Government of the Peoples Republic of Bangladesh
Flood Action Plan

FAP 17

Fisheries Studies and Pilot Project

FINAL REPORT

(Draft)

JUNE 1994

Supporting Volume No. 9

FISHERIES STUDY

SHANGHAIR HAOR PROJECT AND DEKKER HAOR

ODA
Overseas Development Administration, U.K.

FAP 17

FINAL REPORT

SUPPORTING VOLUME NO. 9

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Shanghair Haor Project
and
Dekker Haor

FAP 17
FISHERIES STUDIES
AND PILOT PROJECT

June, 1994

Funded by ODA in conjunction with the Government of Bangladesh

TABLE OF CONTENTS

TABLE OF CONTENTS (Contd.)

LIST OF FIGURES

LIST OF FIGURES (Contd.)

LIST OF FIGURES (Contd.)

LIST OF TABLES

LIST OF TABLES (Contd.)

LIST OF VOLUMES OF FAP 17 DRAFT FINAL REPORT

Volume No.	Name of Reports
	Main Volume
	Guidelines
	Pilot Project Proposals
	Supporting Volumes
	Fisheries Studies
1	Tangail Compartmentalization Pilot Project
2	Satla-Bagda Polder 1
3	Chatla-Fukurhati Project
4	Pabna Irrigation and Rural Development Project
5	The Regulated Baral River
6	Brahmaputra Right Embankment
7	Chalan Beel Polder B
8	Manu Irrigation Project and Hakaluki Haor
9	Shanghair Haor Project and Dekker Haor
10	The Jamuna and Padma Rivers
11	Movements of Fish Hatchlings
	Village Studies
12	Chalan Beel Polder B
13	Pabna Irrigation and Rural Development Project
14	The Kai Project and Dekker Haor
15	Chatla-Fukurhati Project
16	Satla-Bagda Polder 1
17	Manu Irrigation Project and Hakaluki Haor
18	Manikganj District
	Special Studies
19	Thematic Socioeconomic Study
20	Fish Marketing and Prices
21	Fisheries Leasing and Access in the North East Region
22	Aquaculture Development Using NGOs and Target Group Approach
23	The Use of Passes and Water Regulators to Allow Movements of Fish Through FCD/I Structures
24	Investigation of Pesticide Residue Levels in Floodplain Fish in Bangladesh
25	Nature and Extent of NGOs' Participation in Fisheries Resource Development in Bangladesh
26	An Annotated Bibliography (1940-1992) on the River and Floodplain Fisheries Biology and Production in Bangladesh and South Asia
27	Review and Bibliography of Nutrition in Bangladesh
28	An Annotated Bibliography of the Quality and Limnology of Inland Freshwaters in Bangladesh
	Appendices
1	Fisheries Database Documentation
2	Socioeconomic Database Documentation
3	Fisheries and Socioeconomic Methods

PREFACE

The Fisheries Studies and Pilot Project (FAP 17) was funded by the British Overseas Development Administration (ODA) in conjunction with the Government of Bangladesh. The national implementing agency for the Fisheries Studies was the Department of Fisheries of the Ministry of Fisheries and Livestock. FAP 17 also reported to the Flood Plan Coordination Organisation of the Ministry of Water Resources. The project was one of a number of supporting studies of a broader programme known as the Flood Action Plan (FAP) of Bangladesh. The FAP consisted of a series of eleven major engineering studies, five of which comprised separate regional studies which aimed to identify feasible large-scale flood control and drainage projects through which it would be possible to regulate the extent of flooding during the monsoon. The engineering components were supported by a range of complementary studies, several of which were designed to address various social and environmental impacts which were anticipated to result from large-scale flood control.

FAP 17 was designed to address issues relating to fisheries and aimed to collect, analyse and interpret information with which to make predictions of the impacts of the planned flood control action upon the inland capture fisheries of Bangladesh. To do this, quantitative baseline fisheries and socioeconomic data were collected from inside and outside a range of different types of flood control projects in four regions of the country.

A total of eight FCD/I projects was studied and the results of each study were documented in a series of Supporting Volumes (Fisheries Studies) of the project Draft Final Report (see list of reports on page viii). Three further fisheries studies were completed, one of which described the fisheries of the main rivers Jamuna and Padma (Supporting Volume No. 10). The other two investigated the movements of a) adult and juvenile fish and b) fish hatchlings in regulated and unregulated rivers and assessed the impact of regulators on these movements (Supporting Volumes 5 and 11). A parallel set of socioeconomic studies was carried out and the results documented in seven village study reports (Supporting Volumes 12-18). In addition to the fisheries and village studies, several special studies, mainly desk studies, were completed during the course of the project. These provided background information on fish, the environment and socioeconomics (Supporting Volumes 19-28). Several of these studies have been documented previously as annexes to the FAP 17 Interim Report. To ensure wider circulation, however, they were also included as part of the Draft Final Report.

One extremely important output from the FAP 17 study was the establishment of a detailed and comprehensive fisheries database which provides quantitative baseline information on inland fish resources and fisheries in Bangladesh. Fisheries and socioeconomic databases were submitted to the Government of Bangladesh through the Flood Plan Co-ordination Organisation of the Ministry of Water Resources and the Department of Fisheries in the Ministry of Fisheries and Livestock. Documentation of each database was included as Appendices 1 and 2 of the Draft Final Report.

The present report is one of a series of eight fisheries studies which form part of the Supporting Volumes to the Draft Final Report. The principal objectives of the supporting studies are listed below.

1) Evaluation of the effects of different flood control measures on the production of fisheries.
2) Evaluation of the effects of different flood control measures on the movements and populations of fish.
3) Assessment of the feasibility of technical and developmental measures to compensate for or reduce potential losses to fisheries due to flood control.

Descriptions of the methods employed for field data collection, laboratory studies and analyses of data are provided in the FAP 17 Inception and Interim Reports and are presented again with some additions in Appendix 3 of the Draft Final Report.

Two taxonomic guides were used for the identification of fish found during this study. The first was Rahman, A. K. A. 1989, Freshwater Fishes of Bangladesh, published by the Zoological Society of Bangladesh. The second was Talwar, P. K. and Jhingran, A. G. 1991, Inland Fishes of India and Adjacent Countries, Vols. 1 and 2, published by Oxford and IBM Publishing Co. Ltd. The more recent guide was used to provide a systematic listing of the scientific names of fish. However, the guide by Rahman was used more widely by fisheries biologists and all Bengali names of fish used in the present report were derived from this guide. The FAP 17 database also provides comprehensive lists of local names of fish collected in each region studied.

The term "species diversity" was used in this report in its simplest sense to denote the total number of different species of fish recorded at each site. The numbers of species recorded depended on the sampling effort deployed. No doubt more species would have been recorded had more sites or gear units been sampled more often using larger sub-samples of catches. All species recorded were divided into three categories of habitat preference: riverine, migratory and floodplain residents based on distributions identified using the complete FAP 17 database. The categorisations should be regarded as provisional only. As more knowledge is gained of the ecology and behaviour of individual fish and prawn species in Bangladesh more accurate revisions to the list will be needed.

Local names of gears were used throughout the report despite considerable geographical differences in names used in Bangladesh. A list of all gears recorded by FAP 17, with local and English names and a brief description of each are provided as an appendix to this report.

The source of all tables and figures presented in this report, unless otherwise stated, is from data collected by FAP 17 fisheries surveys.

ACKNOWLEDGMENTS

This report is based on the concerted efforts of a large number of people whose responsibilities covered: field data collection; administrative support; entry of data into computers; management of databases; analyses and interpretation of results, and report preparation.

Under the guidance of a senior fisheries supervisor, fisheries biologists, directly recruited by the project or provided through temporary employment by the Department of Fisheries, were responsible for the collection of fisheries, hydrological and limnological data. Field survey schedules required the team to monitor fishing activities from dawn to dusk, 12 hours each day, with additional surveys carried out before dawn to monitor night fishing. That the team accomplished its objectives despite arduous working conditions and long, unsocial hours of work, warrants the highest recognition and is a credit to both the team and the senior fisheries supervisor, Dr. A M Bhouyain, who was responsible for maintaining not only discipline and high quality survey work but also team morale. The achievements of the FAP 17 fisheries survey teams demonstrated that it is possible in Bangladesh to obtain detailed quantitative fisheries appraisals based on the direct monitoring of fishermen's activities on water.

Administrative support staff and computer operators both in the field station and in Dhaka headquarters were responsible for the smooth running of the field programme and ensured that data were entered into the database promptly and accurately.

Mr. Asaf Hussain, senior computer programmer, was responsible for database management and programming and worked closely with Drs. James Scullion and Bernadette McCarton on data analyses. Fisheries resource assessment specialists, Professor John Beddington and Dr. Geoffrey Kirkwood of the Marine Resource Assessment Group, Imperial College, London, UK, advised on the statistical methods for the analysis of catch rates of gears which formed the basis of comparisons of fish catches inside and outside the flood control project.

Mr. Goutam Chandra Dhar, computer specialist, and a small team in Dhaka, were responsible for the preparation of the report.

FAP 17 is grateful for the full cooperation and hospitality offered to project fisheries biologist by leaseholders of perennial *beel* in the MIP and Hakaluki *Haor*. We are also grateful for the cooperation of FAP 6, especially in the supply of hydrological information.

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ABBREVIATIONS AND ACRONYMS

b. aman	broadcast *aman*
BRRI	Bangladesh Rice Research Institute
BWDB	Bangladesh Water Development Board
°C	degree(s) centigrade
cm	centimetre(s)
CPUA	Catch Per Unit Area
CPUE	Catch Per Unit Effort
DO	Dissolved Oxygen
DoF	Department of Fisheries
DWR	Deepwater Rice
EC	European Community
EIRR	Economic Internal Rate of Return
EUS	Epizootic Ulcerative Syndrome
FAP	Flood Action Plan
FAP 17	Flood Action Plan Study No. 17 (Fisheries Studies and Pilot Project)
FCD	Flood Control and Drainage
FCD/I	Flood Control and Drainage with or without Irrigation
FRI	Fisheries Research Institute
g	gram(s)
GPS	Geographical Positioning System
ha	hectare(s)
hr	hour(s)
HYV	High Yield Varieties
kg	kilogram(s)
km	kilometre(s)
m	metre(s)
mg/l	milligram(s) per litre
MIKE11	A microcomputer based modelling system for rivers and channels
MIP	Manu Irrigation Project
NER	North East Region
NGO	Non Government Organisation
NS	Not significant
ODA	Overseas Development Administration
PIRDP	Pabna Irrigation and Rural Development Project
PWD	Public Works Datum (water level)
pH	Measure of acidity and alkalinity of water (log of hydrogen ion concentration)
SRP	Systems Rehabilitation Project
STD ERR	Standard Error
SWMC	Surface Water Modelling Centre
t	tonne(s)
t. aman	transplanted *aman*

ABBREVIATIONS AND ACRONYMS (Contd.)

TDWR	Transplanted Deepwater Rice
t/ha	tonne(s) per hectare
tk	taka
WAPDA	Water and Power Development Authority
WARPO	Water Resources Planning Organisation (previously MPO, Master Plan Organisation)
μS	Measurement of conductivity of water (micro Siemens)

SUMMARY

1. The Shanghair Haor Project (SHP) is a partial flood control project located 13 km south of Sunamganj. It is bounded on the west by the Old Surma River, a distributary of the Surma River, and in the north by the Sylhet-Sunamganj highway. To the east and south lies the Mahasingh River system, also a distributary of the Surma. Construction of the SHP was completed in 1986 and a total of 25 km of submersible embankments now surround the *haor* in the east, west and south. The project covers an area of approximately 4,000 ha supporting a population of about 22,900 people.

2. Between February 1993 and February 1994, fisheries catch assessment surveys were conducted at fortnightly intervals on canals, floodplains and *beel* inside the SHP and on unregulated sections of Dekker *Haor* lying immediately north which was used as a control area for comparative purposes. Three adjacent unregulated rivers, the Surma and two of its distributaries, the Old Surma and Mahasingh, were also surveyed.

Flooding Patterns

3. The SHP was designed to provide protection from river flooding until 15 May to allow the *boro* rice crop to be harvested safely. In the year of study (1993) the SHP functioned as planned. Submersible embankments prevented the temporary ingress of river waters during flash floods in February and March and delayed more permanent flooding for 19 days from 30 April to 18 May. Thereafter embankments were overtopped by rising river levels and monsoonal flooding patterns on floodplains of the SHP and on the unregulated Dekker *Haor* were the same.

4. During the flood drawdown, a temporary ingress of river waters (seen in Dekker *Haor)* was prevented by embankments of the SHP. This resulted in a more rapid decrease in flood levels on regulated floodplains from October to early November.

5. The main drainage canal of the SHP was dammed in November by a leaseholder to concentrate fish migrating from the drying floodplains. Damming the canal caused drainage congestion in the SHP from November to January. Most floodplains dried out by mid-December, 2-4 weeks later than unregulated floodplains. Thus, while the overall duration of inundation was similar inside and outside the SHP, there was a

shift in the flood season of about 3 weeks because of both flood control for agriculture and blockage to drainage for fisheries purposes.

6. Examination of annual flooding patterns of the Surma River revealed that pre-monsoon river flooding inside the SHP was prevented until early May in every year since the date of embankment construction in 1986. The project has therefore succeeded in protecting the *boro* harvest. During the past eight years, however, river flooding inside the SHP was delayed until June for four years and until July in one year. This indicates that there is a degree of over-protection by excessively high embankments.

Water Quality

7. Seasonal variations in water temperature, pH, dissolved oxygen concentration, conductivity, total dissolved solids and transparency were monitored on rivers, canals, floodplains and *beel*. No major differences in water quality were detected between the SHP and the unregulated Dekker *Haor*.

Total Catch

8. Estimates of annual catch per unit area (CPUA) from sampling sites on floodplain and *beel* were extrapolated to wider areas to obtain estimates of the total catch from the SHP and the selected area on Dekker *Haor*. Between March 1993 and February 1994 the total annual catch from 2,801 ha on Dekker *Haor* was 301 tonnes with a CPUA of 107 kg/ha. This compares with a total catch of 384 tones from 3,737 ha in the SHP and a CPUA of 103 kg/ha. Statistical analyses revealed no significant differences in total catches (see para 13).

9. The annual value of CPUA from floodplains on Dekker *Haor* was 56 kg/ha compared with 64 kg/ha from floodplains inside the SHP. Values of CPUA from *beel* on Dekker *Haor* ranged fro 180 kg/ha to 195 kg/ha compared with a considerably higher range, 248-576 kg/ha, from *beel* inside the SHP. Differences in *beel* catches were attributed to differences in the catchment areas of individual *beel*. In the SHP there were fewer perennial *beel* per unit area of floodplain than in Dekker *Haor* and there was therefore a greater concentrating effect during the drawdown on floodplain fish stocks in the SHP.

10. Annual catch per kilometre of river was 5,074 kg/km on the Surma, 5,039 kg/km on the Old Surma and 4,198 kg/km on the Mahasingh. These were some of the highest catch rates recorded by FAP 17 studies covering four FAP regions in Bangladesh. Annual catch per hectare of river was substantially lower in the largest of the three rivers, the Surma and is presumed to have reduced the efficiency of overall fishing effort making it difficult, for example, to set gears across the full width of the river.

11. Analysis of the catch from the fish-out of one *duar* (scour-hole) on the Old Surma River clearly demonstrated these areas as very important habitats which provide shelter for large fish during winter. A total catch of 4.1 tonnes was taken in 2 days of intensive fishing by a leaseholder and more than 200 villagers. Large species such as *boal*, *rui*, *chital*, *guizza*, *catla*, *ayre* and *kalbaus* dominated the catch and comprised 92% of the total. The two most important species were *boal* and *rui* which accounted for 36% and 27% of the catch weight. These results provided the first quantitative support for recommendations for future fisheries management policies relating to rivers in the North East Region (see para 21).

Fish Densities

12. Statistical analyses were carried out on seasonally pooled catch rates of gears used on canals, floodplains and *beel* inside and outside the SHP. The underlying assumption of the method was that once differences in catchabilities between different types of gears had been accounted for, any further differences in catch rates inside and outside the SHP were due solely to differences in fish densities.

13. Statistical comparison of catch rates of dominant gears indicated lower fish densities inside the SHP during the pre-monsoon but higher densities during the flood drawdown and winter. The latter were probably due to the larger catchment areas of individual *beel* inside the SHP than those on the unregulated Dekker *Haor*. Seasonal differences in densities in and out of the SHP were not, however, statistically significant, nor were densities when combined for the year. Higher levels of fishing effort were expended on the smaller number of *beel* inside the SHP. Estimates of standardised effort per hectare (measured in *ber jal* hours per hectare) was 19.8 inside the SHP compared with 6.2 on Dekker *Haor*. This higher fishing effort inside the SHP would also account for the substantially higher values of CPUA from *beel*. The analyses indicated that there was no statistical basis for a significant difference between integrated catch estimates inside (103 kg/ha) and outside (107 kg/ha) the SHP.

Diversity

14. Between March 1993 and February 1994, a total of 71 species of fish was recorded from Dekker *Haor* compared with 76 species from the SHP during the same period. Examination of the number of species in different fish groups revealed no difference in floodplain resident fish inside and outside the SHP, but a slightly lower number of riverine species and a higher number of migratory species, inside the SHP. The results indicated that there was no serious harmful impact of partial flood control on species diversity.

Catch Composition

15. Riverine species made negligible contributions by weight to annual catches inside (<1%) and outside (1%) the SHP. Migratory species, however, provided 9% of the catch from the unregulated Dekker *Haor* compared with 19% from the SHP. Floodplain resident species accounted for 66% and 57% of catches from outside and inside the SHP respectively. The results revealed that there was no reduction in contributions to the catch made by riverine and migratory species in areas protected by submersible embankments.

16. In terms of individual migratory species, the main difference between Dekker *Haor* and the SHP was the greater abundance of *rui* inside the SHP where it was captured from the leased fishery on Karchabrar *Beel* and, to a lesser extent, from the main drainage canal, Lumardai *Khal*. On the unregulated Dekker *Haor chapila* and *kalbaus* were more abundant than inside the SHP. Differences were also found in the composition of dominant floodplain resident species in and out of the SHP. On Dekker *Haor* the most important species, in order of abundance, were *guchi baim*, *kaikka*, *baral baim*, *foli*, *canchan puti* and *bailla*, while inside the SHP, *puti* and *kaikka* predominated. Prawns formed important components of the catch both inside (23%) and outside (24%) the SHP. Since prawns were not identified during the present study, it is not known whether they were migratory or floodplain residents. Other FAP 17 studies on the movements of fish hatchling by passive drift in rivers found juvenile prawns to be a major component of the catch. This suggests that there is widespread breeding on floodplains by some species.

Fish Movements

17. Floodwaters from the Old Surma River were prevented from entering the SHP during flash floods in February and March 1993 and more permanent flooding was delayed for 19 days in May. This had little apparent impact on the movement of adult and juvenile fish other than possibly to delay the entry of juvenile (one year old) *rui* and *kalbaus* and adult *chapila*.

18. Other FAP 17 studies on movements of fish hatchlings by passive downstream drift revealed that the first major carp hatchlings appeared on the 19 May 1993, one day after submersible embankments had been overtopped by river waters. Their entry from rivers to floodplains was not therefore adversely affected in the year of study. In previous years, however, when the entry of river waters was delayed until June or July, it seems likely that major carp hatchlings would have been prevented from entering floodplains inside the SHP. Between March and mid-May the hatchlings of only two migratory species, *fulchela* and *kachki,* were found in rivers. One of these, *fulchela*, is probably capable of surviving on floodplains throughout the year while *kachki* is a more riverine species whose entry on to floodplains of the SHP as hatchlings was delayed by one month due to flood control.

Mitigation Measures

19. Mitigation measures recommended for the SHP include a reassessment of the design height of submersible embankments to avoid excessively high embankments which may delay river flooding of floodplains longer than is necessary to protect the winter rice crop. It is also recommended that the main drainage canal, Lumardai *Khal*, be designated a prohibited fish zone from October to March to reduce fishing pressure at critical times of the year in areas where the number of drainage channels, and thus routes of fish passage, have been reduced by partial flood control. This measures would also avoid drainage congestion which delays the planting of winter rice.

20. In areas of extensive development of partial flood control, such as Sunamganj District, it is recommended that selected free-flooding *haor* remain. This measure would have a beneficial impact on fisheries and also reduce problems of siltation within river channels, an increasing concern in the North East identified by FAP 6, which threatens to cause greater flooding in future.

21. A series of other mitigation measures focuses on fisheries conservation using large perennial *beel* as dry season sanctuaries. The construction of large *katha* within the *beel* would prevent the use of most fishing gears during the winter. It is also recommended that important dry season fish habitats (*duar*) in rivers be converted to prohibited fishing zone in winter to protect broodstock of large species such as major carps and several catfish. These measures will require modification of the present leasing system of *jalmahal* and effective enforcement of (new) fisheries regulations.

22. Several measures are recommended which relate to institutional improvement mainly within BWDB. The most important of these is the need to establish an effective multidisciplinary technical assessment unit in BWDB or WARPO comprising expertise from fisheries, agriculture, environment, hydrology and hydraulic engineering. The unit should be responsible for the re-evaluation of operating procedures of existing flood control projects and for the examination of future project proposals. Plans for major new road or rail links which may affect flooding and drainage patterns should also be assessed by the unit.

Future Research

23. Several topics which require further research work were identified. Most of these follow on from baseline data provided by the FAP 17 studies and could be divided into three broad areas. The first focused on the need for a more detailed understanding of the movements of fish between rivers and floodplains at different stages in their life cycles and the impact of partial and full flood control on such movements between different hydrological years. The second emphasised the need for detailed long-term studies running for at least five years to understand the functioning of complex floodplain fisheries in relation to biological, environmental and socioeconomic factors which influence fish populations. Quantitative fisheries data obtained from these studies, when linked with hydrological data on flooding patterns, will provide a basis for the development of a floodplain fisheries model. This can then be used as a predictive tool to advise on future fisheries management and development. The third area of research highlighted the need for detailed stock assessments of selected fish and prawns dominating floodplain catches. The current status of the stocks of these species is not known, nor is the degree to which they can continue to sustain prevailing levels of fishing pressure, particularly during the dry season. Prawns were identified as the single most important component of catches from both the SHP and Dekker *Haor*. Basic research on their identification, seasonal movements and biological status is urgently required.

SHANGHAIR HAOR PROJECT AND DEKKER HAOR

1 STUDY AREA: BACKGROUND

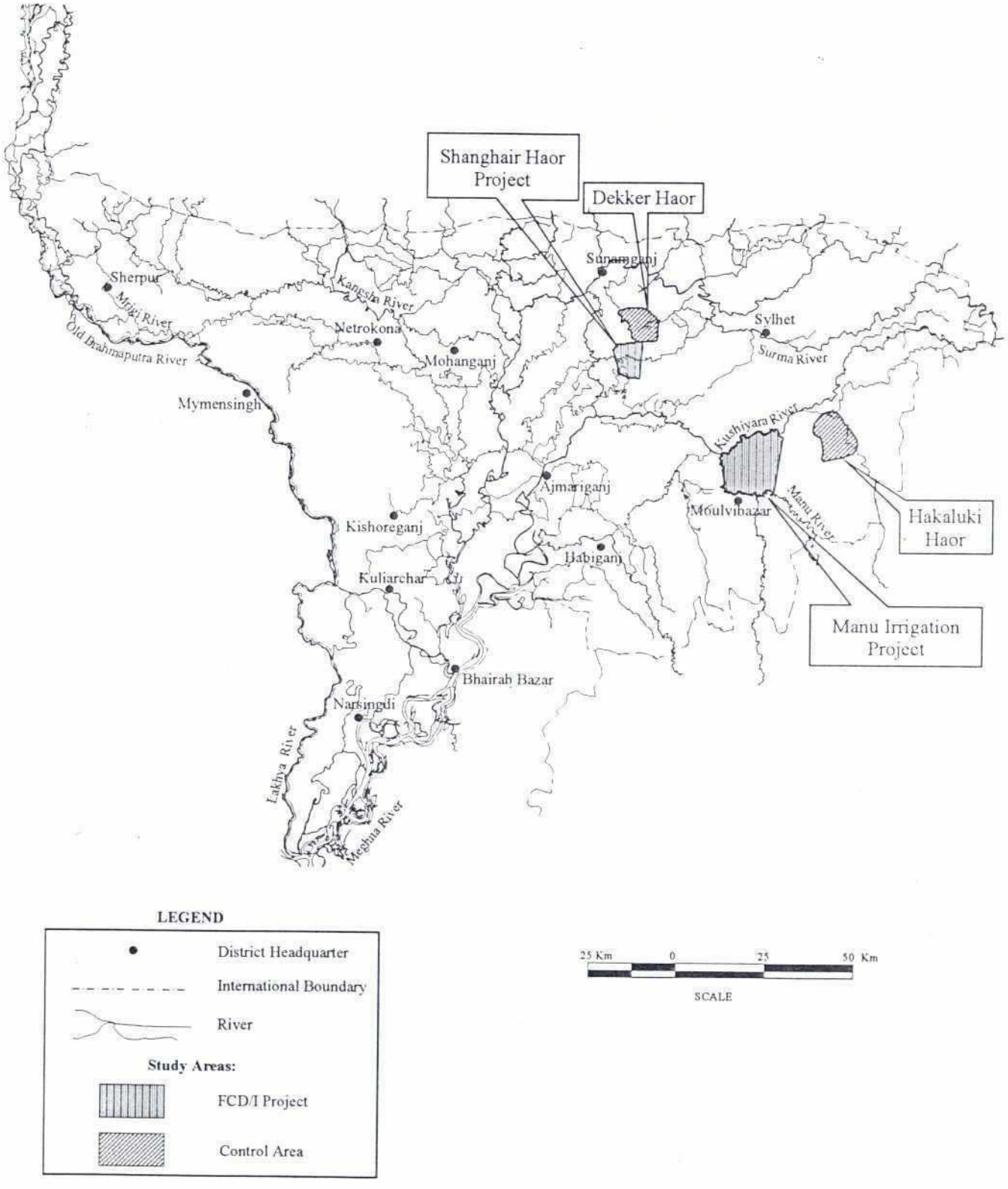
Following extensive preliminary surveys carried out between October and December 1992, two flood control projects were selected for study in the North East Region of Bangladesh. One large full flood control and irrigation (FCDI) project (Manu Irrigation Project) was located near Moulvibazar in a moderately flooded area, and the other (Shanghair *Haor*) was located in the deeply flooded central basin (Fig. 1.1).

The Shanghair Haor Project is a partial flood control project located about 13 kilometres south of Sunamganj. It is bounded on the west by the Old Surma River, a distributary of the Surma, and in the north by the Sylhet-Sunamganj highway. To the south and east lies the Mahasingh River System, also a distributary of the Surma. A total of 25 kilometres of submersible embankments surrounds the *haor* and links with the Sylhet-Sunamganj highway, which acts as a full flood embankment. The project covers an area of approximately 4,000 ha supporting a population of about 22,900 people.

The project was initially proposed by BWDB in 1980. Construction work started in 1981 and was completed by 1985. The principal aim of the project was to protect the *boro* rice crop from pre-monsoon flash floods. Submersible embankments along the Old Surma River were designed to prevent overtopping before mid-May in most years. Since project completion the western and eastern embankments have not overtopped prior to 15 May, but some sections to the north the embankments are so high that they do not submerge during the monsoon. Three regulators at Ujanigaon, Hamamia and Asumura were used for flushing and drainage. In addition, about 30 inlet structures were placed throughout the embankment to facilitate agriculture. Of these local farmers reported that only six were used for irrigation purposes along the Surma River and the remaining were used to provide localized drainage from homestead areas. Almost all the farmers having lands in the central area reported that *jalmahal* leaseholders control post monsoon drainage by constructing a barrier downstream of the Asumura regulator. This was reported to delay the planting of *boro* and increase the risk of pre-monsoon flash floods before harvest.

In recent years the performance of the SHP has been studied as part of a broader review of flood control projects carried out by the Northeast Regional Water Management Project (FAP 6).[1] Trends in flood control development within the North East Region were documented in this review.

