28	2	0.59	99
Grammoplites suppositus	0.11	6	0.23	93
Saurida undosquamis	0.10	2	0.20	92
Uroteuthis duvaucelii	0.05	2	0.11	95
Metapenaeus monoceros	0.02	2	0.04	104
Bregmaceros sp.	0.01	8	0.01	100
Total	46.91		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 36
DATE :09.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 25°14.14
start stop duration Lon E 66°29.72
TIME :09:33:24 10:03:27 30.1 (min) Purpose : 3
LOG : 2314.20 2316.03 1.8 Region : 9100
FDEPTH: 19 21 Gear cond.: 0
BDEPTH: 19 21 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.6 kn
Sorted : 0 Total catch: 40.01 Catch/hour: 79.89

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nemipterus japonicus	27.65	514	34.62	810
J E L L Y F I S H	12.38	0	15.50	
G A S T R O P O D S	11.78	0	14.75	
Acanthopagrus latus	6.19	22	7.75	804
Terapon jarbua	5.29	24	6.62	811
Rastrelliger kanagurta	1.88	22	2.35	798
Drepane longimana	1.70	20	2.12	791
Grammoplites suppositus	1.64	94	2.05	812
Saurida tumbil	1.52	8	1.91	799
Pomadasys maculatus	1.45	48	1.81	808
Alepes djedaba	1.42	8	1.77	797
Uroteuthis duvaucelii	1.27	12	1.58	801
Arius thalassinus*	1.14	12	1.42	806
Scomberoides commersonianus	0.80	2	1.00	802
Pomadasys stridens	0.67	18	0.84	800
Upeneus vittatus	0.56	20	0.69	803
Alectis ciliaris	0.39	6	0.49	796
Lagocephalus spadiceus	0.37	4	0.46	790
Pseudorhombus arsius	0.34	6	0.43	805
Sardinella gibbosa	0.28	6	0.34	807
Gerres filamentosus	0.25	4	0.31	813
Triacanthus biaculeatus	0.24	2	0.30	793
Epinephelus diacanthus	0.22	6	0.27	795
Nemipterus randalli	0.18	4	0.23	809
Pseudorhombus elevatus	0.16	8	0.20	794
Stephanolepis diaspros	0.12	2	0.15	792
Total	79.89		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 37
DATE :26.10.2010 GEAR TYPE: PT NO: 4 POSITION:Lat N 24°38.14
start stop duration Lon E 61°40.14
TIME :22:29:39 22:40:21 10.7 (min) Purpose : 1
LOG : 593.74 594.33 0.6 Region : 9122
FDEPTH: 30 30 Gear cond.: 0
BDEPTH: 1407 1465 Validity : 0
Towing dir: 0° Wire out : 90 m Speed : 3.3 kn
Sorted : 0 Total catch: 45.50 Catch/hour: 255.63

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Benthosema fibulatum	251.12	289388	98.24	239
Ommastrephes sp.	2.58	22	1.01	241
Neoepinnula orientalis	1.51	258	0.59	240
Charybdis sp.	0.33	11	0.13	243
Abralia sp.	0.07	45	0.03	242
Leptocephalus	0.02	22	0.01	
Total	255.63		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 37
DATE :09.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 25°6.79
start stop duration Lon E 66°35.20
TIME :11:39:38 12:08:50 29.2 (min) Purpose : 3
LOG : 2327.68 2329.54 1.9 Region : 9100
FDEPTH: 23 24 Gear cond.: 0
BDEPTH: 23 24 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.8 kn
Sorted : 0 Total catch: 171.02 Catch/hour: 351.41

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus russelli	129.14	4981	36.75	1151
Sphyraena putnamae	55.67	107	15.84	1139
Uroteuthis duvaucelii	41.40	602	11.78	1150
Nemipterus randalli	34.11	767	9.71	1152
Nemipterus japonicus	19.52	330	5.55	1153
Trachinotus mookalee	12.84	18	3.65	1166
Chirocentrus nudus	10.89	14	3.10	1163
Sepia pharaonis	10.07	12	2.87	1154
Alectis ciliaris	5.03	16	1.43	261
J E L L Y F I S H	4.68	0	1.33	
Lutjanus johnii	4.63	2	1.32	1165
Saurida tumbil	3.83	21	1.09	1155
Terapon jarbua	3.39	60	0.96	1140
Lagocephalus spadiceus	2.60	8	0.74	1141
Scomberomorus commerson	2.59	2	0.74	1164
SNAKE	2.05	4	0.58	
G A S T R O P O D S	2.05	101	0.58	
Grammoplites suppositus	1.72	80	0.49	1156
Sepia latimanus	1.30	12	0.37	1142
Arius thalassinus*	0.65	6	0.19	1144
Pomadasys kaakan	0.60	4	0.17	1145
Triacanthus biaculeatus	0.40	2	0.11	228
Sorsogna tuberculata	0.35	23	0.10	1143
Gerres filamentosus	0.28	4	0.08	1157
Saurida undosquamis	0.28	4	0.08	1146
Pomadasys maculatus	0.27	4	0.08	1147
Sepia omani	0.25	10	0.07	1162
Stephanolepis diaspros	0.22	2	0.06	1158
Pomadasys stridens	0.21	6	0.06	1159
Pseudorhombus arsius	0.15	4	0.04	1148
Pseudorhombus elevatus	0.12	6	0.03	1160
Sepiella sp.	0.08	2	0.02	1161
Leiognathus lineolatus	0.01	2	0.00	1149
Philyra sp.	0.00	2	0.00	
Total	351.41		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 38
DATE :09.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 24°50.28
start stop duration Lon E 66°21.42
TIME :17:21:17 17:51:57 30.7 (min) Purpose : 3
LOG : 2364.75 2366.45 1.7 Region : 9100
FDEPTH: 62 69 Gear cond.: 0
BDEPTH: 62 69 Validity : 0
Towing dir: 0° Wire out : 210 m Speed : 3.3 kn
Sorted : 0 Total catch: 54.34 Catch/hour: 106.31

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nemipterus randalli	50.78	1500	47.76	1177
J E L L Y F I S H	15.65	0	14.72	
Decapterus russelli	9.49	184	8.92	1190
Nemipterus japonicus	9.00	102	8.46	1191
Grammoplites suppositus	3.03	110	2.85	1184
Uraspis secunda	2.47	10	2.33	1169
Saurida tumbil	2.47	12	2.32	1183
Solenocera choprai	2.21	158	2.08	1192
Atrobucca alcocki	2.13	6	2.01	1182
Metapenaeus monoceros	1.86	113	1.75	1193
Sepia latimanus	1.41	20	1.32	1180
Saurida undosquamis	1.20	29	1.13	1167
G A S T R O P O D S	1.16	35	1.09	
Sepia kobiensis	1.12	16	1.05	1179
Pseudorhombus arsius	0.57	2	0.54	1168
Triacanthus biaculeatus	0.41	2	0.39	1187
Epinephelus diacanthus	0.37	4	0.35	1172
Upeneus vittatus	0.23	4	0.22	209
CONGER SP	0.12	6	0.11	1186
Bregmaceros sp.	0.11	76	0.11	1189
Sepiella sp.	0.10	16	0.10	1178
Lepidotrigla spiloptera	0.08	4	0.08	1173
Sphyraena putnamae	0.06	2	0.06	1170
Apogon queketti	0.05	4	0.04	1175
Squilla sp.	0.04	10	0.04	
Sorsogna tuberculata	0.04	4	0.04	1176
Parascolopsis aspinosa	0.04	2	0.03	1171
Charybdis sp.	0.03	12	0.03	
Minous dempsterae	0.03	2	0.03	1174
Fistularia petimba	0.02	2	0.02	1185
Laeops parviceps	0.01	2	0.01	1181
Champsodon sp.	0.01	6	0.01	1188
Total	106.31		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 38
DATE :27.10.2010 GEAR TYPE: PT NO: 4 POSITION:Lat N 24°48.42
start stop duration Lon E 61°41.14
TIME :00:38:49 00:53:07 14.3 (min) Purpose : 1
LOG : 607.48 608.33 0.9 Region : 9121
FDEPTH: 30 30 Gear cond.: 0
BDEPTH: 191 370 Validity : 0
Towing dir: 0° Wire out : 90 m Speed : 3.5 kn
Sorted : 0 Total catch: 345.29 Catch/hour: 1448.78

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Benthosema fibulatum	1292.31	1376312	89.20	248
Chelonia mydas	134.27	4	9.27	
Neoepinnula orientalis	16.78	2706	1.16	244
Synagrops adeni	4.32	1620	0.30	246
Abralia sp.	1.08	541	0.07	245
SYNGNATHIDAE	0.02	4	0.00	247
Total	1448.78		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 39
DATE :27.10.2010 GEAR TYPE: PT NO: 4 POSITION:Lat N 24°56.42
start stop duration Lon E 61°47.77
TIME :04:58:42 05:18:29 19.8 (min) Purpose : 1
LOG : 628.59 629.64 1.1 Region : 9121
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 44 34 Validity : 0
Towing dir: 0° Wire out : 85 m Speed : 3.2 kn
Sorted : 0 Total catch: 8.42 Catch/hour: 25.52

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
J E L L Y F I S H	15.01	2501	58.82	
Dussumieria acuta	3.44	106	13.49	249
SNAKE	3.30	12	12.95	
Uroteuthis duvaucelii	2.60	467	10.18	255
Decapterus russelli	0.69	606	2.71	254
Lepturacanthus savala	0.23	9	0.89	250
Abralia sp.	0.09	61	0.37	253
Carangoides sp.	0.08	136	0.33	251
Stolephorus sp.	0.03	12	0.12	252
SYNGNATHIDAE	0.01	3	0.05	
Sardinella sp.	0.01	3	0.04	
Fistularia petimba	0.01	3	0.02	296
Cubiceps whiteleggii	0.01	3	0.02	
Rastrelliger kanagurta	0.00	3	0.01	
Total	25.52		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 39
DATE :10.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 25°0.87
start stop duration Lon E 66°36.72
TIME :02:05:03 02:35:15 30.2 (min) Purpose : 3
LOG : 2396.14 2397.82 1.7 Region : 9100
FDEPTH: 23 26 Gear cond.: 0
BDEPTH: 23 26 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.3 kn
Sorted : 0 Total catch: 574.60 Catch/hour: 1141.97

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pomadasys stridens	500.23	8970	43.80	1219
Lepturacanthus savala	123.72	226	10.83	1194
Gymnura poecilura	80.79	30	7.07	1201
J E L L Y F I S H	61.95	0	5.42	
Sphyraena obtusata	60.78	666	5.32	363
Rastrelliger kanagurta	33.31	269	2.92	364
Sardinella gibbosa	32.14	654	2.81	360
Pomadasys maculatus	30.71	794	2.69	1205
Alepes djedaba	16.79	0	1.47	
Atropus atropos	14.87	70	1.30	372
Gazza minuta	14.61	386	1.28	1218
Gerres filamentosus	13.24	175	1.16	1203
Scomberomorus koreanus	13.12	20	1.15	362
Parastromateus niger	11.48	22	1.00	361
Alectis indicus	11.29	117	0.99	370
Pennahia macrophthalmus *	11.17	129	0.98	1228
Scomberoides commersonianus	10.14	16	0.89	1223
Sphyraena putnamae	8.65	6	0.76	1199
Ilisha sp.	8.63	129	0.76	371
Leiognathus equulus	8.19	129	0.72	369
Terapon jarbua	7.47	70	0.65	373
Rhabdosargus sarba	7.31	35	0.64	1209
Upeneus vittatus	6.66	142	0.58	203
Decapterus russelli	5.98	164	0.52	1202
Himantura walga	5.27	10	0.46	365
Loligo sp.	4.43	70	0.39	1211
Lagocephalus spadiceus	4.07	12	0.36	379
Himantura gerrardi	3.88	0	0.34	1200
Nemipterus randalli	3.40	105	0.30	367
Chirocentrus nudus	2.29	8	0.20	1227
Lactarius lactarius	2.29	35	0.20	368
Saurida undosquamis	2.17	12	0.19	381
Saurida tumbil	2.09	12	0.18	1213
Protonibea diacanthus	2.07	12	0.18	380
Otolithes ruber	1.99	3	0.17	375
Megalaspis cordyla	1.79	4	0.16	366
SNAKE	1.59	2	0.14	
MURAENIDAE	1.49	2	0.13	1224
Arius thalassinus*	1.43	2	0.13	1226
Thenus orientalis	1.36	0	0.12	
Drepane longimana	1.33	12	0.12	1222
Drepane punctata	1.09	2	0.10	376
Sorsogna tuberculata	0.88	47	0.08	377
Epinephelus diacanthus	0.65	35	0.06	1220
Arius dussumieri	0.54	12	0.05	382
Dussumieria acuta	0.54	23	0.05	374
Pampus argenteus	0.50	2	0.04	1225
Sepia kobiensis	0.48	12	0.04	383
Muraenesox cinereus	0.39	2	0.03	1215
Nibea maculata	0.33	2	0.03	1208
Grammoplites suppositus	0.28	12	0.02	378
Pseudorhombus elevatus	0.20	12	0.02	1221
Total	1141.97		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 40
DATE :27.10.2010 GEAR TYPE: PT NO: 4 POSITION:Lat N 24°57.27
start stop duration Lon E 61°52.58
TIME :08:25:37 08:55:04 29.5 (min) Purpose : 1
LOG : 648.92 650.74 1.8 Region : 9121
FDEPTH: 30 38 Gear cond.: 0
BDEPTH: 60 61 Validity : 0
Towing dir: 0° Wire out : 0 m Speed : 3.7 kn
Sorted : 0 Total catch: 754.35 Catch/hour: 1536.88

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dussumieria acuta	780.31	20455	50.77	259
Sardinella sp.	543.97	11625	35.39	260
Sardinella longiceps	191.10	2640	12.43	257
Decapterus russelli	20.07	310	1.31	258
Fistularia petimba	1.43	6	0.09	256
Total	1536.88		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 40
DATE :10.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 24°50.91
start stop duration Lon E 66°20.79
TIME :05:12:44 05:42:45 30.0 (min) Purpose : 3
LOG : 2418.05 2419.60 1.6 Region : 9100
FDEPTH: 65 61 Gear cond.: 0
BDEPTH: 65 61 Validity : 0
Towing dir: 0° Wire out : 180 m Speed : 3.1 kn
Sorted : 0 Total catch: 142.08 Catch/hour: 283.98

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nemipterus randalli	89.02	1447	31.35	1217
Decapterus russelli	67.69	1141	23.84	1214
J E L L Y F I S H	34.94	0	12.30	
Nemipterus japonicus	29.02	347	10.22	1216
Saurida tumbil	11.57	63	4.08	262
Sepia latimanus	11.54	157	4.06	309
Pomadasys kaakan	8.99	6	3.17	312
Himantura gerrardi	4.95	3	1.74	264
Scomberoides commersonianus	3.72	8	1.31	1207
G A S T R O P O D S	2.49	0	0.88	
Saurida undosquamis	2.45	52	0.86	268
Uraspis secunda	2.28	8	0.80	285
Grammoplites suppositus	1.79	36	0.63	288
Sepia kobiensis	1.72	22	0.60	305
Sepia pharaonis	1.60	3	0.56	306
Himantura walga	1.51	3	0.53	308
SNAKE	1.40	2	0.49	
Pomadasys stridens	1.34	22	0.47	287
Sorsogna tuberculata	1.11	91	0.39	1212
Rastrelliger kanagurta	0.81	5	0.28	1210
Epinephelus latifasciatus	0.68	3	0.24	266
Metapenaeus monoceros	0.68	47	0.24	311
Uroteuthis duvaucelii	0.64	25	0.23	307
Lepturacanthus savala	0.38	3	0.13	1206
Sphyraena obtusata	0.32	3	0.11	1229
Sardinella gibbosa	0.26	5	0.09	1204
Sepia sp.	0.21	5	0.08	250
Pterois russelii	0.19	5	0.07	289
Sepiella sp.	0.17	22	0.06	310
Minous dempsterae	0.15	8	0.05	263
Zebrias synapturoides	0.14	3	0.05	267
Apogon queketti	0.11	8	0.04	265
Champsodon sp.	0.06	25	0.02	303
Bregmaceros sp.	0.04	52	0.02	304
Hermits, mixed	0.00	0	0.00	
Total	283.98		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 41
DATE :10.11.2010 GEAR TYPE: PT NO: 1 POSITION:Lat N 24°50.59
start stop duration Lon E 66°20.90
TIME :06:33:06 06:54:26 21.3 (min) Purpose : 1
LOG : 2421.91 2423.22 1.3 Region : 9100
FDEPTH: 30 40 Gear cond.: 0
BDEPTH: 65 71 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.7 kn
Sorted : 0 Total catch: 53.91 Catch/hour: 151.58

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Megalaspis cordyla	125.82	377	83.01	1198
J E L L Y F I S H	22.91	0	15.12	
Lagocephalus spadiceus	1.93	14	1.27	1197
Mene maculata	0.73	3	0.48	1195
Pterois russelii	0.19	3	0.13	1196
Total	151.58		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 41
DATE :27.10.2010 GEAR TYPE: PT NO: 4 POSITION:Lat N 24°57.40
start stop duration Lon E 62°27.10
TIME :22:13:37 22:33:11 19.6 (min) Purpose : 1
LOG : 740.11 741.18 1.1 Region : 9121
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 766 816 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.3 kn
Sorted : 0 Total catch: 86.39 Catch/hour: 264.87

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Benthosema fibulatum	253.12	18392	95.56	263
Neoepinnula orientalis	9.89	1263	3.74	262
Cubiceps whiteleggii	1.16	310	0.44	264
Leptocephalus	0.44	319	0.17	
Abralia sp.	0.20	120	0.08	261
Paralepis sp.	0.06	9	0.02	265
Total	264.87		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 42
DATE :28.10.2010 GEAR TYPE: PT NO: 7 POSITION:Lat N 25°8.55
start stop duration Lon E 62°27.27
TIME :03:33:15 03:55:28 22.2 (min) Purpose : 1
LOG : 770.37 771.55 1.2 Region : 9121
FDEPTH: 2 2 Gear cond.: 0
BDEPTH: 19 22 Validity : 0
Towing dir: 0° Wire out : 85 m Speed : 3.2 kn
Sorted : 0 Total catch: 277.57 Catch/hour: 749.52

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dussumieria acuta	433.67	21076	57.86	268
Lepturacanthus savala	155.94	135	20.81	272
Pomadasys stridens	47.31	637	6.31	269
Sardinella sp.	37.17	1620	4.96	270
Trichiurus lepturus	33.62	32	4.49	273
Rastrelliger kanagurta	12.12	292	1.62	267
SNAKE	12.01	22	1.60	
Lagocephalus spadiceus	9.57	30	1.28	274
Gymnura poecilura	3.43	3	0.46	285
Decapterus russelli	3.04	68	0.41	266
Uroteuthis duvaucelii	1.64	22	0.22	271
Total	749.52		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 42
DATE :10.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 24°43.44
start stop duration Lon E 66°41.64
TIME :09:42:08 10:12:19 30.2 (min) Purpose : 3
LOG : 2447.29 2448.94 1.7 Region : 9100
FDEPTH: 37 37 Gear cond.: 0
BDEPTH: 37 37 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.3 kn
Sorted : 0 Total catch: 47.95 Catch/hour: 95.37

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus russelli	66.92	2017	70.17	1245
J E L L Y F I S H	10.15	0	10.64	
Nemipterus randalli	5.65	211	5.92	1244
Uroteuthis duvaucelii	2.60	36	2.73	1242
G A S T R O P O D S	1.98	89	2.07	
Argyrops spinifer	1.41	4	1.48	1231
Sphyraena putnamae	1.37	6	1.44	1243
Saurida undosquamis	1.30	34	1.36	1241
Sepia kobiensis	0.78	16	0.82	1246
Nemipterus japonicus	0.69	12	0.72	1232
Himantura walga	0.55	2	0.58	1514
Saurida tumbil	0.49	2	0.52	1230
Sardinella gibbosa	0.39	8	0.40	1240
Sepia sp.	0.24	10	0.26	1248
Dussumieria acuta	0.15	4	0.15	1239
Zebrias synapturoides	0.14	6	0.14	1234
Epinephelus diacanthus	0.13	32	0.14	1238
Grammoplites suppositus	0.09	8	0.09	1233
Sepia latimanus	0.09	2	0.09	1247
Sepiella sp.	0.07	8	0.08	1512
Pomadasys stridens	0.05	2	0.05	1237
Pseudorhombus elevatus	0.05	4	0.05	1236
Metapenaeus monoceros	0.04	4	0.04	1513
Cryptopodia fornicata	0.02	6	0.03	
Champsodon sp.	0.01	18	0.01	1511
Sorsogna tuberculata	0.01	2	0.01	1235
Charybdis sp.	0.00	2	0.00	
Total	95.37		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 43
DATE :28.10.2010 GEAR TYPE: PT NO: 7 POSITION:Lat N 24°56.19
start stop duration Lon E 64°8.24
TIME :21:56:33 22:26:32 30.0 (min) Purpose : 1
LOG : 933.52 934.90 1.4 Region : 9122
FDEPTH: 5 5 Gear cond.: 0
BDEPTH: 927 855 Validity : 0
Towing dir: 0° Wire out : 90 m Speed : 2.8 kn
Sorted : 0 Total catch: 1.26 Catch/hour: 2.52

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
J E L L Y F I S H	1.85	308	73.31	
Benthosema fibulatum	0.46	400	18.19	286
GONOSTOMATIDAE	0.13	362	5.24	289
Leptocephalus	0.08	60	3.02	
Abralia sp.	0.00	2	0.16	287
Cubiceps whiteleggii	0.00	2	0.08	288
Total	2.52		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 43
DATE :10.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 24°47.72
start stop duration Lon E 66°43.49
TIME :11:27:28 11:58:11 30.7 (min) Purpose : 3
LOG : 2456.17 2458.09 1.9 Region : 9100
FDEPTH: 28 29 Gear cond.: 0
BDEPTH: 28 29 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.8 kn
Sorted : 0 Total catch: 44.45 Catch/hour: 86.84

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus russelli	30.09	620	34.65	318
J E L L Y F I S H	20.61	0	23.74	
Uroteuthis duvaucelii	8.47	184	9.75	329
G A S T R O P O D S	7.52	473	8.66	
Dussumieria acuta	6.77	182	7.80	328
Nemipterus randalli	3.86	96	4.45	317
Acanthopagrus latus	2.43	6	2.80	313
Saurida tumbil	2.40	20	2.76	315
Lepturacanthus savala	1.21	2	1.39	320
Nemipterus japonicus	0.83	14	0.95	314
Alepes djedaba	0.57	2	0.66	319
Pomadasys kaakan	0.46	2	0.53	321
Sepia kobiensis	0.42	23	0.48	326
Epinephelus diacanthus	0.35	57	0.40	316
Rastrelliger kanagurta	0.25	4	0.29	322
Sphyraena putnamae	0.18	4	0.21	202
Sepiella sp.	0.12	6	0.14	325
Sardinella gibbosa	0.10	2	0.12	330
Grammoplites suppositus	0.10	2	0.11	324
Sepia sp.	0.06	4	0.07	327
Sorsogna tuberculata	0.04	2	0.04	323
Total	86.84		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 44
DATE :10.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 24°48.57
start stop duration Lon E 66°42.66
TIME :12:37:56 13:08:22 30.4 (min) Purpose : 2
LOG : 2462.18 2464.11 1.9 Region : 9100
FDEPTH: 26 28 Gear cond.: 0
BDEPTH: 26 28 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.8 kn
Sorted : 0 Total catch: 272.75 Catch/hour: 537.79

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus russelli	226.47	4423	42.11	291
Pomadasys kaakan	167.26	799	31.10	239
Uroteuthis duvaucelii	36.71	799	6.83	294
Lepturacanthus savala	26.42	51	4.91	292
J E L L Y F I S H	18.95	0	3.52	
Sardinella gibbosa	14.81	284	2.75	293
Plotosus lineatus	10.98	692	2.04	240
Saurida tumbil	7.39	16	1.37	241
Acanthopagrus latus	6.51	24	1.21	302
Nemipterus japonicus	5.70	89	1.06	296
G A S T R O P O D S	3.94	0	0.73	
Torpedo sp.	3.06	2	0.57	301
Terapon jarbua	2.13	35	0.40	242
Metapenaeus affinis	1.08	290	0.20	1515
Dussumieria acuta	0.98	41	0.18	297
Zebrias synapturoides	0.77	24	0.14	246
Lactarius lactarius	0.75	24	0.14	244
Sepia latimanus	0.66	6	0.12	249
Lagocephalus spadiceus	0.56	6	0.10	247
Pseudorhombus elevatus	0.54	24	0.10	298
Sphyraena obtusata	0.54	6	0.10	299
Leiognathus equulus	0.43	6	0.08	245
Upeneus vittatus	0.36	11	0.07	295
Grammoplites suppositus	0.24	18	0.05	300
Sepia kobiensis	0.24	24	0.04	290
Epinephelus diacanthus	0.22	59	0.04	243
Leiognathus lineolatus	0.07	28	0.01	248
Total	537.79		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 44
DATE :29.10.2010 GEAR TYPE: PT NO: 4 POSITION:Lat N 24°54.96
start stop duration Lon E 64°8.81
TIME :00:39:34 00:58:44 19.2 (min) Purpose : 1
LOG : 937.81 939.08 1.3 Region : 9122
FDEPTH: 0 0 Gear cond.: 0
BDEPTH: 1009 915 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 4.0 kn
Sorted : 0 Total catch: 2.28 Catch/hour: 7.14

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
GONOSTOMATIDAE	4.00	12106	56.00	290
Thunnus alalunga	1.58	3	22.17	291
Leptocephalus	1.10	980	15.34	
Auxis thazard	0.36	3	5.04	292
J E L L Y F I S H	0.10	17	1.45	
Total	7.14		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010408 STATION: 45
DATE :30.10.2010 GEAR TYPE: PT NO: 4 POSITION:Lat N 25°5.06
start stop duration Lon E 66°8.76
TIME :09:07:48 09:27:37 19.8 (min) Purpose : 1
LOG : 1149.01 1150.22 1.2 Region : 9122
FDEPTH: 20 24 Gear cond.: 0
BDEPTH: 92 89 Validity : 0
Towing dir: 0° Wire out : 70 m Speed : 3.7 kn
Sorted : 0 Total catch: 105.70 Catch/hour: 319.98