Figure 1.1 Location of study areas in the North East Region

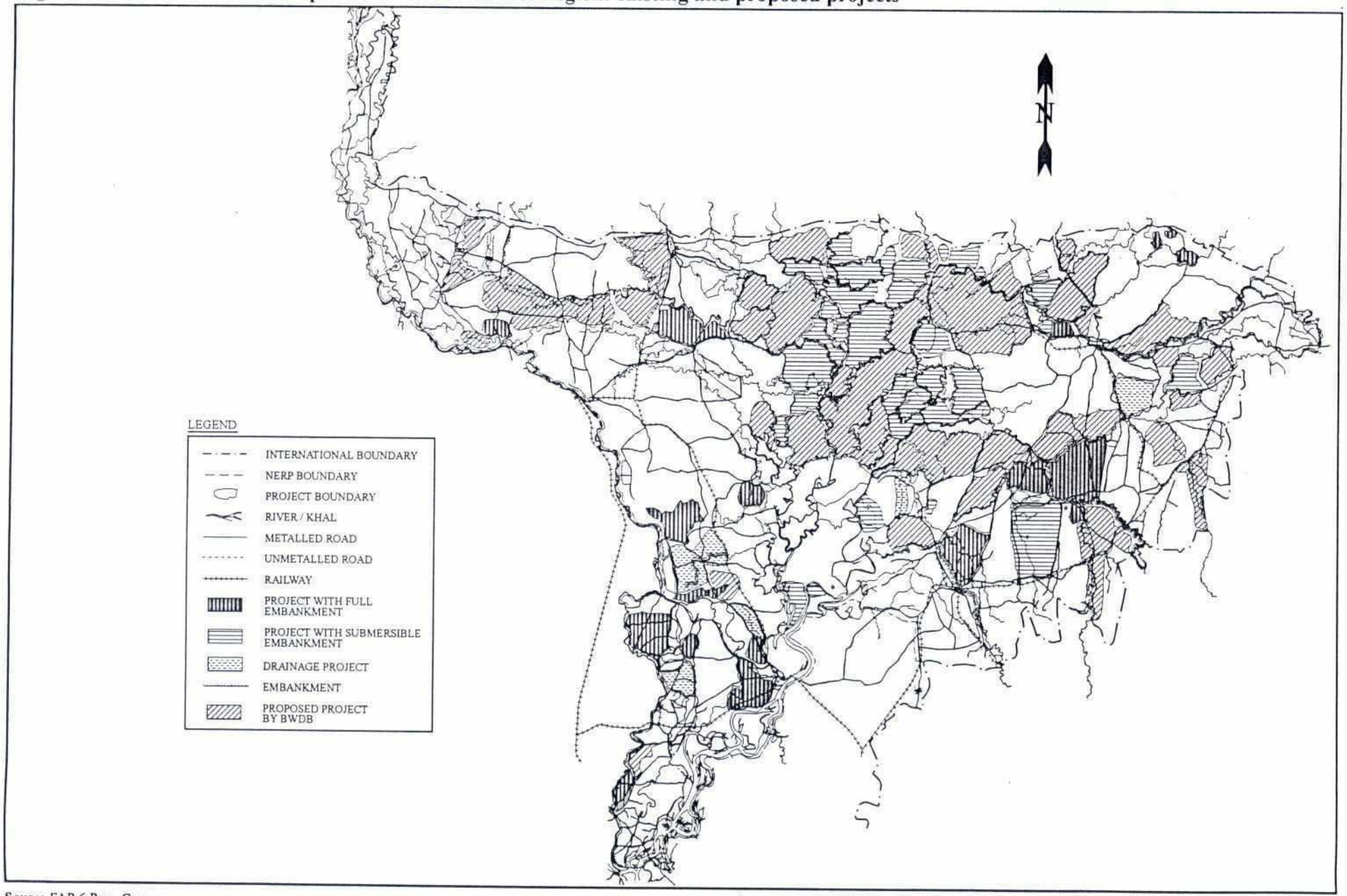


The stated objective of all partial flood control projects in the North East Region is to increase agricultural production by protecting the winter rice crop from early or pre-monsoon flooding. The protection is provided by the construction of submersible embankments around target areas and the inclusion of regulators to provide drainage and allow water to enter the protected area immediately after the *boro* harvest. This type of embankment is normally constructed in areas subject to flash river floods prior to mid-May which also flood to depth exceeding one metre during the monsoon. Most of these projects are located in the deeply flooded areas of the Sylhet Basin (Fig. 1.2). Partial flood control structures are not designed to alter flooding patterns during the monsoon season.

The FAP 6 study[1] reported that prior to 1975 there was little development of partial flood control projects in the region. Up to that time only about 15,000 ha were under partial flood control. From 1975 to 1990 projects were established at a rate of 7,500 ha per year and by 1990 there were 33 projects in the region with a net area of 172,000 ha. Most projects were located in the central area of the Sylhet Basin around Sunamganj. FAP 6 estimated that potentially 800,000 ha of floodplain could be brought under partial flood control in the region. However, BBS statistics on rice production showed on appreciable increase in HYV *boro* during the period 1979-1990 when partial flood control projects were established. No explanation was put forward by FAP 6 to account for the apparent failure of partial flood control to increase winter rice production.

The FAP 6 review expressed concern that expansion of partial flood control projects would result in changes in siltation patterns on floodplains and in river channels and cause increased flood levels in embanked rivers. It was anticipated that river channel morphology would also be affected with shifts in the course of channels inside and outside flood controlled areas. On floodplains protected by submersible embankments it was thought that sediment deposition might result in post-monsoon drainage congestion which in turn would delay the planting of *boro* and thereby increase the risk of pre-monsoon flood damage as well as reduce the area planted.

Figure 1.2 Flood control development in the North East Region: existing and proposed projects



Source FAP 6 Pres. Comm.

The FAP 6 study concluded that submersible embankments impede fish migrations between river and floodplain, in either direction, for about 10-20 days during the early monsoon until the embankment is overtopped. It was suggested that as fish stocks included both early and late spawners, submersible embankments would favour late spawners. Overall, partial flood control projects were considered to have positive or no impact on capture fisheries more frequently than a negative impact. Positive impacts included a greater area and depth of *beel* during the dry season.[2]

FAP 17 selected the SHP as a representative example of a functioning partial flood control project in the Sunamganj area. The study aimed to provide quantitative data to assess the impact of this type of flood control on capture fisheries. No previous quantitative fisheries study had apparently been undertaken on this project. The fisheries of flood controlled area were compared with those in Dekker *Haor*, lying immediately to the north of the project (Fig. 1.1). This area received flooding from the Old Surma River to the west. The FAP 17 Fisheries Studies were complemented by surveys carried out by its socioeconomic team of an area known locally as the Kai Project located immediately to the east of Shanghair *Haor*.[3]

2 SAMPLING SITES

Rivers, canals, floodplains and *beel* were sampled at fortnightly intervals for a total of 13 months from February 1993 to February 1994 inclusive. Site selection and fisheries data collection were carried out following procedures previously outlined in the FAP 17 Inception and Interim Reports.

2.1 Inside Sites

Three floodplain/*beel* sites and one canal site were surveyed inside the SHP; no rivers occurred in the area (Table 2.1 and Fig. 2.1). One was Karchabrar *Beel* (NE13) and the other was Mouti *Beel* (NE12). One floodplain site, Asamura floodplain (NE14), was surveyed. Area elevation curves was constructed for floodplain sites using topographical maps and electronic planimetry (Fig. 2.2). Average heights (50% level) at NE14 was 3.9 m.

The canal selected inside the scheme was Lumardai *Khal* (NE15). This acts as a drainage canal and connects with the Old Surma River to the south west through Asumura regulator.

Table 2.1 Description of sampling sites

Site Code	Site name	Habitat	Inside/ Outside SHP	Area (ha)	Length (km)
NE16	Surma River	Secondary River	Outside	279.0	13.95
NE11	Old Surma River	Secondary River	Outside	83.0	10.00
NE20	Mahasingh River	Secondary River	Outside	59.3	7.91
NE15	Lumardai *Khal*	Canal	Inside	3.3	1.65
NE17	Dapha floodplain	Floodplain	Outside	163.8	-
NE18	Dapha *Beel*	*Beel*	Outside	109.4	-
NE19	Chatal *Beel*	*Beel*	Outside	67.5	-
NE12	Mouti *Beel*	*Beel*	Inside	40.2	-
NE13	Karchabrar *Beel*	*Beel*	Inside	56.0	-
NE14	Asumura floodplain	Floodplain	Inside	55.0	-

Figure 2.1 Location of study areas and sampling sites

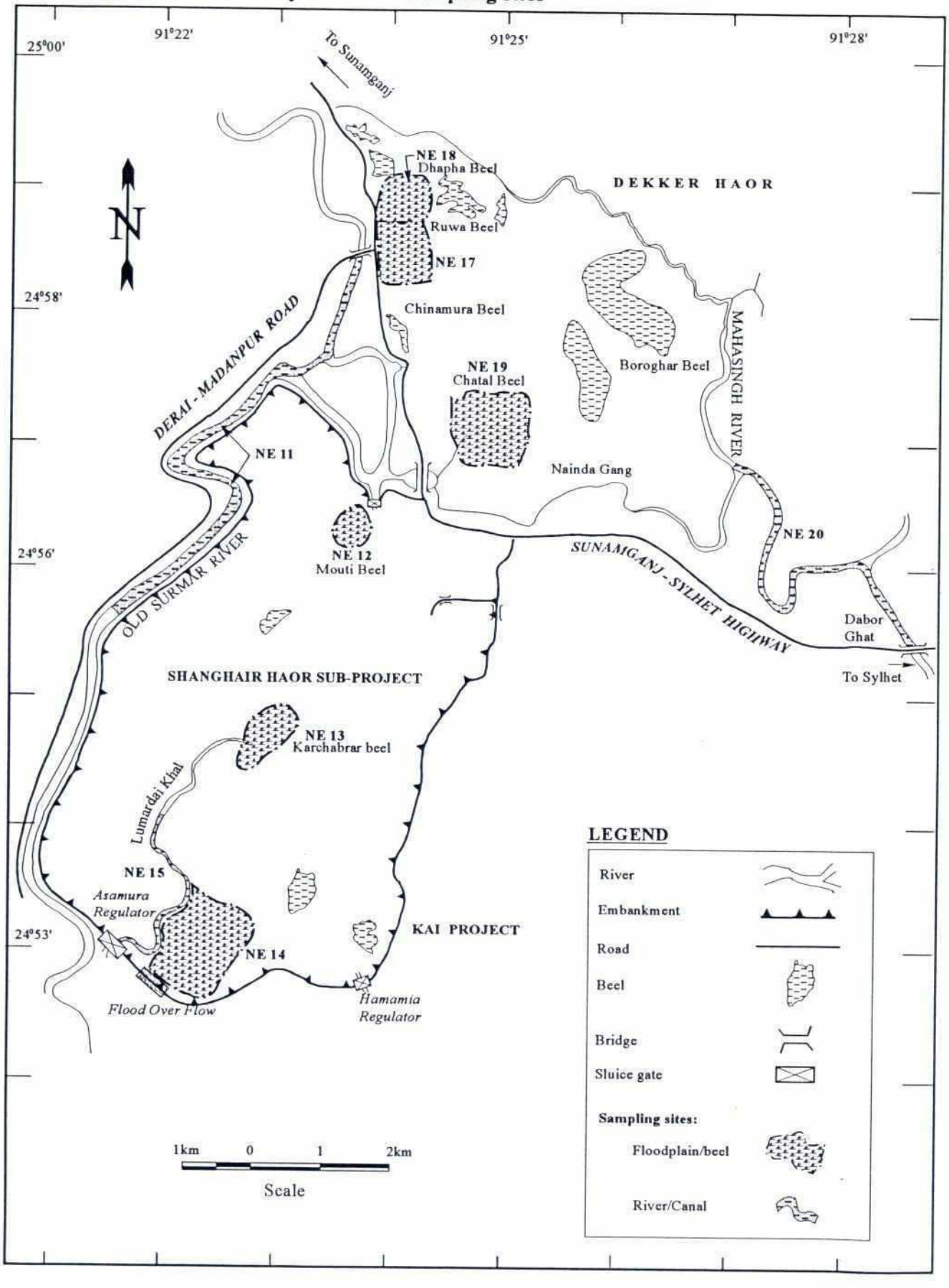
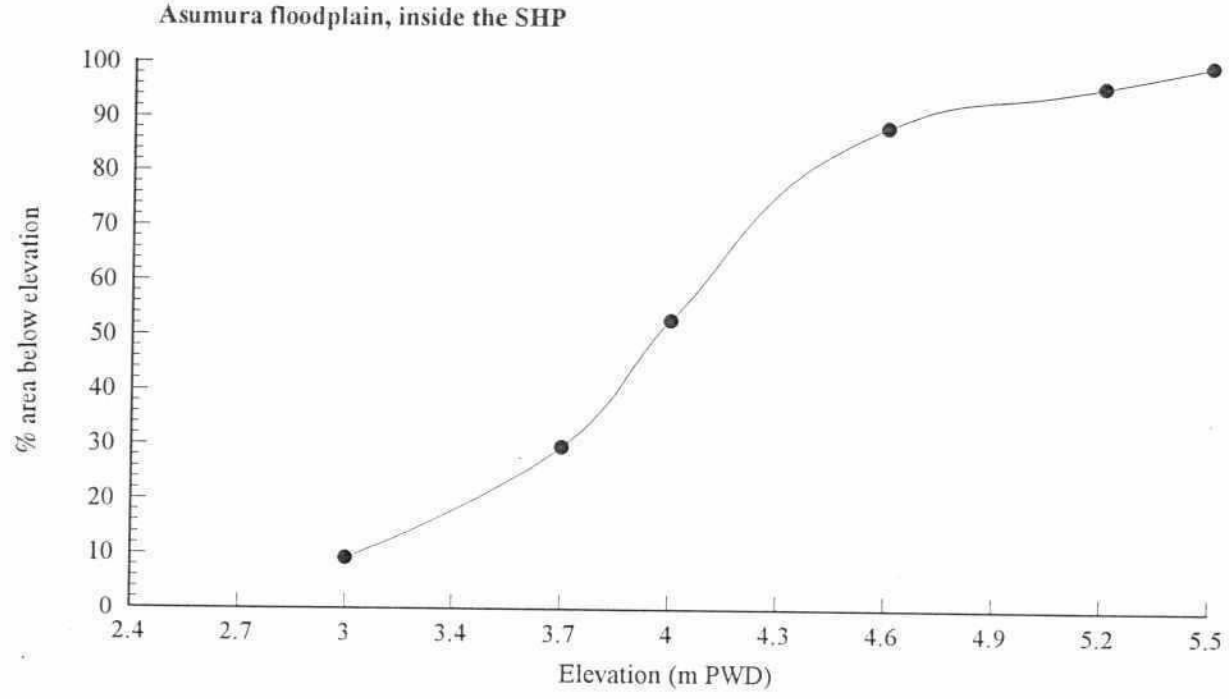
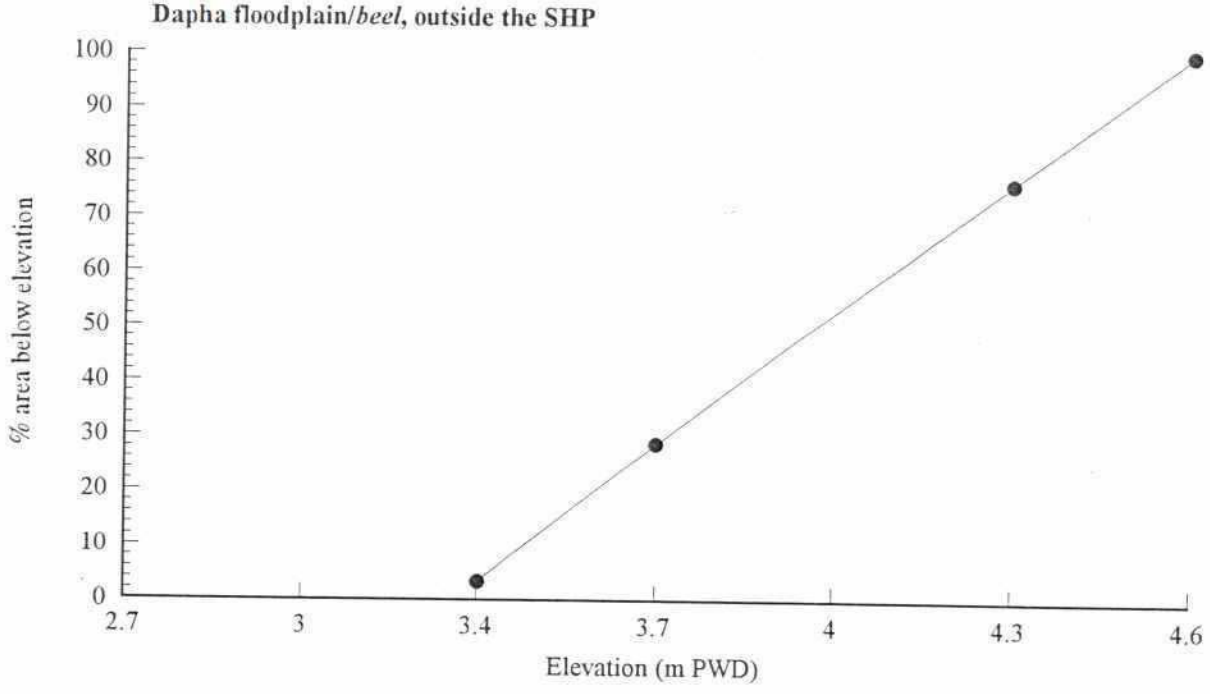


Figure 2.2 Area elevation curves of floodplain/*beel* sites inside and outside the SHP





2.2 Outside Sites

Three floodplain/*beel* sites were surveyed outside the SHP. This area is drained by the Surma and Mahasingh rivers, which was sampled for a distance of 8 km.

Two *beel* were surveyed, Dapha (NE18) and Chatal (NE19). The floodplain site was Dapha floodplain, which covered of elevations ranging from 3.4 m to 4.6 m. Average (50% level) elevation at Dapha was 3.9 m which was comparable to the floodplain inside the SHP.

3 HYDROLOGY

Two sources of data provided quantitative and qualitative description of flooding patterns inside and outside the SHP. The first was from measurements made during fisheries surveys. Water depths were measured at fixed points at different land elevations on each floodplain/*beel* site at fortnightly intervals. At the same time, the extent of the flood was recorded on sketch maps and directions of water flow in feeder and drainage canals were also noted. The second source of data was from daily water levels in the Surma River at Sunamganj. These provided a continuous record of flooding patterns on unregulated floodplains and on regulated floodplains of the SHP once submersible embankments were overtopped by river waters.

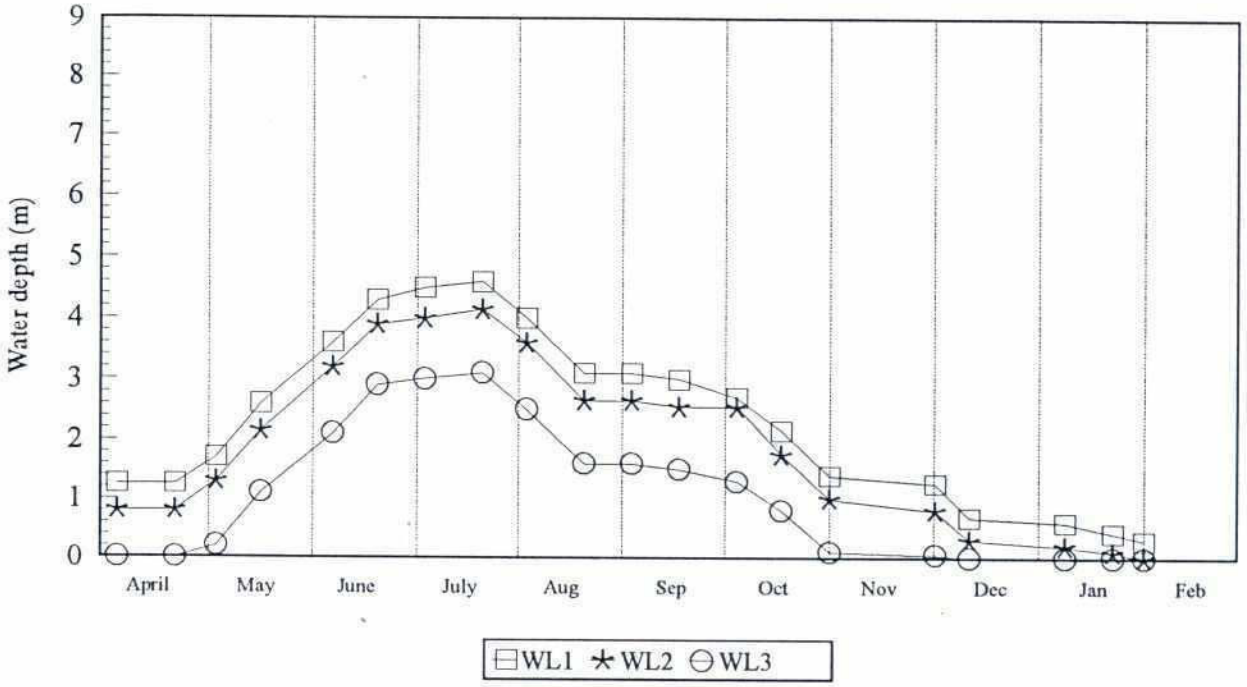
3.1 Outside the SHP

Early heavy rainfall in February 1993 expanded *beel* areas slightly but resulted in no permanent flooding on floodplains. Flash floods in the Surma and its distributary rivers, the Old Surma and Mahasingh rivers also occurred at this time because of heavy rainfall in the surrounding hills in India. Floodwaters from the Old Surma entered canals and *beel* for about one week in February and added to the effect of local rainfall in expanding *beel* areas. River levels quickly dropped again in early March so too did flood levels in *beel* as waters drained back into the river. River waters rose again for a few days in late March, not as high as in February but sufficiently high to enter unregulated *beel*. Further persistent heavy rainfall in April and May resulted in a rapid rise in river levels which overspilled into unregulated *beel* and floodplains on 30 April and continued to do so through the monsoon season.

A sharp rise in water levels of about 2.5-3.0 m was observed in Dekker *Haor* at the beginning of May followed by a temporary drop at the end of the month and a further more permanent rise from June onwards (Fig. 3.1). Fortnightly readings of water levels in Dekker *Haor* suggested a gradual decrease in water levels from late July but examination of daily levels of the Surma River revealed frequent fluctuations up to September (Fig. 3.2). The last rise in river levels occurred during the first week in October after which the flood drawdown commenced and most floodplains were dry by November. From December 1993 to February 1994 *beel* were under leaseholders' control and their drainage canals were dammed then drained according to the needs of leaseholders' fishing operations.

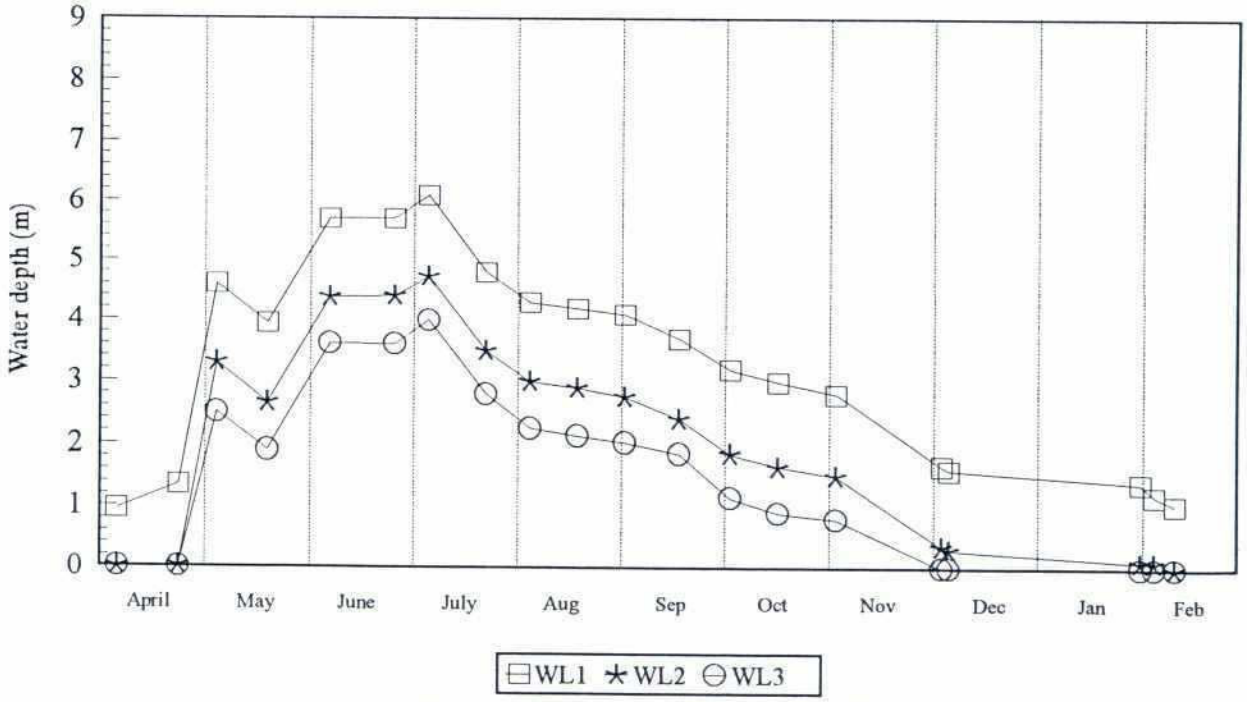
Figure 3.1 Seasonal variation in water depth on floodplains/*beel* inside and outside the SHP

Mouti *Beel* (site NER 12) : inside the SHP



WL1=4.3 mPWD, WL2=4.8 mPWD, WL3= 6 mPWD.

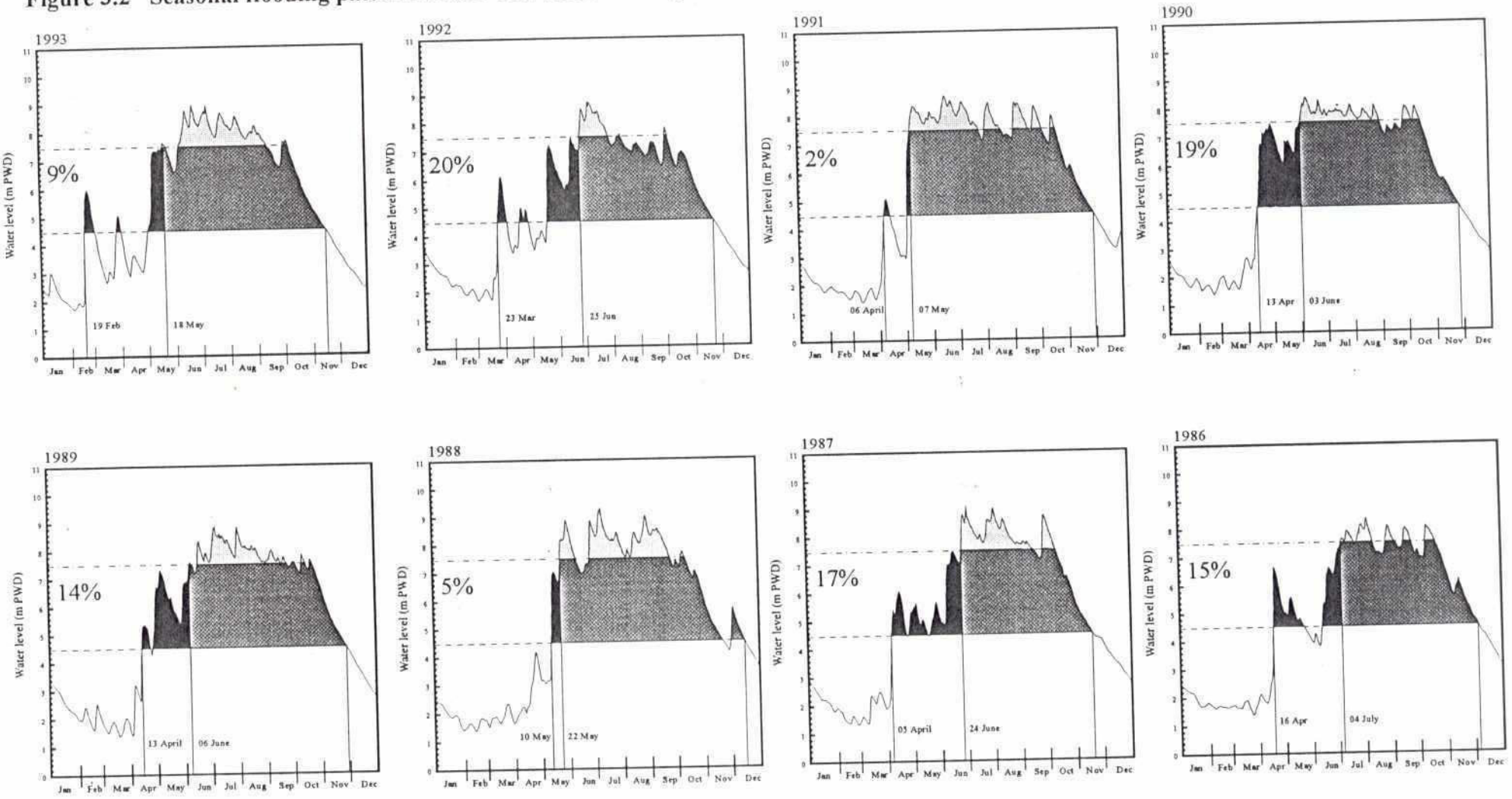
Chatal *Beel* (site NER 19) : outside the SHP



WL1=3.9 mPWD, WL2=5.5 mPWD, WL3=6.3 mPWD.

WL= Land elevations (mPWD) at positions of depth measurements

Figure 3.2 Seasonal flooding patterns inside and outside Shanghair Haor, 1986 - 1993



Notes:
1. River flooding excluded by submersible embankments; Rainfall and river flooding on regulated and unregulated floodplains; River flooding over submersible embankment
2. – – – Denotes the level at which submersible embankment in the SHP overtops by river flooding
3. – – – Denotes the level at which river waters enter unregulated floodplains in Dekker Haor
4. Vertical lines identify a) date of entry of river floods on to unregulated floodplains b) date of first overspill of submersible embankments and c) date of the flood drawdown
5. Percentage values relate to the proportion of the total annual flood index (metre days) reduced by submersible embankments in the SHP
6. Flood levels were derived from water levels of the Surma River at Sunamganj

3.2 Inside the SHP

Flooding patterns inside the Shanghair Haor Project were very similar to those on unregulated floodplains except that the submersible embankments prevented the temporary ingress of river waters in February and March and delayed more permanent flooding for 19 days from 30 April to 18 May (Figs 3.1 and 3.2). The project thus functioned as planned in providing protection from external river flooding until mid-May to allow the *boro* crop to be harvested safely. After submersible embankments were overtopped by river floodwaters, flooding pattern in Shanghair *Haor* followed those seen in Dekker *Haor* during the monsoon. During the drawdown in October, the final temporary ingress of river waters was seen in Dekker *Haor*, was prevented in Shanghair *Haor* by its submersible embankments. This resulted in a more rapid decrease in flood level on regulated floodplains from October to early November. In November and December, however, the main drainage canal, Lumardai *Khal*, was intermittently dammed by a leaseholder to concentrate fish in the *khal* before fishing with *ghori jal*. Damming the *khal* resulted in drainage congestion from November to January and lengthened the potential growth season for fish remaining in the canal. Most of the surrounding floodplains dried out by mid-December, 2 to 4 weeks later than unregulated floodplains. Thus, while the overall duration of inundation was similar inside and outside the SHP, there was a shift in the flood season of about 3 weeks due to flood control for agriculture and damming of the main drainage canal for fisheries purposes.