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
J E L L Y F I S H	319.98	30475	100.00	
Total	319.98		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 45
DATE :10.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 24°20.54
start stop duration Lon E 67°5.17
TIME :23:19:09 23:49:13 30.1 (min) Purpose : 3
LOG : 2525.61 2527.45 1.8 Region : 9100
FDEPTH: 24 23 Gear cond.: 0
BDEPTH: 24 23 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.7 kn
Sorted : 0 Total catch: 192.14 Catch/hour: 383.64

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Arius tenuispinis*	176.37	480	45.97	1262
Gerres filamentosus	66.79	558	17.41	1263
Pomadasys maculatus	22.11	396	5.76	1253
J E L L Y F I S H	12.24	0	3.19	
Terapon jarbua	8.01	168	2.09	1251
Pennahia macrophthalmus *	6.95	117	1.81	1266
Leiognathus equulus	6.87	253	1.79	235
Rastrelliger kanagurta	6.85	58	1.78	1257
Grammoplites suppositus	6.23	396	1.62	1254
Ilisha sp.	6.05	123	1.58	1255
Johnius dussumieri	5.65	84	1.47	234
Alepes djedaba	4.91	117	1.28	233
Acanthopagrus latus	4.89	32	1.27	230
Upeneus vittatus	4.67	136	1.22	1252
Nemipterus randalli	3.92	720	1.02	1250
Sphyraena jello	3.85	6	1.00	1261
Anodontostoma chacunda	3.77	65	0.98	1265
Lactarius lactarius	3.71	91	0.97	1264
Pseudorhombus arsius	2.47	45	0.64	1256
Otolithes ruber	2.35	13	0.61	229
Pseudorhombus elevatus	2.12	149	0.55	1259
Metapenaeopsis stridulans	2.04	789	0.53	
Saurida tumbil	2.04	19	0.53	1249
Charybdis sp.	1.58	244	0.41	
Penaeus merguiensis	1.51	45	0.39	1276
Pomadasys kaakan	1.51	13	0.39	231
Zebrias synapturoides	1.36	32	0.35	1258
Scomberoides commersonianus	1.28	13	0.33	232
OPHICHTHIDAE	1.26	6	0.33	1274
Polynemus plebeius	1.21	13	0.32	1267
Thryssa setirostris	1.01	32	0.26	238
Thryssa vitrirostris	0.97	32	0.25	236
Lepturacanthus savala	0.93	6	0.24	1269
Pomadasys stridens	0.89	19	0.23	68
Muraenesox cinereus	0.83	2	0.22	1279
Drepane punctata	0.67	6	0.17	1270
G A S T R O P O D S	0.57	14	0.15	
Decapterus russelli	0.51	13	0.13	237
Uroteuthis duvaucelii	0.49	13	0.13	1280
CONGER SP	0.49	8	0.13	1275
Drepane longimana	0.42	0	0.11	
Penaeus monodon	0.38	6	0.10	1277
Carangoides malabaricus	0.32	6	0.08	1268
Cynoglossus sp.	0.16	13	0.04	1273
Epinephelus diacanthus	0.15	20	0.04	1272
Metapenaeus affinis	0.15	26	0.04	1278
Sepia sp.	0.12	13	0.03	1260
Leiognathus lineolatus	0.07	20	0.02	1271
Total	383.64		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 46
DATE :11.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 24°19.16
start stop duration Lon E 67°5.92
TIME :01:59:09 02:29:24 30.2 (min) Purpose : 3
LOG : 2532.60 2534.34 1.7 Region : 9100
FDEPTH: 22 22 Gear cond.: 0
BDEPTH: 22 22 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.4 kn
Sorted : 0 Total catch: 109.23 Catch/hour: 216.72

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Gerres filamentosus	134.03	228	61.84	269
Rastrelliger kanagurta	9.62	63	4.44	270
Scomberomorus commerson	9.23	12	4.26	1295
Pomadasys maculatus	8.53	139	3.94	1297
J E L L Y F I S H	7.94	0	3.66	
Arius tenuispinis*	7.14	143	3.30	1294
Acanthopagrus latus	5.85	32	2.70	271
Lutjanus russelli	4.55	62	2.10	1285
Uroteuthis duvaucelii	3.52	58	1.63	1298
Lagocephalus spadiceus	3.19	18	1.47	1304
Sepia pharaonis	2.48	2	1.14	1292
Upeneus vittatus	2.11	65	0.97	1300
Atropus atropos	1.95	12	0.90	1293
Chirocentrus nudus	1.75	10	0.81	1288
Scomberomorus koreanus	1.17	2	0.54	1296
Pseudorhombus arsius	1.17	12	0.54	1301
Pseudorhombus elevatus	1.00	67	0.46	284
Terapon jarbua	0.91	20	0.42	1303
Grammoplites suppositus	0.90	44	0.42	1299
Carangoides malabaricus	0.78	12	0.36	1289
Drepane longimana	0.75	10	0.35	283
Alepes djedaba	0.69	10	0.32	1281
Sphyraena putnamae	0.60	2	0.28	1291
Saurida tumbil	0.56	4	0.26	274
Drepane punctata	0.54	6	0.25	1284
Leiognathus equulus	0.52	8	0.24	276
Leiognathus lineolatus	0.52	55	0.24	281
Dussumieria acuta	0.49	12	0.23	272
Triacanthus biaculeatus	0.46	4	0.21	280
Zebrias synapturoides	0.44	10	0.20	1283
Penaeus merguiensis	0.37	10	0.17	1309
Arius thalassinus*	0.30	2	0.14	279
Cynoglossus sp.	0.29	12	0.14	1305
Lutjanus johnii	0.28	2	0.13	1286
Decapterus russelli	0.28	12	0.13	1287
Rhabdosargus sarba	0.28	4	0.13	282
Anodontostoma chacunda	0.25	6	0.12	1282
G A S T R O P O D S	0.17	14	0.08	
Scomberoides commersonianus	0.17	2	0.08	277
Pomadasys kaakan	0.16	2	0.07	273
Lepturacanthus savala	0.14	2	0.07	1307
Saurida undosquamis	0.13	2	0.06	275
Caranx tille	0.12	2	0.05	1290
Ilisha sp.	0.12	2	0.05	1306
Charybdis sp.	0.09	42	0.04	
Pseudotriacanthus strigilifer	0.08	2	0.04	278
Penaeus semisulcatus	0.07	2	0.03	70
Metapenaeus affinis	0.02	2	0.01	1308
Epinephelus diacanthus	0.01	2	0.00	1302
Total	216.72		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 47
DATE :11.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 24°7.15
start stop duration Lon E 67°13.96
TIME :05:09:37 05:40:26 30.8 (min) Purpose : 3
LOG : 2555.36 2557.02 1.7 Region : 9100
FDEPTH: 19 21 Gear cond.: 0
BDEPTH: 19 21 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.2 kn
Sorted : 0 Total catch: 119.71 Catch/hour: 233.04

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Arius tenuispinis*	86.19	2290	36.98	119
Penaeus sp.	33.40	2489	14.33	197
Thryssa dussumieri	15.56	1839	6.68	171
Muraenesox cinereus	14.01	23	6.01	176
Thryssa vitrirostris	9.78	797	4.20	134
Metapenaeus affinis	7.84	1359	3.36	198
Johnius sp.	7.54	272	3.23	196
Squilla sp.	7.20	0	3.09	
Lepturacanthus savala	4.59	58	1.97	129
Pseudorhombus elevatus	4.17	246	1.79	194
Scomberomorus commerson	3.81	4	1.63	122
Acanthopagrus latus	3.67	31	1.57	123
Parapenaeopsis stylifera	2.86	722	1.23	200
Thryssa setirostris	2.59	190	1.11	133
Himantura walga	2.58	8	1.11	172
Megalaspis cordyla	2.57	27	1.10	120
Parastromateus niger	2.49	4	1.07	1527
Lagocephalus spadiceus	1.87	8	0.80	180
Rastrelliger kanagurta	1.79	19	0.77	195
Lactarius lactarius	1.74	58	0.75	183
Opisthopterus tardoore	1.67	73	0.72	184
Scomberomorus guttatus	1.28	4	0.55	121
Sardinella gibbosa	1.22	23	0.52	130
Ilisha sp.	1.03	58	0.44	131
Otolithes cuvieri	1.01	23	0.43	178
Cynoglossus arel	0.97	12	0.42	188
Johnius dussumieri	0.71	4	0.30	179
OPHICHTHIDAE	0.56	8	0.24	177
Loligo sp.	0.54	138	0.23	174

Cynoglossus sp.	0.51	35	0.22	189
Pseudorhombus arsius	0.51	8	0.22	190
Otolithes ruber	0.49	4	0.21	1406
Terapon jarbua	0.47	11	0.20	192
G A S T R O P O D S	0.47	45	0.20	
Cociella crocodilus	0.46	15	0.20	187
Nemipterus randalli	0.42	169	0.18	175
Solea elongata	0.40	16	0.17	191
Uroteuthis duvaucelii	0.37	4	0.16	173
Plotosus lineatus	0.34	23	0.15	128
Scomberoides commersonianus	0.30	4	0.13	193
Penaeus monodon	0.30	4	0.13	199
Dussumieria acuta	0.29	15	0.13	182
Epinephelus diacanthus	0.29	65	0.12	127
Sepia latimanus	0.27	4	0.12	126
Sardinella albella	0.26	4	0.11	1528
Gerres filamentosus	0.21	4	0.09	181
Charybdis sp.	0.18	0	0.08	
Liza abu	0.18	4	0.08	1405
Metapenaeopsis stridulans	0.14	177	0.06	201
Leiognathus equulus	0.13	4	0.06	1404
Anodontostoma chacunda	0.13	4	0.06	1403
Zebrias synapturoides	0.11	4	0.05	185
Polynemus heptadactylus*	0.11	15	0.05	124
Minous monodactylus	0.11	11	0.05	1407
Decapterus russelli	0.09	4	0.04	125
Upeneus vittatus	0.08	4	0.03	118
Grammoplites suppositus	0.07	4	0.03	186
Pomadasys maculatus	0.06	16	0.03	170
Atropus atropos	0.03	7	0.01	1402
Stolephorus indicus	0.03	12	0.01	132
Total	233.04		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 48
DATE :11.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 24°1.67
start stop duration Lon E 67°9.18
TIME :07:00:55 07:31:00 30.1 (min) Purpose : 3
LOG : 2564.91 2566.67 1.8 Region : 9100
FDEPTH: 26 25 Gear cond.: 0
BDEPTH: 26 25 Validity : 0
Towing dir: 0° Wire out : 128 m Speed : 3.5 kn
Sorted : 0 Total catch: 373.03 Catch/hour: 744.33

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus russelli	626.66	108543	84.19	1342
Sphyraena putnamae	33.92	14	4.56	1345
Scomberomorus commerson	22.65	18	3.04	1350
Sepia pharaonis	16.86	12	2.27	1341
Rastrelliger kanagurta	10.85	597	1.46	1337
Scomberoides commersonianus	6.88	4	0.92	1349
Lagocephalus spadiceus	6.80	26	0.91	1335
Carangoides chrysophrys	3.39	2	0.46	1348
Thenus orientalis	3.11	260	0.42	1344
Seriola dumerili	2.99	2	0.40	1347
Sardinella gibbosa	2.60	260	0.35	1338
Scomberomorus koreanus	2.29	2	0.31	1346
Uroteuthis duvaucelii	1.79	571	0.24	1340
Saurida undosquamis	1.71	26	0.23	1336
Nemipterus randalli	1.45	467	0.20	1339
Sorsogna tuberculata	0.36	3	0.05	1343
Total	744.33		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 49
DATE :11.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 23°54.35
start stop duration Lon E 67°6.19
TIME :10:06:14 10:36:32 30.3 (min) Purpose : 3
LOG : 2585.20 2586.86 1.7 Region : 9100
FDEPTH: 37 36 Gear cond.: 0
BDEPTH: 37 36 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.3 kn
Sorted : 0 Total catch: 102.31 Catch/hour: 202.59

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Aluterus monoceros	40.30	28	19.89	1310
Carangoides chrysophrys	35.35	12	17.45	1314
Uroteuthis duvaucelii	21.88	1313	10.80	1319
Decapterus russelli	16.63	2801	8.21	1318
Scomberoides commersonianus	15.35	16	7.58	1313
J E L L Y F I S H	15.05	0	7.43	
Himantura bleekeri	11.88	2	5.86	1316
Himantura gerrardi	10.40	2	5.13	1317
Scomberomorus commerson	7.03	2	3.47	1315
Pomadasys kaakan	6.67	4	3.29	1311
Lagocephalus spadiceus	4.09	16	2.02	1322
Sphyraena jello	4.06	2	2.00	1312
Nemipterus randalli	3.76	894	1.86	1401
Sepia pharaonis	3.55	2	1.75	1321
Thenus orientalis	1.31	14	0.65	1333
Himantura walga	1.14	2	0.56	1332
Saurida undosquamis	0.89	16	0.44	1324
Sorsogna tuberculata	0.78	73	0.39	1327
Pseudotriacanthus strigilifer	0.78	4	0.38	1331
Rastrelliger kanagurta	0.75	53	0.37	1326
Pseudorhombus arsius	0.30	2	0.15	1320
Pseudorhombus elevatus	0.25	18	0.13	1323
Echeneis naucrates	0.16	4	0.08	1329
Charybdis feriata	0.07	12	0.03	
Grammoplites suppositus	0.06	6	0.03	1325
Saurida tumbil	0.06	8	0.03	1328
Upeneus moluccensis	0.02	2	0.01	1330
Sepiella sp.	0.01	2	0.01	1334
Charybdis sp.	0.01	4	0.00	
Total	202.59		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 50
DATE :11.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 23°52.36
start stop duration Lon E 67°8.55
TIME :12:06:54 12:37:01 30.1 (min) Purpose : 3
LOG : 2597.89 2599.46 1.6 Region : 9100
FDEPTH: 32 33 Gear cond.: 0
BDEPTH: 32 33 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.1 kn
Sorted : 0 Total catch: 183.23 Catch/hour: 365.01

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dussumieria acuta	117.33	3698	32.14	74
Decapterus russelli	96.33	15101	26.39	163
Uroteuthis duvaucelii	34.82	1915	9.54	78
Lagocephalus spadiceus	16.55	64	4.54	79
Sardinella gibbosa	15.74	1167	4.31	166
Sepia pharaonis	13.35	8	3.66	87
Scomberomorus koreanus	11.65	4	3.19	76
Scomberoides commersonianus	10.96	2	3.00	164
Sphyraena putnamae	9.76	4	2.67	88
Pomadasys argenteus	8.07	4	2.21	75
Scomberomorus commerson	7.47	6	2.05	77
Rastrelliger kanagurta	6.67	786	1.83	165
J E L L Y F I S H	4.32	0	1.18	
Thenus orientalis	3.15	20	0.86	169
Stolephorus sp.	2.97	693	0.81	1
Nemipterus randalli	2.49	302	0.68	168
Saurida undosquamis	1.17	16	0.32	167
Sorsogna tuberculata	0.70	60	0.19	82
Triacanthus biaculeatus	0.50	5	0.14	83
Pseudorhombus arsius	0.23	10	0.06	81
G A S T R O P O D S	0.19	0	0.05	
Octopus sp.	0.16	4	0.04	
Echeneis naucrates	0.14	5	0.04	86
Cynoglossus sp.	0.09	15	0.02	84
Upeneus moluccensis	0.08	4	0.02	80
E C H I N O D E R M A T A	0.07	10	0.02	
Lepturacanthus savala	0.05	0	0.01	
SYNGNATHIDAE	0.01	5	0.00	85
SNAKE	0.00	6	0.00	
Total	365.01		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 51
DATE :11.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 23°49.32
start stop duration Lon E 67°14.25
TIME :13:57:07 14:27:39 30.5 (min) Purpose : 2
LOG : 2606.45 2608.61 2.2 Region : 9100
FDEPTH: 25 25 Gear cond.: 0
BDEPTH: 25 25 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 4.2 kn
Sorted : 0 Total catch: 298.92 Catch/hour: 587.47

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Arius tenuispinis*	224.87	4819	38.28	90
Sardinella sp.	188.35	13891	32.06	105
Nemipterus randalli	60.53	22583	10.30	106
Johnius sp.	21.13	394	3.60	107
Rastrelliger kanagurta	16.89	379	2.88	96
Thryssa dussumieri	13.29	1499	2.26	98
Upeneus vittatus	9.35	279	1.59	108
Sorsogna tuberculata	7.20	528	1.23	97
Saurida undosquamis	4.65	38	0.79	102
Uroteuthis duvaucelii	4.09	125	0.70	91
Pseudorhombus elevatus	3.44	86	0.59	1414
Saurida tumbil	3.04	144	0.52	100
Polynemus plebeius	2.76	19	0.47	15
Ilisha sp.	2.54	67	0.43	113
Otolithes ruber	2.51	10	0.43	109
OPHICHTHIDAE	1.92	10	0.33	1412
Nibea maculata	1.80	10	0.31	92
Grammoplites suppositus	1.71	10	0.29	1415
Polynemus heptadactylus*	1.59	38	0.27	110
Lepturacanthus savala	1.51	10	0.26	99
Uranscopus marmoratus	1.48	19	0.25	2
Anodontostoma chacunda	1.43	19	0.24	94
Dussumieria acuta	1.32	336	0.23	1413
Pennahia macrophthalmus *	1.21	19	0.21	1409
CONGER SP	1.20	38	0.20	95
Lagocephalus spadiceus	1.06	10	0.18	93
J E L L Y F I S H	0.94	0	0.16	
Lactarius lactarius	0.90	19	0.15	1411
Leiognathus lineolatus	0.74	182	0.13	101
Scomberoides commersonianus	0.70	10	0.12	1418
G A S T R O P O D S	0.67	10	0.11	
Pomadasys maculatus	0.61	10	0.10	103
Johnius dussumieri	0.55	10	0.09	111
Pseudorhombus arsius	0.43	0	0.07	104
Sepiella sp.	0.35	10	0.06	1417
Decapterus russelli	0.20	0	0.03	
Leiognathus equulus	0.18	10	0.03	112
Apogon quadrifasciatus	0.14	10	0.02	1416
Octopus sp.	0.10	10	0.02	
Squilla sp.	0.06	10	0.01	
SYNGNATHIDAE	0.03	9	0.00	1410
Total	587.47		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 52
DATE :11.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 23°51.57
start stop duration Lon E 67°18.87
TIME :18:12:01 18:42:53 30.9 (min) Purpose : 3
LOG : 2632.23 2634.16 1.9 Region : 9100
FDEPTH: 21 21 Gear cond.: 0
BDEPTH: 21 21 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.7 kn
Sorted : 0 Total catch: 129.79 Catch/hour: 252.18

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Arius tenuispinis*	127.60	2309	50.60	226
Johnius carutta	23.72	492	9.41	225
Pomadasys maculatus	19.02	398	7.54	1373
Pseudorhombus elevatus	9.24	847	3.66	212
Otolithes ruber	8.34	26	3.31	1372
Anodontostoma chacunda	6.88	107	2.73	1359
Terapon jarbua	5.13	17	2.03	217
Nemipterus randalli	4.15	389	1.64	1374
Penaeus merguiensis	4.11	115	1.63	1378
J E L L Y F I S H	3.87	0	1.53	
Pseudorhombus arsius	3.62	51	1.43	1351
Grammoplites suppositus	3.50	179	1.39	214
Thryssa dussumieri	3.38	312	1.34	1362
Acanthopagrus latus	3.30	17	1.31	1354
Johnius sp.	3.17	98	1.26	224
Otolithes cuvieri	1.90	30	0.75	1370
Muraenesox cinereus	1.67	4	0.66	1375
Parastromateus niger	1.57	4	0.62	1356
Polynemus heptadactylus*	1.38	21	0.55	1369
Uroteuthis duvaucelii	1.30	43	0.51	1371
Ilisha melastoma	1.24	34	0.49	1366
Rastrelliger kanagurta	1.21	17	0.48	1368
Sardinella gibbosa	1.15	30	0.46	1358
Rhizoprionodon oligolinx	0.99	2	0.39	213
Zebrias synapturoides	0.81	26	0.32	1357
Sardinella longiceps	0.78	60	0.31	210
Charybdis sp.	0.77	0	0.31	
Lagocephalus spadiceus	0.72	9	0.28	1365
Cynoglossus sp.	0.71	90	0.28	223
Drepane longimana	0.63	13	0.25	1355
Saurida tumbil	0.53	47	0.21	216
Sardinella sindensis	0.49	47	0.19	1353
Lepidotrigla bispinosa	0.47	13	0.19	218
Uranscopus marmoratus	0.47	26	0.19	220
Dussumieria acuta	0.43	13	0.17	1352
Metapenaeus affinis	0.37	115	0.15	1377
Portunus sanguinolentus	0.31	0	0.12	
CONGER SP	0.30	14	0.12	219
Thryssa vitrirostris	0.30	13	0.12	1361
OPHICHTHIDAE	0.29	4	0.12	1376
G A S T R O P O D S	0.26	0	0.10	
Saurida undosquamis	0.25	4	0.10	1363
Upeneus vittatus	0.24	9	0.09	211
Torpedo sp.	0.21	0	0.08	
Octopus sp.	0.19	0	0.08	
Charybdis feriata	0.19	0	0.07	
Squilla sp.	0.17	0	0.07	
Lactarius lactarius	0.16	4	0.06	227
Sepia latimanus	0.15	4	0.06	222
Sepiella inermis	0.13	9	0.05	221
Epinephelus diacanthus	0.13	13	0.05	1364
Leiognathus equulus	0.11	8	0.05	1367
Coilia dussumieri	0.05	4	0.02	215
Calappa sp.	0.05	0	0.02	
Thryssa setirostris	0.04	4	0.02	1360
Bregmaceros sp.	0.02	0	0.01	
Total	252.18		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 53
DATE :12.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 23°53.57
start stop duration Lon E 67°18.07
TIME :01:56:57 02:26:37 29.7 (min) Purpose : 3
LOG : 2651.44 2652.96 1.5 Region : 9100
FDEPTH: 19 20 Gear cond.: 0
BDEPTH: 19 20 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.1 kn
Sorted : 0 Total catch: 298.62 Catch/hour: 603.88

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Arius tenuispinis*	538.81	13153	89.22	1506
Sepia pharaonis	7.45	4	1.23	1526
Scomberomorus koreanus	5.54	6	0.92	1385
Pseudorhombus elevatus	5.42	422	0.90	117
Sardinella sp.	5.03	98	0.83	1386
Chirocentrus nudus	4.45	12	0.74	1382
Uroteuthis duvaucelii	4.02	128	0.67	1383
Scomberoides commersonianus	2.98	20	0.49	1389
Sphyraena putnamae	2.94	8	0.49	1384
Lagocephalus spadiceus	2.93	29	0.49	1395
Cynoglossus sp.	2.92	304	0.48	1504
Rastrelliger kanagurta	2.01	79	0.33	1521
Triacanthus biaculeatus	2.00	10	0.33	1390
Sea cucumbers	1.87	0	0.31	
Johnius sp.	1.58	29	0.26	1503
Lactarius lactarius	1.53	10	0.25	1393
Ilisha sp.	1.49	39	0.25	1388
Zebrias synapturoides	1.47	59	0.24	1510
Alepes djedaba	0.94	20	0.16	1380
SNAKE	0.91	0	0.15	
Dussumieria acuta	0.84	29	0.14	1387
Pseudotriacanthus strigilifer	0.70	10	0.12	1392
Sepia latimanus	0.67	10	0.11	1523
CONGER SP	0.64	10	0.11	1525
Leiognathus equulus	0.63	20	0.10	1509
Pomadasys maculatus	0.60	10	0.10	1391
Grammoplites suppositus	0.56	20	0.09	1394
Upeneus vittatus	0.55	20	0.09	1379
Nemipterus randalli	0.54	79	0.09	1508
Sepiella sp.	0.53	10	0.09	1524
Epinephelus diacanthus	0.43	30	0.07	1507
Uranscopus marmoratus	0.31	10	0.05	1381
Charybdis feriata	0.25	0	0.04	
Charybdis sp.	0.17	0	0.03	
Sphyraena obtusata	0.10	10	0.02	1522
Calappa lophos	0.05	0	0.01	
Total	603.88		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 54
DATE :12.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 23°50.46
start stop duration Lon E 67°13.17
TIME :03:32:55 04:03:57 31.0 (min) Purpose : 3
LOG : 2659.48 2661.15 1.7 Region : 9100
FDEPTH: 26 26 Gear cond.: 0
BDEPTH: 26 26 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.2 kn
Sorted : 0 Total catch: 33.62 Catch/hour: 64.99

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Scomberomorus koreanus	13.14	15	20.22	151
Sepia pharaonis	11.21	6	17.25	1400
Uroteuthis duvaucelii	8.22	261	12.64	137
Arius thalassinus*	5.80	21	8.92	149
Chelonia mydas	4.21	2	6.47	6
Arius tenuispinis*	3.87	81	5.95	136
Upeneus vittatus	3.77	118	5.80	148
Lepturacanthus savala	2.41	10	3.70	1396
J E L L Y F I S H	1.46	0	2.25	
Odonus niger	1.35	6	2.07	162
Scomberoides commersonianus	1.17	10	1.81	152
Terapon jarbua	1.04	13	1.60	153
Triacanthus biaculeatus	0.70	2	1.08	154
Cynoglossus sp.	0.68	101	1.05	142
Lactarius lactarius	0.62	15	0.95	156
Leiognathus equulus	0.61	15	0.94	150
Lagocephalus spadiceus	0.61	4	0.94	147
Selar crumenophthalmus	0.59	6	0.91	155
Pseudorhombus elevatus	0.59	48	0.90	139
Rastrelliger kanagurta	0.43	4	0.67	160
Grammoplites suppositus	0.29	6	0.45	141
Gerres filamentosus	0.28	4	0.43	158
Dussumieria acuta	0.27	6	0.41	146
Saurida tumbil	0.26	4	0.39	140
Sphyraena putnamae	0.21	2	0.32	145
E C H I N O D E R M A T A	0.21	0	0.32	
Pseudorhombus arsius	0.21	4	0.32	143
Gazza minuta	0.14	126	0.21	157
Sphyraena obtusata	0.13	2	0.20	1398
Atropus atropos	0.12	2	0.18	1399
Pseudotriacanthus strigilifer	0.10	2	0.15	159
Sepiella sp.	0.10	4	0.15	138
Ariomma indica	0.07	2	0.11	144
Decapterus russelli	0.06	10	0.09	1397
Nemipterus randalli	0.04	15	0.07	161
Octopus sp.	0.03	0	0.05	
Sardinella sp.	0.00	0	0.00	135
Total	64.99		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 55
DATE :12.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 23°44.85
start stop duration Lon E 67°32.52
TIME :06:36:39 07:06:54 30.3 (min) Purpose : 1
LOG : 2683.25 2684.75 1.5 Region : 9100
FDEPTH: 46 47 Gear cond.: 0
BDEPTH: 46 47 Validity : 0
Towing dir: 0° Wire out : 150 m Speed : 3.0 kn
Sorted : 0 Total catch: 92.94 Catch/hour: 184.35