Assuming embankments were overtopped at the same river level each year since the time of construction of the Shanghair Haor Project, examination of seasonal flooding patterns in the Surma River provide an opportunity to evaluate the performance of the project. Data in Figure 3.2 revealed that pre-monsoon flooding by external rivers was prevented until early May in every year since the construction of submersible embankments. Only once, in 1993, did floodwater enter the SHP before the design date for flood protection of 15 May. The project has therefore succeeded in its objective in protecting the *boro* harvest. During the last eight years, however, river flooding was delayed until June in four years and until July in one, which suggests that there is a degree of over-protection by excessively high embankments.

The areas under the flood curves shown in Figure 3.2 were used to obtain an annual flood index measured in metre days' inundation by river and rainfall flooding. This provided an indicator of the variation in the total amount of flooding each year. It also provided the opportunity to examine the impact of submersible embankments on the amount of annual

4 WATER QUALITY

Surface water measurements of temperature, pH, dissolved oxygen (DO), conductivity and total dissolved solids were made at sites on rivers, canals, floodplains and *beel* at fortnightly intervals using electronic metering techniques. Seasonal variations in these parameters are presented for representative sites outside and inside the SHP in Figures 4.1 to 4.2. Given that temperature, pH and DO levels on floodplains generally depend on the time of day, attempts were made to standardise times when measurements were made. This was not always achieved, however, and whilst most readings were taken between 10.00-12.00, some were outside this range. Data in Figures 4.1 and 4.2 therefore reflect diurnal as well as seasonal changes.

Dissolved oxygen concentrations on Chatal *Beel* ranged from 1 to 4 mg/l while those on Karchabrar *Beel* varied more, from 1 to 7 mg/l. Previous more detailed studies carried out in Bangladesh showed that oxygen levels ranged over a 24 hour period from a completely anoxic (zero oxygen) condition near dawn to supersaturation in mid-afternoon in both open flooded fallow land and deepwater rice fields where depths reached up to 3m[4,5]. The studies also revealed considerable vertical stratification in oxygen levels in fallow areas and rice fields with lowest concentrations (near zero) in the bottom layer whilst surface layers remained near saturation. The effects of stratification were more pronounced towards the end of the monsoon season when amounts of decomposing macrophytic vegetation increased in decreasing volumes of water.

No seasonal trends in pH levels were detected on *beel*, canals or rivers. Values ranged from about 7 to 9 which posed no danger to fish health or survival. Conductivities also showed little seasonal variation but lowest values were recorded during the monsoon on both Chatal and Karchabrar *Beel* where they averaged about 30-50 μS.

Values of transparency on Chatal *Beel* increased in May coinciding with the ingress of floodwaters from the Old Surma River. On Karchabrar *Beel*, transparency also increased in May when submersible embankments were overtopped. The results suggest that the lower values of transparency recorded prior to May were probably caused by lower water depths rather than a reduced clarity of water. During the monsoon, there was little difference in transparencies between sites which were by then both flooded by the Old Surma River.

Figure 4.1 Water Quality, Chatal *Beel* (site NE19) : outside SHP

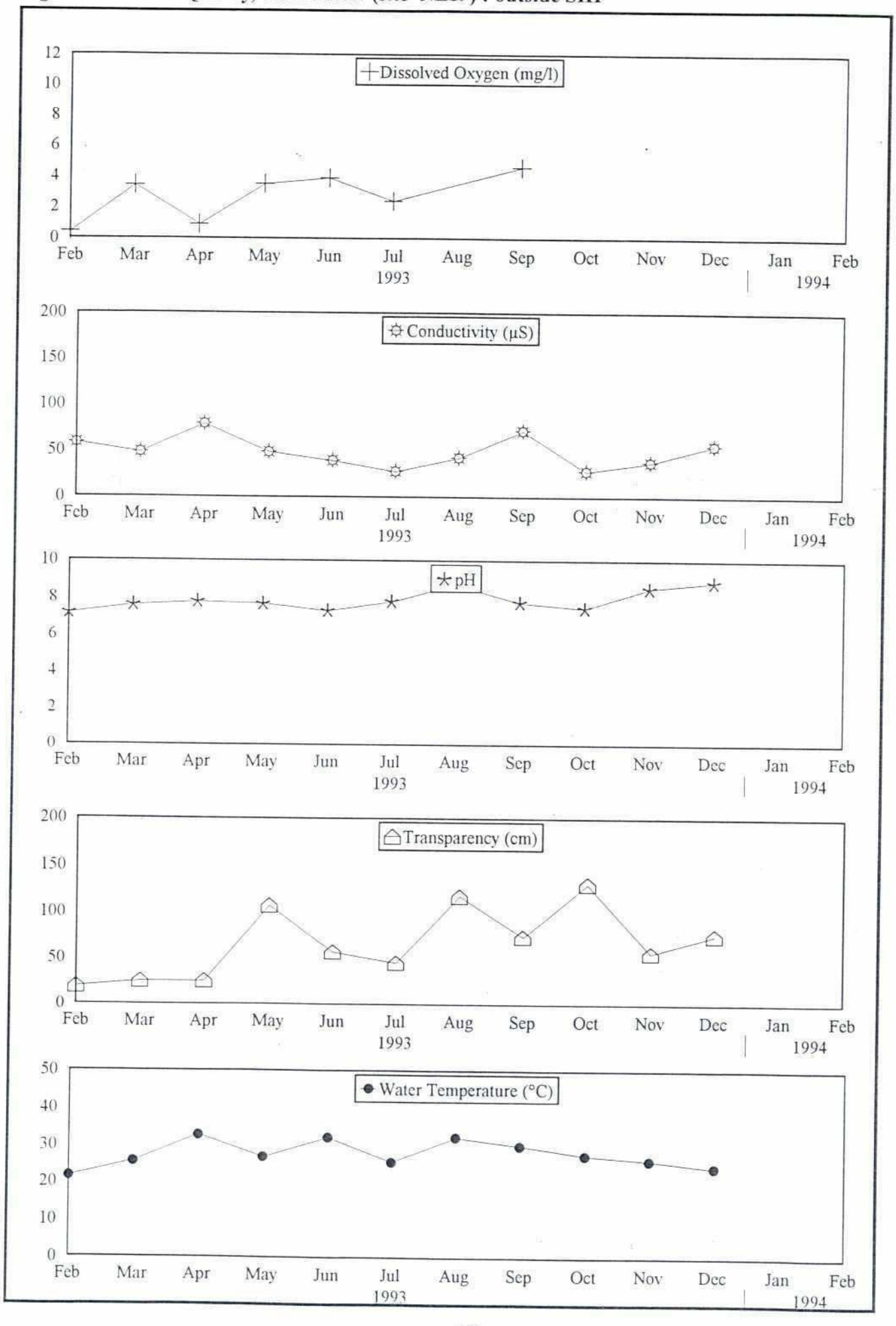
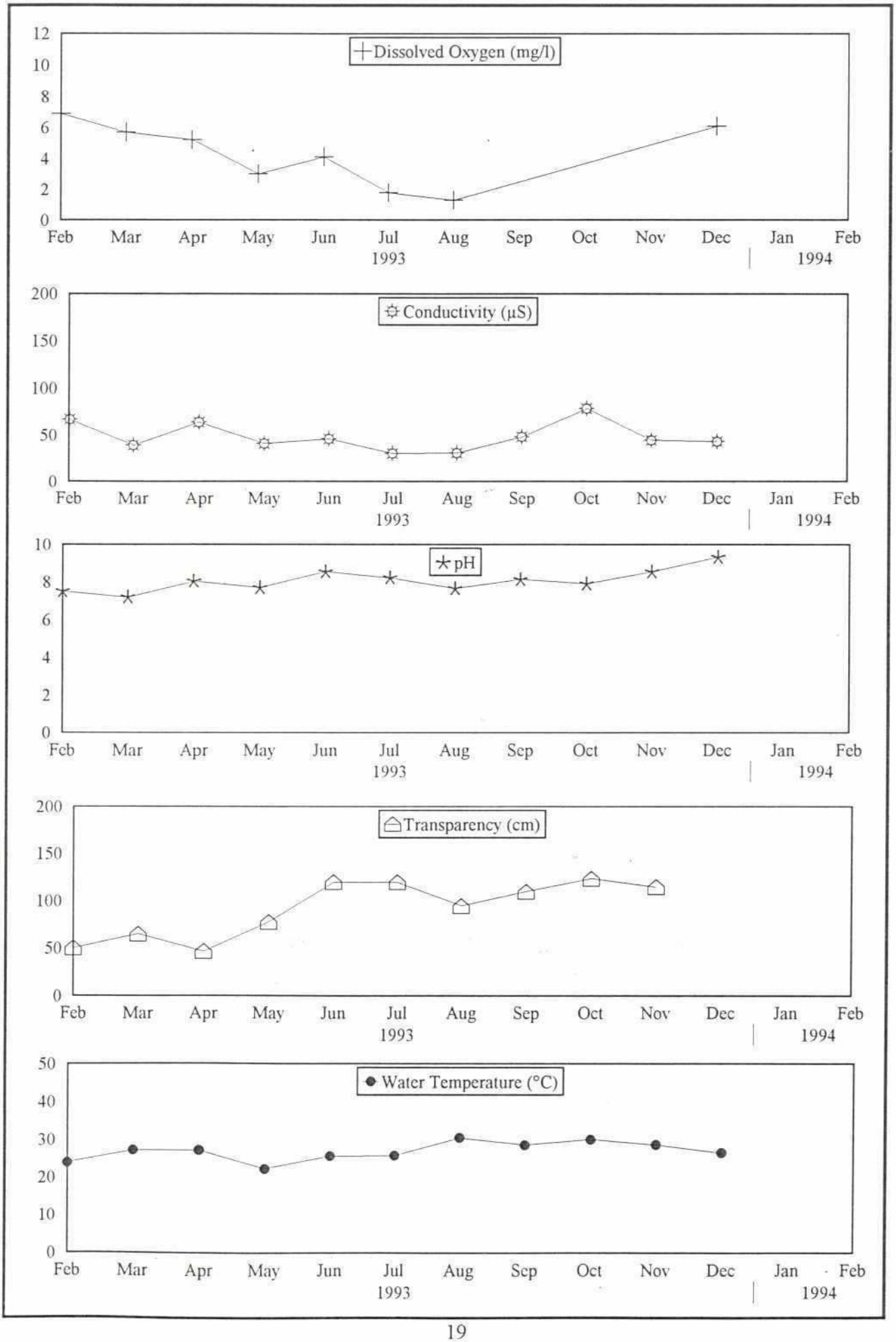


Figure 4.2 Water Quality, Karchabrar *Beel* (site NE13): inside SHP



5 RIVER FISHERIES

In the following discussion fisheries data from three unregulated rivers-the Surma, Old Surma and Mahasingh-are presented in order to assist the identification of fish movements between rivers and floodplains (see Section 6.5) and to provide quantitative baseline information on the magnitude of catches.

5.1 Total Catch

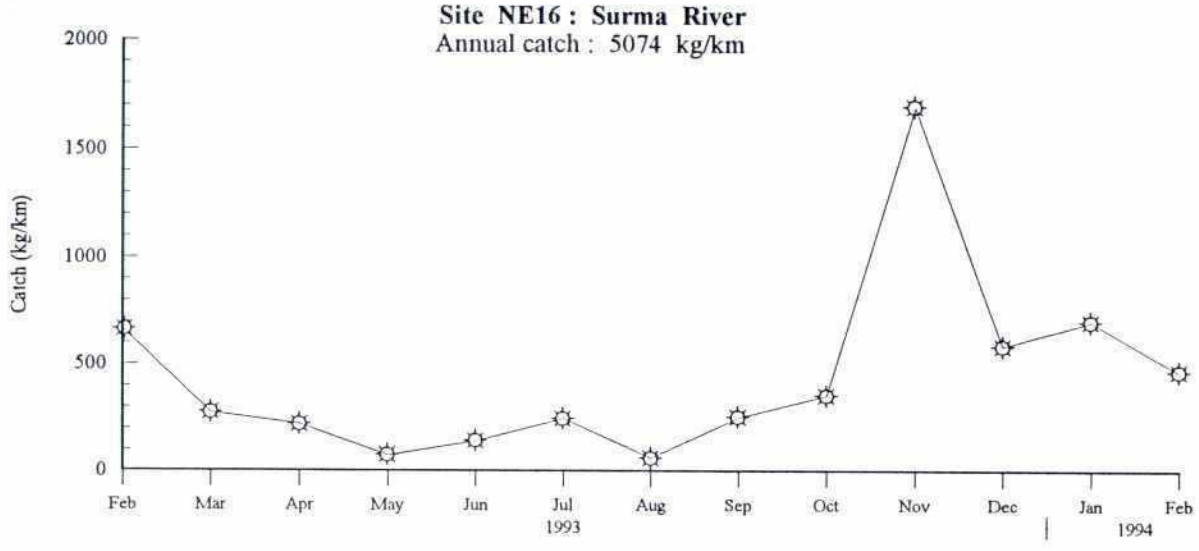
5.1.1 Pattern of catch

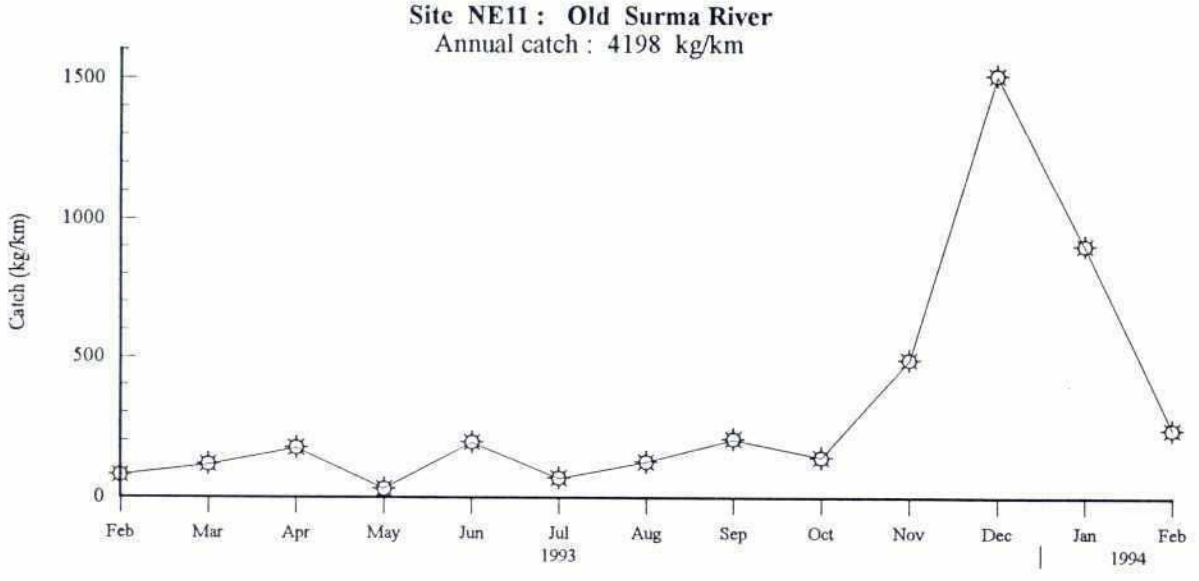
The pattern of catch in all three sampled rivers was generally similar from March to October 1993, when catches remained relatively low with only minor fluctuations between months, compared with the considerable sharp rise in November on the Surma or in December on the Old Surma and Mahasingh (Fig. 5.1). On the Surma, the catch declined equally rapidly in December and remained fairly level until the end of the study period in February 1994. Levels of monthly catches during winter were more than twice as high as those recorded during the pre-monsoon and monsoon seasons. On the Old Surma River, catches remained high in January before dropping to low levels in the following month while on the Mahasingh, a high catch was observed only in December.

5.1.2 Size of catch

The annual catches per kilometre of each river were similar (Table 5.1). The highest catch was recorded in the Surma (5,074 kg/km) followed closely by the Mahasingh (5,039 kg/km) then the Old Surma (4,198 kg/km). In terms of catch per unit area, that from the Surma River was considerably lower than from the other two rivers. This could be attributed to the greater width of the Surma which probably reduced the efficiency of overall fishing effort, making it difficult, for example, to set gears across the full width of river from one bank to other. Values of catch per kilometre of river were among the highest recorded by FAP 17 studies in four FAP regions in Bangladesh.

Figure 5.1 Seasonal variation in the catch (kg/km) of unregulated rivers outside the SHP, February 1993 - February 1994





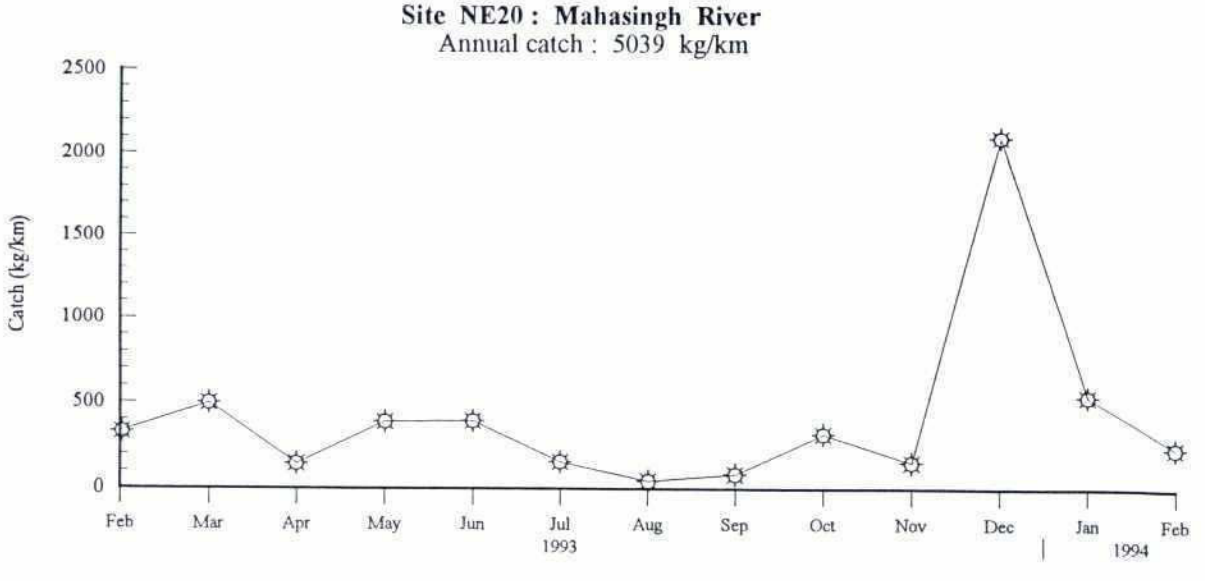


Table 5.1 Total annual catch from unregulated rivers outside the SHP, March 1993 - February 1994

Site Code	Site Name	Annual catch		
		Total catch (kg)	(kg/ha)	(kg/km)
NE16	Surma River	70,777	254	5,074
NE11	Old Surma River	41,984	506	4,198
NE20	Mahasingh River	39,857	672	5,039

5.2 Pattern of Fishing

5.2.1 Catch by gear

Percentage contribution made by dominant gears to the total annual catch from each river are presented in Table 5.2. More detailed information on percentage monthly and annual catches of all observed gears is given in Appendix 2, Tables I - III.

Table 5.2 Percentage contribution (by weight) made by dominant gears to the total annual catch from rivers outside the SHP, March 1993 - February 1994

Gear name	Surma River(NE16)	Old Surma River (NE11)	Mahasingh River (NE20)
Current jal (Drifting)	7.70	-	-
Chandi jal	6.89	-	
Awo jal	6.55		
Current jal(Stationary)	-	-	3.61
Ber jal	11.49	59.61	46.29
Dora jal	-	3.64	16.51
Veshal	8.15	8.32	25.93
Uttar jal	7.16	3.71	-
Katha		12.18	-
Sip	18.14	3.53	-
Tana barsi	16.82	-	
Daun	6.19	-	-
Thella jal	2.71	-	-

Notes: 1. Dominant gears are defined as those which, when ranked in order of abundance, comprised at least 90% of the total annual catch
2. - denotes gear present but not dominant

A total of 21 different gear types was recorded on the Surma River compared with 25 on the Old Surma and only 15 on the Mahasingh. Clear differences in gear usage were observed between rivers. On the largest river, the Surma drifting gill nets (*chandi* and current jal) accounted for 14% of the catch. Drifting hook and line fishing by boat (*tana barsi*) provided a further 17% while *sip* used from banks captured 18% of the annual catch. Fixed gill nets (*awo jal*) and longlines (*daun*) accounted for 7% and 6% of the catch respectively and drifting *uttar jal* caught 7%. Larger-scale gears such as *ber jal* and *veshal* provided 11% and 8% of the catch.

In comparison, on the two distributaries of the Surma there was a less equitable distribution of the catch between gears. *Ber jal* predominated in both and comprised 10% of the catch from the Old Surma and 46% from the Mahasingh. Drifting gears such as gill nets, *uttar jal* and *tana barsi* were less important on these smaller rivers. Instead *veshal* and *dora jal* (drag nets) together provided 42% of the Mahasingh catch while *katha* and *veshal* accounted for 20% from the Old Surma.

5.2.2 Catch by gear by month

On the Surma River drifting current accounted for 41% to 49% of monthly catches as water levels rose from March to May 1993 (Fig. 5.2). With continued rises in discharge, *veshal* predominated in June and July together with the small-scale scoop net, *thella jal*. From August until the flood drawdown in October, *veshal* still contributed 16% to 38% of the catch while the number of different types of gear used increased from 8 to 12. Another predominant gear at this time was *daun* which accounted for 46% of the catch in August compared to 14% in October. The peak catch recorded in November was due largely to hook and line fisheries, *sip* and *tana barsi* which captured 49% and 17% of the catch respectively and to drifting *chandi jal* (15%) and *uttar jal* (11%). The high November catch was due not only to peak fishing effort by dominant gears such as *sip* and *chandi jal* but also peak catch rates (CPUE) of both *sip* and *uttar jal* (Figs. 5.3 and 5.4). As water levels dropped from December to February gears such as *ber jal*, *veshal* and *awo jal* captured the highest shares of monthly catches.

On the Old Surma River *ber jal* predominated in most months while *veshal* were seasonally important from May to October (Fig. 5.5). Other dominant gears included *dora jal* which operated during low winter flows from January to April and *katha* which provided 40% to 57% of monthly winter catches in 1994. The peak catch in December was due almost solely

Figure 5.2 Percentage monthly catch taken by dominant gears: Surma River (site NE16)

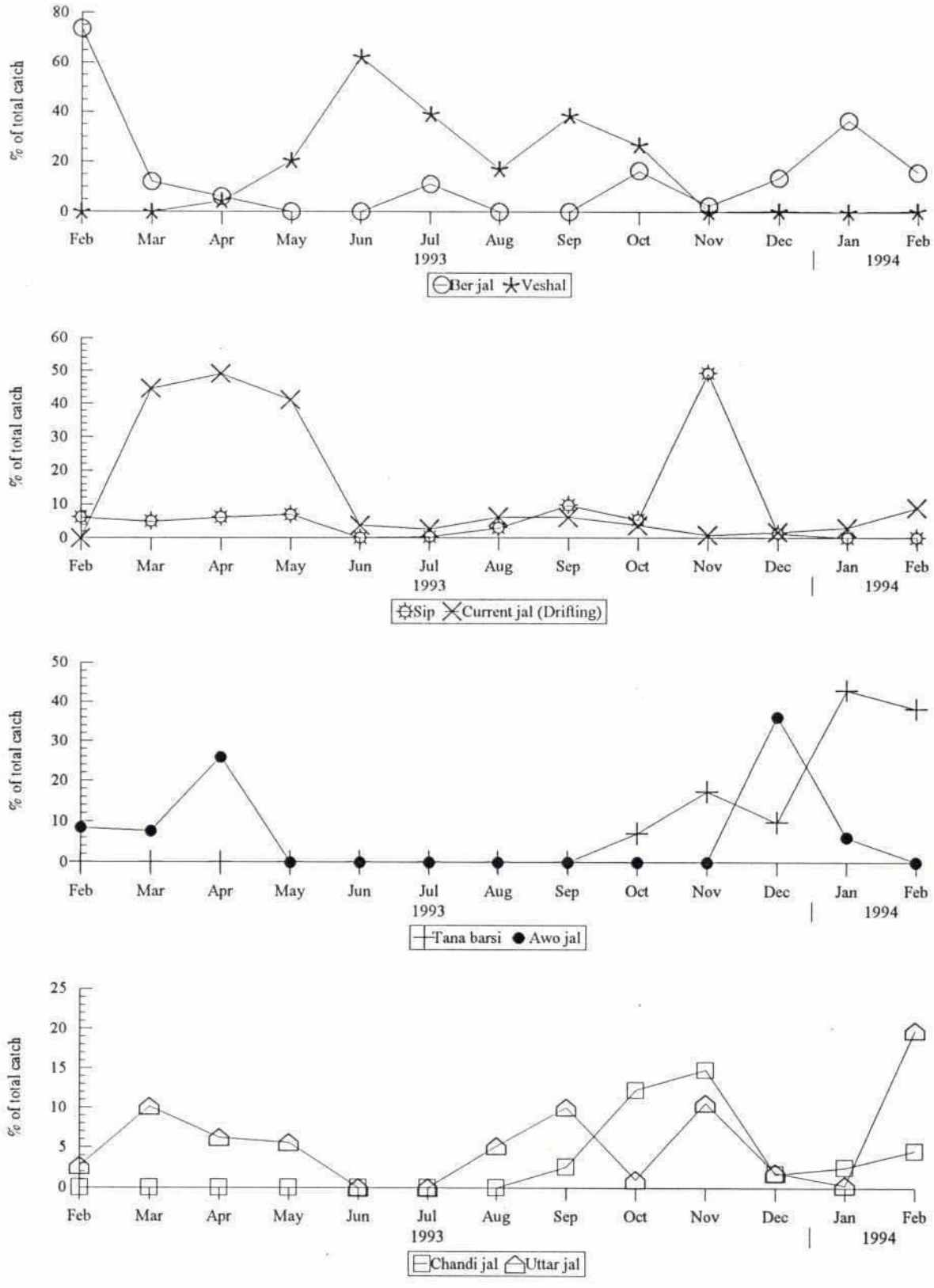


Figure 5.3 Total monthly fishing effort per kilometre of Surma River (site NE16) by dominant gears