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Thryssa dussumieri	37.39	4644	20.28	1443
Upeneus vittatus	26.48	1737	14.36	1440
Lepturacanthus savala	14.98	81	8.12	1445
Rastrelliger kanagurta	14.77	105	8.01	1435
Lactarius lactarius	13.69	315	7.42	1437
Pomadasys kaakan	11.50	71	6.24	1465
Uroteuthis duvaucelii	10.51	265	5.70	1473
Thryssa setirostris	8.76	520	4.75	20
Scomberomorus koreanus	5.95	4	3.23	1468
Acanthopagrus latus	3.45	12	1.87	1433
Sepia pharaonis	2.57	2	1.40	1470
Argyrops spinifer	2.44	4	1.33	1431
Caranx tille	2.36	14	1.28	1464
Epinephelus diacanthus	2.30	186	1.25	1441
Scomberomorus commerson	2.29	2	1.24	1467
Arius dussumieri	2.18	2	1.18	1442
Rhizoprionodon oligolinx	2.16	4	1.17	1432
G A S T R O P O D S	2.05	129	1.11	
Terapon jarbua	1.68	16	0.91	1469
Charybdis sp.	1.58	415	0.86	
Sepia latimanus	1.07	8	0.58	1472
Scomberoides commersonianus	1.05	4	0.57	1466
Megalaspis cordyla	0.97	4	0.53	1449
Odonus niger	0.91	4	0.49	1430
Polynemus heptadactylus*	0.80	8	0.44	1421
Alepes djedaba	0.70	4	0.38	1436
Arius thalassinus*	0.60	2	0.33	1420
Leiognathus equulus	0.59	10	0.32	1423
Lutjanus johnii	0.51	2	0.28	1434
Lagocephalus spadiceus	0.49	2	0.27	1459
Nemipterus japonicus	0.48	8	0.26	1458
Gerres filamentosus	0.48	4	0.26	1452
Decapterus russelli	0.46	69	0.25	1463
Sepiella inermis	0.43	18	0.24	1439
Sphyraena putnamae	0.39	18	0.21	1461
Saurida tumbil	0.37	4	0.20	1453
Cyclichthys orbicularis	0.37	2	0.20	21
Metapenaeus affinis	0.35	28	0.19	25
Minous dempsterae	0.35	20	0.19	1438
Penaeus monodon	0.33	2	0.18	22
Saurida undosquamis	0.31	6	0.17	1454
Nemipterus randalli	0.30	155	0.16	1444
Drepane longimana	0.29	4	0.16	1446
Johnius sp.	0.29	6	0.15	1460
Uranscopus marmoratus	0.28	6	0.15	1462
Leiognathus lineolatus	0.19	83	0.10	1426
Arius tenuispinis*	0.19	4	0.10	1419
Penaeus japonicus	0.18	4	0.10	23
SNAKE	0.18	4	0.10	
Metapenaeus monoceros	0.15	6	0.08	24
Johnius carutta	0.15	2	0.08	1429
Carangoides malabaricus	0.13	2	0.07	1427
Gazza minuta	0.11	10	0.06	1425
Squilla sp.	0.10	30	0.05	
Pomadasys maculatus	0.10	2	0.05	1450
Polynemus sextarius	0.09	2	0.05	1422
Laeops parviceps	0.09	28	0.05	1471
Ariomma indica	0.08	2	0.04	1424
Sphyraena obtusata	0.07	4	0.04	1455

Apogon queketti	0.07	6	0.04	1447
Epinephelus latifasciatus	0.04	2	0.02	1428
Charybdis feriata	0.04	6	0.02	
Grammoplites suppositus	0.04	4	0.02	1451
Pseudorhombus elevatus	0.04	2	0.02	1456
Sardinella sindensis	0.02	4	0.01	1457
Apogon quadrifasciatus	0.02	2	0.01	1448
Total	184.35		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 56
DATE :12.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 23°41.78
start stop duration Lon E 67°40.11
TIME :08:43:05 09:13:49 30.7 (min) Purpose : 1
LOG : 2695.93 2697.55 1.6 Region : 9100
FDEPTH: 24 21 Gear cond.: 0
BDEPTH: 24 21 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.2 kn
Sorted : 0 Total catch: 291.28 Catch/hour: 568.53

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Sphyraena putnamae	205.46	317	36.14	1488
Rastrelliger kanagurta	125.76	1785	22.12	1485
Upeneus vittatus	70.62	3768	12.42	1496
Scomberoides commersonianus	38.23	362	6.72	1498
J E L L Y F I S H	18.05	0	3.18	
Anodontostoma chacunda	15.58	210	2.74	1487
Uroteuthis duvaucelii	14.44	340	2.54	1501
Penaeus merguiensis	13.71	449	2.41	1502
Sepia pharaonis	9.04	4	1.59	1486
Arius tenuispinis*	9.02	350	1.59	1499
Scomberomorus commerson	7.04	5	1.24	1489
Rhizoprionodon oligolinx	6.28	16	1.10	1497
Alepes djedaba	5.57	175	0.98	1484
Rhinobatos sp.	4.79	2	0.84	1500
Acanthopagrus latus	3.91	35	0.69	1480
Lagocephalus spadiceus	3.23	70	0.57	1479
Triacanthus biaculeatus	2.76	23	0.49	30
Ilisha melastoma	1.72	41	0.30	1483
Megalaspis cordyla	1.42	12	0.25	1474
Caranx tille	1.10	6	0.19	1492
Sardinella gibbosa	1.00	35	0.18	1491
Eleutheronema tetradactylum	0.99	4	0.17	1478
E C H I N O D E R M A T A	0.83	162	0.15	
Saurida tumbil	0.77	12	0.14	33
Grammoplites suppositus	0.70	23	0.12	26
Terapon jarbua	0.69	12	0.12	32
Leiognathus equulus	0.67	29	0.12	1495
Decapterus russelli	0.62	29	0.11	27
Pseudorhombus elevatus	0.59	35	0.10	34
Dussumieria acuta	0.58	18	0.10	28
Thryssa vitrirostris	0.57	12	0.10	1481
Drepane punctata	0.57	6	0.10	1476
Pomadasys maculatus	0.43	12	0.07	31
Charybdis feriata	0.37	6	0.07	
Chirocentrus nudus	0.36	2	0.06	1490
Sillago sihama	0.21	6	0.04	29
Sepiella inermis	0.20	5	0.04	1493
Thryssa dussumieri	0.17	17	0.03	1482
Charybdis sp.	0.17	45	0.03	
Drepane longimana	0.15	6	0.03	1475
Gerres filamentosus	0.14	6	0.03	1477
Gazza minuta	0.06	6	0.01	1494
Total	568.53		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 57
DATE :12.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 23°28.14
start stop duration Lon E 67°42.53
TIME :11:17:53 11:48:15 30.4 (min) Purpose : 1
LOG : 2712.16 2713.77 1.6 Region : 9100
FDEPTH: 26 25 Gear cond.: 0
BDEPTH: 26 25 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.2 kn
Sorted : 0 Total catch: 125.77 Catch/hour: 248.47

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Rhinobatos sp.	51.56	4	20.75	
Sphyraena putnamae	34.87	967	14.03	10
Upeneus vittatus	34.28	1740	13.80	7
Himantura walga	20.05	60	8.07	41
Arius dussumieri	17.85	88	7.18	48
Lepturacanthus savala	16.04	237	6.46	40
Eleutheronema tetradactylum	12.94	8	5.21	39
Uroteuthis duvaucelii	10.33	405	4.16	38
Rastrelliger kanagurta	6.20	120	2.50	9
Parapenaeopsis stylifera	5.52	2223	2.22	1516
Scomberoides commersonianus	4.93	36	1.98	8
Lactarius lactarius	4.03	92	1.62	47
SNAKE	3.56	0	1.43	
J E L L Y F I S H	2.48	0	1.00	
Pomadasys maculatus	1.94	637	0.78	37
Rhizoprionodon oligolinx	1.93	4	0.78	45
Sardinella sp.	1.85	60	0.74	18
Rhabdosargus sarba	1.78	4	0.72	42
Dussumieria acuta	1.73	52	0.70	14
Otolithes ruber	1.53	8	0.61	3
Cynoglossus arel	1.23	16	0.49	51
Acanthopagrus latus	1.09	2	0.44	43
Saurida tumbil	1.08	36	0.43	17
Metapenaeus affinis	1.03	187	0.41	1520
Decapterus russelli	0.96	28	0.39	11
Protonibea diacanthus	0.80	4	0.32	46
Terapon jarbua	0.76	8	0.31	36
Polynemus plebeius	0.59	4	0.24	44
Leiognathus lineolatus	0.59	168	0.24	53
Cynoglossus sp.	0.44	32	0.18	52
Parastromateus niger	0.42	28	0.17	49
Anodontostoma chacunda	0.39	4	0.16	59
Cociella crocodilus	0.38	12	0.15	13
Penaeus monodon	0.30	2	0.12	1518
Pomadasys kaakan	0.28	4	0.11	65
Selar crumenophthalmus	0.26	4	0.11	50
G A S T R O P O D S	0.26	0	0.11	
Atropus atropos	0.25	4	0.10	64
Ariomma indica	0.22	12	0.09	19
Ilisha sp.	0.20	4	0.08	61
Penaeus semisulcatus	0.18	8	0.07	1519
Sepiella sp.	0.17	4	0.07	62
Rachycentron canadum	0.17	4	0.07	63
Carangoides sp.	0.16	76	0.06	35
Polynemus heptadactylus*	0.16	4	0.06	58
Epinephelus diacanthus	0.12	24	0.05	55
E C H I N O D E R M A T A	0.11	0	0.05	
Johnius dussumieri	0.09	16	0.04	54
Nemipterus randalli	0.09	24	0.03	12
Pseudorhombus elevatus	0.08	4	0.03	60
Grammoplites suppositus	0.08	4	0.03	67
Echeneis naucrates	0.06	4	0.02	56
Metapenaeopsis stridulans	0.03	11	0.01	1517
Gazza minuta	0.02	2	0.01	66
Johnius sp.	0.01	4	0.00	57
Squilla sp.	0.01	0	0.00	
Total	248.47		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 58
DATE :13.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 23°39.45
start stop duration Lon E 67°38.10
TIME :03:06:17 03:36:40 30.4 (min) Purpose : 3
LOG : 2829.89 2832.06 2.2 Region : 9100
FDEPTH: 27 31 Gear cond.: 0
BDEPTH: 27 31 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 4.3 kn
Sorted : 0 Total catch: 137.90 Catch/hour: 272.26

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Arius tenuispinis*	85.69	208	31.47	340
Lepturacanthus savala	39.72	251	14.59	250
Torpedo sp.	16.40	6	6.02	373
Rhabdosargus sarba	10.21	46	3.75	1746
Acanthopagrus latus	9.59	20	3.52	332
Otolithes ruber	8.12	16	2.98	260
Himantura bleekeri	6.91	4	2.54	372
Penaeus merguiensis	6.50	148	2.39	1757
G A S T R O P O D S	5.54	361	2.04	
Sepia pharaonis	5.36	5	1.97	1749
Rastrelliger kanagurta	5.06	18	1.86	251
Thryssa dussumieri	4.60	388	1.69	342
Grammoplites suppositus	4.59	65	1.69	259
Ilisha sp.	4.26	71	1.57	334
Johnius sp.	3.87	26	1.42	333
Pennahia macrophthalmus *	3.68	65	1.35	355
Scomberoides commersonianus	3.46	12	1.27	335
Muraenesox cinereus	3.23	5	1.19	1748
Pomadasys maculatus	2.97	610	1.09	341
Metapenaeus affinis	2.79	703	1.02	1754
Uroteuthis duvaucelii	2.53	36	0.93	366
Nemipterus randalli	2.52	0	0.92	
Parapenaeopsis stylifera	2.50	13945	0.92	1755
Himantura walga	2.41	2	0.89	374
SNAKE	2.27	0	0.83	
Sepiella sp.	1.90	26	0.70	371
Johnius dussumieri	1.90	51	0.70	354
J E L L Y F I S H	1.76	0	0.64	
Charybdis feriata	1.58	28	0.58	
Nemipterus japonicus	1.50	20	0.55	336
Anodontostoma chacunda	1.39	8	0.51	337
Pseudorhombus arsius	1.23	18	0.45	359
Pampus argenteus	1.15	5	0.42	351
Otolithes cuvieri	1.09	1	0.40	348
Epinephelus diacanthus	1.08	83	0.40	370
Cynoglossus sp.	1.06	49	0.39	364
Polynemus heptadactylus*	0.92	14	0.34	353
Saurida tumbil	0.92	28	0.34	357
Lactarius lactarius	0.81	23	0.30	347
Alepes djedaba	0.72	30	0.27	344
Metapenaeus monoceros	0.60	28	0.22	1753
Metapenaeopsis stridulans	0.60	52	0.22	1751
Sphyraena putnamae	0.54	14	0.20	356
Drepane punctata	0.47	2	0.17	339
Thryssa vitrirostris	0.45	18	0.17	362
Drepane longimana	0.42	6	0.16	338
Penaeus semisulcatus	0.40	9	0.15	1756
Penaeus japonicus	0.40	18	0.15	1758
Cynoglossus arel	0.36	4	0.13	252
CONGER SP	0.36	9	0.13	1747
Sillago sihama	0.36	5	0.13	352
Terapon jarbua	0.33	2	0.12	363
Charybdis sp.	0.33	53	0.12	
Gazza minuta	0.32	18	0.12	365
Pomadasys kaakan	0.30	2	0.11	367
Squilla sp.	0.29	0	0.11	
Thryssa hamiltonii	0.24	2	0.09	258
Carangoides sp.	0.22	261	0.08	1750
Pseudorhombus elevatus	0.15	9	0.06	346
DORIPPIDAE	0.15	20	0.05	
Uranscopus marmoratus	0.14	2	0.05	368
Portunus sanguinolentus	0.13	6	0.05	
Dussumieria acuta	0.13	5	0.05	343
Decapterus russelli	0.11	5	0.04	1696
Parastromateus niger	0.11	14	0.04	350
Upeneus vittatus	0.11	9	0.04	358
Leiognathus lineolatus	0.10	16	0.04	369
Apogon quadrifasciatus	0.07	5	0.03	360
Calappa pustulosa	0.06	4	0.02	
Laeops parviceps	0.06	18	0.02	361
Minous monodactylus	0.05	4	0.02	345
Sardinella sp.	0.04	5	0.02	349
Solenocera choprai	0.03	9	0.01	1752
Doclea sp.	0.02	4	0.01	
Philyra sp.	0.02	2	0.01	
Total	272.26		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 59
DATE :13.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 23°22.16
start stop duration Lon E 67°29.34
TIME :07:24:01 07:54:14 30.2 (min) Purpose : 3
LOG : 2856.28 2858.39 2.1 Region : 9100
FDEPTH: 27 27 Gear cond.: 0
BDEPTH: 27 27 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 4.2 kn
Sorted : 0 Total catch: 48.66 Catch/hour: 96.61

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Scomberoides commersonianus	29.98	12	31.03	319
Uroteuthis duvaucelii	16.38	292	16.95	327
Sepia pharaonis	13.90	9	14.39	246
Scomberomorus commerson	7.35	2	7.60	23
J E L L Y F I S H	7.35	0	7.60	
Decapterus russelli	6.39	1444	6.62	247
Rachycentron canadum	5.66	2	5.86	329
Sardinella gibbosa	4.63	137	4.80	1697
Chirocentrus nudus	2.18	2	2.25	320
Triacanthus biaculeatus	0.61	4	0.63	316
Saurida undosquamis	0.50	12	0.51	324
Grammoplites suppositus	0.26	8	0.27	326
Rastrelliger kanagurta	0.25	20	0.26	325
Saurida tumbil	0.20	8	0.21	323
Thenus orientalis	0.18	0	0.19	
Alectis ciliaris	0.12	2	0.13	248
Cynoglossus arel	0.12	2	0.12	321
G A S T R O P O D S	0.11	14	0.11	
Charybdis feriata	0.09	0	0.10	
Calappa sp.	0.09	0	0.09	
Dussumieria acuta	0.09	4	0.09	249
Pomadasys maculatus	0.07	2	0.07	322
OPHICHTHIDAE	0.05	2	0.06	317
Ariomma indica	0.03	2	0.03	318
Atropus atropos	0.01	2	0.01	328
Carangoides malabaricus	0.01	2	0.01	331
Squilla sp.	0.01	0	0.01	
Leiognathus lineolatus	0.00	2	0.00	330
Total	96.61		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 60
DATE :13.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 23°15.31
start stop duration Lon E 67°31.82
TIME :09:30:44 10:01:20 30.6 (min) Purpose : 3
LOG : 2869.91 2872.05 2.2 Region : 9100
FDEPTH: 30 29 Gear cond.: 0
BDEPTH: 30 29 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 4.2 kn
Sorted : 0 Total catch: 55.89 Catch/hour: 109.59

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Scomberoides commersonianus	49.92	26	45.55	306
Uroteuthis duvaucelii	28.14	4956	25.67	314
J E L L Y F I S H	11.37	0	10.38	
Decapterus russelli	9.98	1166	9.11	29
Scomberomorus koreanus	5.98	6	5.46	304
Ablennes hians	2.25	2	2.06	305
Sardinella gibbosa	0.81	25	0.74	311
Rastrelliger kanagurta	0.37	18	0.34	309
Alectis ciliaris	0.29	2	0.26	313
Thenus orientalis	0.14	2	0.13	315
Parastromateus niger	0.10	6	0.09	1698
Sardinella sindensis	0.10	8	0.09	312
DORIPPIDAE	0.05	2	0.04	
Sorsogna tuberculata	0.03	2	0.03	310
G A S T R O P O D S	0.03	6	0.02	
Charybdis feriata	0.02	8	0.02	
Ariomma indica	0.01	2	0.01	307
Leiognathus lineolatus	0.00	2	0.00	308
Total	109.59		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 61
DATE :13.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 23°5.82
start stop duration Lon E 67°20.56
TIME :12:24:13 12:54:17 30.1 (min) Purpose : 3
LOG : 2891.27 2893.05 1.8 Region : 9100
FDEPTH: 35 37 Gear cond.: 0
BDEPTH: 35 37 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.6 kn
Sorted : 0 Total catch: 168.75 Catch/hour: 336.71

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
J E L L Y F I S H	127.40	0	37.84	
Uroteuthis duvaucelii	39.81	1322	11.82	236
Odonus niger	35.72	146	10.61	1735
Aluterus monoceros	28.63	16	8.50	1729
Sepia pharaonis	23.94	8	7.11	1736
Pomadasys kaakan	19.55	28	5.81	1728
Sphyraena putnamae	13.37	16	3.97	1730
Scomberoides commersonianus	10.68	8	3.17	1734
Scomberomorus koreanus	9.48	10	2.81	1733
Chirocentrus nudus	4.99	6	1.48	1731
Saurida tumbil	4.54	20	1.35	237
Lagocephalus spadiceus	4.26	14	1.26	238
Dussumieria acuta	3.86	74	1.15	1726
Fistularia petimba	1.50	2	0.44	1732
Thenus orientalis	1.49	8	0.44	1699
Decapterus russelli	1.23	285	0.37	1727
Alectis ciliaris	0.86	6	0.26	1695
Atropus atropos	0.81	4	0.24	1694
Saurida undosquamis	0.75	30	0.22	1738
Terapon jarbua	0.66	4	0.19	1742
Carangoides malabaricus	0.41	4	0.12	26
Caranx tille	0.39	2	0.12	1743
Uranscopus marmoratus	0.37	2	0.11	1741
G A S T R O P O D S	0.33	30	0.10	
Sepia latimanus	0.32	2	0.09	1693
Sorsogna tuberculata	0.31	18	0.09	239
Antennarius striatus	0.26	2	0.08	1739
Lactarius lactarius	0.22	2	0.06	296
Nemipterus randalli	0.16	22	0.05	1745
Charybdis feriata	0.10	18	0.03	
Gazza minuta	0.10	20	0.03	1744
Grammoplites suppositus	0.07	4	0.02	1737
Sepiella sp.	0.06	2	0.02	1692
Upeneus moluccensis	0.06	2	0.02	542
Metapenaeus monoceros	0.04	2	0.01	
Epinephelus diacanthus	0.01	2	0.00	1740
Total	336.71		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 62
DATE :13.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 23°6.03
start stop duration Lon E 67°20.71
TIME :15:48:52 16:18:54 30.0 (min) Purpose : 2
LOG : 2906.14 2907.94 1.8 Region : 9100
FDEPTH: 34 36 Gear cond.: 0
BDEPTH: 34 36 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.6 kn
Sorted : 0 Total catch: 310.46 Catch/hour: 620.10

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nemipterus randalli	196.78	31987	31.73	188
Saurida undosquamis	64.29	2948	10.37	160
Saurida tumbil	63.50	485	10.24	161
J E L L Y F I S H	49.43	0	7.97	
Lepturacanthus savala	43.14	601	6.96	191
Sepia pharaonis	30.56	24	4.93	158
Himantura gerrardi	27.76	2	4.48	157
Sorsogna tuberculata	24.23	1454	3.91	198
Sepia latimanus	10.05	68	1.62	192
Psettodes erumei	9.49	16	1.53	171
Uroteuthis duvaucelii	8.39	320	1.35	190
Arothron stellatus	8.29	2	1.34	182
Grammoplites suppositus	7.81	175	1.26	162
Pomadasys kaakan	7.19	26	1.16	159
Metapenaeus monoceros	5.70	378	0.92	200
Thenus orientalis	5.63	29	0.91	186
Carangoides malabaricus	5.59	96	0.90	168
Pseudorhombus arsius	4.67	48	0.75	169
Gazza minuta	4.61	543	0.74	184
Pseudorhombus elevatus	4.22	262	0.68	189
Apogon queketti	4.09	291	0.66	172
SNAKE	3.74	6	0.60	
Aluterus monoceros	3.68	2	0.59	181
Solenocera choprai	2.87	1354	0.46	201
Otolithes ruber	2.67	10	0.43	1810
Lagocephalus spadiceus	2.66	19	0.43	193
G A S T R O P O D S	2.66	40	0.43	
Lactarius lactarius	2.32	29	0.37	165
Sphyraena putnamae	1.77	2	0.29	180
Atropus atropos	1.59	10	0.26	163
Decapterus russelli	1.56	233	0.25	185
Terapon jarbua	1.34	10	0.22	197
Sepiella sp.	1.23	48	0.20	170
Drepane longimana	1.02	10	0.16	166
Panulirus polyphagus	0.90	2	0.14	187
Scomberoides commersonianus	0.89	2	0.14	179
Sphyraena obtusata	0.82	19	0.13	167
Argyrops spinifer	0.72	2	0.12	164
Sepia omani	0.67	10	0.11	196
Squilla sp.	0.26	0	0.04	
Charybdis feriata	0.23	8	0.04	
Fistularia petimba	0.22	10	0.04	183
Upeneus moluccensis	0.22	10	0.04	195
Epinephelus diacanthus	0.17	19	0.03	194
Sand dollar	0.17	0	0.03	
Metapenaeopsis stridulans	0.16	39	0.03	199
Charybdis sp.	0.15	26	0.02	
Total	620.10		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 63
DATE :13.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 22°57.75
start stop duration Lon E 67°26.09
TIME :18:18:14 18:48:54 30.7 (min) Purpose : 2
LOG : 2921.71 2923.64 1.9 Region : 9100
FDEPTH: 35 34 Gear cond.: 0
BDEPTH: 35 34 Validity : 0
Towing dir: 0° Wire out : 130 m Speed : 3.8 kn
Sorted : 0 Total catch: 138.42 Catch/hour: 270.87

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
J E L L Y F I S H	93.16	0	34.39	
Nemipterus randalli	42.71	9656	15.77	389
Muraenesox cinereus	15.60	6	5.76	288
Saurida tumbil	12.32	72	4.55	263
Pomadasys maculatus	12.32	215	4.55	383
Grammoplites suppositus	8.64	226	3.19	287
Metapenaeus affinis	7.79	562	2.87	291
Metapenaeus monoceros	7.15	628	2.64	292
Uroteuthis duvaucelii	7.15	691	2.64	388
Sepia pharaonis	5.09	2	1.88	386
OPHICHTHIDAE	4.40	8	1.63	290
Pennahia sp.	4.23	48	1.56	265
Johnius sp.	4.21	36	1.55	295
G A S T R O P O D S	4.15	67	1.53	
Lepturacanthus savala	4.15	68	1.53	285
Psettodes erumei	3.52	6	1.30	283
Nemipterus japonicus	3.52	127	1.30	261
Argyrosomus sp.	2.84	2	1.05	284
Sepia latimanus	2.70	24	1.00	380
Carangoides malabaricus	2.41	8	0.89	297
Acanthopagrus latus	2.05	2	0.76	382
Solenocera choprai	1.89	1027	0.70	293
Charybdis sp.	1.61	117	0.59	
Pseudorhombus elevatus	1.58	127	0.58	262
Odonus niger	1.37	6	0.51	264
Argyrops spinifer	1.35	8	0.50	276
Sorsogna tuberculata	1.31	83	0.48	286
Pomadasys kaakan	1.17	6	0.43	281
Lagocephalus spadiceus	1.03	4	0.38	277
Panulirus polyphagus	0.90	2	0.33	1813
Charybdis feriata	0.69	106	0.26	
SNAKE	0.68	2	0.25	
Sepiella sp.	0.66	24	0.24	379
Thryssa dussumieri	0.64	44	0.24	269
Lactarius lactarius	0.63	8	0.23	274
Pseudorhombus arsius	0.57	8	0.21	278
Gerres filamentosus	0.54	12	0.20	273
Dussumieria acuta	0.50	8	0.19	375
Saurida undosquamis	0.49	20	0.18	275
Gazza minuta	0.44	302	0.16	384
Minous dempsterae	0.31	8	0.11	298
Apogon quadrifasciatus	0.27	36	0.10	268
Metapenaeopsis stridulans	0.23	64	0.09	294
Polynemus heptadactylus*	0.22	4	0.08	271
Laeops parviceps	0.20	48	0.08	266