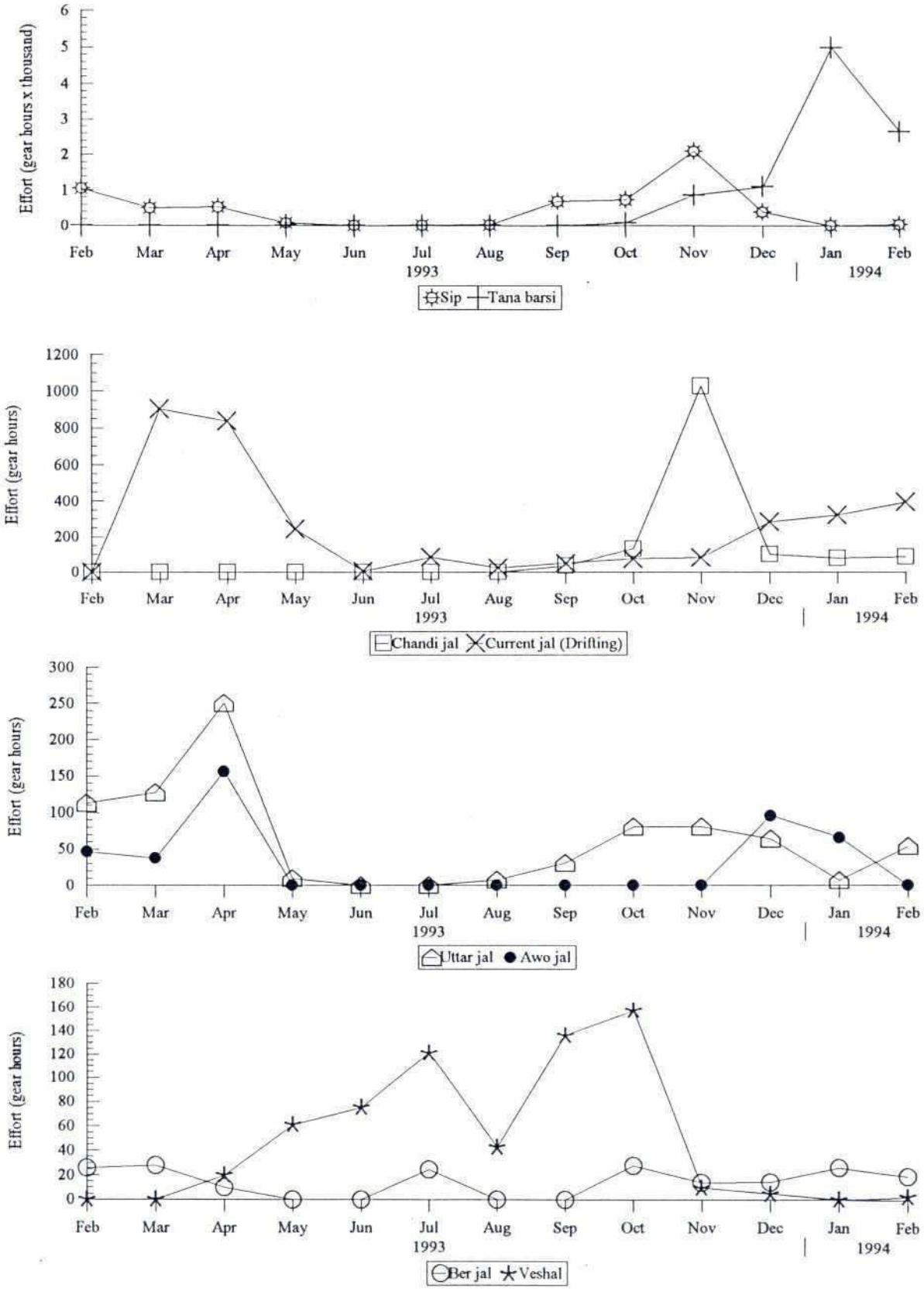
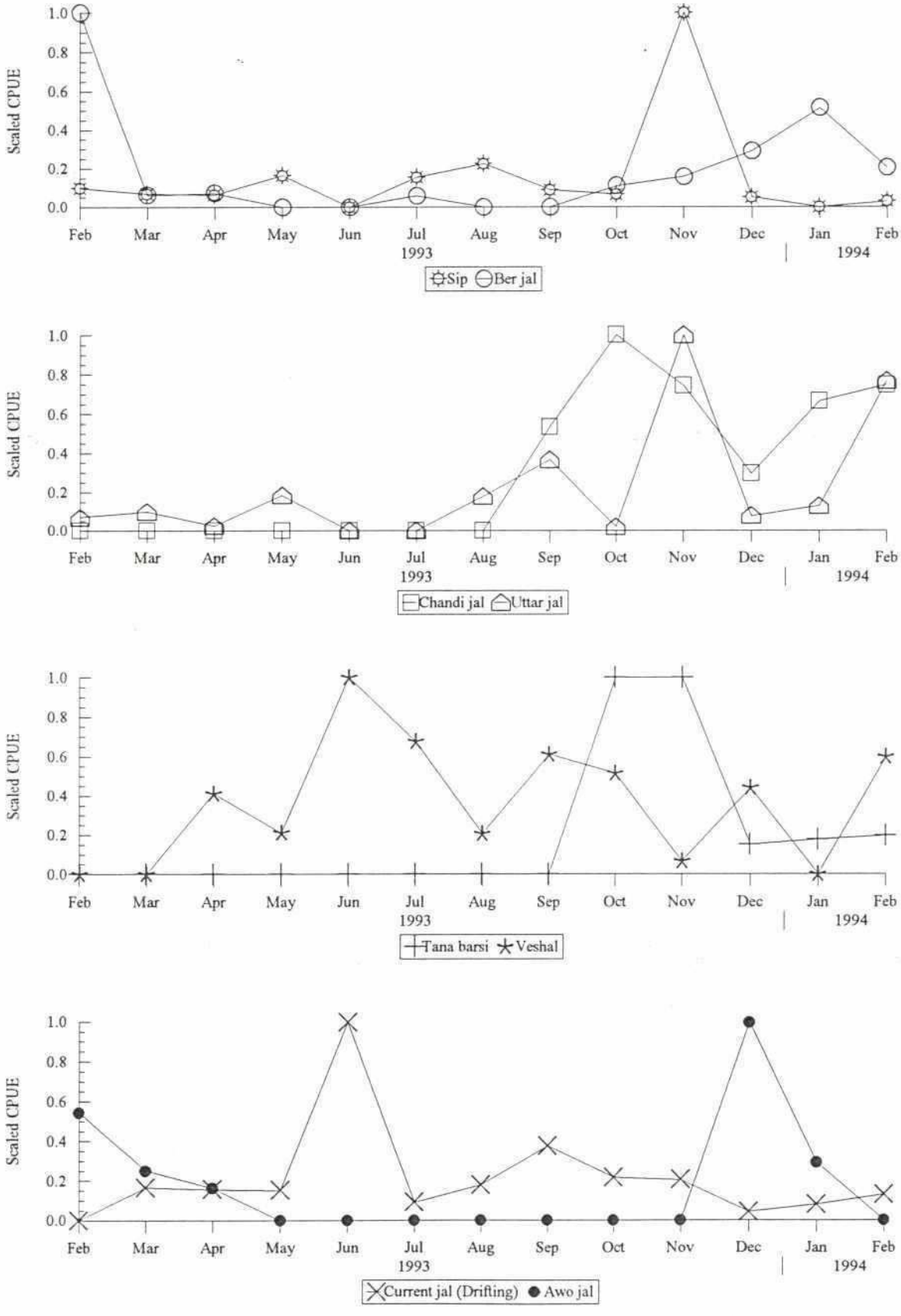
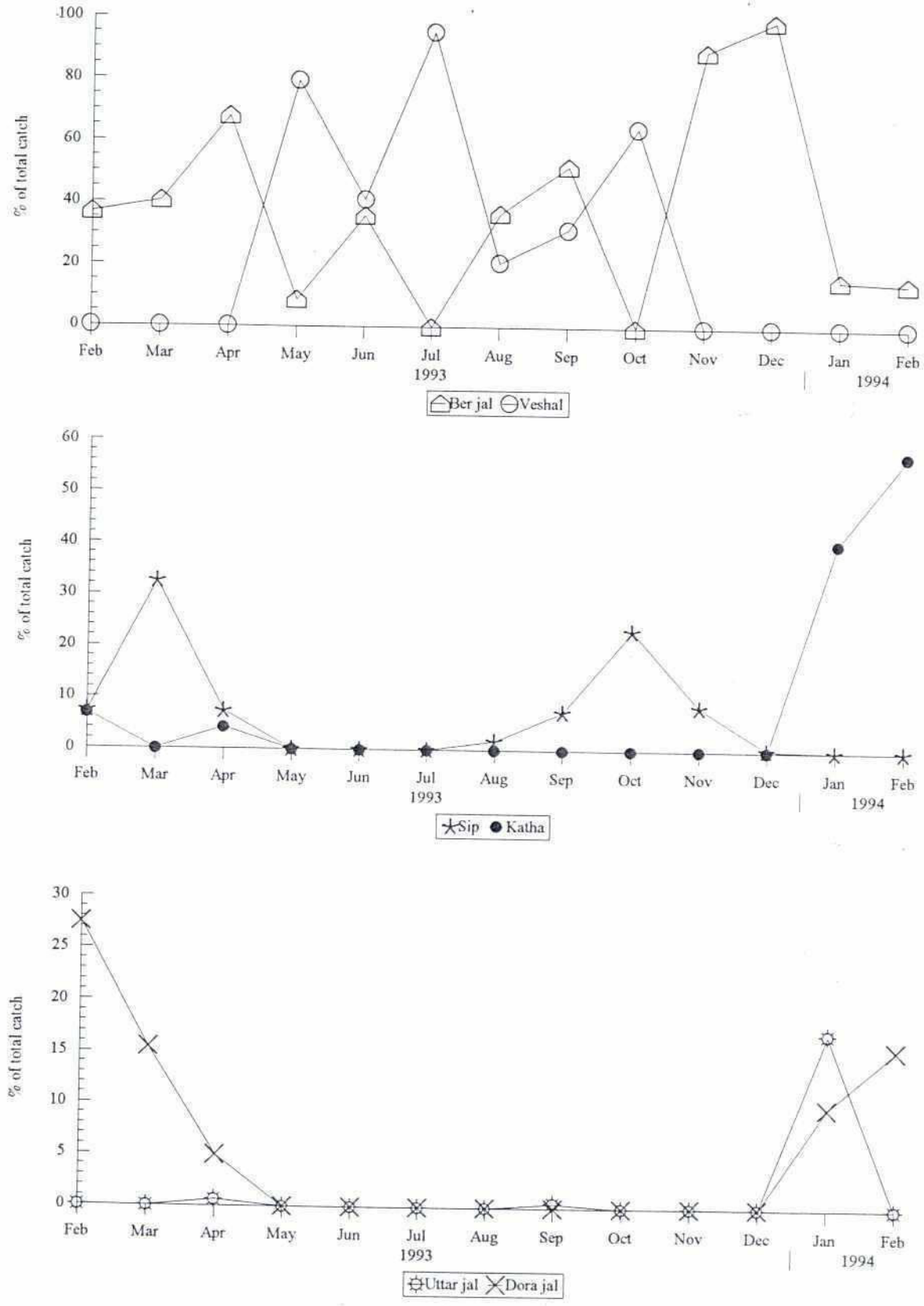


Figure 5.4 Scaled CPUE of dominant gears: Surma River (site NE16)



Note: Scaled CPUE are values of CPUE expressed as a proportion (decimal) of the maximum monthly value recorded

Figure 5.5 Percentage monthly catch taken by dominant gears: Old Surma River (site NE11)



to a peak in the catch rate of *ber jal* whilst the level of fishing effort declined slightly compared with levels recorded in November 1993 and January 1994 (Figs. 5.6 and 5.7). The number of different gear types observed in January 1994 increased substantially due mainly to the fish-out by the leaseholder and local villagers of a single *duar* (scour hole). A more detailed description of this event is provided in Section 5.2.3.

On the Mahasingh River *ber jal* and *dora* dominated catches when flows were lowest from December to April (Fig. 5.8). From May to November *veshal* accounted for 53% to 100% of monthly catches. Other gears which made occasional important contributions to the catch included current jal and *daun*. The peak catch in December was a function of both high fishing effort and peak catch rates of *ber jal* and *dora jal* (Figs. 5.9 and 5.10).

5.2.3 *Duar* fishing on the Old Surma River

A *duar* is an area of deep water created by erosion or scour usually located on the bend of a river. In the North East Region *duar* are recognised as important habitats which provide shelter in winter for fish, particularly large species such as major carps and catfish. Their potential conservation value as protective refuges for overwintering fish broodstock has been recognised by the North East Regional Study, FAP 6[6]. Their value has also been recognised by fishermen, leaseholders and local authorities responsible for the administration of leased stretches of rivers. Areas which contain large *duar* invariably carry a higher lease value and *duar* are therefore specifically fished-out by leaseholder in an effort to maximise short-term profits. In stark contrast to present fishery practices, FAP 6 recommended that river *duars* should be treated as prohibited fishing zones protected by fisheries regulations actively enforced by patrols undertaken by personnel from the Department of Fisheries. The present study provides quantitative and qualitative data on the results of an intensive fish-out by a leaseholder of one *duar* on the Old Surma River.

The duar was isolated using block nets set across the full width of the river upstream and downstream about 400 m apart. Once isolated the *duar* was fished very intensively for one day and less so on a second day. Twelve different gear types were used to fish the *duar* but only 3 of these *ber jal*, *uttar jal* and *jhap jal* were under the direct control of the leaseholder while the remainder were used by local villagers who were allowed free access by the leaseholder (Table 5.3).

Figure 5.6 Total monthly fishing effort per kilometre of Old Surma River (site NE11) by dominant gears

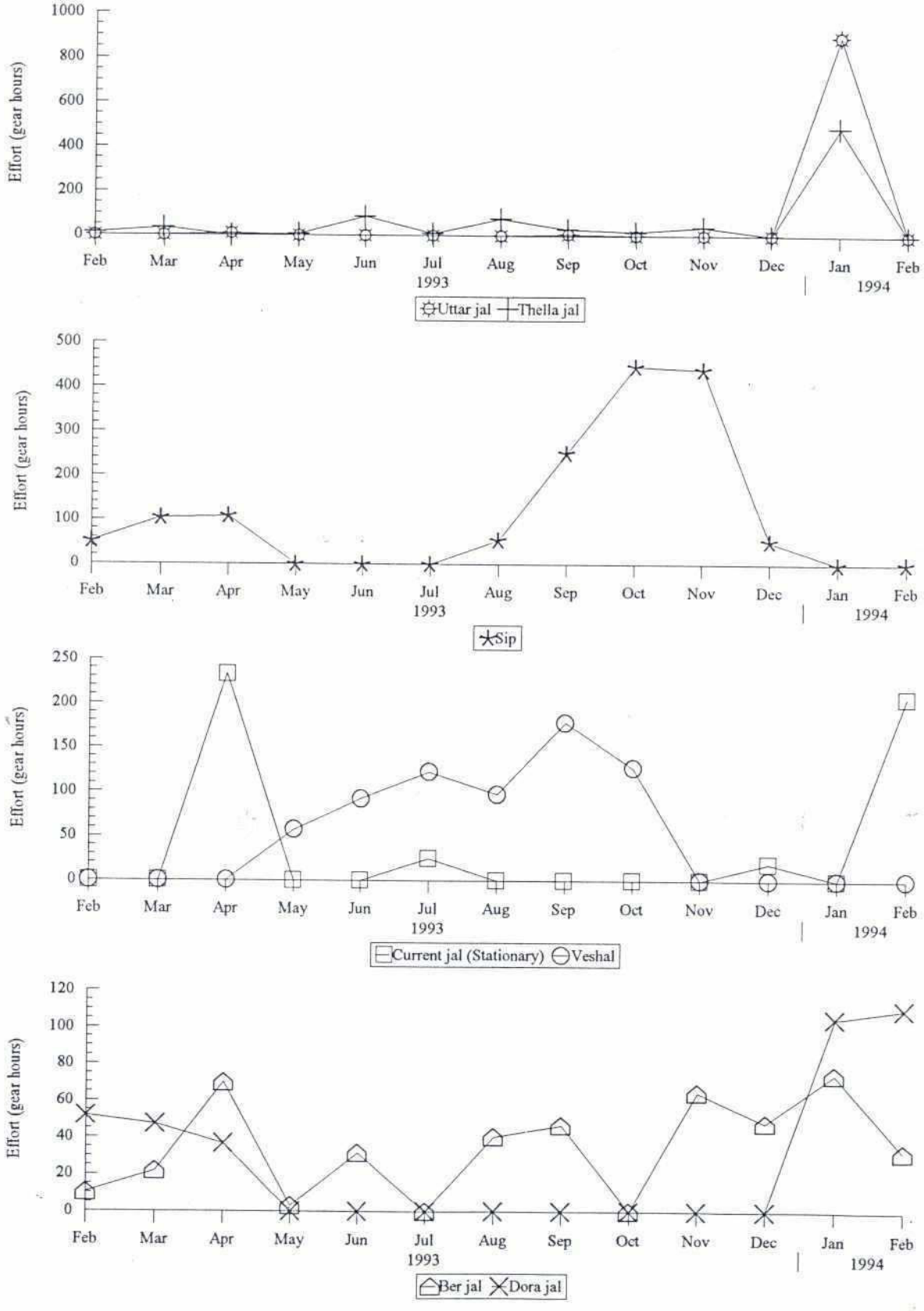
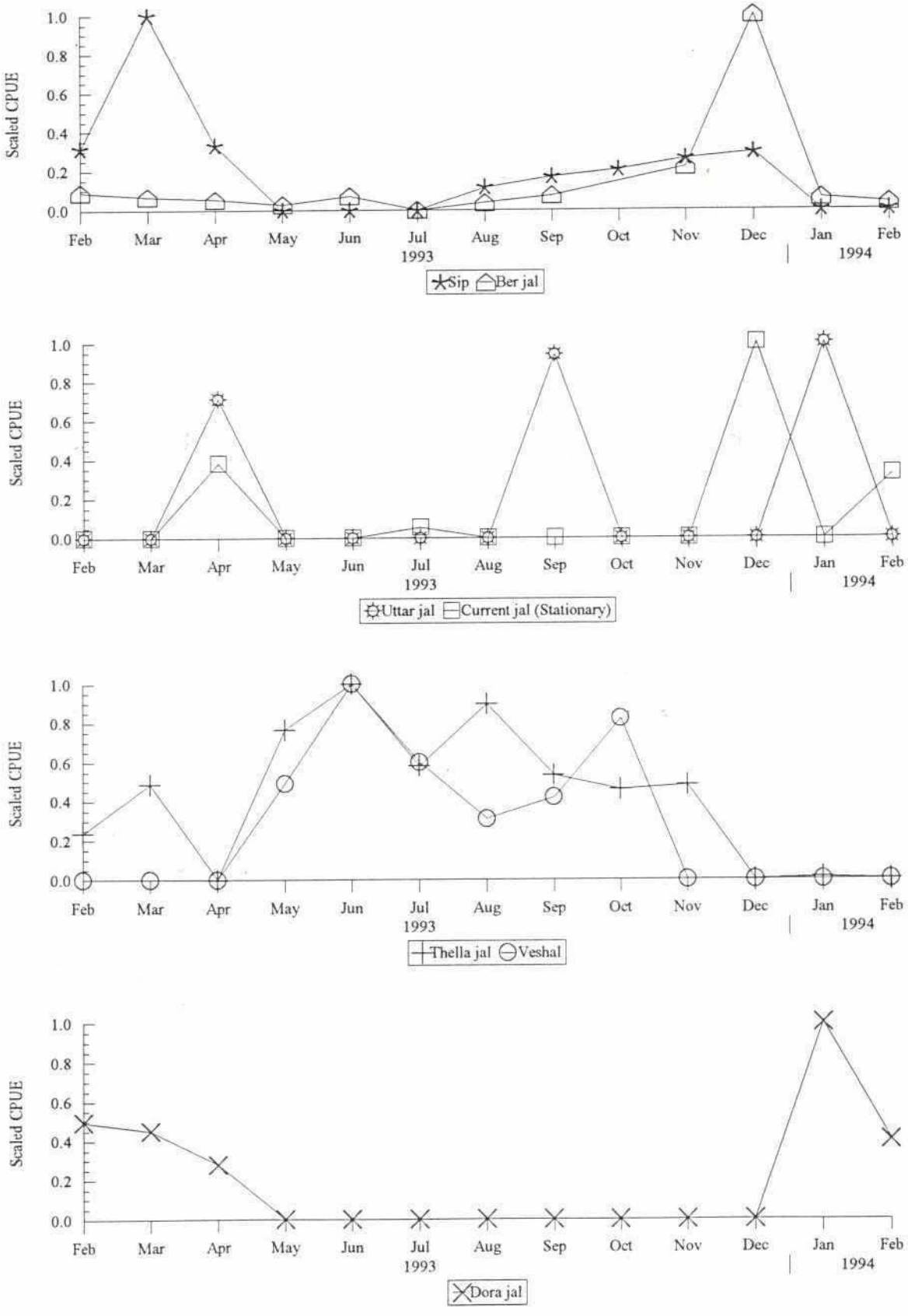
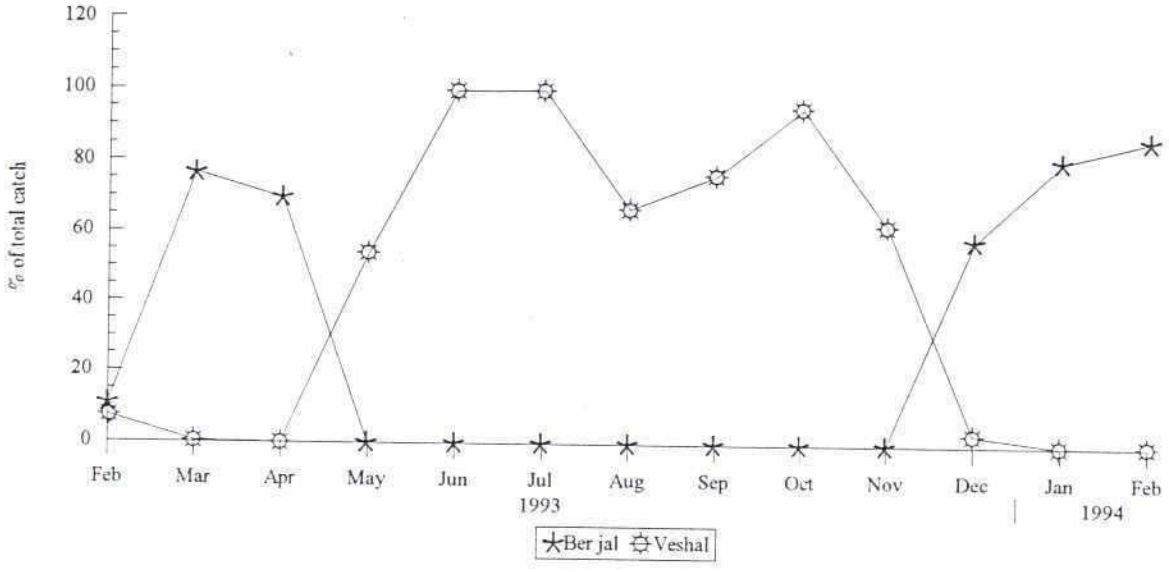


Figure 5.7 Scaled CPUE of dominant gears: Old Surma River (site NE11)



Note: Scaled CPUE are values of CPUE expressed as a proportion (decimal) of the maximum monthly value recorded

Figure 5.8 Percentage monthly catch taken by dominant gears: Mahasingh River (site NE20)



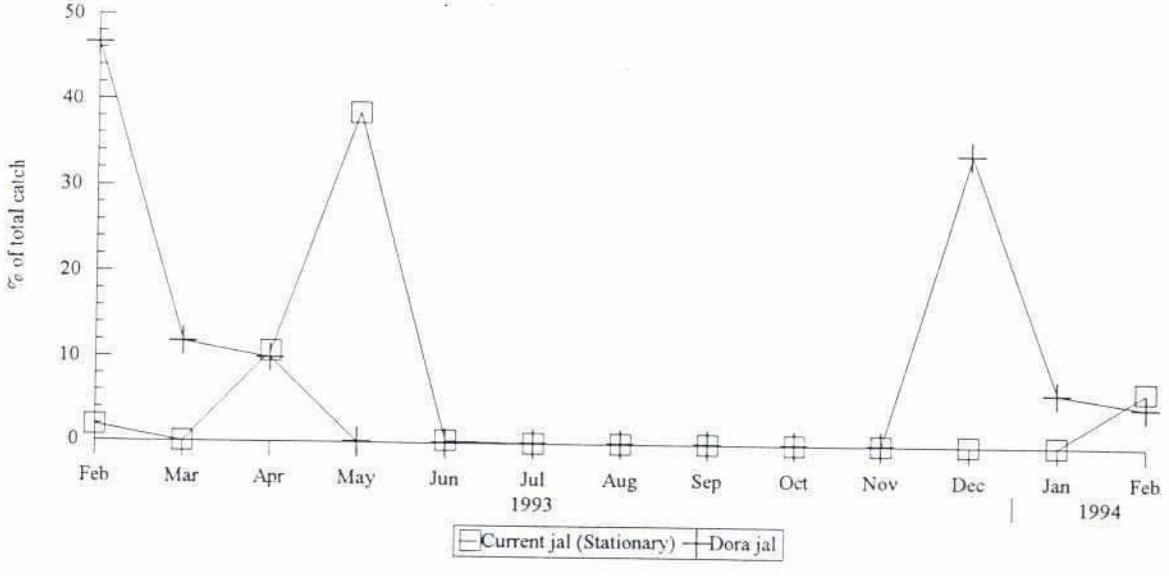
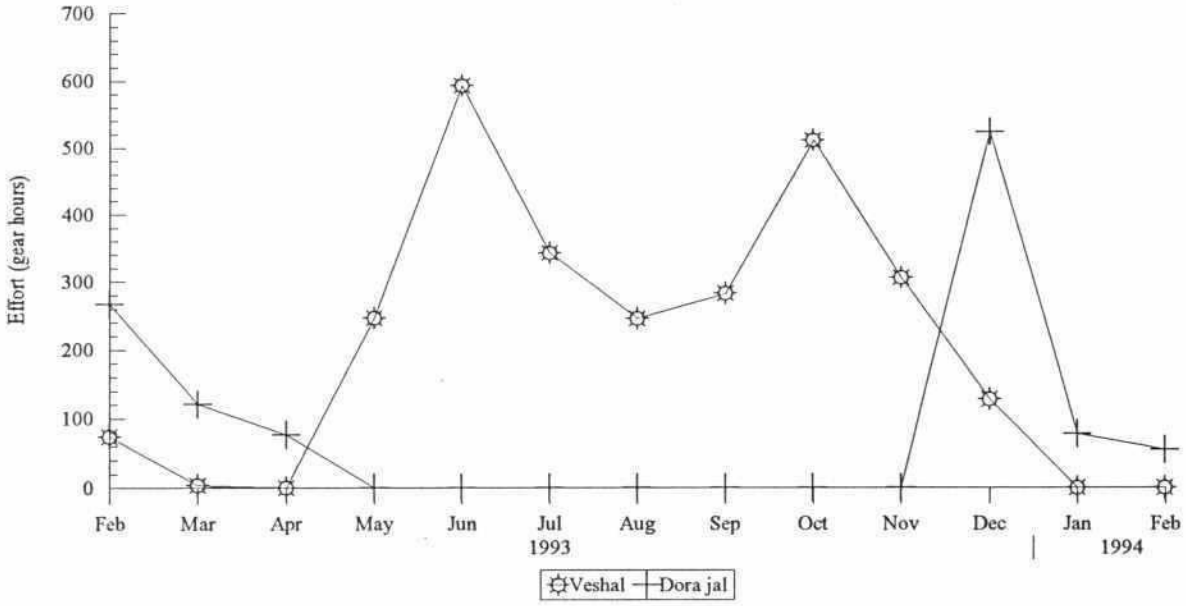
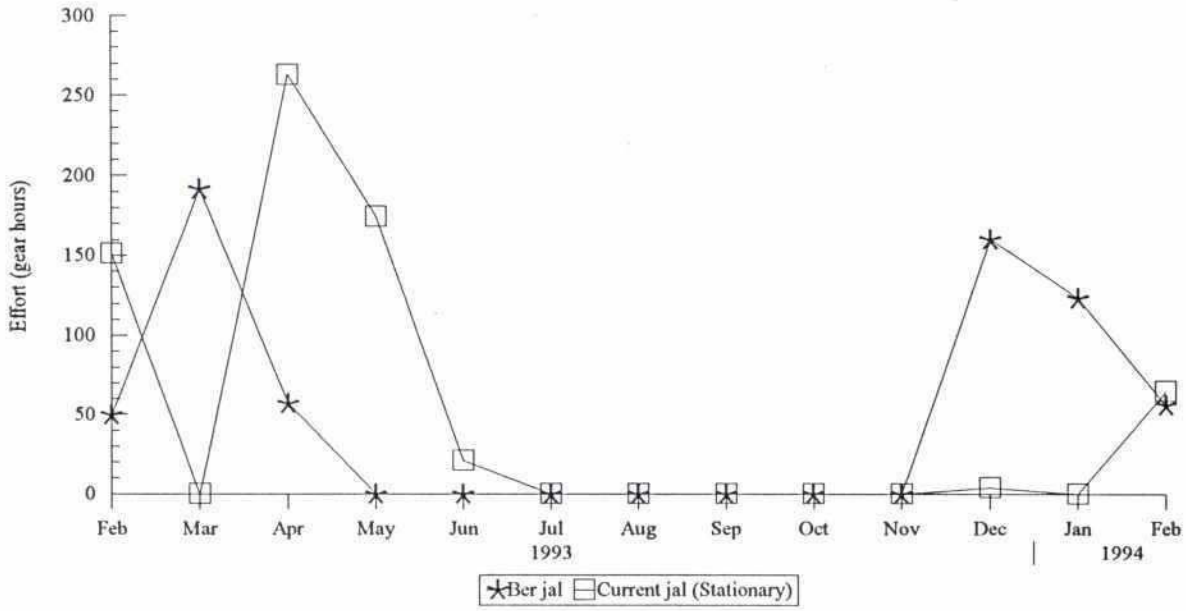


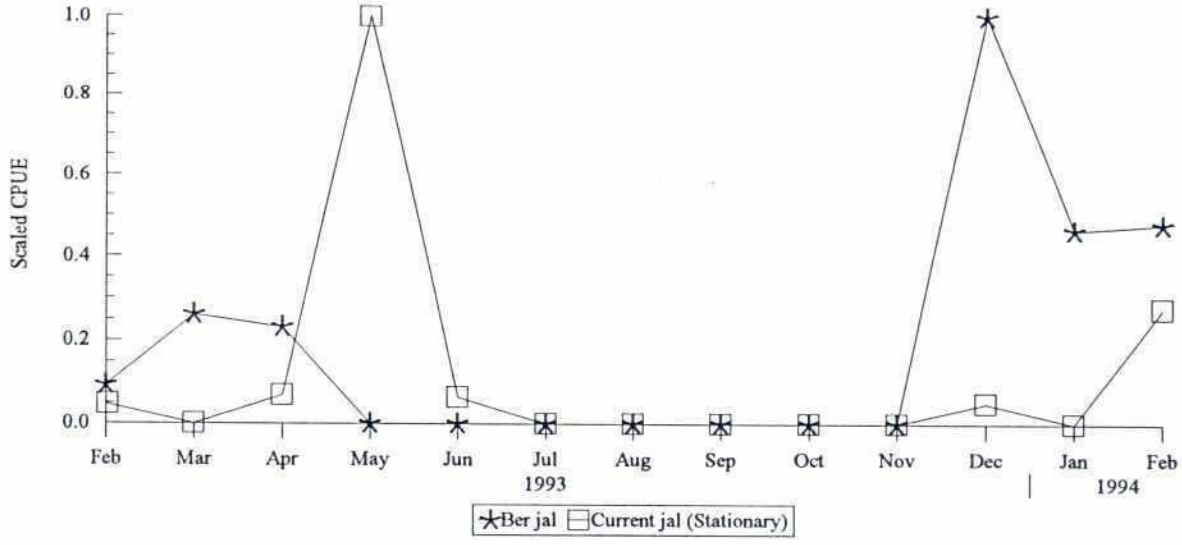
Figure 5.9 Total monthly fishing effort per kilometre of Mahasingh River (site NE20) by dominant gears

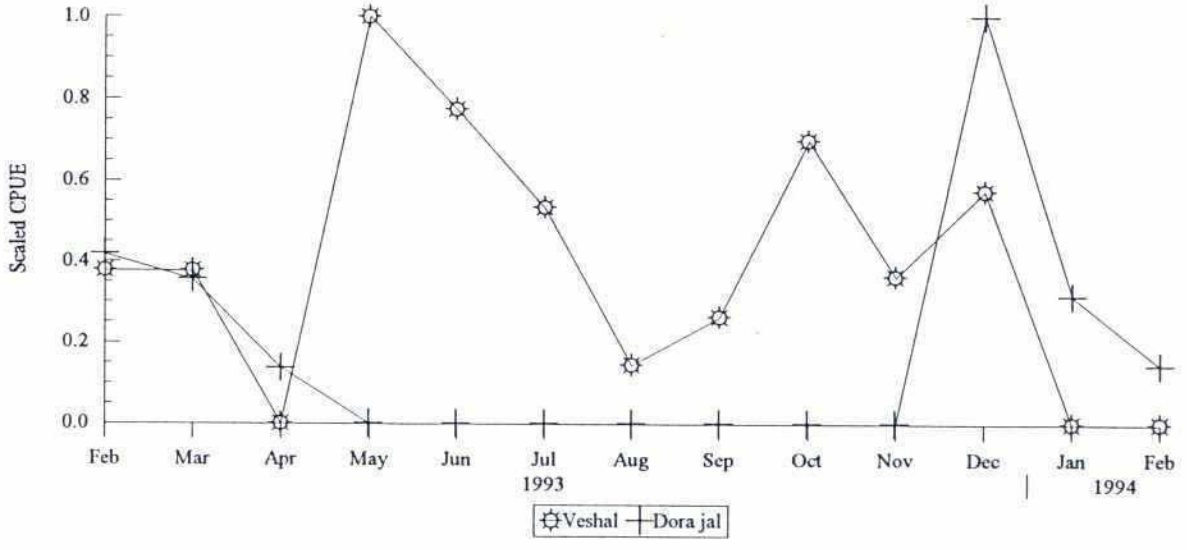




(17)

Figure 5.10 Scaled CPUE of dominant gears: Mahasingh River (site NE20)





Note: Scaled CPUE are values of CPUE expressed as a proportion (decimal) of the maximum monthly value recorded

Table 5.3 Catch by gear from *duar* fishing on the Old Surma River, January 1994

Gear name	Catch		Leaseholder (L) Subsistence (S) gears
	Kg	%	
Ber jal	1419.2	35.0	L
Uttar jal	1199.9	29.6	L
Polo trap	405.6	10.0	S
Urani	399.8	9.9	S
Jhaki jal	336.1	8.3	S
Jhap jal	125.0	3.1	L
Juti	85.3	2.1	S
Dhor jal	38.1	0.9	S
Thella jal	21.6	0.5	S
Koi jal	11.4	0.3	S
Hand fishing	8.1	0.2	S
Dharma jal	2.4	0.1	S
Total	4052.5	100	

Leaseholder gears captured 68% of the total catches of about 4 tonnes of fish over the two day fishing period. *Ber jal* and *uttar jal* took most fish (35% and 30% respectively) whilst the remaining 1.3 tonnes was shared by more than 200 fishermen, many of whom used *polo* traps, *urani* and *juti,* crowded along the two block nets set across the river. *Polo* traps and *urani* together captured about 20% (805 kg) of the catch and *jhaki jal* thrown from the bankside caught a further 8%.