Bregmaceros sp.	0.17	186	0.06	387
Cynoglossus sp.	0.15	24	0.06	280
Apogon queketti	0.14	16	0.05	267
Parastromateus niger	0.13	8	0.05	270
Decapterus russelli	0.10	84	0.04	385
Apogon sp.	0.10	4	0.04	378
Epinephelus diacanthus	0.10	16	0.04	272
Penaeus semisulcatus	0.10	4	0.04	1759
Upeneus vittatus	0.09	4	0.03	279
Sardinella sindensis	0.09	16	0.03	299
Squilla sp.	0.08	16	0.03	
Sepiella inermis	0.06	4	0.02	381
Octopus sp.	0.05	2	0.02	
CONGER SP	0.04	2	0.02	289
Ariomma indica	0.04	12	0.01	377
Fistularia petimba	0.03	20	0.01	282
Stolephorus indicus	0.02	8	0.01	376
Total	270.87		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 64
DATE :14.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 22°59.51
start stop duration Lon E 67°25.36
TIME :02:38:46 03:08:41 29.9 (min) Purpose : 3
LOG : 2947.56 2949.33 1.8 Region : 9100
FDEPTH: 34 34 Gear cond.: 0
BDEPTH: 34 34 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.5 kn
Sorted : 0 Total catch: 359.44 Catch/hour: 720.81

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
J E L L Y F I S H	325.43	0	45.15	
G A S T R O P O D S	91.04	2027	12.63	
Uroteuthis duvaucelii	68.12	3457	9.45	257
Pomadasys maculatus	49.39	691	6.85	1772
Scomberoides commersonianus	44.92	42	6.23	22
Pennahia macrophthalmus *	30.98	290	4.30	1790
Psettodes erumei	12.27	26	1.70	1781
Megalaspis cordyla	10.39	34	1.44	1773
Arius tenuispinis*	7.39	10	1.02	256
Rhizoprionodon oligolinx	4.69	4	0.65	1771
Gazza minuta	4.55	3270	0.63	1764
Lagocephalus spadiceus	4.07	19	0.56	1763
Terapon jarbua	4.05	39	0.56	1777
Upeneus vittatus	3.83	84	0.53	1778
Lutjanus johnii	3.83	4	0.53	1770
Scomberomorus guttatus	3.74	10	0.52	254
Pomadasys kaakan	3.67	4	0.51	253
Lactarius lactarius	3.43	58	0.48	1775
Alepes djedaba	3.09	14	0.43	255
Ilisha sp.	3.07	19	0.43	1780
Trachinotus mookalee	2.66	2	0.37	1787
Rastrelliger kanagurta	2.59	96	0.36	1762
Sphyraena obtusata	2.45	19	0.34	1774
Pampus argenteus	2.08	4	0.29	1765
Grammoplites suppositus	2.07	13	0.29	1839
Saurida undosquamis	2.07	45	0.29	1845
Charybdis feriata	2.03	485	0.28	
Nemipterus randalli	1.80	640	0.25	1848
Pseudorhombus arsius	1.76	13	0.24	1779
Dussumieria acuta	1.70	32	0.24	1776
Sorsogna tuberculata	1.58	77	0.22	1838
Gerres filamentosus	1.56	19	0.22	1784
Pseudorhombus elevatus	1.54	116	0.21	1840
Sepia pharaonis	1.36	2	0.19	1789
Sphyraena putnamae	1.23	2	0.17	1788
Atropus atropos	1.02	13	0.14	1844
Chirocentrus nudus	1.02	2	0.14	1786
Decapterus russelli	0.90	361	0.13	1768
Nemipterus japonicus	0.90	13	0.13	1847
Odonus niger	0.90	4	0.12	1833
Ariomma indica	0.84	45	0.12	1843
Otolithes ruber	0.82	2	0.11	1832
Thryssa dussumieri	0.66	39	0.09	1842
Charybdis sp.	0.44	180	0.06	
Uranscopus marmoratus	0.43	2	0.06	1785
Lepturacanthus savala	0.41	12	0.06	1766
Sepia latimanus	0.38	6	0.05	1783
Metapenaeus monoceros	0.28	19	0.04	1769
Cynoglossus arel	0.26	6	0.04	1841
Sardinella sp.	0.22	6	0.03	1836
Upeneus moluccensis	0.22	6	0.03	1782
Apogon quadrifasciatus	0.20	24	0.03	1767
Epinephelus diacanthus	0.18	12	0.03	1837
Hermits, mixed	0.10	12	0.01	
Parastromateus niger	0.10	6	0.01	1846
Cynoglossus sp.	0.06	10	0.01	1835
Octopus sp.	0.02	0	0.00	
Saurida tumbil	0.00	0	0.00	1834
Total	720.81		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 65
DATE :14.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 23°0.00
start stop duration Lon E 67°22.35
TIME :03:49:32 04:19:49 30.3 (min) Purpose : 3
LOG : 2952.26 2953.84 1.6 Region : 9100
FDEPTH: 39 39 Gear cond.: 0
BDEPTH: 39 39 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.1 kn
Sorted : 0 Total catch: 334.61 Catch/hour: 663.24

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Gazza minuta	264.06	217119	39.81	1803
J E L L Y F I S H	206.82	0	31.18	
Scomberoides commersonianus	75.32	107	11.36	1804
Uroteuthis duvaucelii	30.31	2865	4.57	1856
Dussumieria acuta	19.82	414	2.99	1855
Lepturacanthus savala	9.01	96	1.36	1854
G A S T R O P O D S	7.41	0	1.12	
Pomadasys kaakan	6.11	29	0.92	1807
Sphyraena putnamae	5.25	8	0.79	1792
Arius tenuispinis*	4.96	8	0.75	1802
Scomberomorus koreanus	4.46	4	0.67	1799
Rastrelliger kanagurta	4.06	77	0.61	1808
Lutjanus johnii	4.02	10	0.61	1809
Terapon jarbua	3.13	19	0.47	1805
Rhizoprionodon oligolinx	2.48	2	0.37	1798
Chirocentrus nudus	2.32	6	0.35	1793
Arius caelatus	2.08	2	0.31	1801
Aluterus monoceros	2.07	2	0.31	1796
Pomadasys maculatus	2.07	29	0.31	1852
Ariomma indica	1.65	290	0.25	1794
Psettodes erumei	1.37	2	0.21	1797
Drepane punctata	1.25	10	0.19	1800
SNAKE	0.99	2	0.15	
Carangoides malabaricus	0.94	19	0.14	1853
Charybdis feriata	0.69	0	0.10	
Saurida undosquamis	0.34	10	0.05	1806
Metapenaeus monoceros	0.11	7	0.02	20
Charybdis sp.	0.07	0	0.01	
Sphyraena obtusata	0.04	9	0.01	21
Stolephorus indicus	0.03	10	0.00	1795
Total	663.24		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 66
DATE :14.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 22°53.45
start stop duration Lon E 67°15.89
TIME :05:58:43 06:28:46 30.1 (min) Purpose : 3
LOG : 2965.75 2967.49 1.7 Region : 9100
FDEPTH: 104 105 Gear cond.: 0
BDEPTH: 104 105 Validity : 0
Towing dir: 0° Wire out : 280 m Speed : 3.5 kn
Sorted : 0 Total catch: 28.65 Catch/hour: 57.20

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dussumieria acuta	16.47	140	28.80	71
Sarda orientalis	7.92	6	13.84	72
Rastrelliger kanagurta	4.85	30	8.48	68
Uroteuthis duvaucelii	4.44	154	7.77	88
Atrobucca alcocki	3.61	12	6.32	67
Lepturacanthus savala	3.13	42	5.48	87
J E L L Y F I S H	3.03	0	5.31	
Saurida tumbil	2.91	8	5.08	80
Scomberoides commersonianus	2.00	3	3.49	86
Epinephelus diacanthus	1.88	0	3.29	
Nemipterus randalli	1.32	18	2.30	83
Champsodon sp.	1.31	697	2.29	78
Ariomma indica	0.92	8	1.61	85
G A S T R O P O D S	0.85	22	1.49	
Nemipterus japonicus	0.85	8	1.48	82
Decapterus russelli	0.46	6	0.80	84
Acropoma japonicum	0.28	76	0.49	73
Argyrops spinifer	0.26	2	0.45	69
Upeneus heptacanthus	0.16	4	0.28	70
Saurida undosquamis	0.13	4	0.22	79
Metapenaeus monoceros	0.11	0	0.20	89
Sepia latimanus	0.11	2	0.19	76
Priacanthus hamrur	0.10	2	0.18	90
Synagrops adeni	0.07	50	0.12	77
Sardinella sindensis	0.01	2	0.02	74
Charybdis sp.	0.01	8	0.02	
Solea sp.	0.01	2	0.02	75
Benthosema fibulatum	0.00	2	0.01	
Total	57.20		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 67
DATE :14.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 22°36.50
start stop duration Lon E 67°16.06
TIME :09:24:10 09:56:10 32.0 (min) Purpose : 3
LOG : 2990.47 2992.33 1.9 Region : 9110
FDEPTH: 141 141 Gear cond.: 0
BDEPTH: 141 141 Validity : 0
Towing dir: 0° Wire out : 400 m Speed : 3.5 kn
Sorted : 0 Total catch: 257.95 Catch/hour: 483.81

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Atrobucca alcocki	359.74	2530	74.36	505
Lepturacanthus savala	51.95	1077	10.74	512
Priacanthus hamrur	28.23	532	5.83	504
Decapterus russelli	8.13	75	1.68	503
Epinephelus latifasciatus	6.66	4	1.38	516
Metapenaeus affinis	5.31	4804	1.10	519
Saurida undosquamis	5.01	230	1.04	518
Rhinobatos annandalei	4.60	2	0.95	520
Rastrelliger kanagurta	3.42	21	0.71	510
Nemipterus randalli	2.84	38	0.59	511
Sepia kobiensis	1.76	24	0.36	515
Scomberoides commersonianus	1.01	2	0.21	513
J E L L Y F I S H	0.98	0	0.20	
Epinephelus diacanthus	0.67	1	0.14	506
Uroteuthis duvaucelii	0.40	8	0.08	514
Decapterus macarellus	0.40	4	0.08	499
G A S T R O P O D S	0.38	6	0.08	
Champsodon sp.	0.38	233	0.08	517
Saurida tumbil	0.36	8	0.07	501
Cynoglossus arel	0.34	8	0.07	508
Acropoma japonicum	0.33	36	0.07	500
Parascolopsis boesemani	0.30	15	0.06	498
Charybdis sp.	0.20	8	0.04	
Dussumieria acuta	0.19	4	0.04	496
Solea sp.	0.07	8	0.01	497
CONGER SP	0.06	2	0.01	509
Synagrops adeni	0.05	19	0.01	502
Gazza minuta	0.03	25	0.01	2133
CALLIONYMIDAE	0.01	3	0.00	521
Laeops parviceps	0.00	2	0.00	507
Total	483.81		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 68
DATE :14.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 22°38.08
start stop duration Lon E 67°13.44
TIME :12:39:41 13:11:05 31.4 (min) Purpose : 3
LOG : 3011.53 3013.28 1.7 Region : 9110
FDEPTH: 170 175 Gear cond.: 0
BDEPTH: 170 175 Validity : 0
Towing dir: 0° Wire out : 490 m Speed : 3.3 kn
Sorted : 0 Total catch: 79.46 Catch/hour: 151.78

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Priacanthus blochii	41.45	818 27.31	446
Benthosema fibulatum	30.47	27530 20.07	412
Saurida longimanus	15.34	435 10.10	444
Synagrops adeni	14.51	4214 9.56	413
Parascolopsis eriomma	12.02	489 7.92	495
Atrobucca alcocki	10.78	54 7.10	443
Metapenaeus sp.	6.42	3983 4.23	415
Cynoglossus sp.	5.75	162 3.79	411
Lepturacanthus savala	5.22	91 3.44	416
Sepia kobiensis	4.72	104 3.11	441
Charybdis sp.	1.75	27 1.15	
CONGER SP	1.01	17 0.66	410
Champsodon sp.	0.55	533 0.36	414
Laeops parviceps	0.36	37 0.23	417
Decapterus russelli	0.36	4 0.23	439
J E L L Y F I S H	0.34	0 0.22	
G A S T R O P O D S	0.20	8 0.13	
CALLIONYMIDAE	0.14	16 0.09	419
Pristipomoides multidens	0.13	4 0.08	418
Lepidotrigla bispinosa	0.11	4 0.07	440
Aseraggodes sp.	0.08	8 0.05	442
Calappa pustulosa	0.04	2 0.03	
Solenocera hextii	0.02	4 0.01	
SICYONIIDAE	0.02	38 0.01	
GOBIIDAE	0.01	19 0.01	445
Total	151.78	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 69
DATE :14.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 22°54.31
start stop duration Lon E 67°15.48
TIME :23:58:27 00:28:31 30.1 (min) Purpose : 2
LOG : 3059.39 3061.11 1.7 Region : 9110
FDEPTH: 105 105 Gear cond.: 0
BDEPTH: 105 105 Validity : 0
Towing dir: 0° Wire out : 324 m Speed : 3.4 kn
Sorted : 0 Total catch: 53.61 Catch/hour: 106.98

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Decapterus russelli	58.06	842 54.28	433
Nemipterus randalli	10.77	291 10.07	423
Solenocera choprai	5.67	1614 5.30	430
Lepturacanthus savala	4.39	96 4.10	422
Champsodon sp.	3.69	3560 3.45	356
Saurida undosquamis	3.61	132 3.38	425
Atrobucca alcocki	3.29	12 3.08	434
Priacanthus blochii	2.36	42 2.20	350
Upeneus moluccensis	2.24	76 2.10	432
Nemipterus japonicus	2.18	20 2.04	348
Uranscopus marmoratus	1.38	4 1.29	437
J E L L Y F I S H	1.30	0 1.21	
Epinephelus diacanthus	1.29	48 1.20	435
Charybdis sp.	1.14	694 1.06	
CONGER SP	1.08	38 1.01	424
Sepia latimanus	1.00	14 0.93	426
Saurida tumbil	0.79	4 0.73	352
Saurida longimanus	0.52	22 0.48	351
Lagocephalus spadiceus	0.38	2 0.36	436
G A S T R O P O D S	0.29	10 0.27	
Grammoplites suppositus	0.24	6 0.23	349
Aseraggodes sp.	0.23	46 0.21	354
Ariomma indica	0.18	2 0.17	438
CALLIONYMIDAE	0.18	70 0.17	428
Lophiomus setigerus	0.17	2 0.16	376
Metapenaeus affinis	0.16	16 0.15	431
Synagrops adeni	0.07	54 0.07	355
Uroteuthis duvaucelii	0.07	4 0.06	429
Laeops parviceps	0.06	1 0.06	347
Octopus sp.	0.05	2 0.05	
Acropoma japonicum	0.04	6 0.04	357
Sorsogna tuberculata	0.03	4 0.03	427
SICYONIIDAE	0.03	66 0.03	
Minous dempsterae	0.03	4 0.03	353
Total	106.98	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 70
DATE :15.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 23°3.34
start stop duration Lon E 67°12.53
TIME :02:19:34 02:50:10 30.6 (min) Purpose : 1
LOG : 3074.88 3076.59 1.7 Region : 9100
FDEPTH: 108 107 Gear cond.: 0
BDEPTH: 108 107 Validity : 0
Towing dir: 0° Wire out : 280 m Speed : 3.4 kn
Sorted : 0 Total catch: 286.34 Catch/hour: 561.45

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Priacanthus blochii	235.41	4365 41.93	361
Upeneus moluccensis	79.49	2720 14.16	126
Nemipterus randalli	40.94	644 7.29	125
Decapterus russelli	37.53	600 6.68	366
Epinephelus diacanthus	25.59	348 4.56	133
Uroteuthis duvaucelii	23.54	805 4.19	144
Saurida undosquamis	23.01	859 4.10	124
Lepturacanthus savala	14.46	225 2.58	365
Atrobucca alcocki	13.65	48 2.43	362
Saurida longimanus	11.39	471 2.03	123
Saurida tumbil	11.27	68 2.01	132
Sardinella longiceps	7.51	89 1.34	367
Champsodon sp.	7.25	6074 1.29	146
Selar crumenophthalmus	7.06	55 1.26	363
Carcharhinus macloti	6.67	4 1.19	46
Decapterus macrosoma	4.18	75 0.74	364
Sepia latimanus	2.40	27 0.43	145
Platycephalus sp.	2.25	7 0.40	130
G A S T R O P O D S	2.18	88 0.39	
Ariomma indica	1.31	27 0.23	131
Metapenaeus monoceros	1.21	61 0.22	150
Argyrops spinifer	1.10	7 0.20	129
Sphyraena obtusata	0.46	7 0.08	128
Acropoma japonicum	0.43	34 0.08	135
Pseudorhombus arsius	0.39	6 0.07	7
Sepia kobiensis	0.25	7 0.04	134
Charybdis sp.	0.16	137 0.03	
Synagrops adeni	0.12	75 0.02	143
Solenocera choprai	0.08	17 0.01	148
Fistularia petimba	0.07	7 0.01	127
Gazza minuta	0.05	7 0.01	136
SICYONIIDAE	0.03	63 0.00	
Solea sp.	0.02	7 0.00	147
Total	561.45	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 71
DATE :15.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 23°16.04
start stop duration Lon E 67°1.32
TIME :05:51:55 06:23:03 31.1 (min) Purpose : 3
LOG : 3097.30 3098.97 1.7 Region : 9108
FDEPTH: 122 127 Gear cond.: 0
BDEPTH: 122 127 Validity : 0
Towing dir: 0° Wire out : 330 m Speed : 3.2 kn
Sorted : 0 Total catch: 25.08 Catch/hour: 48.32

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Dussumieria acuta	10.85	102 22.45	114
Atrobucca alcocki	10.54	58 21.81	111
Nemipterus randalli	9.73	137 20.14	121
Priacanthus blochii	7.58	146 15.69	113
Lepturacanthus savala	5.83	125 12.07	112
Acropoma japonicum	2.24	148 4.63	118
Uroteuthis duvaucelii	0.99	54 2.06	110
Cynoglossus sp.	0.15	6 0.31	116
Parascolopsis aspinosa	0.14	4 0.30	108
G A S T R O P O D S	0.13	6 0.27	
Saurida tumbil	0.10	6 0.21	120
Epinephelus diacanthus	0.02	2 0.04	119
Saurida undosquamis	0.01	2 0.02	115
Sepia kobiensis	0.00	0 0.00	109
Total	48.32	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 72
DATE :15.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 23°20.76
start stop duration Lon E 67°5.78
TIME :09:09:10 09:41:15 32.1 (min) Purpose : 3
LOG : 3119.88 3121.89 2.0 Region : 9108
FDEPTH: 98 98 Gear cond.: 0
BDEPTH: 98 98 Validity : 0
Towing dir: 0° Wire out : 320 m Speed : 3.8 kn
Sorted : 0 Total catch: 127.48 Catch/hour: 238.50

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Decapterus russelli	108.04	1223 45.30	385
Nemipterus randalli	39.38	422 16.51	360
Lagocephalus spadiceus	37.70	246 15.81	386
Sphyraena obtusata	14.50	188 6.08	395
Dussumieria acuta	10.38	232 4.35	383
Sepia kobiensis	8.36	119 3.51	396
J E L L Y F I S H	5.05	0 2.12	
Decapterus macarellus	3.09	47 1.29	384
Priacanthus blochii	2.97	56 1.25	389
Uroteuthis duvaucelii	1.80	92 0.75	398
Nemipterus japonicus	1.67	11 0.70	390
Saurida tumbil	1.51	6 0.63	394
Selar crumenophthalmus	0.76	4 0.32	379
Atrobucca alcocki	0.65	2 0.27	393
Epinephelus diacanthus	0.58	17 0.24	378
Lepturacanthus savala	0.46	7 0.19	382
Saurida longimanus	0.33	13 0.14	381
G A S T R O P O D S	0.25	69 0.10	
Saurida undosquamis	0.24	2 0.10	380
Acropoma japonicum	0.21	19 0.09	392
Cepola sp.	0.19	4 0.08	397
Metapenaeus monoceros	0.13	7 0.05	117
Rastrelliger kanagurta	0.10	2 0.04	387
Champsodon sp.	0.05	34 0.02	388
Gazza minuta	0.04	4 0.02	391
Starfish	0.02	6 0.01	
Charybdis feriata	0.01	2 0.00	
Total	238.50	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 73
DATE :16.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 23°48.23
start stop duration Lon E 67°1.24
TIME :19:28:39 19:59:11 30.5 (min) Purpose : 2
LOG : 3347.25 3348.99 1.7 Region : 9100
FDEPTH: 70 70 Gear cond.: 0
BDEPTH: 70 70 Validity : 0
Towing dir: 0° Wire out : 220 m Speed : 3.4 kn
Sorted : 0 Total catch: 88.66 Catch/hour: 174.19

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Nemipterus randalli	44.32	2321 25.44	88
J E L L Y F I S H	29.47	24 16.92	
Grammoplites suppositus	25.23	476 14.48	2136
Saurida tumbil	19.57	94 11.23	102
Nemipterus japonicus	11.93	104 6.85	83
Solenocera choprai	6.75	3601 3.88	2139
Uranscopus marmoratus	5.65	42 3.24	82
Sepia kobiensis	5.16	85 2.96	2138
Metapenaeus monoceros	4.53	429 2.60	2140
Saurida longimanus	3.27	57 1.88	66
Sepia latimanus	3.13	42 1.80	2137
Echeneis naucrates	2.32	2 1.33	92
Champsodon sp.	1.37	848 0.78	93
Suggrundus sp.	1.28	0 0.74	
Minous dempsterae	0.99	33 0.57	87
G A S T R O P O D S	0.95	0 0.55	
Sorsogna tuberculata	0.87	80 0.50	101
Lepturacanthus savala	0.86	24 0.50	99
Apogon queketti	0.65	80 0.37	100
Ariomma indica	0.64	9 0.37	80
Penaeus monodon	0.64	6 0.37	2141
Uroteuthis duvaucelii	0.55	38 0.31	90
Acanthocepola indica	0.50	5 0.29	98
Lepidotrigla bispinosa	0.41	19 0.24	85
Sphyraena obtusata	0.34	5 0.20	2207
Bregmaceros sp.	0.34	302 0.20	94

Thenus orientalis	0.33	6	0.19	2073
Saurida undosquamis	0.33	5	0.19	2072
Fistularia petimba	0.26	14	0.15	79
Charybdis sp.	0.24	67	0.14	
Pterois russelii	0.21	14	0.12	2206
Gazza minuta	0.17	23	0.10	84
Laeops parviceps	0.16	24	0.09	97
Decapterus russelli	0.16	113	0.09	91
Zebrias synapturoides	0.15	5	0.09	95
Sicyonia sp.	0.12	161	0.07	
Sand dollar	0.07	0	0.04	
Minous monodactylus	0.07	5	0.04	86
Epinephelus diacanthus	0.05	9	0.03	96
Charybdis feriata	0.05	20	0.03	
Sepiella sp.	0.05	24	0.03	89
Cryptopodia fornicata	0.04	0	0.02	
Calappa sp.	0.02	20	0.01	
CALLIONYMIDAE	0.00	4	0.00	81
Total	174.19		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 74
DATE :17.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 23°50.37
start stop duration Lon E 67°1.29
TIME :01:51:34 02:21:55 30.3 (min) Purpose : 3
LOG : 3358.10 3359.82 1.7 Region : 9100
FDEPTH: 71 70 Gear cond.: 0
BDEPTH: 71 70 Validity : 0
Towing dir: 0° Wire out : 220 m Speed : 3.4 kn
Sorted : 0 Total catch: 155.24 Catch/hour: 307.00

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
J E L L Y F I S H	260.59	0	84.88	
Lepturacanthus savala	9.49	34	3.09	74
Uroteuthis duvaucelii	9.27	729	3.02	70
Scomberomorus commerson	5.24	2	1.71	2215
Saurida tumbil	5.21	16	1.70	2208
Selar crumenophthalmus	4.23	26	1.38	2210
Arius thalassinus*	2.37	2	0.77	71
Nemipterus japonicus	1.98	16	0.64	2209
Gazza minuta	1.30	168	0.42	72
Decapterus russelli	1.15	36	0.37	2211
Metapenaeus monoceros	0.89	57	0.29	75
Uranscopus marmoratus	0.88	2	0.29	62
Grammoplites suppositus	0.67	20	0.22	53
Sepia latimanus	0.61	8	0.20	51
Ariomma indica	0.59	14	0.19	61
Sepia kobiensis	0.53	8	0.17	52
Champsodon sp.	0.44	214	0.14	69
Odonus niger	0.40	2	0.13	60
G A S T R O P O D S	0.22	14	0.07	
Dussumieria acuta	0.18	10	0.06	64
Sardinella sindensis	0.18	4	0.06	56
Nemipterus randalli	0.17	42	0.06	59
Upeneus moluccensis	0.11	2	0.04	65
Sorsogna tuberculata	0.09	8	0.03	58
Charybdis feriata	0.06	18	0.02	
Charybdis sp.	0.04	16	0.01	
Sand dollar	0.03	16	0.01	
Apogon queketti	0.03	2	0.01	55
Fistularia petimba	0.02	2	0.01	57
CONGER SP	0.01	2	0.00	63
SYNGNATHIDAE	0.01	2	0.00	73
Bregmaceros sp.	0.01	4	0.00	68
Laeops parviceps	0.00	4	0.00	54
Sicyonia sp.	0.00	4	0.00	
Total	307.00		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 75
DATE :17.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 23°41.37
start stop duration Lon E 66°57.10
TIME :05:20:23 05:51:03 30.7 (min) Purpose : 3
LOG : 3376.49 3378.15 1.7 Region : 9100
FDEPTH: 83 78 Gear cond.: 0
BDEPTH: 83 78 Validity : 0
Towing dir: 0° Wire out : 250 m Speed : 3.3 kn
Sorted : 0 Total catch: 91.33 Catch/hour: 178.68