The principal species captured within the duar are shown in Table 5.4. *Boal* and *rui* dominated the catch, comprising 36% and 27% respectively. There other large species, *chital, guizza* and *catla,* formed the next most important catch components which together accounted for 24% by weight. Two large species, *ayre* and *kalbaus,* comprised 4% and 2% bringing the total percentage catch of large species to 92%, most of which were adults.

The results clearly demonstrate the importance of *duar* in providing shelter for overwintering broodstock of several large species which form the basis of commercial fisheries not only in rivers of the North East Region but also floodplains and *beel.* On the bases of these results

the recommendation by FAP 6 for protection of *duar* fisheries is fully supported by the present FAP 17 study.

Table 5.4 Catch composition from *duar* fishing in the Old Surma River, January 1994

Species name		Weight (kg)	Percentage of total catch
Scientific	Bengali		
Wallagu attu	*Boal*	1439	35.5
Labeo rohita	*Rui*	1105	27.3
Notopterus chitala	*Chital*	411	10.1
Aorichthys seenghala	*Guizza*	337	8.3
Catla catla	*Catla*	214	5.3
Gudusia chapra	*Chapila*	157	3.9
Aorichthys aor	*Ayre*	147	3.6
Labeo calbasu	*Kalbaus*	89	2.1
Salmostoma phulo	*Fulchela*	54	1.3
Other species		100	2.6
Total		4053	100

Note: Only those fish species which comprised 1% or more of the total catch were included in the table

5.3 Biodiversity and Catch Composition

5.3.1 Species richness

Between March 1993 and February 1994, 105 species were recorded from the Surma River, 100 species from the Old Surma River and 91 from the Mahasingh River (Table 5.5).

In Table 5.5 species have been divided into three categories of habitat preference based on spatial distributions derived from the FAP 17 fisheries database covering four FAP regions. The categories are defined below.

a) Riverine

Species which are usually confined to rivers and estuaries (or sea in the case of *ilish*) throughout their life cycles with no direct dependence on floodplains, although some

species can be found on more extensive floodplains, particularly in the North East Region.

b) Migratory

Species which move between river and floodplains during different stages of their life cycle and therefore have some dependence on floodplains for growth and/or reproduction.

c) Floodplain resident

Species which are capable of surviving in perennial waters of the floodplain throughout the year and are largely dependent upon them for growth and reproduction. Many of these species occupy a variety of habitats, including large rivers.

Table 5.5 Total annual number of fish species, classified by habitat preference, recorded from rivers outside the SHP, March 1993 - February 1994

Name of river	Site Code	Number of species			
		Riverine	Migratory	Floodplain resident	Total
Surma River	NE16	35	26	44	105
Old Surma River	NE11	31	24	45	100
Mahasingh River	NE20	23	23	45	91

The numbers of floodplain resident and migratory species were very similar between rivers. The number of riverine species was, however, highest (35) in the largest river, the Surma, and lowest (23) in the Mahasingh which had a poorer direct connection with the Surma than did the Old Surma where 31 riverine species were found.

5.3.2 Catch composition

Percentage contribution made by riverine, migratory and floodplain resident species to annual catches from the three sampled rivers are presented in Table 5.6. The catch from the Surma River consisted of a very high proportion of riverine (20%) and migratory species (73%) while floodplain resident fish comprised only 5% of the annual catch. On the two distributaries of the Surma, riverine species accounted for 10-11% of the catch and migratory

species 58% from the Old Surma and 36% from the Mahasingh. Conversely, floodplain resident fish were more important on these smaller rivers where they formed 18% and 38% respectively.

Table 5.6 Percentage contribution of riverine, migratory and floodplain resident species to the total annual catches from rivers outside SHP, March 1993 - February 1994

Name of river	Site Code	Percentage of annual Catch		
		Riverine	Migratory	Floodplain resident
Surma River	NE16	20	73	5
Old Surma River	NE11	11	58	18
Mahasingh River	NE20	10	36	38

Note: Percentage values are rounded to nearest whole number

Percentage annual catches of individual dominant species are presented in Table 5.7. A total of 6 dominant riverine species was recorded from the Surma compared with 2 species in the distributaries. The most abundant riverine species by weight in all rivers was *kachki*. In the Surma other important species included *ilish*, *rita*, *rani*, *ghaura* and *putul* while in the Old Surma and Mahasingh, *ghaura* and *gharpoia* predominated.

The most important migratory species on the Surma were, in order of abundance, *guizza*, *kalbaus*, *boal*, *chital*, *ayre*, *rui* and *chapila*. In contrast, on the Old Surma, *chapila* was clearly the most abundant species in catches, followed by *rui*, *boal* and *kabashi*. On the Mahasingh, *chapila* was also the most abundant species by weight followed by *golsha tengra* and *kabashi*. No major carps were recorded as dominant species in this river whereas both *rui* and *kalbaus* formed dominant species on the Old Surma and Surma.

Only one floodplain resident species, *baral baim*, comprised more than 1% of the annual catch on the Surma compared with 5 on the Old Surma and 11 species on the Mahasingh. The most important species on the Old Surma were *baral baim, chanda* and *bailla* while on the Mahasingh *bailla*, *canchan puti*, *chanda*, *baral baim* and *guchi baim* were the most abundant species by weight. Prawns were not an important component of the Surma catch but on the Old Surma and Mahasingh they comprised 13% and 16% respectively.

Table 5.7 Percentage contribution (by weight) to the total annual catch by dominant species from rivers outside the SHP, March 1993 – February 1994

Habitat Preference	Species name		Surma River	Old Surma River	Mahasingh River
	Scientific	Bengali	NE16	NE11	NE20
Riverine	*Rita rita*	*Rita*	2.5	–	–
	Somileptes gongota	*Gharpoia*	–	–	1.3
	Botia dario	*Rani*	2.5	–	–
	Botia lohachata	*Putul*	1.1	–	–
	Hilsa ilisha	*Ilish*	3.6	–	–
	Corica soborna	*Kachki*	5.6	6.3	5.6
	Clupisoma garua	*Ghaura*	2.4	1.3	–
Subtotal			17.7	7.7	6.9
Migratory	*Aorichthys aor*	*Ayre*	5.1	2.0	3.9
	Aorichthys seenghala	*Guizza*	24.0	2.8	–
	Mystus bleekeri	*Golsha tengra*	–	1.6	5.2
	Mystus cavasius	*Kabashi*	–	5.1	4.1
	Cirrhinus reba	*Raik*	1.7	1.6	2.1
	Labeo calbasu	*Kalbaus*	15.3	2.1	–
	Labeo gonius	*Goni*	–	–	3.6
	Labeo rohita	*Rui*	4.9	8.1	–
	Salmostoma bacaila	*Katari*	–	1.3	–
	Salmostoma phulo	*Fulchela*	1.4	1.0	2.9
	Gudusia chapra	*Chapila*	4.2	21.1	10.2
	Eutropiichthys vacha	*Bacha*	1.0	–	–
	Wallagu attu	*Boal*	7.4	5.6	–
	Notopterus chitala	*Chital*	6.0	3.8	–
Subtotal			70.9	56.0	32.1
Floodplain Resident	*Xenentodon cancila*	*Kaikka*	–	–	1.5
	Osteobrama cotio cotio	*Keti*	–	1.3	–
	Puntius conchonius	*Canchan puti*	–	–	4.1
	Puntius sophore	*Puti*	–	–	1.1
	Glossogobius giurus	*Bailla*	–	1.8	5.7
	Channa punctatus	*Taki*	–	–	1.5
	Macrognathus pancalus	*Guchi*	–	–	3.0
	Mastacembelus armatus	*Baral baim*	1.1	3.7	3.1
	Notopterus notopterus	*Foli*	–	1.5	–
	Chaca chaca	*Cheka*	–	–	1.6
	Chanda baculis	*Chanda*	–	2.1	3.5
	Chanda nama	*Nama chanda*	–	–	2.0
	Chanda ranga	*Lal chanda*	–	–	1.2
Subtotal			1.1	10.3	28.1
Other	Prawn spp.	*Chingri/Icha*	1.5	13.3	16.4
Subtotal			1.5	13.3	16.4
Grand total			91.1	87.3	83.6

Notes: 1. Dominant species are those species contributing 1% or more by to the total annual catch

2. Shaded values highlight the most important species (>4%)

3. See text for definitions of habitat preference categories (Section 5.3.1)

6 FLOODPLAIN FISHERIES

In the analyses and interpretations of the data that follow, the results from one regulated canal were also presented since this formed a separate major leased fishery during the winter. On the unregulated Dekker *Haor*, canal catches were included in *beel* catches since the drainage canals did not form independent leased fisheries.

6.1 Total Catch

6.1.1 Pattern of catch

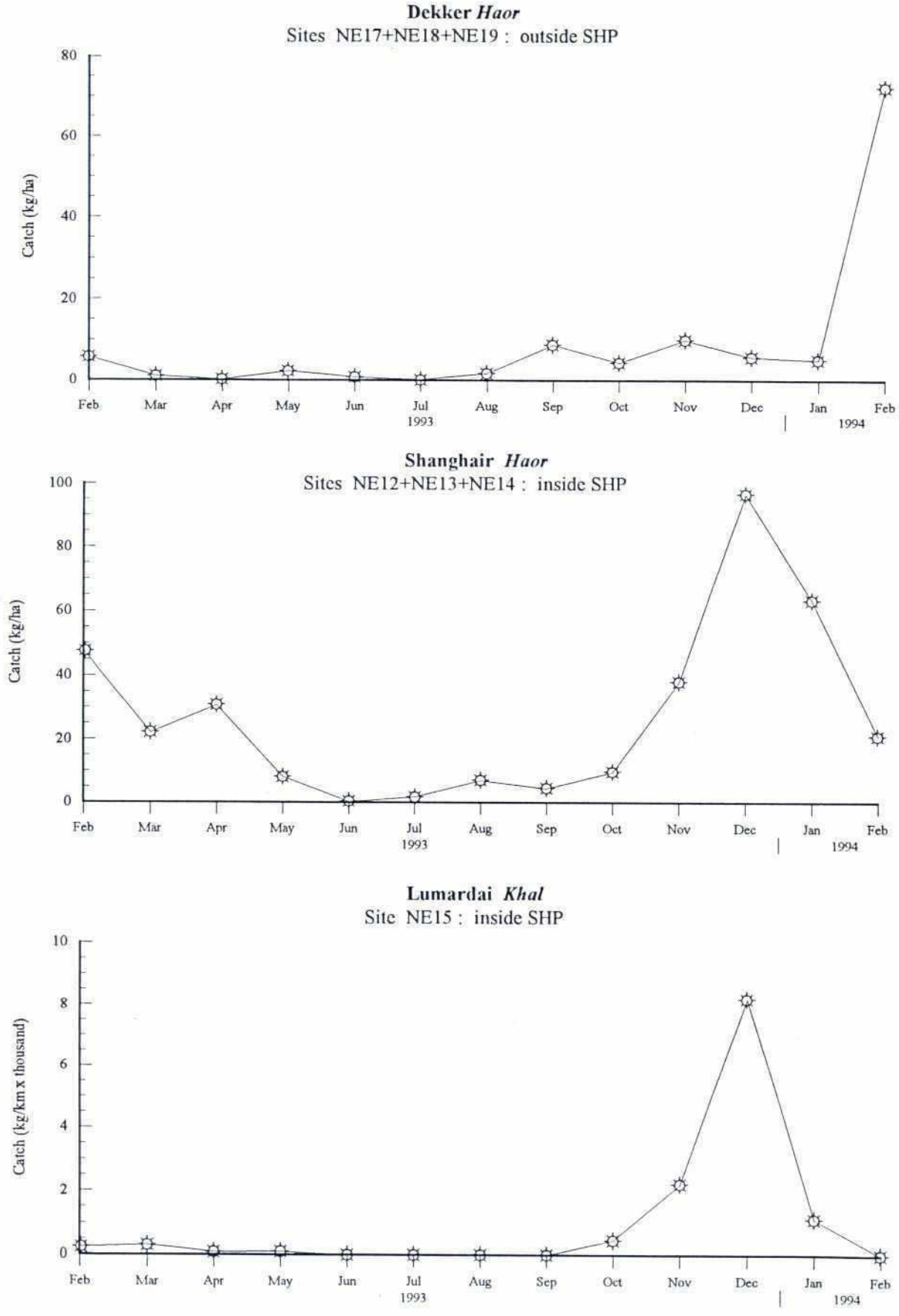
Variations in catches from Shanghair and Dekker *Haor* followed different seasonal patterns (Fig. 6.1). Catches from Dekker *Haor* were lowest from March to August. In September they rose slightly and again in November. In February 1994 catches increased considerably to reach a peak of 72 kg/ha.

On Shanghair *Haor*, catches were fairly high from February to April 1993 when leased *beel* were fished but rapidly decreased in May and June when the *haor* was inundated by river flooding. From June to October catches remained low but increased in November to reach a peak of 97 kg/ha in December after which they decreased equally rapidly up to February 1994.

On regulated floodplains/*beel* a greater share of the annual catch was taken during early winter (November 1993 - January 1994) particularly in December when 32% of the catch was taken. In contrast, on unregulated floodplains, the bulk of the catch (63%) was taken in February 1994 during leaseholder fishing of *beel*.

On Lumardai *Khal*, the main drainage canal of the SHP, low catches were recorded from March to May after which the canal was submerged and indistinguishable from the inundated floodplain. During the flood drawdown the canal re-emerged and leaseholder fishing started in November and continued until January 1994. Peak catches were recorded in December when dams constructed by the leaseholder were cut to facilitate fishing.

Figure 6.1 Seasonal variation in the catch from floodplains/*beel* and canal inside and outside the SHP, February 1993 - February 1994



6.1.2 Size of catch

Between March 1993 and February 1994, the annual catch per unit hectare (CPUA) from floodplains on Dekker *Haor* was 56 kg/ha compared with 64 kg/ha from floodplains inside the SHP (Table 6.1). Values of annual CPUA from *beel* on Dekker *Haor* ranged from 180 kg/ha to 195 kg/ha compared with a considerably higher range (248-576 kg/ha) from *beel* inside the SHP. Differences in *beel* catches were attributed to differences in the catchment areas of individual *beel*. In the SHP there were fewer perennial water bodies per unit area of floodplain than in the study area of Dekker *Haor* and there was therefore a greater concentrating effect on floodplain fish stocks during the drawdown in the SHP.

Table 6.1 Comparison of total annual catch per unit area (kg/ha) from floodplains/ *beel* inside and outside the SHP, March 1993 - February 1994

Site code	Site name	Inside/ Outside SHP	Annual catch	
			Total catch (kg)	(kg/ha)
NE17	Dapha floodplain	Outside	9,109	56
NE18	Dapha *Beel*	Outside	19,706	180
NE19	Chatal *Beel*	Outside	13,131	195
NE12	Mouti *Beel*	Inside	9,952	248
NE13	Karchabrar *Beel*	Inside	32,235	576
NE14	Asumura floodplain	Inside	3,531	64
NE15	Lumardai *Khal**	Inside	20,522	12,438

Note: * Catch of Lumardai *Khal* (NE15) is given in kg/km

To obtain a more accurate comparison of fish yields between regulated and unregulated study areas, it was first necessary to extrapolate site catch estimates to larger areas and then integrate catches from floodplains, *beel* and canals. Satellite images and topographical maps were used to calculate areas for extrapolation of CPUA values from floodplains and *beel* separately. Canal catches were included in floodplain and *beel* catches during surveys on Dekker *Haor* but the main drainage canal of the SHP was sampled separately when it re-emerged from submergence during the monsoon. The catch per kilometre of this canal was applied to an estimated total canal length (sampled and unsampled) of 7.5 km. This was then added to the total floodplain and *beel* catch of the SHP to obtain a total integrated catch. The results of the analyses are presented in Table 6.2 and 6.3. It was estimated that the total

annual catch from 2,801 ha on Dekker *Haor* was 301 tonnes which was equivalent to a CPUA of 107 kg/ha. This was slightly higher than that derived from an estimated catch of 384 tonnes from 3,737 ha inside the SHP which was equivalent to an annual CPUA of 103 kg/ha. Statistical analyses revealed no significant difference between fish densities inside and outside the SHP and there was therefore no evidence of significant differences in overall catches between study areas. The annual yields per hectare of floodplain recorded inside and outside the SHP were slightly lower than those recorded by FAP 17 studies on the unregulated Hakaluki *Haor* (142 kg/ha) and inside the Manu Irrigation Project (113 kg/ha).[7]

Table 6.2 Total annual catch from floodplains and *beel* on the unregulated Dekker *Haor*, March 1993 - February 1994

Site code	Annual yield (kg/ha)	Extrapolation area (ha)	Total annual catch (tonnes)	Integrated CPUA (kg/ha)
NE17	56	1694	95	
NE18+NE19	186	1107	206	
Total		2801	301	107

Table 6.3 Total annual catch from floodplains, *beel* and canals inside the SHP, March 1993 - February 1994

Site code	Annual yield (kg/ha)	Extrapolation area (ha)	Total annual catch (tonnes)	Integrated CPUA (kg/ha)
NE14	64	3556	228	
NE12	248	125	31	
NE13	576	56	32	
NE15*	12,438	7.5	93	
Total		3,737	384	103

Note: * For Lumardai *Khal* (NE15) yield is given in kg/km and extrapolation by in kilometres of canal

6.2 Pattern of Fishing

6.2.1 Catch by gear

Percentage contribution made by dominant gears to the total annual catch at each site are presented in Table 6.4. More detailed data on monthly catches of all observed gears from combined floodplain and *beel* sites are given in Tables 6.5 and 6.6 while data for individual sites are provided in Appendix 4, Tables I - VII.

Table 6.4 **Percentage contribution (by weight) to the total annual catch made by dominant gears on floodplains/beel inside and outside the SHP, March 1993 – February 1994**

	Inside SHP					Outside SHP			
Gear	Lumardai *Khal* NE15	Mouti *Beel* NE12	Karchabrar *Beel* NE13	Asumura Floodplain NE14	All Floodplain/beel sites	Dhapha Floodplain NE17	Dhapha *Beel* NE18	Chatal *Beel* NE19	All Floodplain/beel Sites
Ber jal	–		38.698	11.150	28.146	26.300	39.176	45.888	39.332
Current jal (Stationary)	–	22.163	8.215	41.268	13.804	6.458	–	–	–
Dhor jal	–	5.124	2.481	–	3.180	–	–		–
Doiar trap		4.806	–	12.197	2.382			–	–
By hand/Dewatering	–	8.202			1.785	–	6.845	9.771	6.768
Koi jal		6.571	–	5.408	2.342				
Thella jal	5.583	19.557	26.558	18.385	24.403	61.724	6.781	14.973	18.576
Ucha	–	5.427	–	4.540	–	–	–		–
Katha			14.766		10.411	–			–
Kua	17.905	13.539	–		4.369				
Hand fishing	–	4.846	–		–	–	32.115	–	16.138
Ghori jal	67.774						5.346	24.404	10.830

Notes: 1. Dominant gears are defined as those gears which when ranked in order of abundance, comprised at least 90% of the total annual catch

2. – denotes gear present but not dominant, blank denotes gears absent

Table 6.5 Percentage monthly catch from combined floodplain/beel sites by gear type: outside SHP (sites NE17+NE18+NE19)

Gear Code	Gear name	Year: 1993											Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
45	*Ber jal*	87.602	–	–	–	–	–	–	–	–	20.821	80.177	16.901	49.010	15465.640	39.332
255	*Thella jal*	8.375	64.203	34.695	31.077	4.342	35.658	7.073	85.370	74.900	68.463	16.634	4.048	0.624	7304.200	18.576
307	*Hand fishing*	0.134	35.797	–	–	–	–	–	–	–	–	0.130	2.357	25.113	6345.422	16.138
320	*Ghori jal*	–	–	–	–	–	–	–	–	–	–	–	60.362	13.069	4258.027	10.829
97	By hand/Dewatering	1.110	–	–	–	–	–	–	–	–	–	–	–	10.820	2661.101	6.768
88	*Current jal (Stationary)*	1.276	–	–	65.923	27.677	–	2.866	8.413	21.511	5.048	1.099	0.945	–	1397.716	3.555
272	*Daun*	–	–	–	3.000	67.981	64.342	60.035	1.160	3.589	–	–	–	–	668.131	1.699
170	*Juti*	–	–	65.305	–	–	–	–	–	–	–	–	–	1.365	377.599	0.960
98	Net/Basket + Dewatering	–	–	–	–	–	–	–	–	–	–	–	14.803	–	256.000	0.651
95	*Doiar trap*	–	–	–	–	–	–	26.710	2.665	–	–	–	–	–	233.700	0.594
89	*Dhor jal*	1.333	–	–	–	–	–	1.398	–	–	5.115	–	–	–	182.441	0.464
263	*Ucha*	–	–	–	–	–	–	1.918	2.392	–	–	–	–	–	82.845	0.211
164	*Jhaki jal*	0.169	–	–	–	–	–	–	–	–	0.553	1.960	–	–	77.765	0.198
270	*Katha*	–	–	–	–	–	–	–	–	–	–	–	0.584	–	10.100	0.026
		100	100	100	100	100	100	100	100	100	100	100	100	100	39320.695	100

Note: – denotes zero catch

Table 6.6 Percentage monthly catch from combined floodplain/beel sites by gear type: inside SHP (sites NE12+NE13+NE14)

Gear Code	Gear name	Year: 1993											Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
45	*Ber jal*	46.973	75.786	55.912	–	–	–	–	–	–	6.874	29.589	20.893	32.675	12868.149	28.146
255	*Thella jal*	35.919	17.207	15.718	68.558	–	–	–	6.251	0.576	12.771	50.743	6.747	5.892	11156.736	24.403
88	*Current jal (Stationary)*	7.597	0.544	7.965	12.390	89.383	68.460	36.520	52.129	71.967	50.263	3.464	2.622	4.238	6311.128	13.804
270	*Katha*	–	2.423	9.491	–	–	–	–	–	–	–	–	40.748	10.941	4759.842	10.411
302	*Kua*	–	–	–	–	–	–	–	–	–	–	3.227	9.174	20.609	1997.681	4.369
89	*Dhor jal*	3.340	0.354	0.704	5.790	–	–	–	–	–	1.933	3.159	8.028	–	1453.766	3.180
95	*Doiar trap*	1.405	–	–	–	–	5.622	57.073	15.649	0.490	6.369	–	–	–	1088.826	2.382
123	*Koi jal*	–	–	–	4.055	–	–	–	15.122	9.676	6.563	2.729	0.036	–	1070.670	2.342
97	By hand/Dewatering	0.226	0.716	–	–	–	–	–	–	–	–	4.961	0.715	–	816.276	1.785
263	*Ucha*	1.554	1.260	–	8.189	–	–	2.848	0.741	10.133	7.140	–	0.257	0.787	782.591	1.712
276	*Hat panch*	–	–	–	–	–	–	–	–	–	–	–	3.155	13.519	728.000	1.592
164	*Jhaki jal*	0.134	0.688	4.294	1.018	–	–	–	–	–	–	0.488	1.278	3.283	531.276	1.162
307	Hand fishing	0.202	–	–	–	–	–	–	–	–	–	0.567	3.845	1.023	482.301	1.055
272	*Daun*	–	–	–	–	10.617	25.917	3.559	6.459	4.094	3.772	–	–	–	429.410	0.939
278	*Nol barsi*	2.650	–	–	–	–	–	–	–	–	–	–	1.670	7.035	381.525	0.834
222	*Polo*	–	–	5.915	–	–	–	–	–	–	–	–	0.832	–	353.537	0.773
30	*Sip*	–	–	–	–	–	–	–	3.649	3.065	4.316	–	–	–	316.654	0.693
301	*Chunga*	–	–	–	–	–	–	–	–	–	–	0.607	–	–	88.571	0.194
318	*Kotta*	–	–	–	–	–	–	–	–	–	–	0.247	–	–	36.000	0.079
170	*Juti*	–	1.022	–	–	–	–	–	–	–	–	–	–	–	34.239	0.075
98	Net/Basket+Dewatering	–	–	–	–	–	–	–	–	–	–	0.219	–	–	31.961	0.070
		100	100	100	100	100	100	100	100	100	100	100	100	100	45719.134	100

Note: – denotes zero catch

A total of 14 different gear types was recorded on unregulated floodplains/*beel* compared with 21 different types of floodplains/*beel* inside the SHP. On the regulated Lumardai *Khal*, a total of 12 different gear types was found.

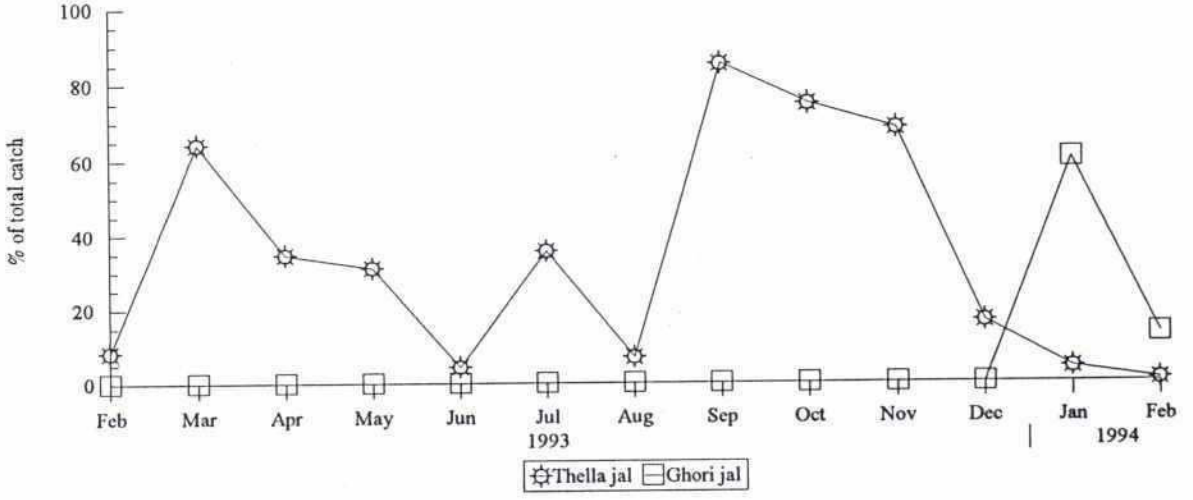
Ber jal predominated in both unregulated and regulated floodplains/*beel*, comprising 39% of the combined catch from Dekker *Haor* and 28% from the SHP (Table 6.4). *Thella jal* was the second most important gear, providing 18% and 24% of the annual catch from unregulated and regulated floodplain/*beel* sites. *Ghori jal* set in drainage canals were also important inside and outside the SHP. At outside sites the catch from the gear was included as part of the sampled floodplain catch which accounts for its apparently lower catch contribution (11%) than that from the regulated Lumardai *Khal* (68%) which was surveyed separately. Fishing by hand, often in conjunction with dewatering by leaseholders, made an important contribution (23%) to the annual catch from unregulated floodplains but was less important inside the SHP where it accounted for only 2% of the catch. In contrast, *current jal* provided a considerably higher catch contribution (14%) inside the SHP than outside (<1%). This may have been due to the greater proximity of Dekker *Haor* to Sunamganj from which officers from the Department of Fisheries could more easily confiscate this illegal gear.

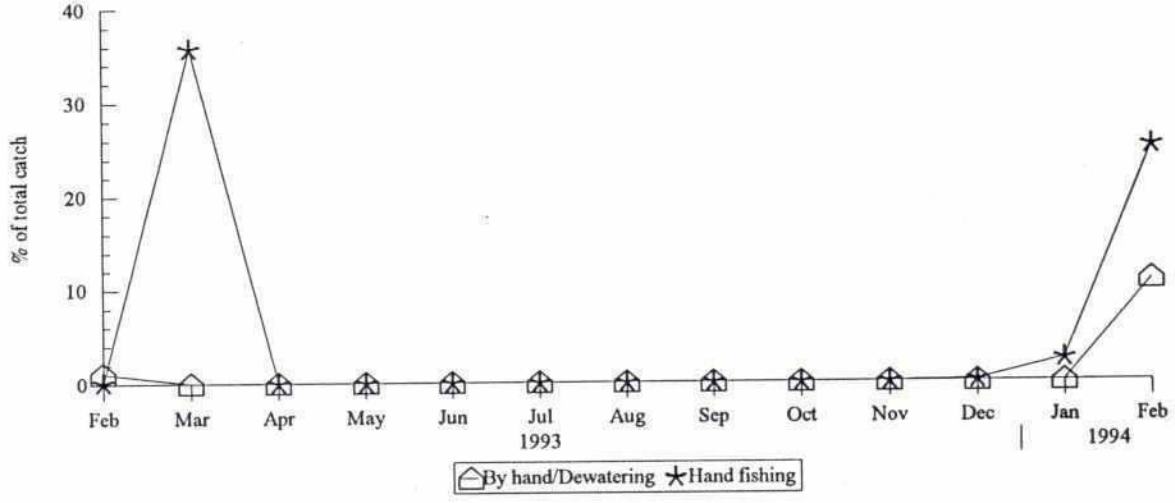
6.2.2 Catch by gear by month

On unregulated floodplains/*beel*, lowest fishing activity was observed during the pre-monsoon and early monsoon from March to July 1993. During this period *thella jal*, *daun* and *current jal* were the most important gears. *Thella jal* contributed between 31% and 64% of monthly catches, except in June, while *current jal* provided 66% and 28% of the catch in May and June and *daun* provided 68% and 64% of June and July catches respectively (Table 6.5 and Fig. 6.2).

In August, fishing activity increased and 6 different gear types were recorded compared with only 2 or 3 in previous months. However, combined floodplain/*beel* catches did not start to rise until September and then only moderately, providing about 10 kg/ha up to January 1994. During this period *thella jal* accounted for 68% to 85% of monthly catches between September and November while *ber jal* and *ghori jal* provided 80% and 60% of the catch in December 1993 and January 1994 respectively. The considerably higher catch recorded in February 1994 was provided mainly by *ber jal* (49%), hand fishing (35%) and *ghori jal* (13%). The catch increase was caused by an increase in hand fishing effort and by peak catch rates of *ber jal*, *ghori jal* and hand fishing with dewatering (Figs. 6.3 and 6.4).

Figure 6.2 Percentage of total monthly catch taken by dominant gears: combined sites NE17+NE18+NE19 (outside SHP)





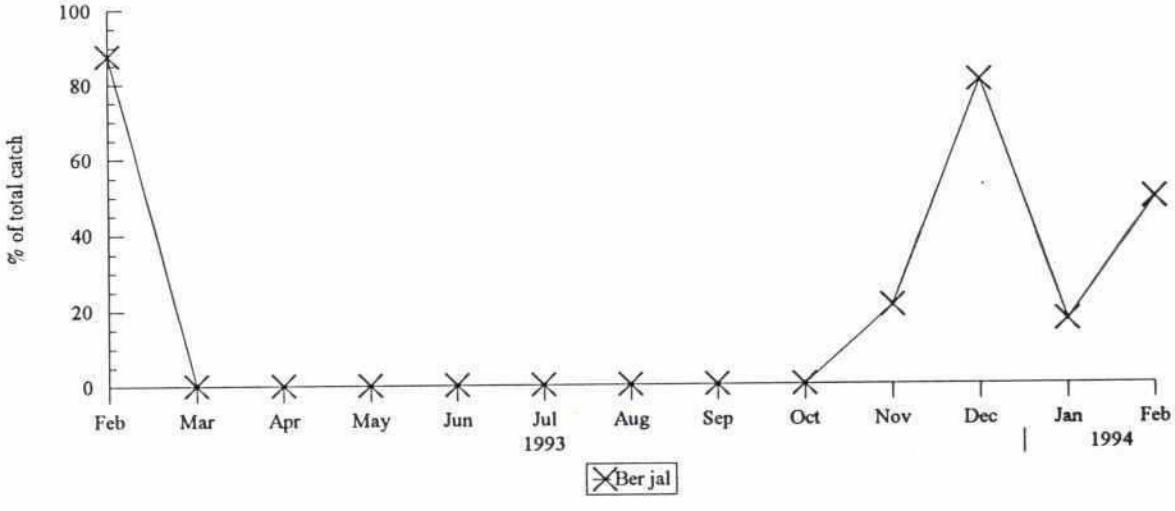
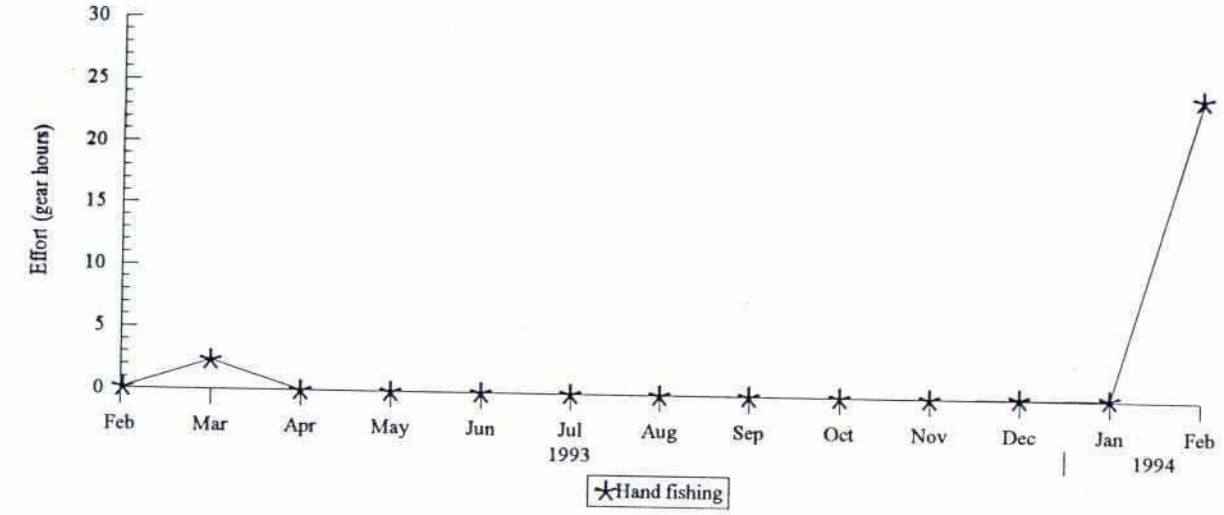
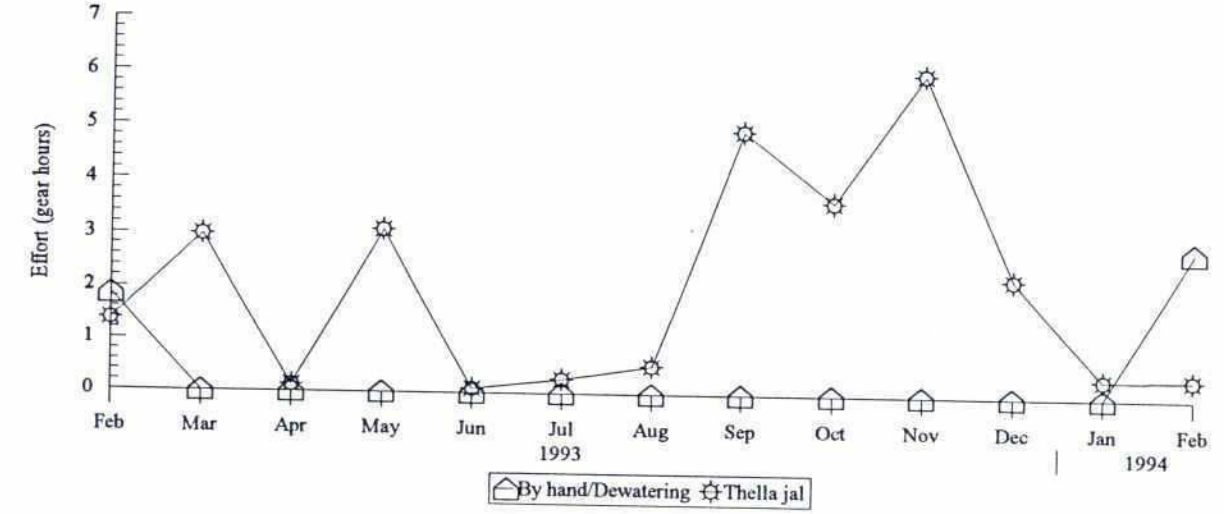


Figure 6.3 Total monthly fishing effort per hectare of floodplains/*beel* by dominant gears: combined sites NE17+NE18+NE19 (outside SHP)





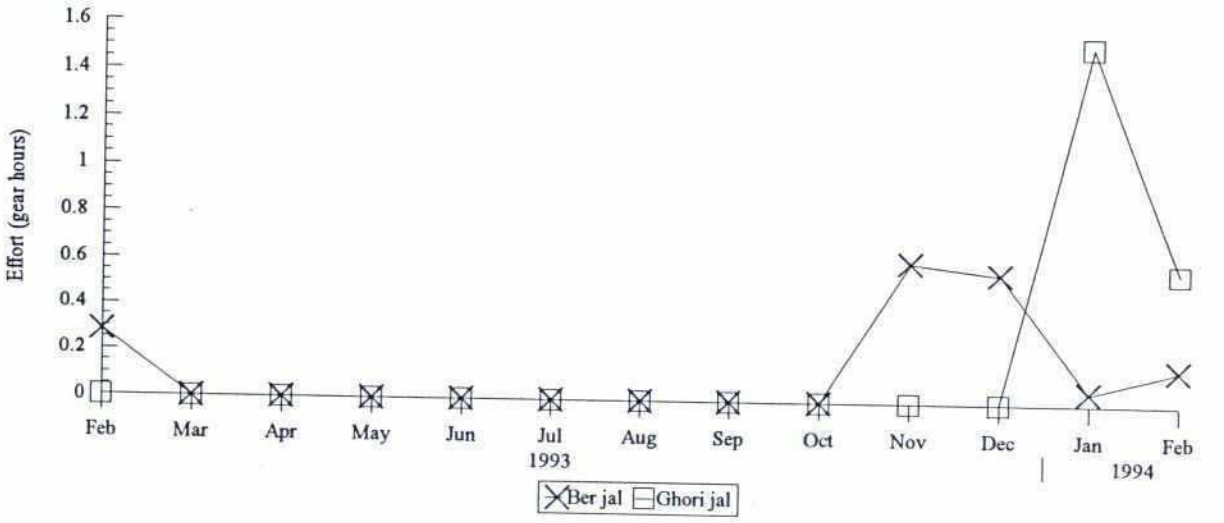
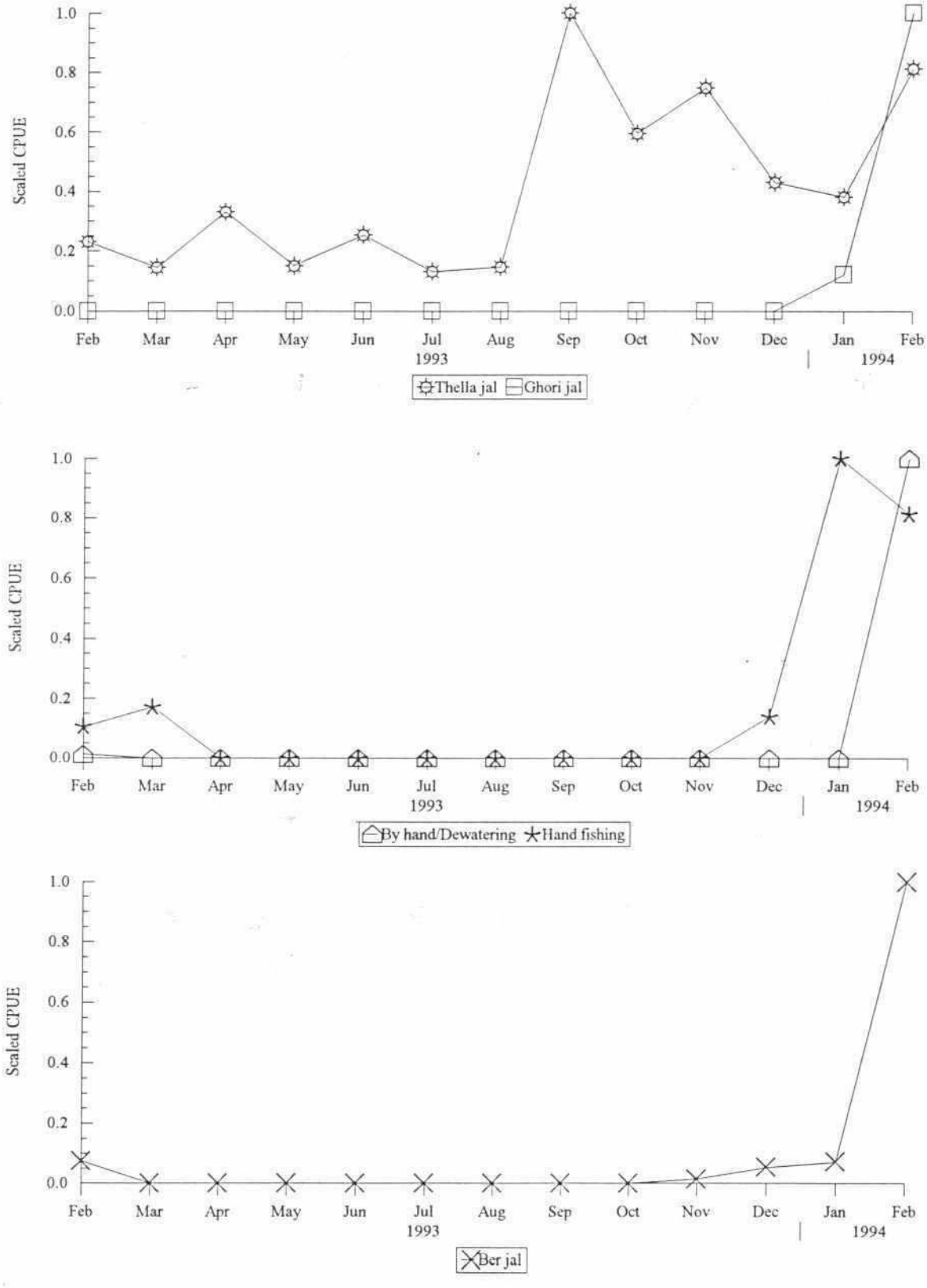


Figure 6.4 Scaled CPUE of dominant gears used on floodplains/*beel*: combined sites NE17+NE18+NE19 (outside SHP)



Note: Scaled CPUE are values of CPUE expressed as a proportion (decimal) of the maximum monthly value recorded

On regulated floodplains/*beel* inside the SHP, moderately high catches recorded from February to April 1993 were made principally by *ber jal* and *thella jal* (Fig. 6.5). Catches dropped in May and remained low up to October. During this period, *current jal* predominated forming 36% to 89% of catches from June to October. Other important gears, used more intermittently, included *daun* and *doiar* traps. Catches rose again in November due mainly to *current jal* and *thella jal* and reached a peak in December when *thella jal* provided more than half (51%) the catch and *ber jal* activity increased, providing a further 30% of the catch. The peak catch in December was caused by peak fishing effort by the two dominant gears, *thella jal* and *ber jal* (Fig. 6.6) and peak catch rates of *thella jal* (Fig. 6.7). These two gears operated largely under the control of leaseholders of *beel* fisheries. Winter catches in January and February 1994 were provided mainly by *ber jal*, *katha* and *kua*.

On the regulated Lumardai *Khal* inside the SHP, catches remained low from February to May 1993 after which the canal was submerged and indistinguishable from the flooded surrounding land until October. Between February and May small-scale gears such as *thella jal*, *dhor jal*, *jhaki jal* and *current jal* predominated. On re-emergence of the canal in October many of these same gears were active but from November onwards fishing activities were under the control of a leaseholder who operated a *ghori jal*. This gear captured the bulk of monthly catches at this time although some small-scale gears were allowed to operate (Figs. 6.8 and 6.9). The very high catch recorded in December was due almost solely to the increase in catch rate of *ghori jal* (Fig. 6.10). As fish left the drying floodplains, they were concentrated in the canal which was at first dammed by the leaseholder then allowed to flow freely once the *ghori jal* was in operation.

6.3 Statistical Comparison of Catch Rates and Catches

Statistical comparisons of seasonally pooled catch rates of dominant gears used inside and outside the SHP were made following the method describe in Appendix 3 of the FAP 17 Final Report. The underlying assumption of the method was that once differences in catchabilities between gears were accounted for, any further differences in catch rates inside and outside the SHP were due solely to differences in fish densities. The statistical comparison included the regulated Lumardai *Khal* and unregulated drainage canals on Dekker *Haor*.

Figure 6.5 Percentage of total monthly catch taken by dominant gears: combined sites NE12+NE13+NE14 (inside SHP)

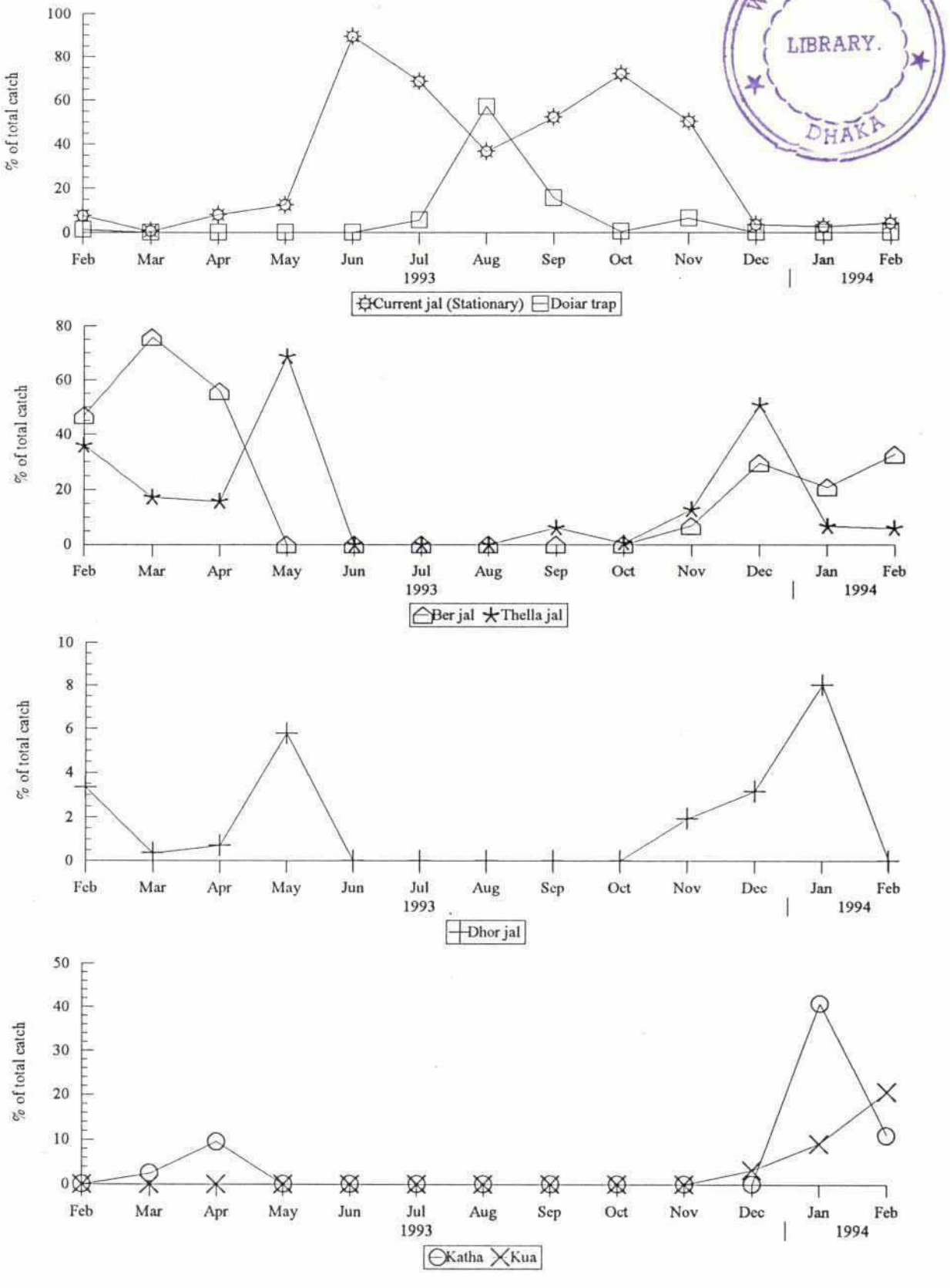


Figure 6.6 Total monthly fishing effort per hectare of floodplains/*beel* by dominant gears: combined sites NE12+NE13+NE14 (inside SHP)

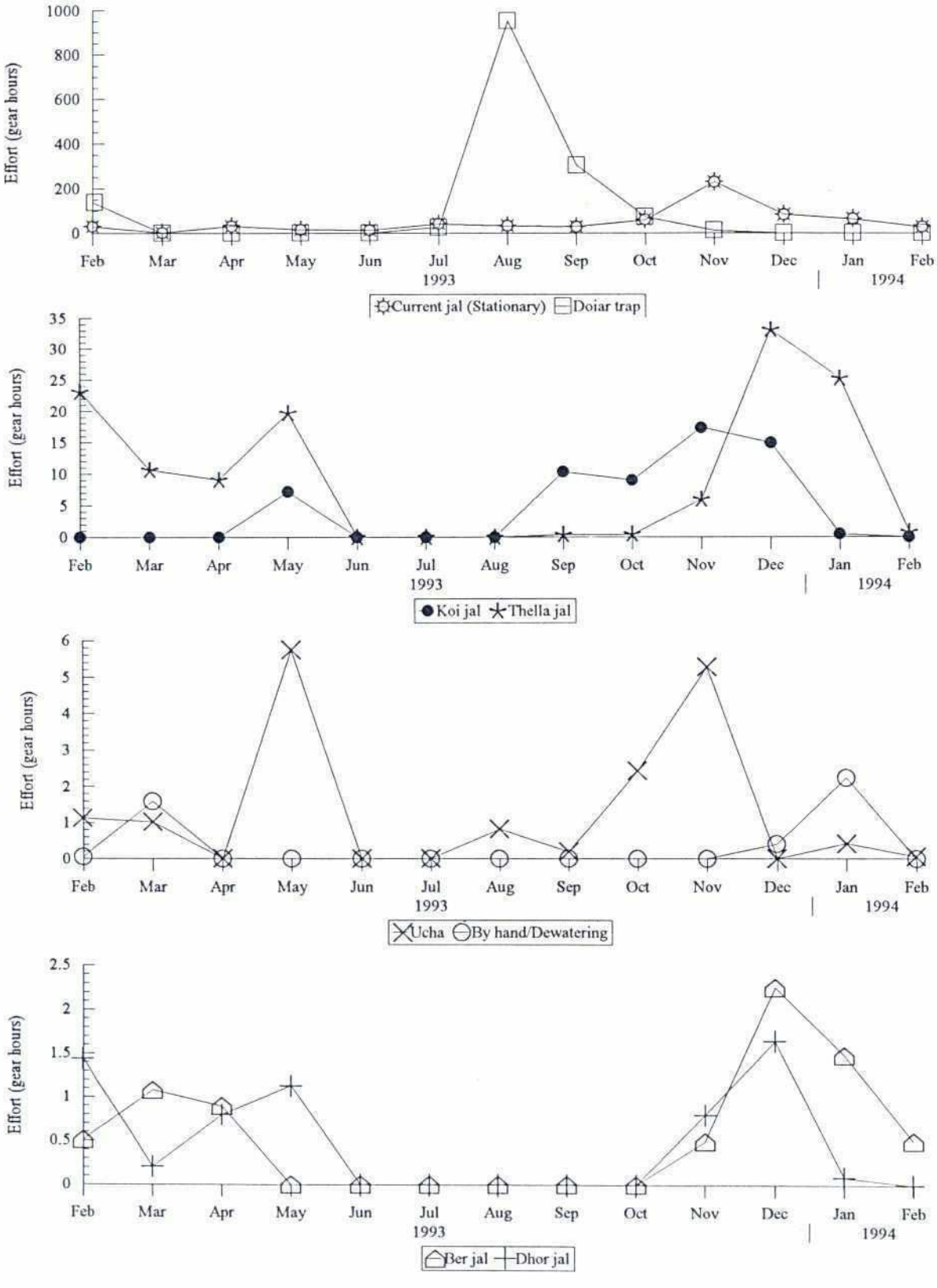
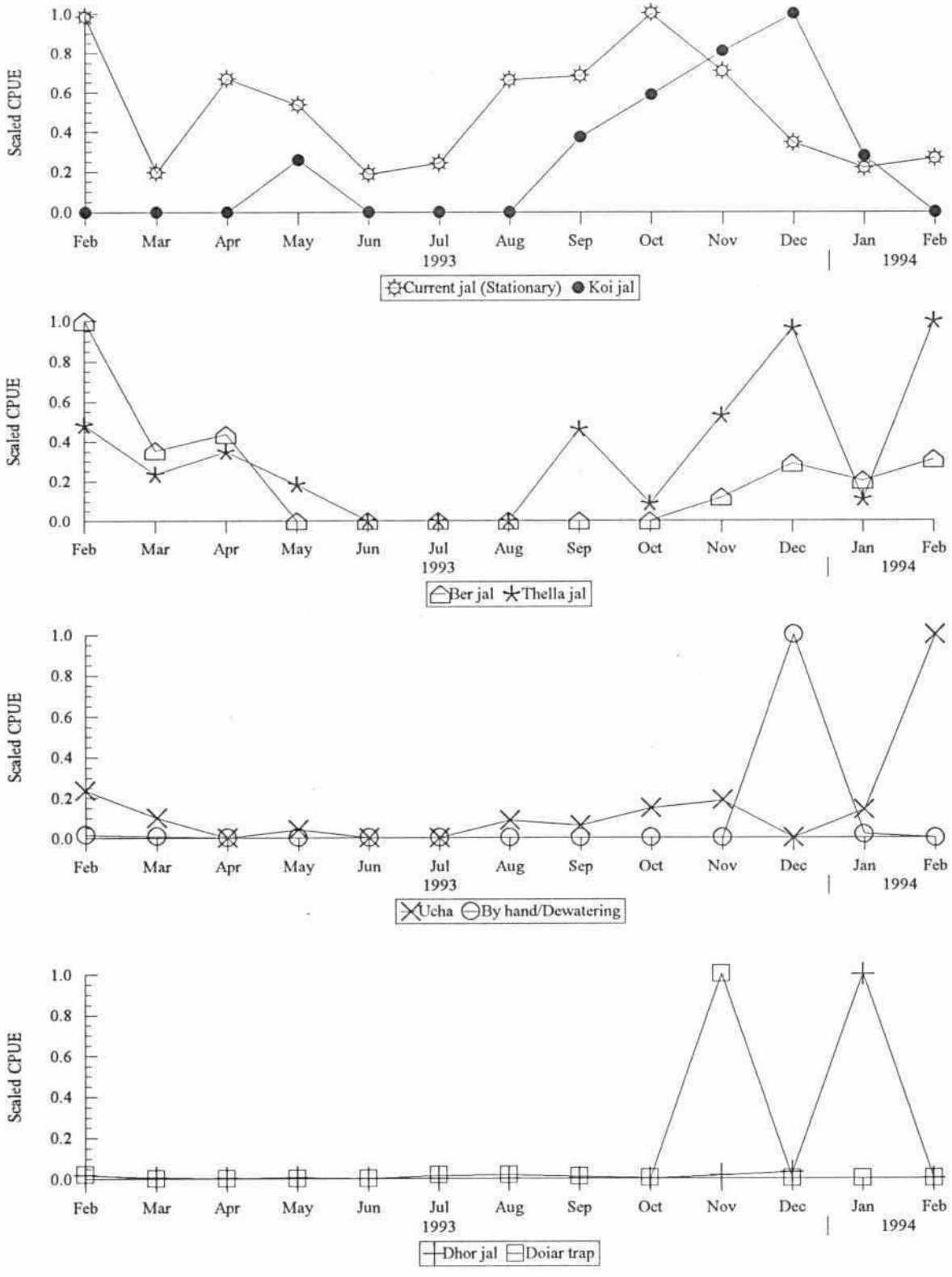