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dussumieria acuta	33.75	885	18.89	2081
Saurida tumbil	25.04	84	14.01	2084
Saurida undosquamis	16.34	82	9.14	2083
Uroteuthis duvaucelii	13.21	583	7.39	2098
Sepia kobiensis	12.91	174	7.23	2085
Nemipterus randalli	12.81	112	7.17	2082
Rastrelliger kanagurta	9.78	58	5.47	2079
Sphyraena jello	9.78	0	5.47	2101
J E L L Y F I S H	6.85	0	3.83	
Grammoplites suppositus	6.36	84	3.56	2096
Sepia latimanus	6.36	65	3.56	5
Upeneus vittatus	4.30	61	2.41	2080
Pomadasys kaakan	3.72	2	2.08	2097
Nemipterus japonicus	3.64	20	2.04	2094
Epinephelus diacanthus	3.03	22	1.70	2091
Sphyraena putnamae	2.93	8	1.64	2076
Uranscopus marmoratus	1.98	14	1.11	2093
Ariomma indica	1.93	12	1.08	2074
Pseudorhombus arsius	1.05	10	0.59	2092
Suggrundus sp.	0.94	4	0.53	2075
G A S T R O P O D S	0.91	293	0.51	
Calappa sp.	0.21	0	0.12	
Champsodon sp.	0.14	78	0.08	2095
Metapenaeus monoceros	0.13	12	0.07	2100
Priacanthus blochii	0.10	2	0.05	2077
Starfish	0.09	29	0.05	
Sorsogna tuberculata	0.07	6	0.04	2088
Fistularia petimba	0.07	2	0.04	2087
Apogon queketti	0.06	10	0.03	2090
Decapterus russelli	0.05	2	0.03	2089
Minous dempsterae	0.04	2	0.02	2078
Sand dollar	0.03	10	0.02	
Solenocera choprai	0.02	2	0.01	2099
CONGER SP	0.02	2	0.01	2086
Sepiella sp.	0.02	4	0.01	2102
Doclea sp.	0.01	2	0.01	
Charybdis feriata	0.01	2	0.00	
Squilla sp.	0.01	0	0.00	
Charybdis sp.	0.00	2	0.00	
DORIPPIDAE	0.00	2	0.00	
Sicyonia sp.	0.00	2	0.00	
Total	178.68		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 76
DATE :17.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 23°27.91
start stop duration Lon E 66°46.84
TIME :09:19:02 09:49:09 30.1 (min) Purpose : 1
LOG : 3408.27 3410.13 1.9 Region : 9100
FDEPTH: 107 106 Gear cond.: 0
BDEPTH: 107 106 Validity : 0
Towing dir: 0° Wire out : 318 m Speed : 3.7 kn
Sorted : 0 Total catch: 38.15 Catch/hour: 75.99

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nemipterus randalli	25.80	305	33.95	20
Atrobucca alcocki	10.46	48	13.76	21
J E L L Y F I S H	8.37	0	11.01	
Lepturacanthus savala	6.47	112	8.52	22
Uroteuthis duvaucelii	5.92	318	7.80	23
Epinephelus diacanthus	4.76	8	6.27	39
Saurida tumbil	2.47	8	3.25	16
Muraena sp.	1.99	40	2.62	67
Saurida undosquamis	1.89	10	2.49	17
OPHICHTHIDAE	1.14	6	1.50	24
Acropoma japonicum	0.99	92	1.30	19
Sphyraena obtusata	0.89	12	1.17	32
Rastrelliger kanagurta	0.66	4	0.87	25
Suggrundus sp.	0.59	2	0.78	15
Champsodon sp.	0.58	96	0.76	40
Sepia kobiensis	0.58	8	0.76	38
Uranscopus marmoratus	0.48	18	0.63	37
Saurida longimanus	0.29	12	0.39	18
Priacanthus blochii	0.26	4	0.34	14
Ariomma indica	0.22	2	0.29	12
CONGER SP	0.17	2	0.22	29
G A S T R O P O D S	0.16	0	0.21	
Upeneus vittatus	0.16	2	0.21	13
Grammoplites suppositus	0.13	2	0.17	31
Decapterus russelli	0.12	2	0.16	28
Starfish	0.11	0	0.14	
Cynoglossus sp.	0.09	2	0.12	26
Pseudorhombus elevatus	0.06	2	0.07	33
Acanthocepola indica	0.05	1	0.07	27
Bregmaceros sp.	0.03	32	0.04	48
Sepiella sp.	0.02	6	0.03	49
Minous dempsterae	0.02	2	0.02	34
Aseraggodes sp.	0.01	2	0.02	35
Apogon queketti	0.01	2	0.02	30
Sicyonia sp.	0.01	12	0.02	
Sorsogna tuberculata	0.01	2	0.01	36
SYNGNATHIDAE	0.01	2	0.01	47
Leptocephalus	0.00	0	0.01	
Total	75.99		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 77
DATE :17.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 23°22.06
start stop duration Lon E 66°43.59
TIME :11:59:18 12:29:28 30.2 (min) Purpose : 1
LOG : 3425.98 3427.55 1.6 Region : 9100
FDEPTH: 129 128 Gear cond.: 0
BDEPTH: 129 128 Validity : 0
Towing dir: 0° Wire out : 360 m Speed : 3.1 kn
Sorted : 0 Total catch: 131.76 Catch/hour: 262.12

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Priacanthus blochii	85.11	1715	32.47	2126
Nemipterus randalli	61.42	1418	23.43	2103
Atrobucca alcocki	31.58	232	12.05	2104
Synagrops adeni	21.21	14363	8.09	2130
Uroteuthis duvaucelii	11.59	853	4.42	2129
Saurida longimanus	11.35	484	4.33	2127
Sepia kobiensis	6.03	94	2.30	2105
G A S T R O P O D S	5.68	2041	2.17	
Champsodon sp.	5.12	3487	1.96	2128
Acropoma japonicum	5.12	380	1.95	2110
Lepturacanthus savala	2.96	54	1.13	2123
Uranscopus marmoratus	2.95	10	1.13	2111
Saurida tumbil	2.56	20	0.98	2124
Parascolopsis aspinosa	2.06	99	0.79	2122
Cynoglossus sp.	1.24	34	0.47	2109
Sepia latimanus	0.83	5	0.32	2106
CONGER SP	0.69	10	0.26	2112
Calappa pustulosa	0.58	4	0.22	
Aseraggodes sp.	0.57	64	0.22	2113
Decapterus russelli	0.44	5	0.17	2117
Apogon queketti	0.41	44	0.16	2108
Minous dempsterae	0.41	20	0.16	2114
Parapercis sp.	0.34	10	0.13	2107
Sphyraena obtusata	0.31	5	0.12	2119
Charybdis sp.	0.30	20	0.11	
MURAENIDAE	0.28	5	0.11	2120
Pseudorhombus arsius	0.27	5	0.10	2118
Epinephelus diacanthus	0.24	30	0.09	2121
Cryptopodia fornicata	0.11	20	0.04	
Parascolopsis eriomma	0.09	39	0.03	2116
SICYONIIDAE	0.08	151	0.03	
J E L L Y F I S H	0.05	0	0.02	
Starfish	0.04	28	0.01	
Bregmaceros sp.	0.03	14	0.01	2115
Johnius sp.	0.03	9	0.01	2125
Squilla sp.	0.01	4	0.01	
Muraenesox sp.	0.00	4	0.00	2131
Total	262.12		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 78
DATE :18.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 23°39.89
start stop duration Lon E 66°36.67
TIME :02:32:24 03:02:28 30.1 (min) Purpose : 1
LOG : 3509.90 3511.62 1.7 Region : 9100
FDEPTH: 105 103 Gear cond.: 0
BDEPTH: 105 103 Validity : 0
Towing dir: 0° Wire out : 290 m Speed : 3.4 kn
Sorted : 0 Total catch: 29.03 Catch/hour: 57.93

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nemipterus randalli	21.65	327	37.37	2142
Epinephelus diacanthus	15.46	28	26.69	2143
Ariomma indica	3.47	24	5.99	2151
Atrobucca alcocki	2.89	12	4.99	2148
J E L L Y F I S H	2.56	0	4.43	
Uroteuthis duvaucelii	2.41	146	4.16	2144
Acropoma japonicum	1.90	166	3.28	2153
Priacanthus blochii	1.66	14	2.86	2150
G A S T R O P O D S	1.00	431	1.72	
Saurida longimanus	0.88	24	1.51	2160
Champsodon sp.	0.81	249	1.39	2145
Sepia kobiensis	0.80	12	1.38	2161
Lepturacanthus savala	0.38	6	0.65	2149
Parascolopsis aspinosa	0.32	6	0.55	2155
Sphyraena obtusata	0.30	4	0.52	2163
CONGER SP	0.30	4	0.52	2164
Sepia latimanus	0.25	6	0.44	2157
Uranscopus marmoratus	0.20	12	0.35	2146
Sorsogna tuberculata	0.15	8	0.26	2162
Charybdis sp.	0.14	6	0.25	
Aseraggodes sp.	0.14	14	0.24	2152
Apogon queketti	0.09	8	0.15	2154
Minous dempsterae	0.07	2	0.12	2156
Cynoglossus sp.	0.05	2	0.08	2158
Pseudorhombus elevatus	0.02	2	0.04	2159
Cryptopodia fornicata	0.02	2	0.03	
SICYONIIDAE	0.01	24	0.02	
Cubiceps whiteleggii	0.00	2	0.00	2147
Calappa pustulosa	0.00	2	0.00	
Total	57.93		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 79
DATE :18.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 23°45.75
start stop duration Lon E 66°44.12
TIME :04:31:11 05:01:43 30.5 (min) Purpose : 1
LOG : 3520.93 3522.72 1.8 Region : 9100
FDEPTH: 96 97 Gear cond.: 0
BDEPTH: 96 97 Validity : 0
Towing dir: 0° Wire out : 300 m Speed : 3.5 kn
Sorted : 0 Total catch: 15.84 Catch/hour: 31.13

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nemipterus randalli	8.37	85	26.90	2165
J E L L Y F I S H	5.70	0	18.31	
Lagocephalus spadiceus	5.31	47	17.05	2171
Uroteuthis duvaucelii	2.31	167	7.42	2166
Nemipterus japonicus	2.02	10	6.49	2172
Priacanthus blochii	1.29	10	4.15	2181
Ariomma indica	1.28	10	4.10	2173
Saurida longimanus	1.20	6	3.84	2179
Saurida tumbil	0.93	2	2.97	2174
Atrobucca alcocki	0.77	2	2.47	2176
Saurida undosquamis	0.40	2	1.27	2180
Lepturacanthus savala	0.27	2	0.87	2178
G A S T R O P O D S	0.23	110	0.73	
Lophiomus setigerus	0.21	2	0.68	2170
Sorsogna tuberculata	0.18	14	0.59	2168
Sphyraena obtusata	0.17	2	0.54	2182
Champsodon sp.	0.15	43	0.47	2167
Grammoplites suppositus	0.13	2	0.43	2183
Sepia latimanus	0.13	2	0.41	2169
Minous dempsterae	0.04	2	0.13	2177
Cubiceps whiteleggii	0.02	6	0.08	2184
Bregmaceros sp.	0.02	2	0.06	2185
Epinephelus diacanthus	0.02	2	0.05	2175
Total	31.13		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 80
DATE :18.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 23°50.30
start stop duration Lon E 66°34.20
TIME :06:27:14 06:57:31 30.3 (min) Purpose : 3
LOG : 3531.24 3533.09 1.9 Region : 9108
FDEPTH: 99 99 Gear cond.: 0
BDEPTH: 99 99 Validity : 0
Towing dir: 0° Wire out : 300 m Speed : 3.7 kn
Sorted : 0 Total catch: 62.74 Catch/hour: 124.28

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus russelli	55.76	699	44.87	375
Lagocephalus spadiceus	22.78	145	18.33	376
Nemipterus randalli	20.50	208	16.50	374
Saurida undosquamis	4.06	20	3.27	382
J E L L Y F I S H	3.64	0	2.93	
Dussumieria acuta	3.03	57	2.44	373
Ariomma indica	2.54	20	2.04	377
Uroteuthis duvaucelii	2.44	147	1.96	386
Champsodon sp.	2.22	518	1.79	384
Chaenogaleus macrostoma	1.82	6	1.47	385
Epinephelus latifasciatus	1.50	2	1.20	381
Parascolopsis aspinosa	0.76	8	0.62	155
Uranscopus marmoratus	0.75	4	0.60	380
Uraspis secunda	0.67	4	0.54	283
Priacanthus blochii	0.65	5	0.52	370
G A S T R O P O D S	0.35	119	0.28	
Epinephelus diacanthus	0.28	2	0.22	378
Sepia kobiensis	0.16	2	0.13	383
Saurida longimanus	0.13	6	0.11	379
Sorsogna tuberculata	0.09	6	0.07	369
CONGER SP	0.08	2	0.06	371
Acropoma japonicum	0.05	4	0.04	372
C R A B S	0.02	0	0.02	
Total	124.28		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 81
DATE :18.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 23°52.05
start stop duration Lon E 66°12.45
TIME :09:47:11 10:17:21 30.2 (min) Purpose : 3
LOG : 3555.15 3556.85 1.7 Region : 9108
FDEPTH: 162 164 Gear cond.: 0
BDEPTH: 162 164 Validity : 0
Towing dir: 0° Wire out : 490 m Speed : 3.4 kn
Sorted : 0 Total catch: 64.50 Catch/hour: 128.31

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Atrobucca alcocki	65.45	560	51.01	342
Parascolopsis boesemani	35.21	1355	27.44	343
Champsodon sp.	5.28	2026	4.12	187
Decapterus russelli	3.86	50	3.01	340
Sepia kobiensis	3.75	74	2.92	186
Nemipterus randalli	2.78	32	2.17	348
J E L L Y F I S H	2.59	0	2.02	
Cynoglossus carpenteri	1.61	44	1.25	347
Saurida longimanus	1.48	48	1.15	350
Acropoma japonicum	1.42	101	1.11	341
Lophiomus setigerus	1.15	2	0.90	339
Chaenogaleus macrostoma	1.14	6	0.89	349
Synagrops adeni	0.80	561	0.62	345
Priacanthus blochii	0.48	8	0.37	332
Benthosema fibulatum	0.47	426	0.37	344
Charybdis sp.	0.20	6	0.16	351
Sepia latimanus	0.16	2	0.13	337
CONGER SP	0.14	2	0.11	336
Lepidotrigla bispinosa	0.10	4	0.08	334
G A S T R O P O D S	0.08	22	0.06	
Minous dempsterae	0.04	2	0.03	338
Aseraggodes sp.	0.03	2	0.02	333
SICYONIIDAE	0.03	90	0.02	
Solenocera choprai	0.02	24	0.02	
GOBIIDAE	0.01	12	0.01	346
Abralia sp.	0.01	10	0.01	
Bregmaceros sp.	0.00	2	0.00	335
Total	128.31		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 82
DATE :18.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 23°59.31
start stop duration Lon E 66°9.85
TIME :12:07:33 12:37:41 30.1 (min) Purpose : 3
LOG : 3569.12 3570.81 1.7 Region : 9108
FDEPTH: 133 134 Gear cond.: 0
BDEPTH: 133 134 Validity : 0
Towing dir: 0° Wire out : 410 m Speed : 3.4 kn
Sorted : 0 Total catch: 57.99 Catch/hour: 115.45

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Atrobucca alcocki	65.59	464	56.82	387
Epinephelus latifasciatus	17.97	2	15.56	331
Nemipterus randalli	10.15	179	8.79	318
Lepturacanthus savala	9.85	204	8.54	321
Parascolopsis boesemani	3.48	189	3.02	319
Saurida longimanus	1.42	56	1.23	320
Champsodon sp.	1.25	399	1.08	313
Uraspis secunda	1.22	4	1.06	316
Acropoma japonicum	0.88	82	0.76	314
Sepia kobiensis	0.86	14	0.75	322
Priacanthus blochii	0.74	12	0.64	168
Synagrops adeni	0.63	463	0.54	317
Sepia latimanus	0.30	4	0.26	327
Chaenogaleus macrostoma	0.29	2	0.26	325
Parascolopsis aspinosa	0.20	6	0.17	315
J E L L Y F I S H	0.20	0	0.17	
Cynoglossus carpenteri	0.13	6	0.11	323
Pristipomoides multidens	0.09	2	0.08	324
Charybdis sp.	0.06	2	0.05	
Uroteuthis duvaucelii	0.06	2	0.05	328
Minous dempsterae	0.03	2	0.03	326
G A S T R O P O D S	0.03	4	0.03	
Aseraggodes sp.	0.02	2	0.01	329
Bregmaceros sp.	0.00	2	0.00	330
Total	115.45		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 83
DATE :19.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 24°2.10
start stop duration Lon E 66°43.41
TIME :04:18:40 04:48:45 30.1 (min) Purpose : 3
LOG : 3669.50 3671.17 1.7 Region : 9108
FDEPTH: 80 80 Gear cond.: 0
BDEPTH: 80 80 Validity : 0
Towing dir: 0° Wire out : 210 m Speed : 3.3 kn
Sorted : 0 Total catch: 75.87 Catch/hour: 151.39

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
J E L L Y F I S H	40.21	0	26.56	
Saurida tumbil	27.93	116	18.45	227
Pomadasys kaakan	26.24	16	17.33	226
Saurida longimanus	11.27	42	7.45	240
Nemipterus japonicus	6.39	34	4.22	244
Arius thalassinus*	6.09	2	4.02	242
Nemipterus randalli	4.79	34	3.16	229
Uranscopus marmoratus	4.26	26	2.82	232
Fistularia petimba	3.69	80	2.44	243
Grammoplites suppositus	3.65	42	2.41	228
Starfish	3.02	1596	2.00	
Sea cucumbers	2.05	46	1.35	
Lepturacanthus savala	1.85	34	1.22	238
Sepia kobiensis	1.51	24	1.00	236
Uroteuthis duvaucelii	1.43	44	0.94	251
Sorsogna tuberculata	1.42	104	0.94	230
Saurida undosquamis	1.33	18	0.88	241
Platycephalus sp.	0.72	2	0.47	233
Decapterus russelli	0.72	8	0.47	235
Lagocephalus spadiceus	0.71	4	0.47	249
Epinephelus latifasciatus	0.59	2	0.39	234
Sepia latimanus	0.36	6	0.24	245
Lophiomus setigerus	0.35	2	0.23	237
Champsodon sp.	0.28	132	0.19	252
G A S T R O P O D S	0.20	52	0.13	
CONGER SP	0.14	2	0.09	247
Pseudorhombus arsius	0.10	2	0.07	248
Ariomma indica	0.05	4	0.03	246
Metapenaeus monoceros	0.02	2	0.02	239
Chascanopsetta lugubris	0.02	2	0.01	250

SICYONIIDAE	0.00	0	0.00
Charybdis feriata	0.00	0	0.00
Total	151.39		100.00

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 84
DATE :19.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 24°10.73
start stop duration Lon E 66°51.85
TIME :06:47:17 07:18:40 31.4 (min) Purpose : 3
LOG : 3686.16 3687.89 1.7 Region : 9108
FDEPTH: 72 71 Gear cond.: 0
BDEPTH: 72 71 Validity : 0
Towing dir: 0° Wire out : 200 m Speed : 3.3 kn
Sorted : 0 Total catch: 103.66 Catch/hour: 198.26

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Decapterus russelli	69.05	950	34.83	260
Nemipterus japonicus	24.58	142	12.40	261
Nemipterus randalli	23.91	323	12.06	262
J E L L Y F I S H	22.47	0	11.34	
Grammoplites suppositus	9.82	149	4.95	148
Saurida tumbil	9.74	36	4.91	259
Decapterus macarellus	6.89	92	3.47	253
Sepia kobiensis	5.99	88	3.02	264
Sphyraena putnamae	5.39	4	2.72	275
Sepia latimanus	3.53	55	1.78	150
Suggrundus sp.	2.61	10	1.32	145
G A S T R O P O D S	2.01	589	1.01	
Lepturacanthus savala	1.51	8	0.76	274
Thenus orientalis	1.28	11	0.65	146
Pseudorhombus arsius	1.27	23	0.64	147
Uroteuthis duvaucelii	1.27	46	0.64	263
Epinephelus diacanthus	1.20	4	0.60	266
Sphyraena obtusata	1.20	11	0.60	255
Saurida undosquamis	1.13	25	0.57	256
Uraspis secunda	0.99	4	0.50	265
Coelentrates	0.46	11	0.23	
SNAKE	0.38	4	0.19	
Lepidotrigla bispinosa	0.30	10	0.15	273
Uranscopus marmoratus	0.28	6	0.14	272
Parascolopsis aspinosa	0.26	4	0.13	257
E C H I N O D E R M A T A	0.20	0	0.10	
Minous dempsterae	0.12	6	0.06	254
Aseraggodes sp.	0.09	10	0.05	271
Starfish	0.07	57	0.03	
Champsodon sp.	0.06	38	0.03	149
Sorsogna tuberculata	0.05	6	0.03	267
Apogon queketti	0.04	11	0.02	268
Sand dollar	0.03	8	0.02	
Laeops parviceps	0.03	4	0.01	270
PAGUROIDEA	0.02	2	0.01	
Gazza minuta	0.02	2	0.01	258
Charybdis feriata	0.02	4	0.01	
Apogon quadrifasciatus	0.01	2	0.00	269
Charybdis sp.	0.00	2	0.00	
Total	198.26		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 85
DATE :19.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 24°6.76
start stop duration Lon E 66°34.24
TIME :09:41:43 10:11:56 30.2 (min) Purpose : 3
LOG : 3707.26 3708.92 1.7 Region : 9108
FDEPTH: 81 85 Gear cond.: 0
BDEPTH: 81 85 Validity : 0
Towing dir: 0° Wire out : 250 m Speed : 3.3 kn
Sorted : 0 Total catch: 70.85 Catch/hour: 140.71

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Dussumieria acuta	31.08	684	22.09	2433
Nemipterus randalli	30.29	244	21.52	2435
J E L L Y F I S H	22.54	0	16.02	
Nemipterus japonicus	15.79	87	11.22	2434
Saurida undosquamis	7.28	32	5.17	2438
Epinephelus diacanthus	6.54	12	4.65	2457
Decapterus russelli	6.22	79	4.42	2436
Saurida tumbil	4.71	14	3.35	2455
Pomadasys kaakan	3.87	2	2.75	2456
Uroteuthis duvaucelii	2.30	198	1.64	2439
Sepia kobiensis	2.30	30	1.64	2459
Ariomma indica	2.13	16	1.51	2454
Grammoplites suppositus	1.72	26	1.23	2453
Sepia latimanus	0.49	8	0.35	2449
Uranscopus marmoratus	0.47	12	0.34	2446
G A S T R O P O D S	0.43	99	0.31	
Lepturacanthus savala	0.42	4	0.30	2445
Rastrelliger kanagurta	0.35	2	0.25	2437
Champsodon sp.	0.31	113	0.22	2458
Sorsogna tuberculata	0.30	29	0.21	2447
Thenus orientalis	0.23	2	0.16	2461
Coelentrates	0.23	12	0.16	
Priacanthus blochii	0.15	2	0.10	2448
Zebrias synapturoides	0.14	2	0.10	2440
Lagocephalus spadiceus	0.10	2	0.07	2441
Pseudorhombus elevatus	0.08	2	0.06	2444
Fistularia petimba	0.07	2	0.05	2442
Minous dempsterae	0.06	2	0.04	2452
Laeops parviceps	0.04	4	0.03	2443
Charybdis feriata	0.02	4	0.01	
Starfish	0.01	4	0.01	
Aseraggodes sp.	0.01	2	0.01	2450
Acropoma japonicum	0.01	2	0.01	2451
Cubiceps whiteleggii	0.01	8	0.01	2460
Sand dollar	0.01	2	0.00	
Carangoides sp.	0.00	0	0.00	
Total	140.71		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 86
DATE :19.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 24°24.33
start stop duration Lon E 66°37.25
TIME :12:24:42 12:54:54 30.2 (min) Purpose : 3
LOG : 3726.97 3728.62 1.7 Region : 9108
FDEPTH: 77 78 Gear cond.: 0
BDEPTH: 77 78 Validity : 0
Towing dir: 0° Wire out : 228 m Speed : 3.3 kn
Sorted : 0 Total catch: 48.05 Catch/hour: 95.46

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Nemipterus randalli	23.74	784	24.87	191
Sepia kobiensis	22.65	517	23.73	190
J E L L Y F I S H	19.47	0	20.40	
Decapterus russelli	9.54	125	9.99	151
Sphyraena obtusata	5.26	54	5.52	152
Sepia latimanus	3.92	66	4.11	192
G A S T R O P O D S	3.77	536	3.95	
Champsodon sp.	2.96	3082	3.10	189
Nemipterus japonicus	1.23	10	1.29	188
Uranscopus marmoratus	0.77	2	0.80	212
SNAKE	0.50	4	0.52	
Priacanthus blochii	0.32	6	0.34	219
Parascolopsis aspinosa	0.26	4	0.27	217
Sorsogna tuberculata	0.22	20	0.23	224
Synagrops adeni	0.17	103	0.18	223
Metapenaeus monoceros	0.13	10	0.14	225
Lepturacanthus savala	0.12	2	0.13	220
Epinephelus diacanthus	0.09	8	0.09	221
Uroteuthis duvaucelii	0.09	12	0.09	222
Lepidotrigla bispinosa	0.06	2	0.06	218
Parapercis sp.	0.06	2	0.06	214
Saurida tumbil	0.03	2	0.03	213
SICYONIIDAE	0.03	42	0.03	
Cryptopodia fornicata	0.02	6	0.02	
Charybdis feriata	0.02	2	0.02	
Aseraggodes sp.	0.02	2	0.02	215
Apogon queketti	0.02	2	0.02	216
Total	95.46		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 88
DATE :19.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 24°25.20
start stop duration Lon E 66°16.95
TIME :18:50:33 19:15:40 25.1 (min) Purpose : 3
LOG : 3769.11 3770.62 1.5 Region : 9108
FDEPTH: 65 64 Gear cond.: 0
BDEPTH: 65 64 Validity : 0
Towing dir: 0° Wire out : 210 m Speed : 3.6 kn
Sorted : 0 Total catch: 51.35 Catch/hour: 122.70

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Sicyonia sp.	26.28	0	21.42	
Nemipterus randalli	23.89	579	19.47	57
Epinephelus diacanthus	13.50	24	11.00	56
G A S T R O P O D S	11.47	0	9.35	
Parapercis sp.	10.16	358	8.28	51
Decapterus russelli	5.99	76	4.88	49
Cyclichthys orbicularis	5.73	65	4.67	71
Sand dollar	5.38	241	4.38	
Sepia prashadi	5.22	29	4.25	54
Bregmaceros sp.	2.43	1906	1.98	70
Fistularia petimba	1.34	7	1.09	50
J E L L Y F I S H	1.27	0	1.03	
Saurida tumbil	1.03	2	0.84	52
Uroteuthis duvaucelii	1.02	14	0.83	61
Sepia latimanus	0.97	7	0.79	59
Saurida undosquamis	0.97	31	0.79	48
Sepia kobiensis	0.95	41	0.77	55
Uraspis secunda	0.89	2	0.72	67
Lagocephalus spadiceus	0.72	5	0.58	64
Sepia omani	0.60	14	0.49	60
Pterois russelii	0.54	2	0.44	47
Thenus sp.	0.54	2	0.44	73
Lepturacanthus savala	0.53	2	0.43	53
C R A B S	0.25	0	0.20	
Atrobucca alcocki	0.23	2	0.19	65
Apogonichthyoides pharaonis	0.20	5	0.16	74
Brachypterois serrulata	0.14	10	0.11	75
Grammoplites suppositus	0.11	2	0.09	62
Epinephelus chlorostigma	0.09	3	0.07	58
Choridactylus multibarbus	0.09	5	0.07	46
Cryptopodia fornicata	0.03	5	0.03	
Pomacanthus sp.	0.02	2	0.02	63
Charybdis feriata	0.02	2	0.02	
Sorsogna tuberculata	0.02	2	0.02	68
Aseraggodes sp.	0.02	2	0.02	69
Solenocera choprai	0.02	2	0.02	
Charybdis sp.	0.02	10	0.01	
Apogon queketti	0.01	2	0.01	66
Champsodon sp.	0.01	5	0.01	72
Total	122.70		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 89
DATE :20.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 24°21.55
start stop duration Lon E 65°59.49
TIME :01:54:16 02:24:16 30.0 (min) Purpose : 3
LOG : 3816.92 3818.56 1.6 Region : 9108
FDEPTH: 111 116 Gear cond.: 0
BDEPTH: 111 116 Validity : 0
Towing dir: 0° Wire out : 290 m Speed : 3.3 kn
Sorted : 0 Total catch: 106.54 Catch/hour: 213.15

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nemipterus randalli	77.63	1323	36.42	1
Decapterus russelli	45.10	584	21.16	8
Atrobucca alcocki	25.88	59	12.14	15
Lepturacanthus savala	8.04	118	3.77	10
Decapterus macarellus	7.25	106	3.40	9
Sphyraena obtusata	6.74	90	3.16	12
Rhinobatos annandalei	5.80	6	2.72	24
Saurida longimanus	5.33	180	2.50	5
Epinephelus diacanthus	4.43	12	2.08	2
Chaenogaleus macrostoma	4.40	10	2.06	11
Lagocephalus spadiceus	3.82	24	1.79	16
Acropoma japonicum	2.95	259	1.38	6
Sepia kobiensis	2.27	35	1.07	4
Uroteuthis duvaucelii	2.15	67	1.01	3
Uraspis secunda	1.96	8	0.92	21
Priacanthus blochii	1.95	27	0.92	17
G A S T R O P O D S	1.82	96	0.86	
Saurida tumbil	1.10	4	0.52	19
Parascolopsis aspinosa	0.97	24	0.46	13
Ariomma indica	0.91	8	0.43	20
J E L L Y F I S H	0.79	0	0.37	
Champsodon sp.	0.68	196	0.32	7
Aseraggodes sp.	0.36	39	0.17	14
Cubiceps whiteleggii	0.23	39	0.11	23
Parapercis sp.	0.19	4	0.09	18
Sand dollar	0.16	20	0.08	
CONGER SP	0.13	4	0.06	22
C R A B S	0.03	2	0.02	
Doclea sp.	0.03	2	0.02	
Bregmaceros sp.	0.02	12	0.01	25
Total	213.15		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2010409 STATION: 90
DATE :20.11.2010 GEAR TYPE: BT NO: 24 POSITION:Lat N 24°23.12
start stop duration Lon E 66°16.54
TIME :06:11:11 06:41:59 30.8 (min) Purpose : 3
LOG : 3844.22 3845.87 1.7 Region : 9108
FDEPTH: 77 81 Gear cond.: 0
BDEPTH: 77 81 Validity : 0
Towing dir: 0° Wire out : 220 m Speed : 3.2 kn
Sorted : 0 Total catch: 78.57 Catch/hour: 153.06

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
J E L L Y F I S H	105.19	0	68.73	
Nemipterus randalli	11.98	70	7.83	31
Ariomma indica	10.06	74	6.57	30
Dussumieria acuta	9.15	195	5.98	29
Saurida longimanus	4.56	25	2.98	33
Saurida tumbil	2.82	10	1.84	32
Nemipterus japonicus	2.45	12	1.60	39
Epinephelus diacanthus	1.84	8	1.21	38
Uroteuthis duvaucelii	1.16	39	0.76	42
SNAKE	0.88	2	0.57	
Grammoplites suppositus	0.52	6	0.34	40
Saurida undosquamis	0.46	8	0.30	34
Sorsogna tuberculata	0.38	23	0.25	41
Sepia kobiensis	0.38	6	0.25	43
Cubiceps whiteleggii	0.30	304	0.20	36
Uranscopus marmoratus	0.30	2	0.20	26
Lagocephalus spadiceus	0.19	2	0.13	28
CONGER SP	0.15	2	0.10	37
Lepidotrigla bispinosa	0.09	4	0.06	27
Champsodon sp.	0.08	33	0.05	45
G A S T R O P O D S	0.07	19	0.05	
Starfish	0.03	33	0.02	
Decapterus russelli	0.00	2	0.00	44
Carangoides sp.	0.00	2	0.00	35
Total	153.06		100.00	

Demersal stratum catch rates

Groups based on taxonomic families include *Carangidae, Sciaenidae* (Croakers), *Serranidae* (Groupers), *Haemulidae* (Grunts) and *Scombridae*.

The groups not based on taxonomic families are defined as:

Cephalopods: squids and octopuses.

Clupeoids: *Clupeidae* and *Engraulidae*.

Shrimps: *Penaeidae, Solenoceridae*

Soles: *Soleidae, Psettodidae, Bothidae,Cynoglossidae*.

Threadfin breams: *Nemipterus japonicus* and *N. randalli*

Regions are as defined as in Figure 3 and numbers as in Table 4 in the main report.

Table 5a:11 Catch rates (kg/hour) by main groups caught in valid swept area bottom trawl hauls on the shelf – Balochistan region

9103. Inner shelf (20–50 m).

Stations	Gear depth	Carangids	Cephalopods	Clupeoids	Croakers	Groupers	Grunts	Scombrids	Shrimps	Soles	Threadfin breams	Other	Total
1	39	42.3	1.9			0.2			0.1	0.9	39	47.5	131.7
2	21	0.8	0.3			8.2				16.7	223	245.9	495
3	17.5	12.7				27				0.2		663	703
4	33.5	14.9	13.3						0.1	0.6	2.1	113.6	144.7
5	28	1.8	14.5			0.2		0.4	0.1	1.8	36.8	83.9	139.6
9	17.5	7.9	0.1			0.9	23.2				1.3	1333.9	1367.2
10	20	15	0.6	11.1		3.7			0.1		0.5	131.6	162.6
11	27	500.1	33.5	8.3			41.8	7.7	0.2	7.2	105.5	259.3	963.8
12	20	13	30.8				1.9		0.3	22.1	18.8	213.1	300.1
13	29.5		34.4			72.6				5.9	4	178.9	295.8
16	18	41.1	13.5	752.1	35.3		152.5		11.4	6.4	13.9	761	1787.3
19	17.5	11.4	0.3	15.3		12.3	5.2			0.7	22.9	82.7	150.8
20	23.5	16.9	9.1	83.9			2.6	7.9		16.7	74	117.1	328.2
21	21	16.9	35.7	0.1			21.6			4.3	4.4	175.9	259
22	21.5	0.5				36.1				0.3		13.1	49.9
27	33	8.4	2.9			0.9	83.3	3		0.2	2.3	120.7	221.6
28	28.5	1.8	0.1			0.1	8.7	1.8		1.2	1.3	51.5	66.5
29	24.5	5.1	11.7			0.2	3.4			0.5	0.9	41.3	63.1
Mean	24.5	39.5	11.3	48.4	2	9	19.1	1.2	0.7	4.8	30.6	257.4	423.9
Std dev		115.6	13.4	176.7	8.3	18.9	39.5	2.6	2.7	6.8	56.1	336.1	486.1
%Catch		9.3	2.7	11.4	0.5	2.1	4.5	0.3	0.2	1.1	7.2	60.7	

9104. Outer shelf (51–200 m).

Station	Gear depth	Carangids	Cephalopods	Clupeoids	Croakers	Groupers	Grunts	Scombrids	Shrimps	Soles	Threadfin breams	Other	Total
8	115.5	4.0	5.8		13.1	72.7			0.1	0.4	31.0	27.3	154.4
14	104.0	11.6	5.8		0.8	9.8					93.1	18.5	139.6
15	95.5	1426.6	40.9		5.6	71.4					132.0	153.5	1830.0
26	58.0	1.9		1.0		0.4		2.1	0.1		0.4	79.9	85.8
Mean	93.3	361.0	13.1	0.3	4.9	38.6		0.5	0.1	0.1	64.1	69.8	552.5
Std dev		710.4	18.7	0.5	6.0	38.8		1.1	0.1	0.2	59.5	62.0	852.2
%Catch		65.3	2.4		0.9	7.0		0.1			11.6	12.6	

Table 5a (continued): Catch rates (kg/hour) by main groups caught in valid swept area bottom trawl hauls on the shelf – Sonmiani region

9105. Inner shelf (20–50 m).

Station	Gear depth	Carangids	Cephalopods	Clupeoids	Croakers	Groupers	Grunts	Scombrids	Shrimps	Soles	Threadfin breams	Other	Total
41	35.0	125.8										25.8	151.6
34	19.0	29.5	2.2	13.4	0.5		3.6	7.8		0.1	0.8	91.7	149.6
36	20.0	2.6	1.3	0.3	0.0	0.2	2.1	1.9		0.5	27.8	43.2	79.9
37	23.5	147.0	53.1				1.1	2.6		0.3	53.6	93.7	351.4
39	24.5	72.3	4.9	41.3	15.5	0.7	530.9	46.4		0.2	3.4	426.3	1142.0
Mean	24.4	75.4	12.3	11.0	3.2	0.2	107.5	11.7		0.2	17.1	136.1	374.9
Std dev		61.4	22.9	17.9	6.9	0.3	236.7	19.6		0.2	23.4	164.9	440.6
%Catch		20.1	3.3	2.9	0.9		28.7	3.1		0.1	4.6	36.3	100.0

9106. Outer shelf (51–200 m).

Station	Gear depth	Carangids	Cephalopods	Clupeoids	Croakers	Groupers	Grunts	Scombrids	Shrimps	Soles	Threadfin breams	Other	Total
25	147.0	25.1	6.8		161.1	1.1			0.1	0.4	230.1	59.0	483.7
30	78.0	71.7	0.1			0.5				0.1	33.6	17.6	123.5
33	79.0	242.9	2.1		36.0	0.8					49.6	44.6	376.1
35	69.0	13.0	7.3			3.2					14.6	8.8	46.9
40	63.0	73.7	15.9	0.3		0.7	10.3	0.8	0.7		118.0	63.6	284.0
Mean	87.2	85.3	6.4	0.1	39.4	1.3	2.1	0.2	0.2	0.1	89.2	38.7	262.8
Std dev		92.2	6.1	0.1	69.8	1.1	4.6	0.4	0.3	0.2	87.9	24.5	179.0
%Catch		32.4	2.5	0.0	15.0	0.5	0.8	0.1	0.1		33.9	14.7	

Table 5a (continued): Catch rates (kg/hour) by main groups caught in valid swept area bottom trawl hauls on the shelf – Sindh region.

9107. Inner shelf (20–50 m).

Station	Gear depth	Carangids	Cephalopods	Clupeoids	Croakers	Groupers	Grunts	Scombrids	Shrimps	Soles	Threadfin breams	Other	Total
42	37.00	66.90	3.80	0.50		0.10	0.10				6.30	17.50	95.40
43	28.50	30.70	9.10	6.90		0.30	0.50	0.20			4.70	34.50	86.80
44	27.00	226.50	37.60	15.80		0.20	167.30		1.10	0.50	5.70	83.10	537.80
46	22.00	4.00	6.00	0.90			8.70	20.00	0.50	2.20		174.50	216.70
47	20.00	5.50	1.20	32.60	9.70	0.30	0.10	6.90	44.50	4.70	0.40	127.20	233.00
48	25.50	639.90	18.70	2.60				35.80			1.50	45.90	744.30
49	36.50	67.30	25.40				6.70	7.80		0.60	3.80	91.00	202.60
50	32.50	107.30	48.30	136.00			8.10	25.80		0.20	2.50	36.80	365.00
53	19.50	3.90	12.70	7.40	1.60	0.40	0.60	7.60		5.40	0.50	563.80	603.90
54	26.00	1.90	19.60	0.30				13.60		0.80		28.80	65.00
55	46.50	5.70	14.60	46.20	0.40	2.30	11.60	23.00	1.00	0.10	0.80	78.60	184.40
Mean	29.20	105.40	17.90	22.60	1.10	0.30	18.50	12.80	4.30	1.30	2.40	116.50	303.20
Std dev		189.80	14.50	40.50	2.90	0.70	49.50	11.90	13.40	1.90	2.40	155.70	229.60
%Catch		34.76	5.90	7.45	0.36	0.10	6.10	4.22	1.42	0.43	0.79	38.42	

Table 5a (continued): Catch rates (kg/hour) by main groups caught in valid swept area bottom trawl hauls on the shelf – Sindh region.

9108. Outer shelf (51–200 m).

Station	Gear depth	Carangids	Cephalopods	Clupeoids	Croakers	Groupers	Grunts	Scombrids	Shrimps	Soles	Threadfin breams	Other	Total
71	124.5		1.0	10.8	10.5						9.9	16.0	48.3
72	98.0	111.9	10.2	10.4	0.7	0.6		0.1	0.1		41.1	63.5	238.5
74	70.5	5.4	10.4	0.4				5.2	0.9		2.2	282.6	307.0
75	80.5	0.1	32.5	33.7		3.0	3.7	9.8	0.1	1.0	16.5	78.2	178.7
76	106.5	0.1	6.5		10.5	4.8		0.7		0.1	25.8	27.6	76.0
77	128.5	0.4	18.5		31.6	0.2			0.1	0.3	63.6	147.5	262.1
80	99.0	56.4	2.6	3.0		1.8					21.3	39.2	124.3
81	163.0	3.9	3.9		65.5						38.0	17.0	128.3
82	133.5	1.2	1.2		65.6	18.0					13.8	15.6	115.4
83	80.0	0.7	3.3			0.6	26.2			0.1	11.2	109.2	151.4
84	71.5	76.9	10.8			1.2				1.3	48.7	59.3	198.3
85	83.0	6.2	5.1	31.1		6.5	3.9	0.3		0.1	46.1	41.4	140.7
86	77.5	9.5	26.7			0.1			0.2		25.2	33.8	95.5
88	64.5	6.9	8.8		0.2	13.6			26.3		23.9	43.1	122.7
89	113.5	54.3	4.4		25.9	4.4					78.6	45.5	213.2
90	79.0		1.5	9.2		1.8					14.4	126.1	153.1
Mean	98.3	20.9	9.2	6.2	13.2	3.5	2.1	1.0	1.7	0.2	30.0	71.6	159.6
Std dev		34.5	9.2	11.0	22.7	5.2	6.6	2.7	6.6	0.4	21.1	68.8	69.6
%Catch		13.1	5.8	3.9	8.3	2.2	1.3	0.6	1.1	0.1	18.8	44.9	

Table 5a (continued): Catch rates (kg/hour) by main groups caught in valid swept area bottom trawl hauls on the shelf – Kori region.

9109. Inner shelf (20–50 m).

Station	Gear depth	Carangids	Cephalopods	Clupeoids	Croakers	Groupers	Grunts	Scombrids	Shrimps	Soles	Threadfin breams	Other	Total
56	22.5	46.9	23.7	19.6			0.4	132.8	13.7	0.6		330.8	568.5
57	25.5	7.0	10.5	4.2	2.4	0.1	2.2	6.2	7.0	0.1	0.1	260.2	300.0
58	29.0	4.6	9.8	11.1	18.6	1.1	3.3	5.1	13.8	1.4	4.0	199.4	272.3
59	27.0	36.5	30.3	4.7			0.1	7.6				17.4	96.6
60	29.5	60.3	28.1	0.9				6.4				13.9	109.6
61	36.0	14.4	64.1	3.9			19.6	9.5			0.2	225.1	336.7
64	34.0	63.1	69.9	5.7	31.8	0.2	53.1	6.3	0.3	3.3	2.7	484.5	720.8
65	39.0	76.3	30.3	19.9			8.2	8.5	0.1			520.0	663.2
Mean	30.3	38.6	33.3	8.7	6.6	0.2	10.8	22.8	4.4	0.7	0.9	256.4	383.5
Std dev		27.5	22.4	7.4	12.0	0.4	18.3	44.5	6.3	1.2	1.6	187.9	240.6
%Catch		10.1	8.7	2.3	1.7	0.1	2.8	5.9	1.1	0.2	0.2	66.9	

9110. Outer shelf (51–200 m).

Station	Gear depth	Carangids	Cephalopods	Clupeoids	Croakers	Groupers	Grunts	Scombrids	Shrimps	Soles	Threadfin breams	Other	Total
66	104.5	2.5	4.6	16.5	3.6	1.9		12.8	0.1		2.2	13.2	57.2
67	141.0	9.5	2.2	0.2	359.7	7.3		3.4	5.3		3.1	93.0	483.8
68	172.5	0.4	4.7		10.8				6.5	0.4	12.0	117.1	151.8
70	107.5	48.8	26.2	7.5	13.6	25.6			1.3	0.4	40.9	397.1	561.5
Mean	131.4	15.3	9.4	6.0	96.9	8.7		4.0	3.3	0.2	14.6	155.1	313.6
Std dev		22.7	11.3	7.8	175.2	11.7		6.0	3.1	0.2	18.1	167.3	246.5
%Catch		4.9	3.0	1.9	30.9	2.8		1.3	1.1	0.1	4.7	49.5	

ANNEX 6

Demersal survey catch distribution and stratified analysis of selected species groups

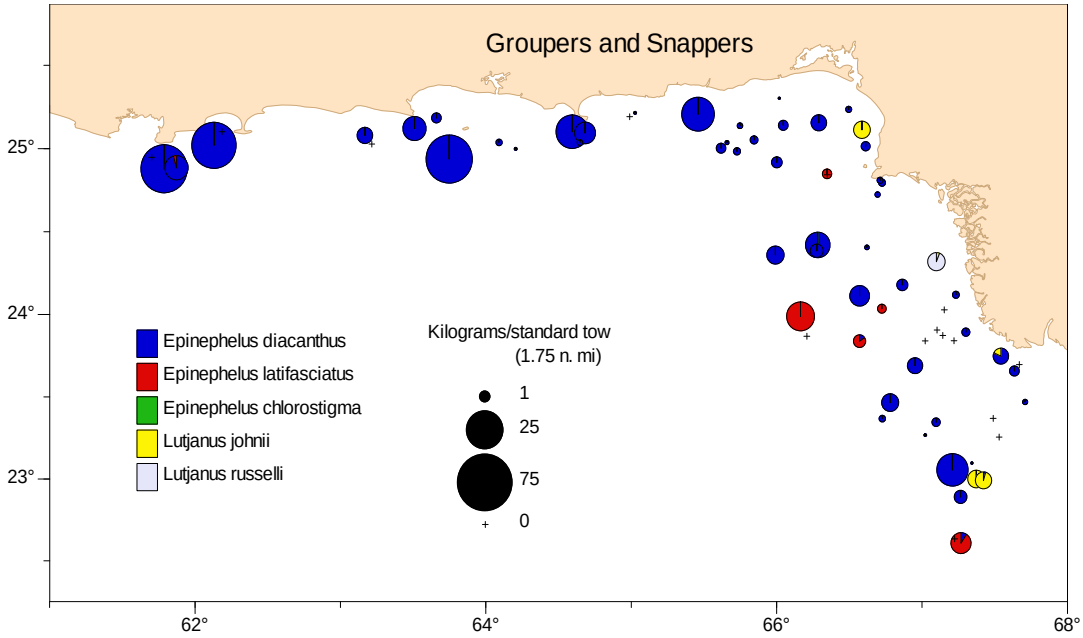

Figure 6a: Catch distribution and stratified analysis of groupers (*Serranidae*) and snappers (*Lutjanidae*) from Pakistan demersal survey 2010409

Mean catch per std tow (KG/1.75 n.mi.)

Species on map	9103	9104	9105	9106	9107	9108	9109	9110	
Epinephelus diacanthus	4.38	22.11	0.11	0.49	0.19	1.16	0.08	3.64	2.45
Epinephelus latifasciatus		0.06		0.06	0.00	0.65		0.84	0.29
Epinephelus chlorostigma						0.00			0.00
Lutjanus johnii			0.53		0.04		0.52		0.10
Lutjanus russelli					0.21				0.02
Grand Total	4.38	22.17	0.64	0.55	0.44	1.81	0.59	4.48	2.86

Mean catch per std tow (number/1.75 n.mi.)

Species on map	9103	9104	9105	9106	9107	9108	9109	9110	
Epinephelus diacanthus	378.57	67.83	5.76	10.38	21.19	4.78	6.75	48.27	86.29
Epinephelus latifasciatus		0.28		0.26	0.10	0.19		0.47	0.13
Epinephelus chlorostigma						0.08			0.03
Lutjanus johnii			0.24		0.20		0.92		0.13
Lutjanus russelli					2.87				0.32
Grand Total	378.57	68.11	6.00	10.64	24.36	5.05	7.67	48.74	86.90

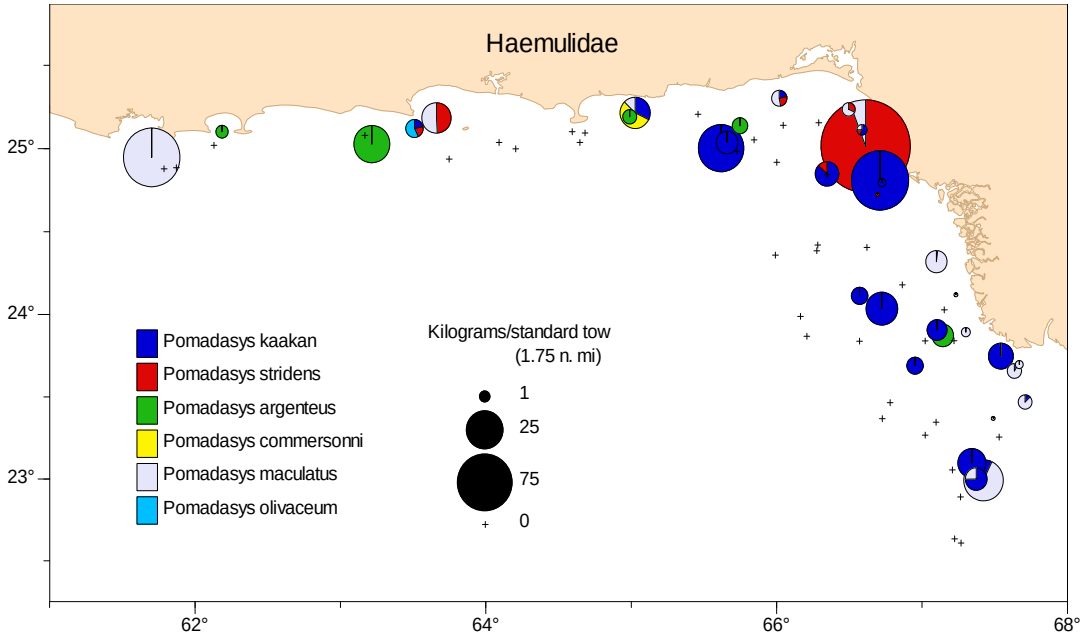

Figure 6b: Catch distribution and stratified analysis of grunters (*Haemulidae*) from Pakistan demersal survey 2010409

Mean catch per std tow(KG/1.75 n.mi.)

Species on map	9103	9104	9105	9106	9107	9108	9109	9110	
Pomadasys kaakan	2.68		0.16	0.85	7.96	1.11	1.89		2.04
Pomadasys stridens	0.33		65.76	0.13	0.00				6.14
Pomadasys argenteus	1.31				0.41				0.31
Pomadasys commersonni	0.36								0.07
Pomadasys maculatus	4.51		4.45		0.43		3.51		1.66
Pomadasys olivaceum	0.08								0.02
Grand Total	6.26		4.45		0.84		3.51		10.23

Mean catch per std tow(number/1.75 n.mi.)