Figure 6.7 Scaled CPUE of dominant gears used on floodplains/*beel* : combined sites NE12+NE13+NE14 (inside SHP)



Note: Scaled CPUE are values of CPUE expressed as a proportion (decimal) of the maximum monthly value recorded

Figure 6.8 Percentage of total monthly catch taken by dominant gears: Lumardai *Khal* site NE15 (inside SHP)

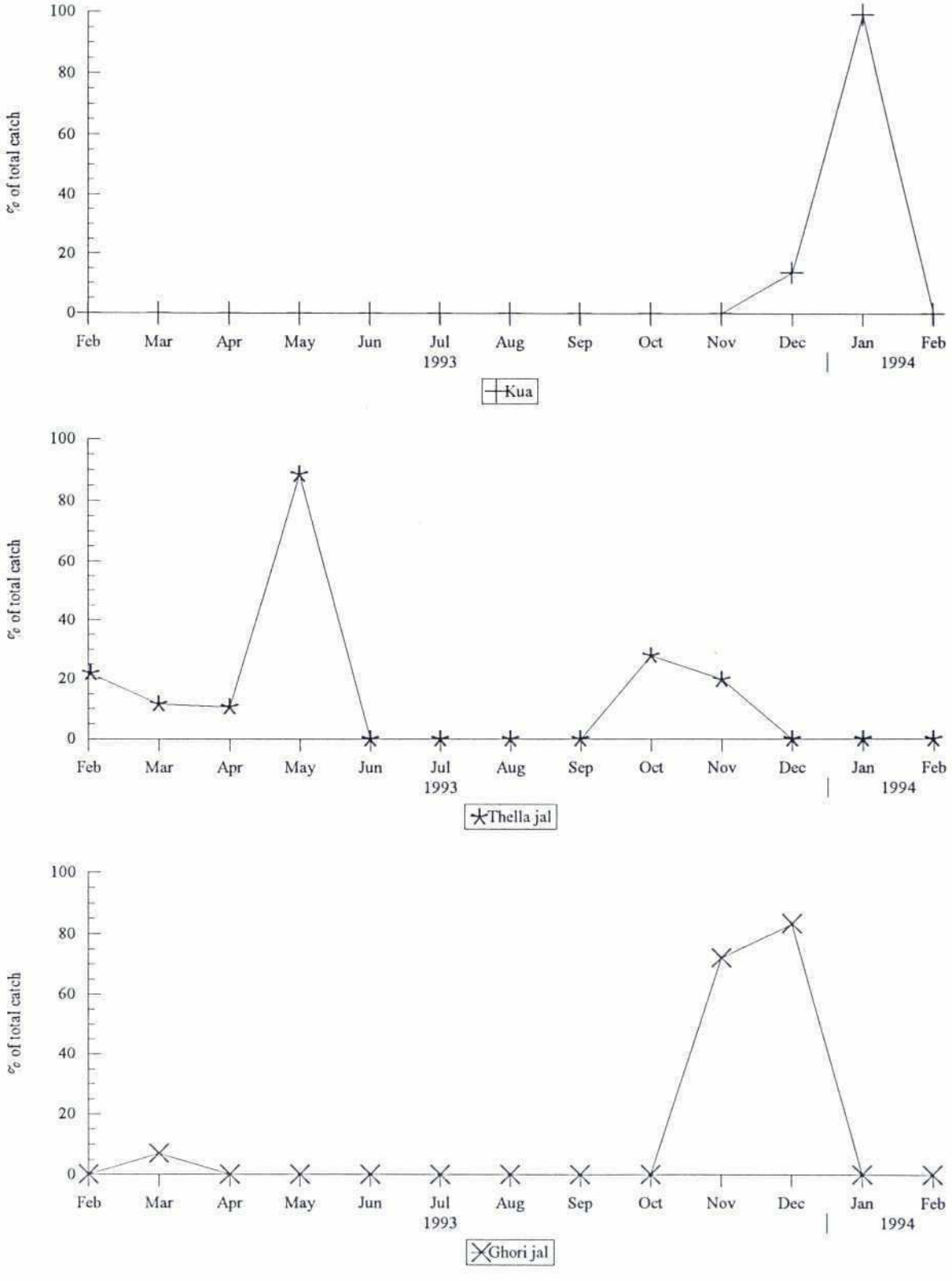


Figure 6.9 Total monthly fishing effort per hectare of Lumardai *Khal* by dominant gears: site NE15 (inside SHP)

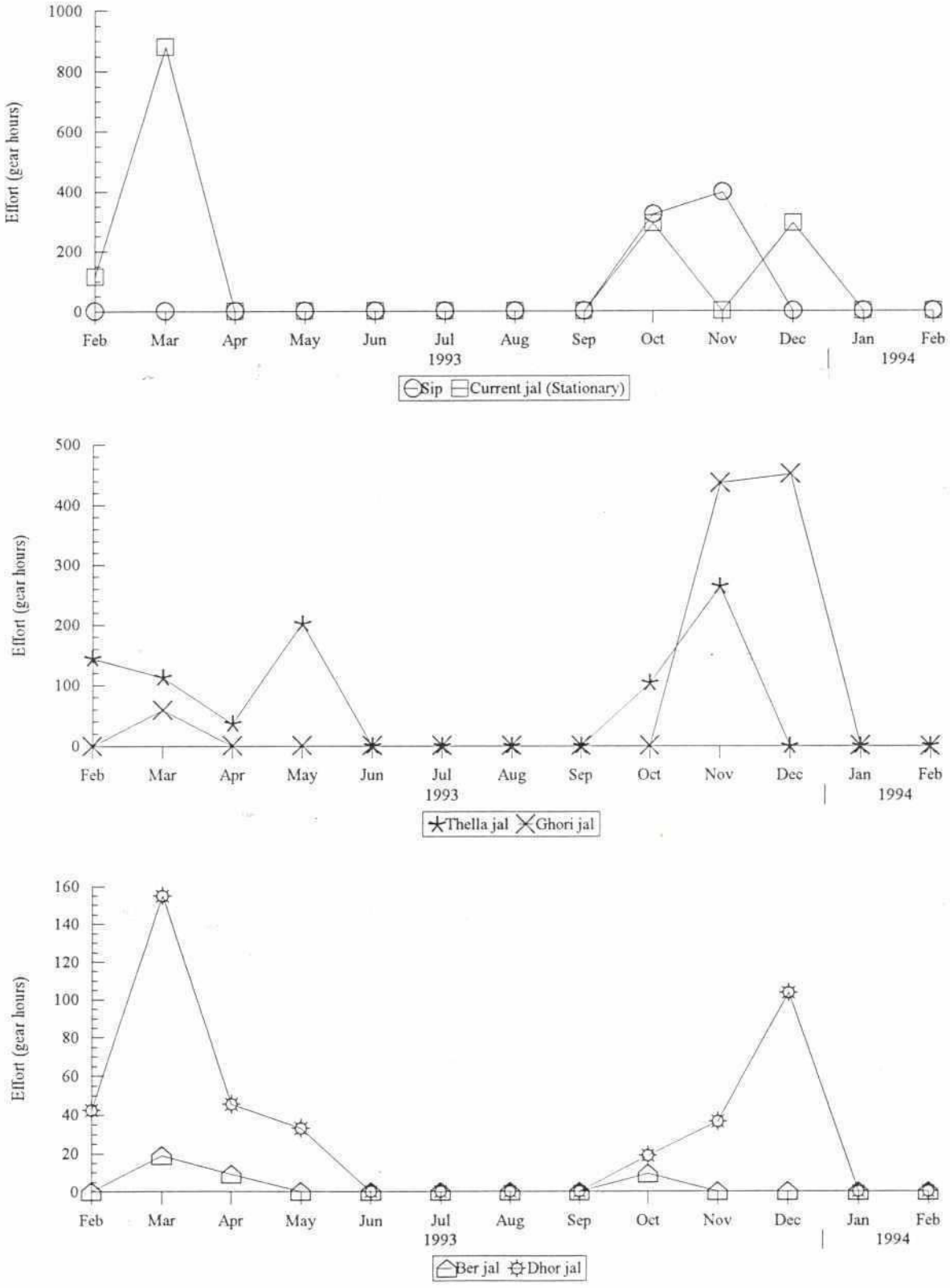
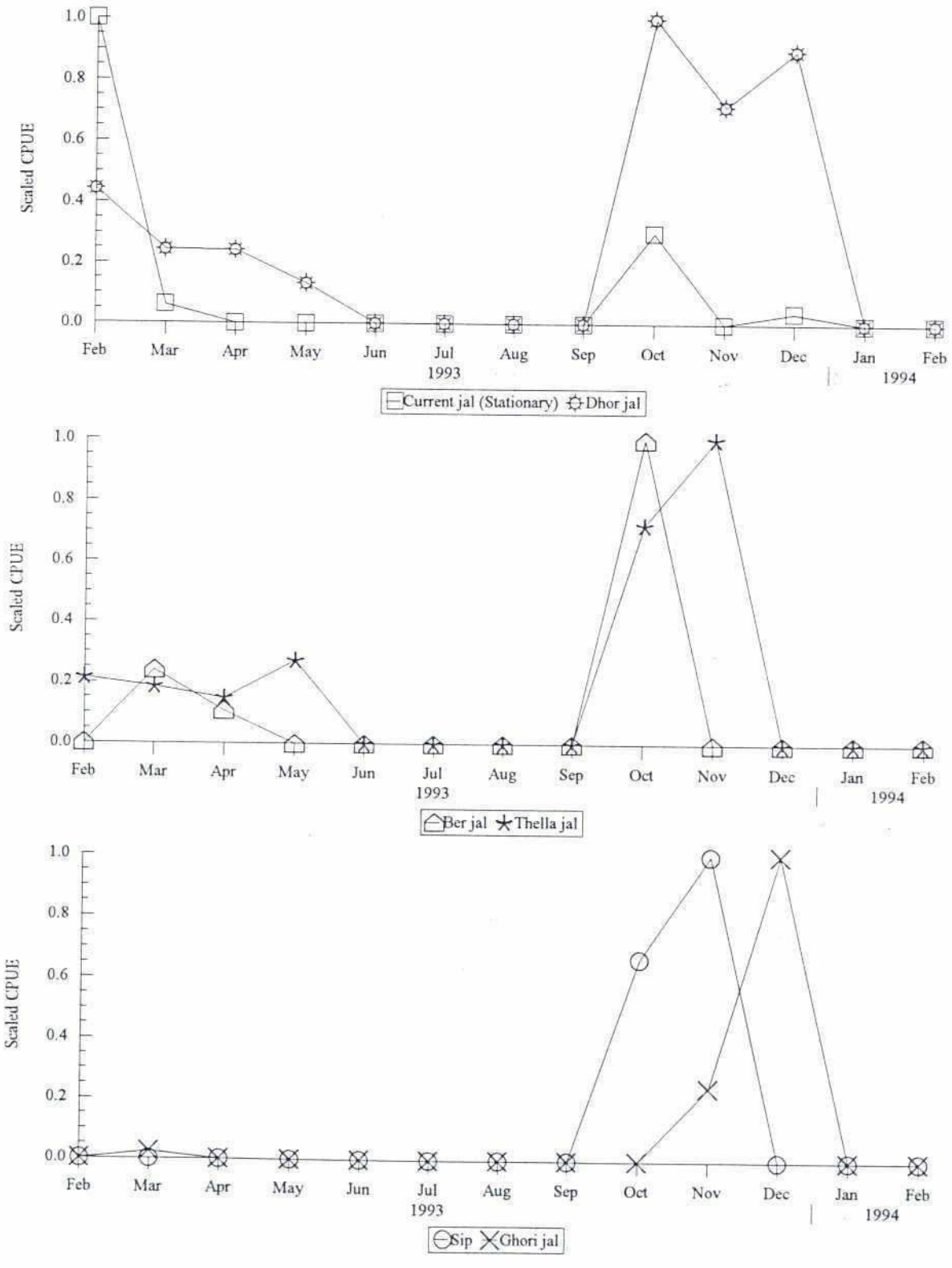


Figure 6.10 Scaled CPUE of dominant gears: Lumardai *Khal* site NE15 (inside SHP)



Note: Scaled CPUE are values of CPUE expressed as a proportion (decimal) of the maximum monthly value recorded

At the inside sites, over 92% of the total catch per hectare for the period March 1993 to February 1994, excluding *katha* and *kua*, was taken by 9 gears. At the outside sites, more than 90% of the total catch per hectare over the same period was taken by 7 gears. In all, 11 gears were initially selected for the statistical analysis of catch rates. Five gears appeared in both lists: *ber jal*, *ghori jal*, *thella jal*, *current jal* and *daun*. *Ber jal* took 24% of the catch per hectare at the inside sites and 36% at the outside sites. An initial inspection of catch rates by gear inside and outside revealed that the usage and seasonal pattern of catch rates by *ghori jal* differed markedly on the inside and outside, so these were removed from the analysis. An extreme outlying catch rate observation for *thella jal* in season 5 at the outside sites was also deleted. Gears used are listed in Table 6.7. A total of 1103 individual catch rate observations were then used in the analysis of catch rates.

Even with the deletions mentioned above, comparison of the seasonally pooled catch rates by gear between inside and outside sites indicated some failures of the assumptions of the statistical analysis, with some notable discrepancies between observed and predicted catch rates, particularly for *current jal* in season 2 at inside sites and *ber jal* in season 5 at outside sites. Other discrepancies could be traced to a very small of catch rate observations.

Parameter estimates measuring the seasonal differences in underlying density of fish at the inside and outside sites indicated a lower density at the inside sites in seasons 2 and 3, and slightly higher densities at the inside sites in seasons 1, 4 and 5. Only the comparison for season 3 was statistically significant at the 5% level when each was considered individually; the others were far from significant. Taken together, no significant difference was found in fish densities at inside and outside sites ($p > 0.6$).

Total annual catches per hectare by the 10 gears were slightly higher at the inside sites than at the outside sites (see Table 6.7). However, given the lack of significant differences in fish density between inside and outside sites detected by the statistical analysis, this was due solely to higher levels of fishing effort expended at the inside sites. Estimates of standardised effort per hectare, summed across all 9 gears and seasons, were derived from the statistical analysis. For the inside sites, the total standardised effort (measured in *ber jal* hours per hectare) was 19.8, compared with 6.2 for the outside sites. Observed and predicted catches per hectare are shown in Table 6.7.

Table 6.7 Statistical comparison of the total catch per hectare from floodplains/*beel* inside and outside the SHP, March 1993 - February 1994

		SEASON																	
		Mar -Apr			May - June			July - Sept			Oct - Nov			Dec - Feb					
		1			2			3			4			5			TOTAL		
GEAR		Obs	Pred	Pred Out	Obs	Pred	Pred Out	Obs	Pred	Pred Out	Obs	Pred	Pred Out	Obs	Pred	Pred Out	Obs	Pred	Pred Out
OUTSIDE	*Ber jal*	0.0	0.0		0.0	0.0		0.0	0.0		1.2	1.8		120.1	53.2		121.3	55.0	
	Thella jal	0.9	0.9		0.8	0.8		4.9	4.5		6.9	6.3		16.4	19.5		29.9	32.0	
	Current jal (stationary)	0.0	0.0		1.7	1.6		0.8	0.7		0.9	1.0		0.1	0.1		3.4	3.3	
	Daun	0.0	0.0		0.5	0.5		0.8	0.8		0.1	0.2		0.0	0.0		1.4	1.4	
	Hand fishing	0.4	0.4		0.0	0.0		0.0	0.0		0.0	0.0		10.6	10.6		11.0	11.0	
	By hand/Dewatering	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		4.2	4.2		4.2	4.2	
TOTAL		1.2	1.3		2.9	2.9		6.6	5.9		9.1	9.3		151.4	87.6		171.2	107.0	
STD ERR			0.2		0.0	0.4			0.6			1.6			5.0			5.3	
INSIDE	*Ber jal*	18.6	18.6	18.6	0.0	0.0	0.0	3.4	3.4	3.4	1.9	1.3	1.3	5.0	8.1	8.1	28.9	31.4	31.4
	Thella jal	6.6	6.4	6.4	6.6	6.2	6.2	3.1	4.4	4.4	7.3	10.7	10.7	18.2	15.8	15.8	41.8	43.4	43.4
	Current jal (stationary)	3.5	3.5	3.5	0.9	2.3	2.3	5.6	7.7	7.7	15.9	11.7	11.7	9.2	9.2	9.2	35.0	34.4	34.4
	Daun	0.0	0.0	0.0	0.0	0.1	0.1	1.3	1.3	1.3	1.3	1.0	1.0	0.0	0.0	0.0	2.6	2.5	2.5
	Dhor jal	1.7	1.7	1.7	0.6	0.6	0.6	1.0	1.0	1.0	1.0	1.0	1.0	3.5	3.5	3.5	7.9	7.9	7.9
	Doiar trap	0.0	0.0	0.0	0.0	0.0	0.0	2.7	2.7	2.7	0.1	0.1	0.1	1.9	1.9	1.9	4.6	4.6	4.6
	Ucha	0.3	0.3	0.3	0.7	0.7	0.7	0.7	0.7	0.7	2.8	2.8	2.8	2.7	2.7	2.7	7.1	7.1	7.1
	Koi jal	0.0	0.0	0.0	0.3	0.3	0.3	0.6	0.6	0.6	1.3	1.3	1.3	4.8	4.8	4.8	7.0	7.0	7.0
TOTAL		30.7	30.4	30.4	9.2	10.3	10.3	18.3	21.9	21.9	31.6	29.8	29.8	45.2	46.0	46.0	135.0	138.4	138.4
STD ERR			6.6	6.6		1.4	1.4		2.8	2.8		2.7	2.7		6.9	6.9		10.4	10.4

Note: Obs = observed; Pred = predicted

6.4 Biodiversity and Catch Composition

6.4.1 Species richness

Between March 1993 and February 1994, 71 species of fish were recorded from the unregulated Dekker *Haor*. This compares with a total of 76 species found inside the SHP during the same period, an increase in species diversity of 7% (Table 6.8). Examination of diversities of different fish groups revealed no difference in floodplain resident fish inside and outside the SHP but a higher diversity of migratory species and a slightly lower number of riverine species from regulated sites. The results suggest that there was no discernible harmful impact on biodiversity by partial flood control using submersible embankments.

Table 6.8 Total annual number of fish species, classified by habitat preference, recorded from floodplains/*beel*/submerged canals inside and outside the SHP, March 1993 - February 1994

Site name	Site Code	In/Out SHP	Number of species			Total
			Riverine	Migratory	Floodplain resident	
Dapha floodplain	NE17	Out	4	11	40	55
Dapha *Beel*	NE18	Out	10	12	41	63
Chatal *Beel*	NE19	Out	8	8	41	57
Total		Out	11	14	46	71
Mouti *Beel*	NE12	In	6	15	46	67
Karchabrar *Beel*	NE13	In	5	17	42	64
Asumura floodplain	NE14	In	6	15	37	58
Total		In	8	22	46	76
Lumardai *Khal*	NE15	In	7	9	43	59

6.4.2 Catch composition

Percentage contribution made to annual catches by riverine, migratory and floodplain resident species are presented in Table 6.9.

Table 6.9 Percentage contribution of riverine, migratory and floodplain resident species to the total annual catches from floodplains/*beel*/submerged canals inside and outside the SHP, March 1993 - February 1994

Floodplain name	Site Code	In/Out SHP	Percentage of annual catch		
			Riverine	Migratory	Floodplain resident
Dapha floodplain	NE17	Out	<1	5.9	26.3
Dapha *Beel*	NE18	Out	1	7.4	73.2
Chatal *Beel*	NE19	Out	1	12.5	70.7
Total		Out	1	9.1	66.1
Mouti *Beel*	NE12	In	<1	8.1	74.6
Karchabrar *Beel*	NE13	In	<1	22.2	52.3
Asumura floodplain	NE14	In	1.2	14.3	61.6
Total			<1	18.5	57.9
Lumardai *Khal*	NE15	In	<1	47.8	44.6

Riverine species made negligible contributions to annual catches at all sites inside and outside the SHP. Migratory species, however, provided 9% of the catch from sites on the unregulated Dekker *Haor* compared with 19% of the catch from sites inside the SHP. Floodplain resident species accounted from 66% and 57% of catches from unregulated and regulated floodplain/ *beel* respectively. The results indicated that not only was there no appreciable impact on species diversity by partial flood control but that there was also no overall reduction in contributions to the catch made by migratory and riverine species.

The percentage contributions of individual dominant species to annual catches from each site are presented in Table 6.10. No riverine species comprised more than 1% of the catch at sites inside and outside the SHP. A total of 7 dominant migratory species was recorded from sites on Dekker *Haor* compared with 8 from the SHP. When catch data were pooled from floodplain and *beel* sites, only 3 dominant migratory species were observed inside and outside the SHP. These were, in order of abundance, *kalbaus*, *chapila*, and *fulchela* on Dekker *Haor* and *rui*, *fulchela* and *chapila* inside the SHP. The major differences between unregulated and regulated areas was the greater abundance of *rui* inside the SHP where it was captured mainly from the leased fishery on Karchabrar *Beel* and, to a lesser extent, from Lumardai *Khal*. *Fulchela* was particularly abundant in Lumardai *Khal* where it accounted for 30%

Table 6.10 Percentage contribution (by weight) by dominant species to the total catch from floodplains/beel inside and outside the SHP, March 1993 – February 1994

Habitat	Specie name		Inside SHP					Outside SHP			
			Mouti *Beel*	Karchabrar *Beel*	Asumura Floodplain	All Floodplain/ beel Sites	Lumardai *Khal*	Dhapha Floodplain	Dhapha *Beel*	Chatal *Beel*	All Floodplain/ beel Sites
Preference	Scientific	Bengali	NE12	NE13	NE14		NE15	NE17	NE18	NE19	
Migratory	*Aorichthys aor*	*Ayre*	1.2	–	–	–	–	–	–	1.3	–
	Aorichthys seenghala	*Guizza*	1.5	–	2.6	–	–	–	–	–	–
	Mystus bleekeri	*Golsha tengra*	–	–	5.2	–	–	–	–	–	–
	Mystus cavasius	*Kabashi*	–	–	1.4	–	–	–	–	–	–
	Labeo calbasu	*Kalbaus*	1.1	–	–	–	1.4	2.6	1.4	–	1.4
	Labeo rohita	*Rui*	1.0	15.5	–	11.4	4.2	–	1.1	–	–
	Salmostoma bacaila	*Katari*	–	–	–	–	–	1.3	–	–	–
	Salmostoma phulo	*Fulchela*	–	2.3	–	1.7	30.4	–	–	2.5	1.1
	Gudusia chapra	*Chapila*	1.3	1.4	3.0	1.5	10.2	3.1	2.5	6.5	3.9
	Wallagu attu	*Boal*	–	–	–	–	–	–	1.4	–	–
Subtotal			6.2	19.5	12.2	14.6	46.3	6.9	6.4	10.3	6.4
Floodplain	*Anabas testudineus*	*Koi*	3.5	1.4	6.5	2.2	–	–	–	–	–
Resident	*Mystus tengara*	*Bajari tengra*	–	–	–	–	–	–	3.6	–	1.9
	Mystus vittatus	*Tengra*	–	–	5.6	1.1	–	–	–	–	–
	Rama chandramara	*Laia*	–	–	–	–	–	–	3.2	–	1.6
	Colisa fasciatus	*Khalisha*	3.7	–	1.1	1.4	–	–	–	–	–
	Xenentodon cancila	*Kaikka*	1.0	6.1	3.6	4.8	14.2	–	3.3	14.3	6.5
	Puntius chola	*Chala puti*	3.8	1.6	2.6	2.1	–	–	–	–	–
	Puntius conchonius	*Canchan puti*	2.5	–	6.2	1.7	–	11.4	2.5	5.3	4.9
	Puntius gelius	*Giliputi*	–	4.4	1.2	3.3	1.8	–	–	–	–
	Puntius sophore	*Puti*	11.4	7.5	3.0	6.2	1.5	1.4	–	–	–
	Puntius ticto	*Tit puti*	–	–	–	–	–	2.6	–	–	–
	Rasbora daniconius	*Darkina*	1.8	1.9	–	1.7	–	–	–	–	–
	Glossogobius giurus	*Bailla*	2.3	4.1	–	3.4	1.3	1.2	4.5	5.0	4.1
	Lepidocephalus guntea	*Gutum*	1.4	–	–	–	–	–	3.4	2.4	2.6
	Channa marulius	*Gajar*	3.3	1.8	–	2.0	3.4	–	2.3	7.4	3.7
	Channa punctatus	*Taki*	8.8	1.5	5.4	3.4	1.3	1.7	2.2	1.6	1.9
	Channa striatus	*Shol*	1.3	–	–	–	–	–	–	3.4	1.5
	Clarias batrachus	*Magur*	1.2	–	2.1	–	3.1	–	–	–	–
	Heteropneustes fossilis	*Shingi*	3.3	–	2.8	1.5	4.0	–	5.3	–	3.1
	Macrognathus aculeatus	*Tara baim*	–	–	–	–	–	–	3.7	1.4	2.4
	Macrognathus pancalus	*Guchi*	6.1	1.2	–	2.2	–	–	14.6	3.1	8.4
	Mastacembelus armatus	*Baral baim*	1.1	–	1.6	–	1.2	1.3	9.0	1.4	5.2
	Nandus nandus	*Bheda*	2.0	1.8	6.9	2.2	–	3.1	1.5	3.4	2.4
	Notopterus notopterus	*Foli*	3.7	2.0	–	2.3	1.3	1.2	2.6	11.1	5.2
	Tetraodon cutcutia	*Potka*	–	1.9	1.1	1.7	–	3.5	2.2	2.0	2.3
	Chaca chaca	*Cheka*	–	–	–	–	–	–	1.2	–	–
	Chanda baculis	*Chanda*	3.4	2.9	6.0	3.2	4.8	1.4	2.9	4.5	3.2
	Chanda nama	*Nama chanda*	–	–	–	–	1.5	–	–	–	–
	Chanda ranga	*Lal chanda*	1.6	1.9	–	1.7	–	–	–	–	–
Subtotal			66.9	42.3	55.6	50.2	39.5	28.9	67.9	66.3	60.9
	Prawn spp.	*Chingri/Icha*	17.0	25.0	23.0	23.1	7.4	57.2	18.5	15.9	24.0
Subtotal			17.0	25.0	23.0	23.1	7.4	57.2	18.5	15.9	24.0
Grand total			90.1	86.7	90.8	87.9	93.2	93.0	92.8	92.5	91.3

Notes: 1. Dominant species are those species contributing 1% or more by to the total annual catch

2. Shaded values highlight the most important species (>4%)

3. See text for definations of habitat preference categories (Section 5.3.1)

of the catch. In contrast, *chapila* and *kalbaus* were more abundant on Dekker *Haor* than inside the SHP.

A total of 20 dominant floodplain resident species was recorded from sites on Dekker *Haor* compared with 23 species from sites in the SHP. As with migratory species, there were large variations in species compositions between sites. When catch data from floodplains and *beel* were pooled 17 and 19 dominant floodplain resident species were observed from unregulated and regulated areas respectively. The most abundant species by weight on Dekker *Haor* were *guchi baim*, *kaikka*, *baral baim*, *foli*, *canchan puti* and *bailla*. In the SHP the two most dominant species were *puti* and *kaikka* whilst the percentage catch contributions of remaining 17 species ranged from about 1% to 3%. A total of 11 dominant floodplain resident species was common to both Dekker *Haor* and the SHP, and these included all the most abundant species listed above from Dekker *Haor*.

Prawns formed an important component of the catch from Dekker *Haor* and the SHP where they accounted for 24% and 23% of the overall catch from floodplains and *beel* respectively. They were particularly abundant in catches from unregulated floodplains where they comprised 57% of the annual catch. A similarly high abundance on floodplains on the unregulated Hakaluki *Haor* and from those inside the Manu Irrigation Project was observed in other FAP 17 studies.[7] Unfortunately, because of taxonomic difficulties, prawns were rarely identified in the field. However, sub-samples were regularly sent to the Institute of Marine Science, Chittagong for identification. Results provided so far indicate that all species belonged to the genus *Macrobrachium*. This genus is generally regarded as an estuarine spawner which makes migrations into freshwaters at the juvenile stage in its life history. However, FAP 17 studies on fish hatchling movements by passive downstream drift revealed that juvenile prawns formed an important component of the catch in the North East Region and in other parts of Bangladesh. This suggests that at least some prawn species are capable of breeding inland.