Species on map	9103	9104	9105	9106	9107	9108	9109	9110	
Pomadasys kaakan	1.57		0.70	0.56	37.60	0.65	4.36		5.20
Pomadasys stridens	4.90		1,181	2.07	0.10				110.12
Pomadasys argenteus	0.96				0.20				0.21
Pomadasys commersonni	0.24								0.05
Pomadasys maculatus	63.77		115.48		7.78		120.46		34.88
Pomadasys olivaceum	0.46								0.09
Grand Total	71.90		1,298	2.63	45.68	0.65	124.82		150.56

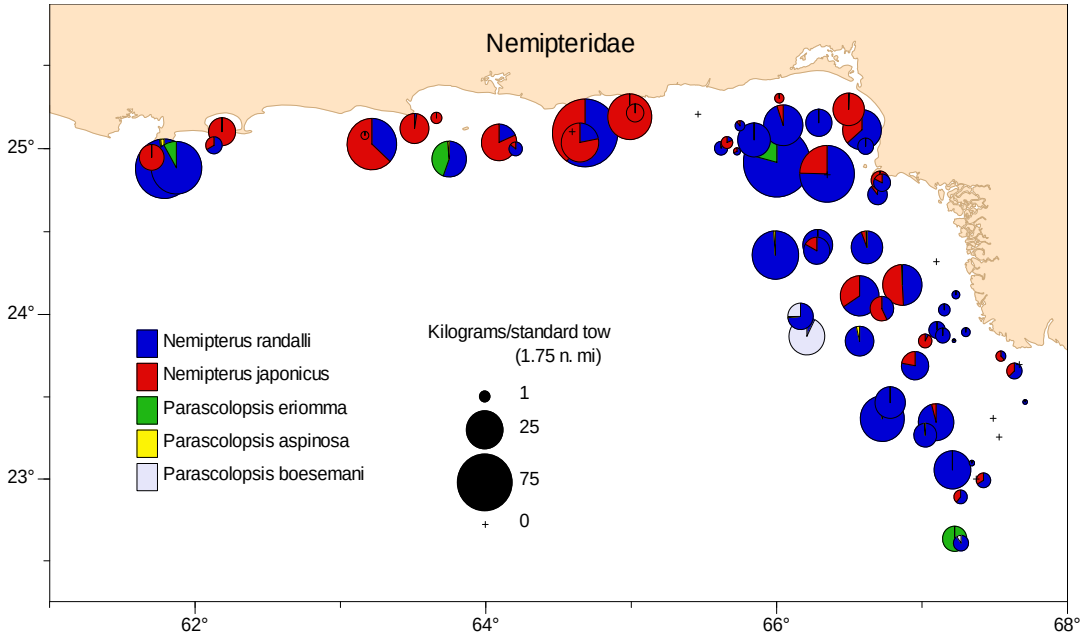

Figure 6c: Catch distribution and Stratified analysis of breams (*Nemipteridae*) from Pakistan demersal survey 2010409

Mean catch per std tow(KG/1.75 n.mi.)

Species on map	9103	9104	9105	9106	9107	9108	9109	9110	
Nemipterus japonicus	9.77	0.01	5.64	2.96	0.33	1.90	0.13	0.11	3.34
Nemipterus randalli	5.41	33.44	4.37	32.00	0.88	12.32	0.26	5.83	9.34
Parascolopsis aspinosa		0.43				0.16			0.07
Parascolopsis boesemani						1.25		0.04	0.45
Parascolopsis eriomma		3.11		4.17		0.00		1.58	0.44
Grand Total	15.18	37.00	10.01	39.12	1.21	15.64	0.39	7.56	13.64

Mean catch per std tow(number/1.75 n.mi.)

Species on map	9103	9104	9105	9106	9107	9108	9109	9110	
Nemipterus japonicus	166.52	0.93	100.92	34.51	5.30	10.91	1.80	1.01	48.79
Nemipterus randalli	136.19	725.29	102.15	683.79	115.47	203.86	42.43	90.57	195.62
Parascolopsis aspinosa		5.32				5.06			2.02
Parascolopsis boesemani						50.00		1.88	17.99
Parascolopsis eriomma		81.27		182.16		1.36		64.38	17.02
Grand Total	302.72	812.81	203.07	900.46	120.77	271.19	44.22	157.84	281.44

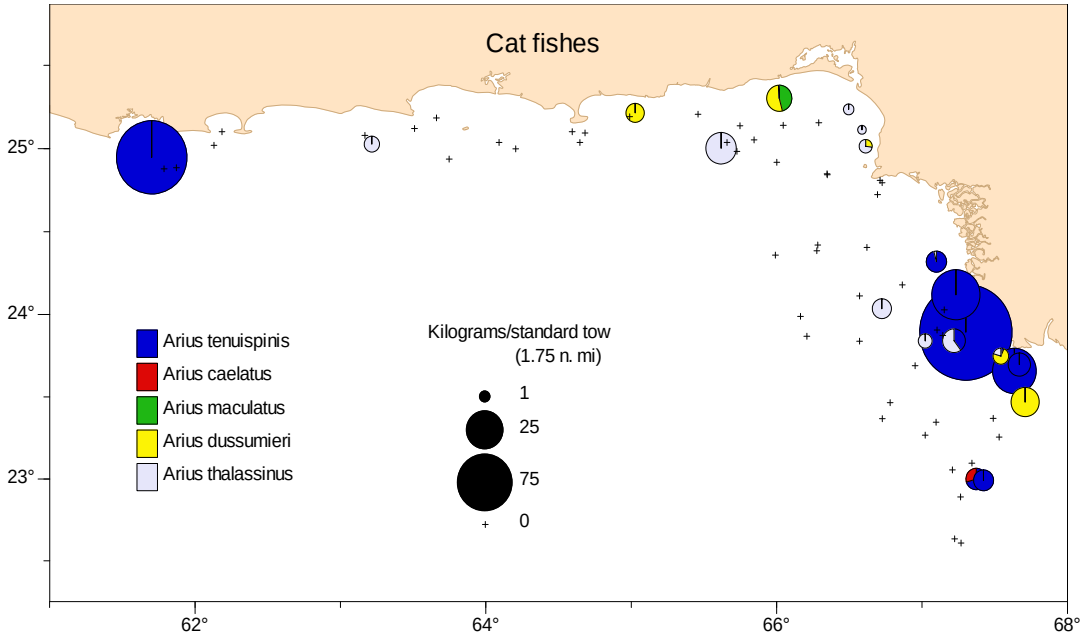

Figure 6d: Catch distribution and Stratified analysis of catfishes (*Ariidae*) from Pakistan demersal survey 2010409

Mean catch per std tow(KG/1.75 n.mi.)

Species on map	9103	9104	9105	9106	9107	9108	9109	9110	
Arius tenuispinis	7.82				32.85		5.80		5.71
Arius caelatus							0.15		0.01
Arius maculatus			0.81						0.07
Arius dussumieri	0.15		1.00		0.12		1.23		0.25
Arius thalassinus	0.77		0.41		0.33	0.27			0.33
Grand Total	8.75		2.23		33.30	0.27	7.17		6.37

Mean catch per std tow(number/1.75 n.mi.)

Species on map	9103	9104	9105	9106	9107	9108	9109	9110	
Arius tenuispinis	50.12				808.80		36.01		103.00
Arius caelatus							0.14		0.01
Arius maculatus			4.56						0.42
Arius dussumieri	0.31		20.22		0.11		6.07		2.48
Arius thalassinus	0.63		2.63		1.25	0.13			0.55
Grand Total	9,111	9,104	9,106	9,106	9,140	9,108	9,115	9,110	5.80

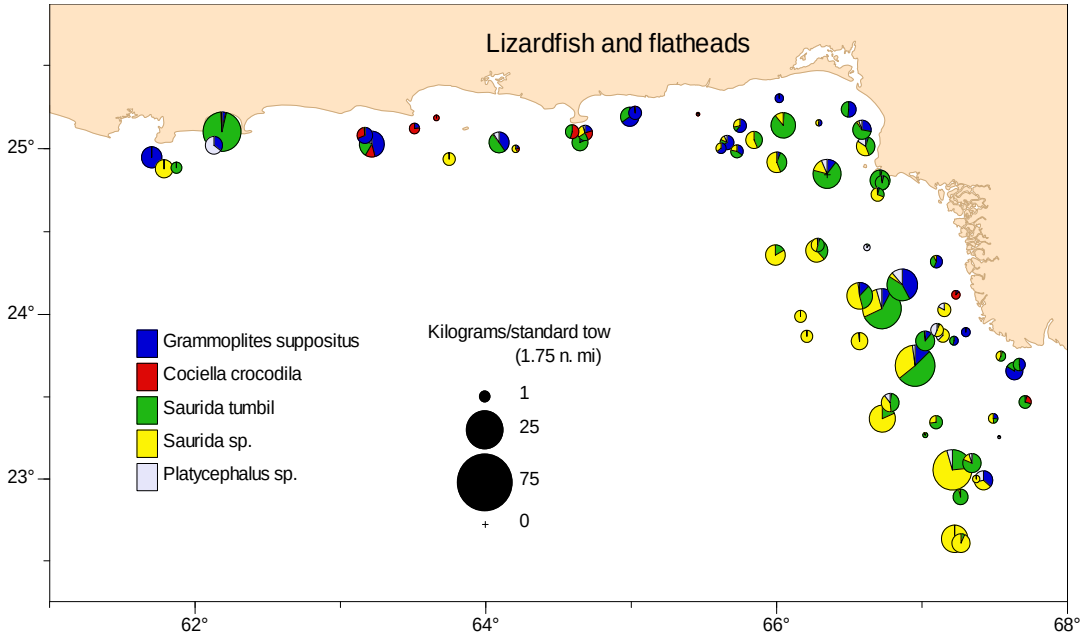

Figure 6e: Catch distribution and Stratified analysis of lizardfish (*Synodontidae*) and flathead (*Platycephalidae*) from Pakistan demersal survey 2010409

Mean catch per std tow(KG/1.75 n.mi.)

Species on map	9103	9104	9105	9106	9107	9108	9109	9110	
Grammoplites suppositus	0.92	0.08	0.50	0.22	0.11	0.76	0.43		0.57
Cociella crocodila	0.17				0.02		0.03		0.04
Saurida tumbil	1.61	0.25	0.89	2.41	0.50	2.78	0.46	1.87	1.74
Saurida undosquamis	0.09	0.67	0.32	0.50	0.27	1.10	0.22	3.63	0.76
Saurida longimanus		0.22		0.38		1.21		3.50	0.67
Platycephalus sp.						0.02		0.29	0.03
Sorsogna tuberculata	0.17		0.15	0.10	0.09	0.09	0.12		0.11
Suggrundus sp.						0.14			0.05
Grand Total	2.95	1.21	1.87	3.63	0.99	6.10	1.27	9.29	3.96

Mean catch per std tow(number/1.75 n.mi.)

Species on map	9103	9104	9105	9106	9107	9108	9109	9110	
Grammoplites suppositus	37.13	2.09	25.81	5.06	5.22	10.95	6.67		15.17
Cociella crocodila	4.96				0.76		0.82		1.14
Saurida tumbil	8.88	3.53	4.84	11.94	2.56	10.67	6.34	10.80	8.28
Saurida undosquamis	1.62	14.32	2.00	10.97	4.80	7.44	5.92	140.76	13.89
Saurida longimanus		5.16		15.55		29.45		118.37	18.70
Platycephalus sp.						0.07		0.88	0.08
Sorsogna tuberculata	14.42		8.71	8.54	6.88	6.73	5.97		7.80
Suggrundus sp.						0.51			0.18
Grand Total	67.01	25.11	41.37	52.07	20.22	65.81	25.72	270.81	65.23

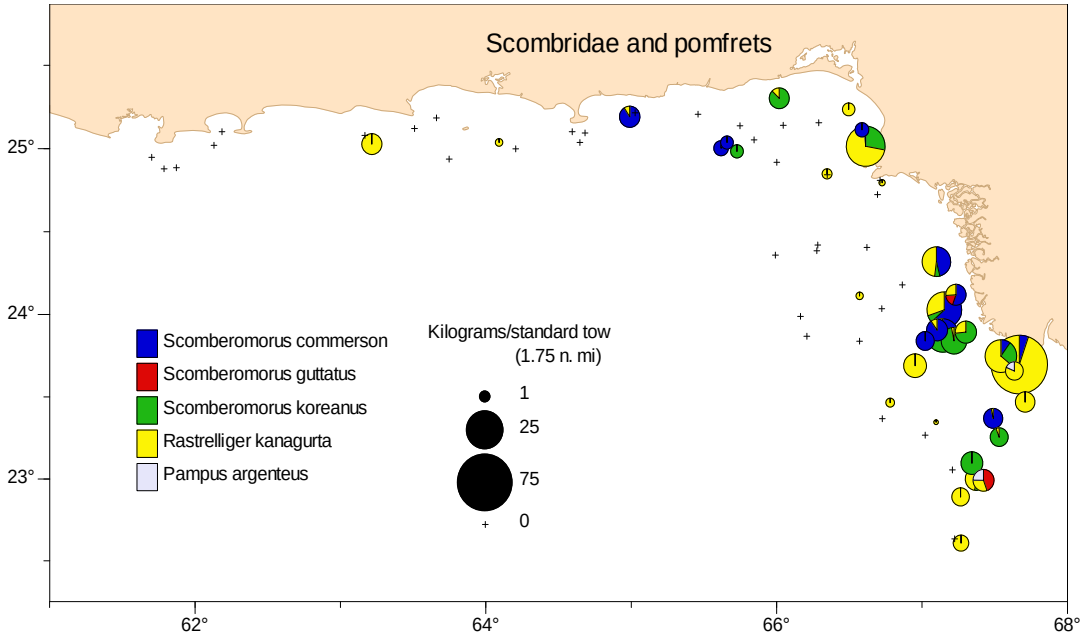

Figure 6f: Catch distribution and Stratified analysis of mackerels (*Scombridae*) and pomfrets (*Stromateidae*) from Pakistan demersal survey 2010409

Mean catch per std tow(KG/1.75 n.mi.)

Species on map	9103	9105	9106	9107	9108	9109	9110		
Scomberomorus commerson	0.33		0.30		2.48	0.17	0.87		0.51
Scomberomorus guttatus					0.06		0.23		0.03
Scomberomorus koreanus		0.24	2.50		2.01		1.21		0.57
Rastrelliger kanagurta	0.23		4.70	0.08	2.33	0.36	9.86	1.04	1.81
Pampus argenteus			0.07				0.19		0.02
Grand Total	0.56	0.24	9,110	9,106	9,916	9,108	9,145	1.04	2.94

Mean catch per std tow(number/1.75 n.mi.)

Species on map	9103	9105	9106	9107	9108	9109	9110		
Scomberomorus commerson	0.16		0.24		2.06	0.06	0.42		0.34
Scomberomorus guttatus					0.19		0.60		0.07
Scomberomorus koreanus		0.23	3.74		1.68		1.20		0.65
Rastrelliger kanagurta	2.48		38.54	0.52	83.56	2.19	145.93	6.36	27.54
Pampus argenteus			0.25				0.48		0.07
Grand Total	2.64	0.23	42.77	0.52	87.48	2.25	148.63	6.36	28.67

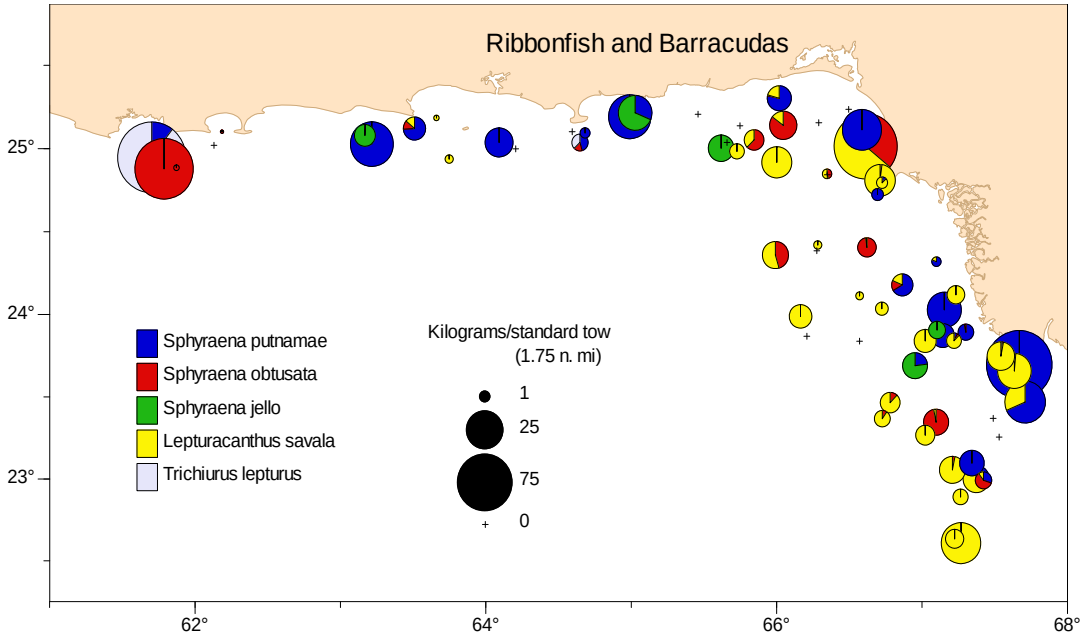

Figure 6g: Catch distribution and Stratified analysis of ribbonfish (*Trichiuridae*) and Barracudas (*Sphyraenidae*) from Pakistan demersal survey 2010409

Mean catch per std tow(KG/1.75 n.mi.)

Species on map	9103	9104	9105	9106	9107	9108	9109	9110	
Sphyraena putnamae	5.44		8.71		2.32	0.28	17.91		3.83
Sphyraena obtusata	0.05	20.30	7.98	1.65	0.04	0.90	0.15	0.06	1.99
Sphyraena jello	1.26				0.20	0.33			0.39
Lepturacanthus savala	0.04	0.43	16.53	2.45	2.31	1.55	3.79	9.47	3.40
Trichiurus lepturus	6.34								1.25
Grand Total	13.13	20.73	33.22	4.09	4.86	3.05	21.84	9.53	10.86

Mean catch per std tow(number/1.75 n.mi.)

Species on map	9103	9104	9105	9106	9107	9108	9109	9110	
Sphyraena putnamae	6.63		14.61		2.85	0.39	90.75		11.21
Sphyraena obtusata	0.66	302.17	87.52	19.81	1.07	11.17	1.85	0.88	25.67
Sphyraena jello	0.29				0.10				0.07
Lepturacanthus savala	0.51	2.21	30.73	33.37	9.98	22.98	36.54	181.54	28.32
Trichiurus lepturus	54.40								10.77
Grand Total	62.48	304.38	132.85	53.18	14.00	34.55	129.13	182.42	76.03

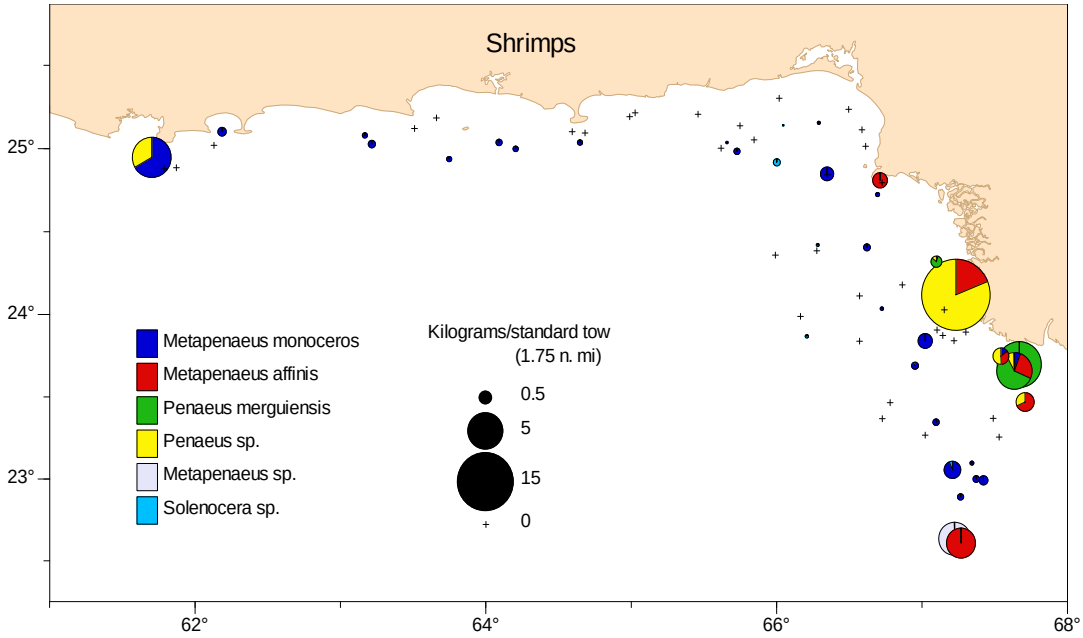

Figure 6h: Catch distribution and Stratified analysis of shrimps (Penaeidae, Solenoceridae) from Pakistan demersal survey 2010409

Mean catch per std tow(KG/1.75 n.mi.)

Species on map	9103	9104	9106	9107	9108	9109	9110		
Metapenaeus monoceros	0.22	0.02		0.07	0.01	0.04	0.06	0.17	0.08
Metapenaeus affinis					0.45		0.21	0.67	0.11
Penaeus merguiensis					0.02		1.28		0.12
Penaeus sp (included)					1.64				0.18
Penaeus japonicus					0.01		0.02		0.00
Penaeus semisulcatus	0.10				0.00		0.03		0.02
Penaeus monodon					0.03		0.02		0.01
Metapenaeus sp.								0.85	0.05
Solenocera sp (included)				0.00					0.00
Solenocera choprai						0.00	0.00	0.01	0.00
Solenocera hextii				0.01				0.00	0.00
Grand Total	0.33	0.02		0.08	2.17	0.04	1.63	1.70	0.57

Mean catch per std tow(number/1.75 n.mi.)

Species on map	9103	9104	9106	9107	9108	9109	9110		
Metapenaeus monoceros	6.12	0.51		4.57	0.51	2.85	3.16	7.98	3.31
Metapenaeus affinis					80.60		48.76	602.48	49.79
Penaeus merguiensis					0.46		38.63		3.50
Penaeus sp(included)					122.51				13.61
Penaeus japonicus					0.21		0.94		0.11
Penaeus semisulcatus	1.52				0.09		1.02		0.40
Penaeus monodon					0.30		0.14		0.04
Metapenaeus sp								524.26	31.75
Solenocera sp (included)				0.17					0.01
Solenocera choprai						0.91	0.46	2.18	0.50
Solenocera hextii				13.55				0.50	0.73
Grand Total	7.64	0.51		18.30	204.68	3.76	93.11	1,137	103.74

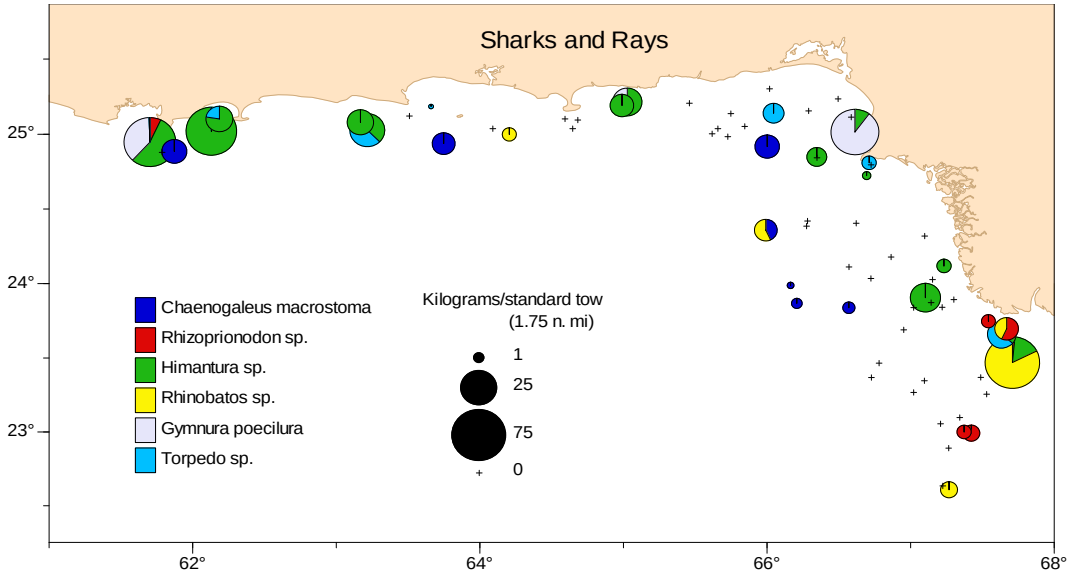

Figure 6i: Catch distribution and Stratified analysis of sharks and rays (*Elasmobrachii*) from Pakistan demersal survey 2010409

Mean catch per std tow(KG/1.75 n.mi.)

Species on map	9103	9104	9105	9106	9107	9108	9109	9110	
Chaenogaleus macrostoma		3.18		1.12		0.25			0.27
Rhizoprionodon acutus	0.19								0.04
Rhizoprionodon oligolinx	0.04				0.12		1.03		0.11
Himantura bleekeri	3.58				0.58		0.35		0.80
Himantura gerrardi	3.30		0.51	0.47	0.50				0.78
Himantura walga	0.03		0.69	0.14	0.21		1.50		0.24
Rhinobatos sp.							3.88		0.35
Rhinobatos annandalei	0.07					0.19		0.58	0.12
Rhinobatos thouin							3.55		0.32
Gymnura poecilura	1.42		10.59						1.26
Torpedo sp.	0.80			0.70	0.13		0.84		0.28
Grand Total	9.42	3.18	11.78	2.44	1.53	0.44	11.15	0.58	4.56

Mean catch per std tow(number/1.75 n.mi.)

Species on map	9103	9104	9105	9106	9107	9108	9109	9110	
Chaenogaleus macrostoma		22.45		1.47		0.77			1.25
Rhizoprionodon acutus	0.16								0.03
Rhizoprionodon oligolinx	0.05				0.21		1.74		0.19
Himantura bleekeri	0.64				0.10		0.20		0.15
Himantura gerrardi	3.67		0.00	0.26	0.10				0.75
Himantura walga	0.12		1.30	0.26	0.57		4.24		0.60
Rhinobatos sp.							0.41		0.04
Rhinobatos annandalei	0.06					0.20		0.24	0.10
Rhinobatos thouin							0.27		0.02
Gymnura poecilura	0.22		3.91						0.40
Torpedo sp.	1.84			0.17	0.08		0.30		0.41
Grand Total	6.76	22.45	5.21	2.16	1.06	0.97	7.15	0.24	3.94

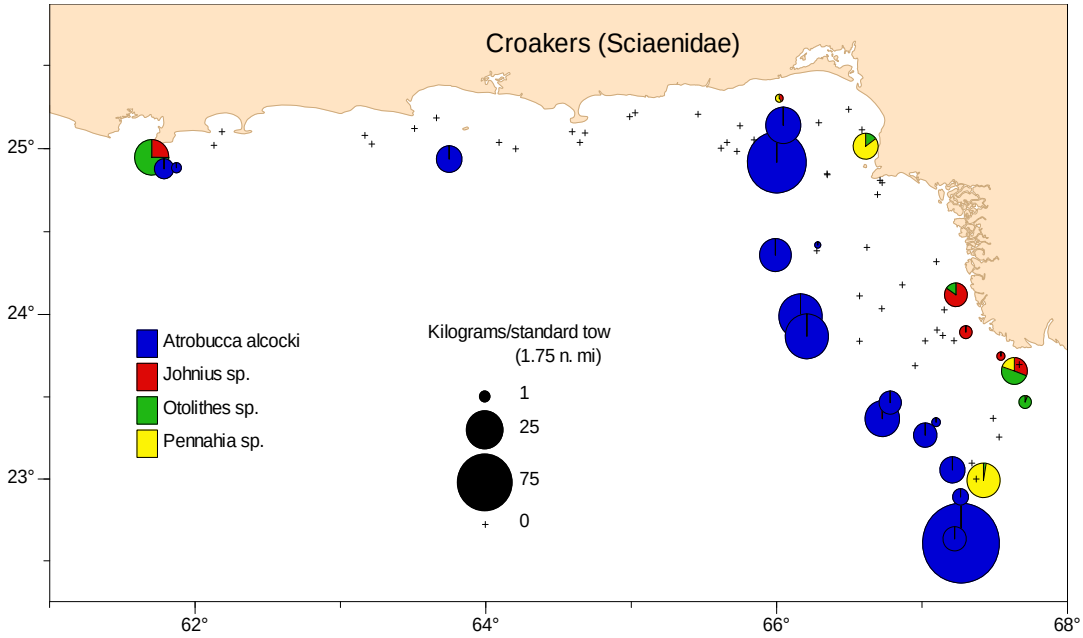

Figure 6j: Catch distribution and stratified analysis of croakers (*Sciaenidae*) from Pakistan demersal survey 2010409

Mean catch per std tow(KG/1.75 n.mi.)

Species on map	9103	9104	9105	9106	9107	9108	9109	9110	
Atrobucca alcocki		2.79		17.03		6.92		48.76	6.42
Johnius sp	0.24		0.02		0.47	0.00	0.20		0.12
Johnius carutta					0.01				0.00
Johnius dussumieri					0.03		0.10		0.01
Otolithes cuvieri	0.66				0.05		0.06		0.14
Otolithes ruber	0.05		0.26		0.02		0.57		0.09
Pennahia macrophthalmus			1.50				2.10		0.33
Grand Total	0.95	2.79	1.78	17.03	0.59	6.92	3.02	48.76	7.10

Mean catch per std tow(number/1.75 n.mi.)

Species on map	9103	9104	9105	9106	9107	9108	9109	9110	
Atrobucca alcocki		10.09		155.27		46.85		332.10	45.26
Johnius sp	3.04		0.23		15.24	0.33	1.58		2.57
Johnius carutta					0.11				0.01
Johnius dussumieri					0.19		3.68		0.35
Otolithes cuvieri	7.59				1.13		0.06		1.63
Otolithes ruber	0.16		0.45		0.19		1.48		0.23
Pennahia macrophthalmus			17.07				21.21		3.47
Grand Total	7.75		17.52		1.62		26.44		5.69

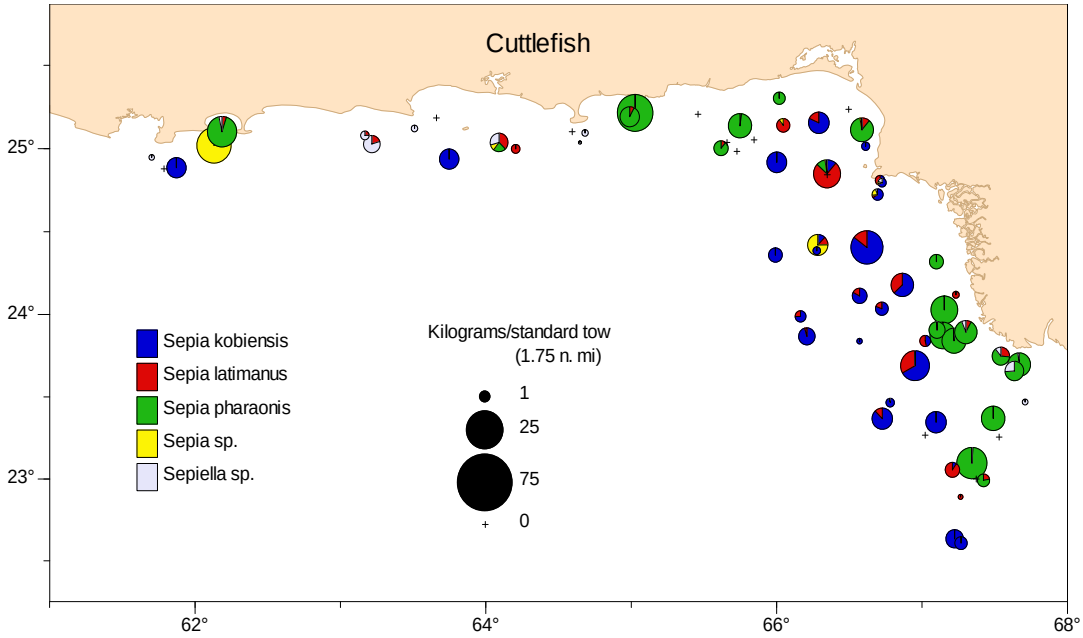

Figure 6k: Catch distribution and stratified analysis of cuttlefish (*Sepiidae*) from Pakistan demersal survey 2010409

Mean catch per std tow(KG/1.75 n.mi.)

Species on map	9103	9104	9105	9106	9107	9108	9109	9110	
Sepia kobiensis	0.09	1.66	0.06	1.28	0.07	2.27		0.88	1.03
Sepia latimanus	0.25		0.15	1.37	0.14	0.58	0.04	0.32	0.38
Sepia pharaonis	2.20		1.35	0.15	2.81		3.18		1.16
Sepia sp.				0.02	0.01				0.00
Sepia omani	0.00		0.03	0.02		0.02			0.01
Sepia prashadi	0.79					0.16			0.21
Sepiella sp.	0.19		0.01	0.02	0.04	0.00	0.11		0.05
Sepiella inermis					0.02		0.01		0.00
Grand Total	3.52	1.66	1.60	2.85	3.09	3.03	3.35	1.20	2.86

Mean catch per std tow(number/1.75 n.mi.)

Species on map	9103	9104	9105	9106	9107	9108	9109	9110	
Sepia kobiensis	1.20	22.29	1.53	18.94	2.77	40.51		17.57	18.10
Sepia latimanus	12.30		1.41	18.45	1.48	7.49	0.51	3.79	6.63
Sepia pharaonis	3.07		1.64	0.26	1.74		1.59		1.11
Sepia sp.				0.52	0.65				0.10
Sepia omani	0.06		1.18	0.37		0.43			0.29
Sepia prashadi	4.24					0.87			1.15
Sepiella sp.	5.40		0.24	2.06	1.43	0.31	1.71		1.62
Sepiella inermis					0.95		0.38		0.14
Grand Total	26.26	22.29	5.99	40.60	9.02	49.62	4.18	21.36	29.14

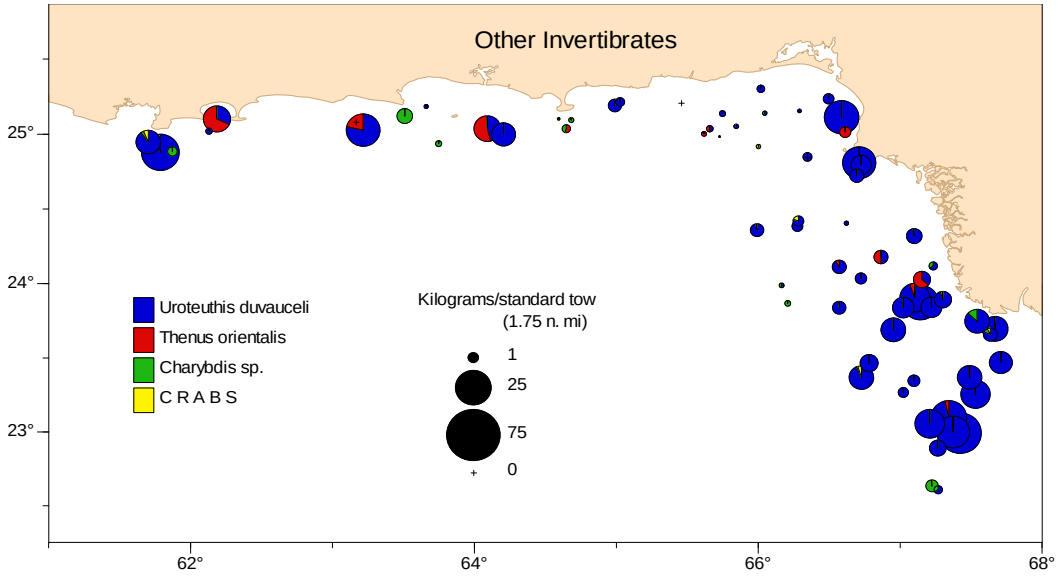

Figure 6l: Catch distribution and stratified analysis of various invertebrate species and species groups from Pakistan demersal survey 2010409

Mean catch per std tow(KG/1.75 n.mi.)

Species on map	9103	9104	9105	9106	9107	9108	9109	9110	
Uroteuthis duvauceli	1.98	5.95	4.95	0.08	6.29	1.79	12.92	3.66	3.80
Thenus orientalis	0.84		0.18		0.36	0.05	0.11		0.25
Charybdis sp.	0.13	0.31		0.01	0.11	0.02	0.06	0.28	0.08
Charybdis feriata	0.01				0.02	0.01	0.29		0.03
Charybdis lucifera	0.01								0.00
C R A B S	0.00					0.01			0.00
Philyra sp.	0.00		0.00	0.00			0.00		0.00
Doclea sp.	0.00					0.00	0.00		0.00
Calappa sp.	0.01					0.01	0.00		0.00
Calappa lophos	0.00				0.00				0.00
Calappa pustulosa						0.02	0.00	0.01	0.01
Portunus sanguinolentus	0.02						0.01		0.01
Grand Total	3.01	6.26	5.13	0.09	6.78	1.91	13.40	3.95	4.19

Mean catch per std tow(number/1.75 n.mi.)

Species on map	9103	9104	9105	9106	9107	9108	9109	9110	
Uroteuthis duvauceli	35.19	103.52	71.29	2.84	266.34	105.11	820.13	124.75	165.68
Thenus orientalis	6.39				2.87	0.45	0.59		1.80
Charybdis sp.	6.93	8.73		2.92	24.37	1.88	16.95	23.27	8.17
Charybdis feriata	2.81				0.89	1.09	33.24		4.01
Charybdis lucifera	0.30								0.06
C R A B S	0.05					0.07			0.03
Philyra sp.	0.97		0.24	1.01			0.10		0.27
Doclea sp.	0.05					0.13	0.20		0.08
Calappa sp.	0.11								0.02
Calappa lophos	0.06								0.01
Calappa pustulosa						0.14	0.20	0.25	0.08
Portunus sanguinolentus	0.76						0.30		0.18
Grand Total	53.61	112.25	71.53	6.76	294.47	108.87	871.72	148.28	180.39

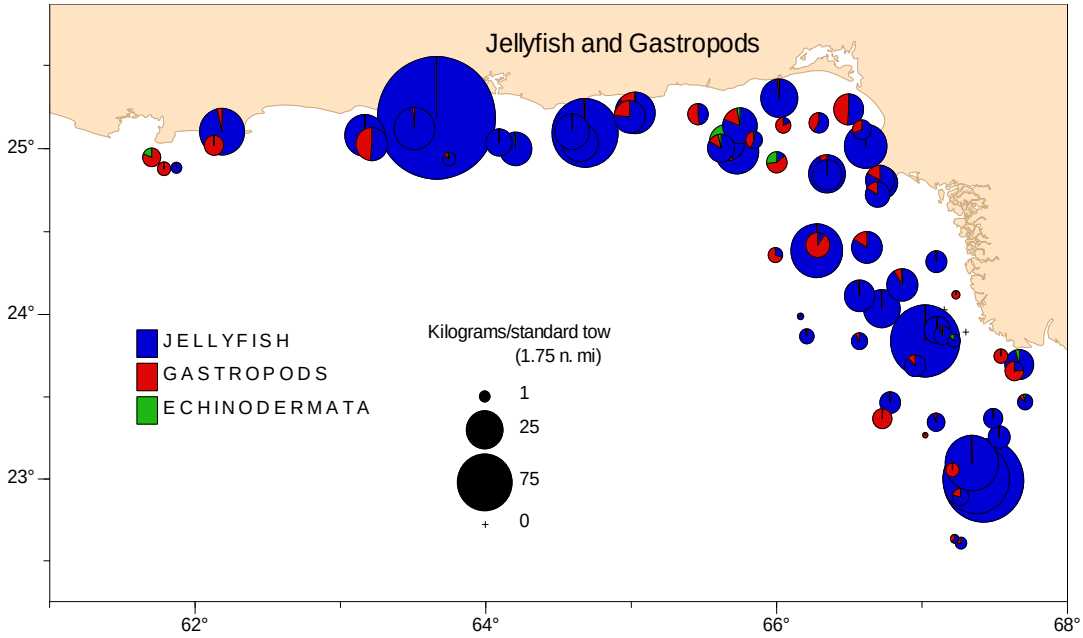

Figure 6m: Catch distribution and stratified analysis of jellyfish (Jellyfish) gastropods and echinodermata from Pakistan demersal survey 2010409

Mean catch per std tow(KG/1.75 n.mi.)

Species on map	9103	9104	9105	9106	9107	9108	9109	9110	
JELLYFISH	53.83	8.78	15.43	5.77	3.54	16.30	44.83	0.55	22.98
GASTROPODS	1.58	0.54	1.76	1.20	0.73	0.89	6.46	0.46	1.56
ECHINODERMATA	0.63	0.02	0.00	0.17	0.01	0.01	0.07		0.15
Grand Total	56.04	9.34	17.19	7.15	4.28	17.20	51.35	1.01	24.68

Mean catch per std tow(number/1.75 n.mi.)

Species on map	9103	9104	9105	9106	9107	9108	9109	9110	
JELLYFISH									
GASTROPODS	44.93	33.06	16.99	70.97	34.03	134.62	146.27	15.92	81.34
ECHINODERMATA	83.30	3.30		47.91	0.51		11.21		20.14
Grand Total	128.23	36.36	16.99	118.88	34.53	134.62	157.48	15.92	101.48

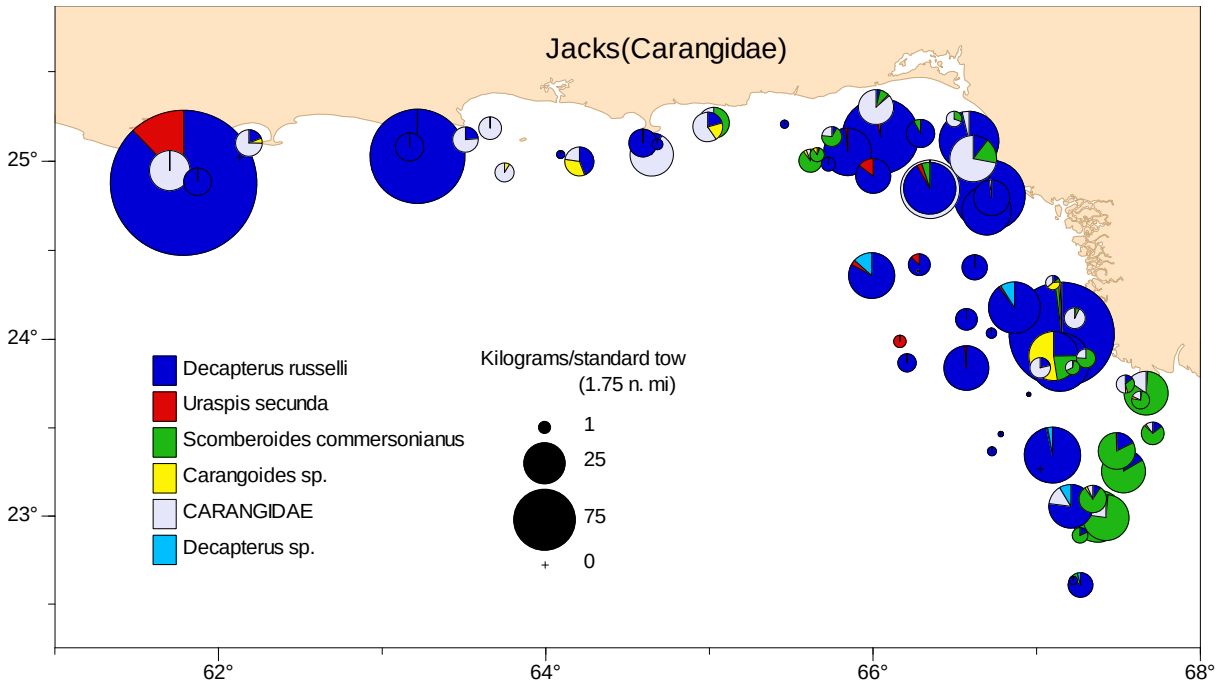

Figure 6n: Catch distribution and stratified analysis of jacks (*Carangidae*) from Pakistan demersal survey

	Mean catch per std tow(KG/1.75 n.mi.)								
Species on map	9103	9104	9105	9106	9107	9108	9109	9110	
Decapterus russelli	14.52	183.95	15.69	34.73	48.12	9.50	1.10	5.99	22.69
Uraspis secunda		25.24		1.34		0.18			1.15
Scomberoides commersonianus	0.78		1.71	0.44	1.90		16.00	0.38	2.00
Carangoides sp	0.02					0.00	0.02		0.01
Carangoides armatus			0.04						0.00
Carangoides chrysophrys	0.09				1.86				0.23
Carangoides fulvoguttatus	0.01								0.00
Carangoides malabaricus	0.15	0.05			0.04		0.09		0.04
Selar crumenophthalmus	0.01	0.52			0.03	0.16	0.02	0.92	0.14
Seriola dumerili					0.14				0.02
Seriolina nigrofasciata	0.04								0.01
Trachinotus mookalee			1.47				0.16		0.15
Megalaspis cordyla	1.33		0.23	9.96	0.18		0.74		0.88
Parastromateus niger	1.73		2.68		0.12		0.05		0.61
Alectis ciliaris	0.32		0.62				0.07		0.13
Alectis indicus	0.11		1.48						0.16
Alepes djedaba			4.05		0.14		0.61		0.44
Decapterus macarellus						0.56		0.05	0.20
Decapterus macrosoma								0.54	0.03
Grand Total	19.12	209.76	27.97	46.48	52.54	10.41	18.87	7.88	28.88

Mean catch per std tow(number/1.75 n.mi.)

Species on map	9103	9104	9105	9106	9107	9108	9109	9110	
Decapterus russelli	310.13	2,896	593.24	495.25	6,135	119.82	179.87	88.60	1,004
Uraspis secunda		139.72		4.98		0.71			6.11
Scomberoides commersonianus	0.98		2.32	0.96	3.04		40.63	0.55	4.45
Carangoides sp (included)	0.10					0.07	18.55		1.70
Carangoides armatus			0.06						0.01
Carangoides chrysophrys	0.05				0.67				0.08
Carangoides fulvoguttatus	0.11								0.02
Carangoides malabaricus	0.91	0.27			0.65		1.69		0.41
Selar crumenophthalmus	0.06	2.17			0.29	0.94	0.27	7.08	0.92
Seriola dumerili					0.09				0.01
Seriolina nigrofasciata	0.06								0.01
Trachinotus mookalee			2.12				0.12		0.21
Megalaspis cordyla	4.51		0.52	29.83	1.53		2.91		2.91
Parastromateus niger	2.18		3.78		0.19		3.30		1.10
Alectis ciliaris	1.01		2.61				0.57		0.49
Alectis indicus	0.21		15.31						1.46
Alepes djedaba			38.46		1.77		14.52		5.04
Decapterus macarellus						7.92		0.47	2.86
Decapterus macrosoma								9.74	0.59
Grand Total	320.31	3,038	658.42	531.01	6,143	129.46	262.45	106.45	1,032

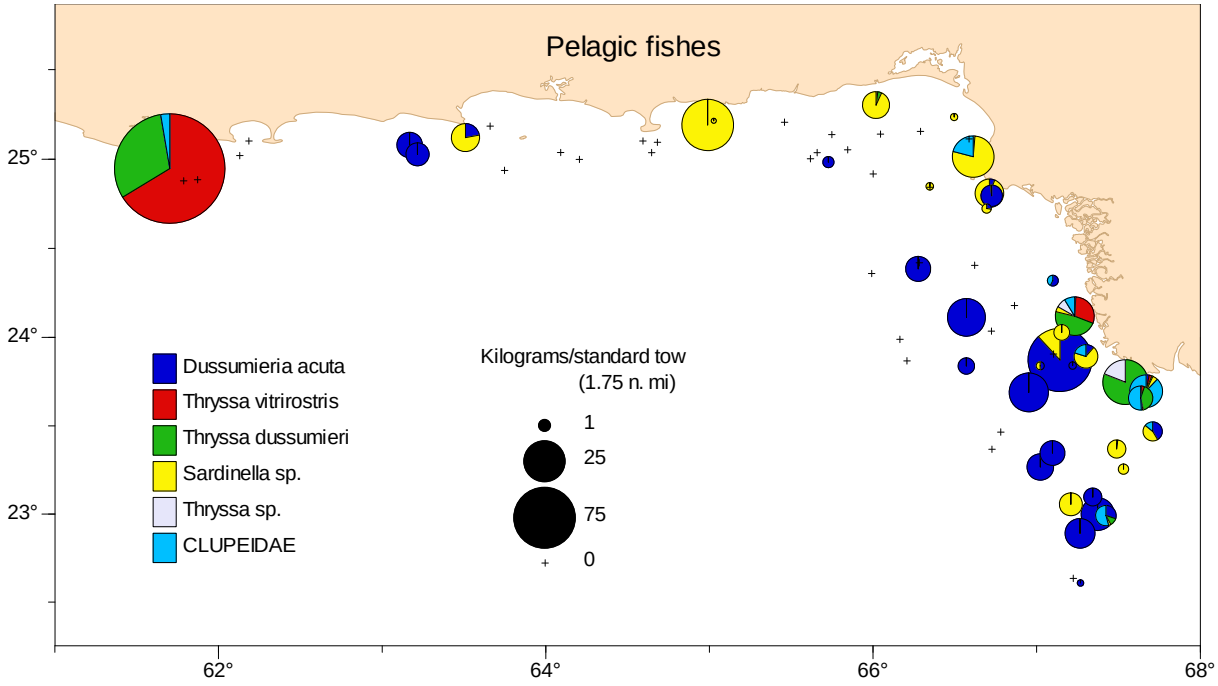

Figure 6o: Catch distribution and stratified analysis of pelagic fishes (*Clupeidae* and *Engraulidae*) from Pakistan demersal survey 2010409

Mean catch per std tow(KG/1.75 n.mi.)

Species on map	9103	9104	9105	9106	9107	9108	9109	9110	
Dussumieria acuta	0.60	0.12	0.10		6.40	3.25	1.90	2.10	2.30
Thryssa vitrirostris	13.44				0.48		0.06		2.72
Thryssa dussumieri	6.30		0.07		2.77		0.29		1.59
Sardinella sp	2.25				0.26		0.14		0.49
Sardinella albella			1.25		0.01				0.12
Sardinella gibbosa	0.30		4.43	0.02	1.62		0.35		0.68
Sardinella longiceps	0.00							0.97	0.06
Sardinella sindensis					0.00	0.01	0.01	0.00	0.00
Thryssa hamiltonii							0.01		0.00
Thryssa setirostris	0.01				0.60				0.07
Ilisha sp	0.51		1.13		0.13		0.42		0.26
Ilisha melastoma							0.12		0.01
Stolephorus sp					0.15				0.02
Stolephorus indicus					0.00		0.00		0.00
Grand Total	23.42	0.12	6.98	0.02	12.42	3.25	3.30	3.07	8.31

Mean catch per std tow(number/1.75 n.mi.)

Species on map	9103	9104	9105	9106	9107	9108	9109	9110	
Dussumieria acuta	27.41	1.86	4.30		200.84	71.35	40.66	18.07	58.43
Thryssa vitrirostris	1,895				39.23		1.75		379.59
Thryssa dussumieri	690.97		6.15		338.82		23.38		177.05
Sardinella sp	238.23				5.11		4.77		48.14
Sardinella albella			133.16		0.19				12.31
Sardinella gibbosa	8.40		89.89	0.52	84.60		10.90		20.36
Sardinella longiceps	0.19							11.51	0.74
Sardinella sindensis					0.21	0.13	0.41	0.25	0.12
Thryssa hamiltonii							0.10		0.01
Thryssa setirostris	0.76				37.14				4.28
Ilisha sp	16.71		16.85		4.98		5.09		5.87
Ilisha melastoma							2.83		0.25
Stolephorus sp					35.26				3.92
Stolephorus indicus					0.58		0.69		0.13
Grand Total	2,878	1.86	250.34	0.52	746.96	71.48	90.57	29.83	711.18

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Marine Fisheries
Department
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