6.5 Fish Migrations

Seasonal movements of fish were identified from changes in monthly catch compositions from floodplains/*beel* in Dekker *Haor* and the SHP (Tables 6.11 - 6.12) together with temporal and spatial changes in the distributions of important individual species and changes in monthly species numbers and catch contributions of riverine, migratory and floodplain resident fish. Where available, additional data on the average size of fish and their reproductive state (Table 6.13) were used to determine whether the fish were adults or juveniles and whether migration were made primarily for breeding, growth or both.

6.5.1 Unregulated Dekker *Haor*

In February 1993, the first month of sampling on Dekker *Haor*, 10 riverine and migratory species were recorded on floodplains/*beel*. These species may have overwintered in perennial waters or may have entered from the Old Surma River during the flash flood in late February which temporarily flooded *beel* and their surrounding low land. In March there was little entry of river floodwaters on to floodplains and in April, none at all. During this period, the number of riverine and migratory species declined considerably and, in April, no riverine species were found in catches. One migratory species, *guizza*, accounted for 65% of the total monthly catch (Figs 6.11 and 6.12). Throughout May river floodwaters inundated floodplains and at this time one riverine species and 6 migratory species reappeared in catches. The most abundant of these were *rui*, *kalbaus* and *chapila*. Data on mean individual weights of fish indicated that the two major carp species were at least one year old (*rui*: 800 g; *kalbaus*: 404 g) and that *chapila* were adults (25 g) in peak breeding condition (Table 6.13). Further heavy river flooding in June and July which resulted in extensive inundation of floodplains produced no notable increase in the entry of riverine and migratory species. Diversities and catch contributions of these groups of fish decreased during this period but later increased again from August to October.

6.5.2 Regulated Shanghair *Haor*

The entry of river waters on to Shanghair *Haor* was prevented by submersible embankments until 18 May 1993. Between February and April, a total of 3 riverine and 9 migratory species was recorded (Fig. 6.13). This compares with totals of 5 riverine and 7 migratory species recorded from unregulated floodplains and *beel* during the same period. Monthly catch contributions by riverine species remained very low (<0.2%) while migratory species

Table 6.11 Monthly catch composition (% by weight) from combined floodplains/beel: outside SHP (sites NE17+NE18+NE19)

Species Code	Habitat Preference	Species name		Year: 1993										Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Scientific	Bengali	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
139	Riverine	*Nemacheilus botia*	*Balichata*	–	–	–	–	–	–	0.054	–	–	–	0.001	0.066	0.027	8.221	0.021
941		*Neoeucirrhichthys maydelli*	*Gutum*	0.204	1.399	–	0.821	–	–	–	–	0.012	0.054	–	0.205	0.652	177.234	0.451
198		*Somileptes gongota*	*Gharpoia*	0.028	–	–	–	–	–	–	–	–	–	0.001	0.087	0.237	59.707	0.152
28		*Botia dario*	*Rani*	–	–	–	–	–	–	–	0.026	0.025	–	–	–	0.00002	1.175	0.003
58		*Corica soborna*	*Kachki*	0.291	–	–	–	–	–	–	–	–	0.067	0.187	0.040	–	8.588	0.022
30		*Brachygobius nunus*	*Nunabailla*	0.170	0.038	–	–	–	–	0.017	0.049	0.134	0.070	–	–	–	6.111	0.016
92		*Hyporhampus gaimardi*	*Ek thota*	0.714	–	–	–	–	–	–	–	–	–	0.112	0.583	0.088	35.088	0.089
51		*Clupisoma garua*	*Ghaura*	–	–	–	–	–	–	0.189	–	–	–	–	–	–	1.085	0.003
87		*Hara hara*	*Kutakanti*	–	–	–	–	–	–	–	–	–	–	–	–	0.001	0.132	0.0003
961		*Microphis deocata*		–	–	–	–	–	–	–	0.196	0.003	0.022	–	–	–	6.684	0.017
158		*Pangasius pangasius*	*Pangas*	–	–	–	–	0.180	–	–	–	–	–	–	–	–	0.470	0.001
	Subtotal			1.407	1.437	–	0.821	0.180	–	0.259	0.271	0.174	0.214	0.301	0.981	1.005	304.495	0.774
130	Migratory	*Aoriichthys aor*	*Ayre*	–	–	–	–	–	–	–	–	–	0.068	–	–	0.695	173.206	0.440
135		*Aoriichthys seenghala*	*Guizza*	–	–	65.304	–	–	–	–	0.149	0.282	–	–	–	0.118	79.779	0.203
25		*Batasio tengana*	*Tengra*	–	–	–	–	–	–	–	–	–	0.133	0.215	–	–	11.008	0.028
131		*Mystus bleekeri*	*Golsha tengra*	0.019	–	–	0.505	0.493	–	5.709	0.666	0.166	0.018	0.186	0.037	0.163	107.522	0.273
132		*Mystus cavasius*	*Kabashi*	–	–	–	1.306	0.433	–	8.165	0.580	0.029	0.014	0.032	–	0.038	86.933	0.221
47		*Cirrhinus mrigala*	*Mrigel*	–	–	–	–	–	–	–	0.197	0.322	–	–	–	–	10.735	0.027
48		*Cirrhinus reba*	*Raik*	–	–	–	–	–	–	–	–	0.043	0.004	0.007	0.105	0.001	3.006	0.008
102		*Labeo calbasu*	*Kalbaus*	–	–	–	17.498	15.102	–	2.263	5.383	2.639	0.141	–	0.075	0.571	536.009	1.363
107		*Labeo rohita*	*Rui*	0.527	–	–	25.222	–	–	–	–	–	–	0.312	–	0.004	205.953	0.524
188		*Salmostoma bacaila*	*Katari*	–	0.177	–	–	–	–	–	–	–	1.008	1.788	–	–	88.721	0.226
189		*Salmostoma phulo*	*Fulchela*	1.309	–	–	0.036	–	–	–	0.010	–	–	0.511	4.514	1.321	418.801	1.065
86		*Gudusia chapra*	*Chapila*	1.457	0.039	–	5.269	–	–	0.135	0.498	2.764	2.644	12.831	6.656	3.487	1546.716	3.934
169		*Pseudeutropius atherinoides*	*Batasi*	–	–	–	–	–	–	–	–	–	–	–	0.0002	–	0.003	0.000008
209		*Wallagu attu*	*Boal*	0.579	0.039	–	–	–	–	–	0.476	–	–	–	0.114	1.243	322.144	0.819
	Subtotal			3.891	0.256	65.304	49.836	16.028	–	16.271	7.959	6.245	4.030	15.882	11.501	7.640	3590.536	9.131
6	Floodplain	*Anabas testudineus*	*Koi*	0.123	–	–	–	0.229	–	–	–	–	–	–	–	0.047	12.227	0.031
136	Resident	*Mystus tengara*	*Bajari tengra*	0.022	0.296	–	0.443	–	–	0.207	0.097	0.439	0.269	1.763	0.190	2.742	754.965	1.920
137		*Mystus vittatus*	*Tengra*	0.044	0.049	–	0.067	0.130	0.995	7.316	0.199	–	0.013	0.434	0.484	0.493	192.761	0.490
942		*Rama chandramara*	*Laia*	0.578	–	–	–	–	–	0.034	0.548	0.054	0.081	1.011	0.122	2.405	644.065	1.638
55		*Colisa fasciatus*	*Khalisha*	0.358	0.251	–	0.170	–	–	0.077	0.324	–	0.369	0.570	0.037	0.122	72.835	0.185
211		*Colisa labiosus*	*Khalisha*	–	0.321	–	0.669	–	–	0.193	0.025	0.162	0.101	0.071	–	–	16.199	0.041
57		*Colisa sota*	*Khalisha*	–	0.020	–	0.261	–	–	0.017	–	0.023	–	0.014	0.0001	–	2.957	0.008
210		*Xenentodon cancila*	*Kaikka*	4.644	0.216	–	0.468	0.899	–	0.198	0.027	0.100	0.513	1.484	15.602	9.062	2570.786	6.538
187		*Osteobrama cotio cotio*	*Keti*	0.028	–	–	–	–	–	–	–	–	–	0.064	–	–	1.934	0.005
174		*Puntius chola*	*Chala puti*	–	–	–	1.066	0.602	–	–	0.024	0.174	0.216	–	0.021	0.026	27.280	0.069
175		*Puntius conchonius*	*Canchan puti*	3.945	1.851	–	3.011	0.432	–	4.805	1.085	0.845	11.162	19.054	6.174	3.099	1926.018	4.898
176		*Puntius gelius*	*Giliputi*	1.572	0.833	2.239	0.176	–	0.120	0.086	0.054	0.208	0.439	2.690	0.428	0.091	136.563	0.347
178		*Puntius phutunio*	*Phutani puti*	0.210	0.133	–	–	–	–	0.187	0.006	0.268	0.007	0.008	0.006	–	6.335	0.016
180		*Puntius sophore*	*Puti*	1.090	–	–	0.563	0.179	–	–	0.041	0.476	1.372	2.912	0.488	0.265	221.161	0.562
181		*Puntius terio*	*Teri punti*	–	0.433	1.959	0.057	–	–	0.043	0.047	0.074	0.026	0.948	0.064	0.058	50.844	0.129
212		*Puntius tieto*	*Tit puti*	0.072	–	–	0.102	–	–	–	0.050	–	2.009	3.243	0.466	0.397	273.893	0.697
5		*Amblypharyngodon mola*	*Mola*	0.612	0.020	–	–	–	0.120	–	–	–	–	–	0.076	0.00004	1.453	0.004
68		*Danio devario*	*Chebli*	–	–	–	–	–	–	–	–	–	–	–	0.087	0.027	8.194	0.021
75		*Esomus danricus*	*Darkina*	0.057	–	–	0.045	–	–	–	–	0.009	0.033	–	0.013	0.008	3.686	0.009
182		*Rasbora daniconius*	*Darkina*	0.139	0.339	–	–	–	–	–	–	–	–	0.103	0.128	0.367	96.668	0.246
184		*Rasbora rasbora*	*Leuzza darkina*	–	–	–	–	–	–	–	–	–	–	0.012	–	–	0.357	0.001

(Cont.)

Table 6.11 Monthly catch composition (% by weight) from combined floodplains/beel: outside SHP (sites NE17+NE18+NE19)

Species	Habitat	Species name		Year: 1993										Year: 1994		Total annual catch (Mar'93 – Feb'94)	
Code	Preference	Scientific	Bengali	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
83		*Glossogobius giurus*	*Bailla*	4.671	5.542	–	1.747	4.166	2.034	4.763	0.409	0.395	1.421	2.504	4.531	5.377	1614.705	4.107
43		*Chela cachius*	*Chep chela*	–	–	–	–	–	–	–	–	–	–	0.016	–	–	0.476	0.001
219		*Lepidocephalus annandalei*	*Puiya*	–	–	–	–	–	–	–	–	–	0.022	–	–	–	0.739	0.002
110		*Lepidocephalus guntea*	*Gutum*	1.785	13.778	–	2.967	–	–	–	0.011	0.275	0.186	0.520	1.477	3.648	1020.177	2.595
9		*Aplocheilus panchax*	*Kanpona*	0.002	–	–	–	–	–	–	–	–	–	0.025	–	0.0003	0.827	0.002
38		*Channa barca*	*Tila shol*	–	–	–	–	–	–	–	–	–	–	–	0.006	–	0.100	0.0003
39		*Channa marulius*	*Gajar*	0.843	–	–	–	–	–	12.584	0.185	1.972	–	–	4.570	5.073	1434.246	3.648
41		*Channa punctatus*	*Taki*	0.908	6.764	–	5.478	35.939	50.019	3.662	0.157	1.792	0.401	0.438	2.559	1.794	750.587	1.909
42		*Channa striatus*	*Shol*	1.275	–	–	–	–	–	–	–	–	–	–	2.940	2.230	599.350	1.524
49		*Clarias batrachus*	*Magur*	–	–	–	1.557	0.058	–	–	–	–	–	0.131	0.546	0.903	247.601	0.630
88		*Heteropneustes fossilis*	*Shingi*	1.781	1.110	–	9.660	3.858	5.271	1.117	0.202	1.587	0.405	0.183	0.706	4.228	1199.368	3.050
121		*Macrognathus aculeatus*	*Tara baim*	0.052	1.084	–	0.573	0.521	–	0.560	0.607	0.047	0.035	–	0.349	3.661	939.462	2.389
123		*Macrognathus pancalus*	*Guchi*	0.957	7.340	–	1.985	–	–	0.075	0.232	0.040	–	0.130	2.142	13.101	3311.820	8.423
122		*Mastacembelus armatus*	*Baral baim*	0.179	–	–	0.482	16.262	1.129	35.367	0.511	2.664	0.342	0.567	0.880	6.852	2034.776	5.175
138		*Nandus nandus*	*Bheda*	1.698	0.618	–	1.091	5.293	1.807	1.220	1.238	9.689	0.751	2.187	3.037	2.390	946.954	2.408
15		*Badis badis*	*Napit koi*	0.244	0.255	–	0.079	0.057	–	0.040	0.321	0.529	0.400	0.236	0.040	0.038	50.255	0.128
149		*Ophisternon bengalense*	*Bamosh*	–	–	–	–	–	0.225	–	–	–	–	–	–	–	0.116	0.0003
147		*Ompok bimaculatus*	*Kani pabda*	–	–	–	0.107	2.188	–	0.569	–	0.046	0.131	0.028	–	0.145	51.473	0.131
148		*Ompok pabda*	*Madhu pabda*	–	–	–	–	0.207	–	–	0.204	–	–	–	0.236	–	10.762	0.027
145		*Notopterus notopterus*	*Foli*	6.742	–	–	0.208	8.294	5.512	0.646	0.963	1.233	0.535	1.280	3.084	7.505	2032.994	5.170
203		*Tetraodon cutcutia*	*Potka*	5.863	0.984	3.077	0.159	–	0.241	1.036	0.733	1.187	2.863	5.670	2.882	2.198	911.039	2.317
33		*Chaca chaca*	*Cheka*	0.727	2.277	–	1.067	–	–	–	–	–	–	–	0.893	0.936	261.908	0.666
35		*Chanda baculis*	*Chanda*	4.750	1.784	2.239	0.575	0.447	0.241	0.504	1.061	0.549	2.247	11.861	4.214	2.863	1266.408	3.221
36		*Chanda nama*	*Nama chanda*	9.396	0.184	0.840	–	–	0.241	0.034	0.006	0.005	0.054	1.183	0.216	0.031	50.461	0.128
37		*Chanda ranga*	*Lal chanda*	2.463	3.906	1.959	0.880	0.471	1.927	0.390	0.704	1.085	0.477	2.339	0.501	0.229	215.148	0.547
	Subtotal			57.827	50.385	12.313	35.713	80.231	69.883	75.730	10.071	25.926	26.879	63.676	60.191	82.410	25972.933	66.054
998	Others	Unidentified fish		0.057	–	–	–	–	–	–	–	–	–	–	–	–	–	–
945		*Crab sp*	*Kakra*	–	–	–	–	–	–	–	0.126	0.060	–	–	–	–	4.684	0.012
931		Prawn spp.	*Chingri/Icha*	36.817	47.922	22.384	13.630	3.561	30.116	7.738	81.571	67.594	68.876	20.140	27.325	8.945	9447.874	24.028
	Subtotal			36.874	47.922	22.384	13.630	3.561	30.116	7.738	81.697	67.654	68.876	20.140	27.325	8.945	9452.558	24.040
	Grand total			100	100	100	100	100	100	100	100	100	100	100	100	100	39320.517	100

Note: – denotes zero catch

Table 6.12 Monthly catch composition (% by weight) from combined floodplains/beel: inside SHP (sites NE12+NE13+NE14)

Species Code	Habitat Preference	Species name		Year: 1993											Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Scientific	Bengali	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
139	Riverine	*Nemacheilus botia*	*Balichata*	–	–	–	1.068	–	–	–	–	–	–	–	–	–	13.001	0.028
941		*Neoeucirrhichthys maydelli*	*Gutum*	–	0.021	0.163	2.913	–	–	0.093	0.004	–	0.009	–	–	–	45.217	0.099
28		*Botia dario*	*Rani*	–	–	–	–	–	–	–	0.115	0.023	–	–	–	–	1.113	0.002
58		*Corica soborna*	*Kachki*	–	–	–	–	–	–	–	–	–	0.179	0.006	–	–	11.120	0.024
952		*Awaous grammepomus*	*Nonda baila*	–	–	–	–	–	–	–	–	–	–	–	–	0.001	0.041	0.0001
14		*Awaous stamineus*	*Bele*	–	0.050	–	–	–	–	–	–	–	–	–	–	–	1.666	0.004
92		*Hyporhampus gaimardi*	*Ek thota*	–	–	–	–	–	–	–	–	–	0.080	0.053	–	–	12.256	0.027
112		*Lobotes surinamensis*	*Samudra koi*	0.184	–	–	–	–	–	–	–	–	–	–	–	–	–	–
51		*Clupisoma garua*	*Ghaura*	–	–	–	–	–	1.352	0.770	0.522	–	–	–	–	–	15.118	0.033
	Subtotal			0.184	0.071	0.163	3.981	–	1.352	0.863	0.641	0.023	0.268	0.058	–	0.001	99.532	0.218
130	Migratory	*Aorichthys aor*	*Ayre*	–	–	–	–	–	0.116	–	–	–	–	0.044	2.957	0.415	302.370	0.661
135		*Aorichthys seenghala*	*Guizza*	0.017	–	1.441	0.528	5.969	2.493	–	8.125	4.067	0.658	–	0.076	0.899	270.283	0.591
24		*Batasio batasio*	*Tengra*	–	–	–	–	–	–	–	–	–	–	0.100	–	–	14.639	0.032
131		*Mystus bleekeri*	*Golsha tengra*	0.001	–	0.174	–	14.943	0.095	6.691	3.262	4.334	2.981	0.139	0.070	0.566	385.994	0.844
132		*Mystus cavasius*	*Kabashi*	–	–	0.075	0.167	3.055	0.503	6.385	0.287	0.378	–	0.509	0.014	–	158.033	0.346
32		*Cada cada*	*Cada*	–	–	–	–	–	–	–	–	–	–	–	0.238	–	22.755	0.050
47		*Cirrhinus mrigala*	*Mrigel*	–	–	–	–	–	0.746	–	–	–	–	–	–	–	1.948	0.004
48		*Cirrhinus reba*	*Raik*	–	–	0.004	–	–	–	1.477	0.291	0.343	–	–	–	–	22.579	0.049
101		*Labeo boga*	*Bhangan*	–	–	–	–	–	–	–	–	–	–	0.023	–	–	3.391	0.007
102		*Labeo calbasu*	*Kalbaus*	0.013	–	0.016	–	–	19.189	2.715	4.708	0.581	–	0.054	0.854	0.216	215.904	0.472
104		*Labeo gonius*	*Goni*	–	–	–	–	–	0.179	0.376	–	–	–	–	0.079	0.316	21.916	0.048
107		*Labeo rohita*	*Rui*	6.397	22.410	18.274	–	–	–	6.347	–	–	–	4.015	29.701	3.596	5201.149	11.376
188		*Salmostoma bacaila*	*Katari*	–	–	–	–	–	–	–	–	0.138	0.037	0.004	0.381	0.397	53.655	0.117
189		*Salmostoma phulo*	*Fulchela*	2.836	3.422	0.012	0.163	–	–	–	–	–	0.321	3.213	1.470	0.850	771.605	1.688
86		*Gudusia chapra*	*Chapila*	–	–	–	1.141	–	0.832	11.464	14.661	7.208	2.601	0.950	0.586	0.404	696.822	1.524
76		*Eutropiichthys vacha*	*Bacha*	–	–	–	–	3.421	3.866	0.141	–	–	–	–	–	–	13.157	0.029
169		*Pseudeutropius atherinoides*	*Batasi*	–	–	0.004	–	–	–	–	–	–	–	0.002	–	–	0.492	0.001
944		*Ompok pabo*	*Pabda*	–	–	–	–	–	–	–	–	0.129	0.114	–	–	–	8.408	0.018
209		*Wallagu attu*	*Boal*	–	0.167	0.434	–	–	–	–	–	–	–	0.200	1.857	1.631	283.708	0.621
140		*Nemacheilus corica*	*Koirka*	–	–	–	–	–	–	–	–	–	0.127	–	0.004	–	7.649	0.017
142		*Nemacheilus scaturigina*	*Dari*	–	–	–	–	–	–	–	–	–	–	0.093	–	–	13.564	0.030
161		*Pellona ditchela*	*Chouka*	–	–	–	–	–	–	–	–	–	0.053	–	–	–	3.062	0.007
	Subtotal			9.264	25.999	20.433	1.998	27.387	28.018	35.596	31.334	17.177	6.892	9.346	38.286	9.290	8473.083	18.533
6	Floodplain	*Anabas testudineus*	*Koi*	0.759	–	0.256	3.714	24.166	4.069	0.334	7.790	12.448	7.195	1.334	0.602	1.327	1022.864	2.237
136	Resident	*Mystus tengara*	*Bajari tengra*	0.011	0.304	0.108	–	–	–	0.063	0.171	0.057	0.010	0.284	0.503	0.830	134.194	0.294
137		*Mystus vittatus*	*Tengra*	0.407	0.058	0.261	1.352	–	2.647	14.067	3.314	0.339	1.656	0.164	0.813	2.436	485.031	1.061
942		*Rama chandramara*	*Laia*	0.028	0.090	0.356	–	–	–	–	–	0.060	–	0.126	0.206	0.953	88.502	0.194
61		*Ctenops nobilis*	*Neftani*	0.040	0.110	–	–	–	–	–	–	–	0.021	0.001	0.014	0.0001	6.381	0.014
55		*Colisa fasciatus*	*Khalisha*	6.395	3.266	2.276	8.982	–	–	0.026	0.396	3.204	1.340	0.894	0.711	0.048	650.513	1.423
211		*Colisa labiosus*	*Khalisha*	0.141	2.229	2.887	0.907	–	–	0.070	–	0.733	0.193	0.311	–	–	287.331	0.628
56		*Colisa lalia*	*Lal khalisha*	–	–	–	–	–	–	–	–	–	–	0.039	–	–	5.716	0.013
57		*Colisa sota*	*Khalisha*	0.035	0.154	0.653	–	–	–	–	0.032	–	–	–	0.000	–	35.610	0.078
210		*Xenentodon cancila*	*Kaikka*	9.566	7.171	9.738	–	0.292	–	2.305	1.074	2.637	2.251	3.118	7.212	5.513	2208.375	4.830
187		*Osteobrama cotio cotio*	*Keti*	–	–	0.023	–	–	0.601	–	–	0.038	–	0.003	0.011	0.069	6.752	0.015
174		*Puntius chola*	*Chala puti*	0.132	0.151	1.109	1.013	3.567	8.932	3.622	7.765	6.582	11.912	0.001	0.099	–	972.216	2.126
175		*Puntius conchonius*	*Canchan puti*	1.353	0.393	0.254	0.371	–	1.689	21.944	8.102	13.223	2.836	0.133	0.752	0.104	767.714	1.679
176		*Puntius gelius*	*Giliputi*	0.400	6.205	3.621	0.281	–	–	0.130	0.087	0.067	1.155	4.204	3.521	4.040	1525.470	3.337
178		*Puntius phutunio*	*Phutani puti*	0.948	3.794	0.073	1.905	–	–	0.056	0.041	0.031	0.074	0.010	0.016	–	162.281	0.355
180		*Puntius sophore*	*Puti*	4.530	2.757	19.954	0.122	–	0.164	1.931	1.625	6.202	9.579	8.593	4.338	12.187	3741.941	8.185
181		*Puntius terio*	*Teri punti*	0.193	0.096	0.595	–	1.602	–	0.093	0.080	0.246	0.905	0.478	0.016	0.0001	159.782	0.349

(Cont.)

Table 6.12 Monthly catch composition (% by weight) from combined floodplains/beel: inside SHP (sites NE12+NE13+NE14)

Species Code	Habitat Preference	Species name		Year: 1993											Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Scientific	Bengali	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
212		*Puntius ticto*	*Tit puti*	0.371	0.111	0.410	0.770	–	–	–	0.009	3.130	–	0.434	0.720	0.629	229.814	0.503
4		*Amblypharyngodon microlepis*	*Mola*	0.013	0.040	–	–	–	–	–	–	–	–	–	–	–	1.342	0.003
5		*Amblypharyngodon mola*	*Mola*	0.046	0.157	0.632	0.200	–	–	–	–	–	0.130	0.334	0.274	0.789	144.154	0.315
68		*Danio devario*	*Chebli*	0.014	1.178	0.032	–	–	–	–	–	–	–	–	0.003	–	41.227	0.090
75		*Esomus danricus*	*Darkina*	0.063	0.023	–	1.200	–	–	–	–	–	0.013	0.268	0.027	0.0003	57.835	0.126
182		*Rasbora daniconius*	*Darkina*	2.025	15.161	1.171	0.420	–	–	–	–	–	1.494	0.570	0.312	0.759	789.831	1.728
83		*Glossogobius giurus*	*Bailla*	0.764	0.386	1.184	3.022	–	1.713	0.703	0.205	0.685	0.747	7.427	1.879	4.310	1569.781	3.433
110		*Lepidocephalus guntea*	*Gutum*	0.909	1.024	–	5.475	–	–	0.149	0.023	0.112	0.245	0.312	0.402	0.314	212.133	0.464
9		*Aplocheilus panchax*	*Kanpona*	0.005	0.004	–	0.165	–	–	–	–	–	0.022	0.001	–	–	3.579	0.008
39		*Channa marulius*	*Gajar*	0.951	0.093	3.200	–	–	–	2.831	–	–	0.210	0.842	2.284	11.665	902.106	1.973
41		*Channa punctatus*	*Taki*	2.533	0.830	1.763	18.316	12.870	25.588	1.996	2.536	6.312	3.680	1.420	4.535	5.557	1561.956	3.416
42		*Channa striatus*	*Shol*	0.088	1.022	0.042	–	–	–	–	–	0.980	1.963	0.034	1.402	2.461	379.421	0.830
49		*Clarias batrachus*	*Magur*	0.677	–	–	0.717	–	–	–	–	–	1.183	0.433	1.735	4.534	448.427	0.981
150		*Oreochromis mossambica*	*Tilapia*	–	–	–	–	–	–	–	–	–	–	–	0.001	–	0.115	0.0003
88		*Heteropneustes fossilis*	*Shingi*	0.821	0.238	0.124	5.352	13.227	0.555	1.238	3.209	2.542	3.766	0.256	1.680	3.624	686.242	1.501
121		*Macrognathus aculeatus*	*Tara baim*	0.198	–	0.207	0.020	–	–	–	0.460	–	0.569	0.830	0.684	0.173	237.400	0.519
123		*Macrognathus pancalus*	*Guchi*	0.327	0.861	0.045	2.254	–	–	1.079	0.035	0.866	0.528	2.793	4.633	1.141	999.047	2.185
122		*Mastacembelus armatus*	*Baral baim*	0.018	–	0.174	–	11.793	–	0.695	7.882	6.790	0.910	0.055	0.331	0.228	272.230	0.595
138		*Nandus nandus*	*Bheda*	0.200	0.193	0.248	0.678	5.096	3.800	1.183	4.438	3.240	5.630	3.359	0.427	1.304	1022.811	2.237
15		*Badis badis*	*Napit koi*	0.524	0.128	0.138	2.618	–	–	0.168	0.071	0.082	0.479	0.253	0.040	0.004	114.363	0.250
124		*Monopterus cuchia*	*Kuchia*	–	–	–	–	–	–	–	–	–	–	–	–	0.015	0.461	0.001
147		*Ompok bimaculatus*	*Kani pabda*	–	–	–	–	–	18.588	–	1.327	–	0.328	0.012	0.184	0.294	105.021	0.230
148		*Ompok pabda*	*Madhu pabda*	–	–	0.008	0.246	–	–	–	0.564	1.356	0.067	0.007	0.009	–	32.605	0.071
145		*Notopterus notopterus*	*Foli*	0.527	0.675	2.388	–	–	1.498	–	5.502	0.581	2.979	1.514	2.967	6.175	1052.922	2.303
203		*Tetraodon cutcutia*	*Potka*	2.191	1.433	0.716	–	–	0.059	2.231	1.413	0.158	1.146	3.176	1.106	0.151	755.958	1.653
33		*Chaca chaca*	*Cheka*	0.205	1.507	0.130	–	–	–	–	0.753	–	0.675	0.575	0.240	0.097	210.186	0.460
35		*Chanda baculis*	*Chanda*	3.659	1.316	0.432	0.092	–	0.229	1.800	2.321	2.331	6.958	5.242	1.728	0.454	1477.182	3.231
36		*Chanda nama*	*Nama chanda*	3.069	0.748	0.005	–	–	–	0.213	0.079	0.030	0.189	0.307	0.320	0.065	116.608	0.255
37		*Chanda ranga*	*Lal chanda*	6.877	4.719	0.804	1.518	–	–	0.288	0.317	1.102	1.162	1.580	1.368	3.559	775.219	1.696
	Subtotal			52.010	58.622	56.018	61.709	72.613	70.132	59.215	61.619	76.160	74.199	51.725	48.102	75.806	26460.649	57.876
931	Others	Prawn spp.	*Chingri/Icha*	38.520	15.307	23.384	32.313	–	0.497	4.325	6.405	6.639	18.640	37.950	13.610	14.901	10552.288	23.080
207		*Trionyx gangeticus*	*Kachhim*	–	–	–	–	–	–	–	–	–	–	0.919	–	–	134.101	0.293
	Subtotal			38.520	15.307	23.384	32.313	–	0.497	4.325	6.405	6.639	18.640	38.869	13.610	14.901	10686.389	23.374
	Grand total			100	100	100	100	100	100	100	100	100	100	100	100	100	45719.654	100

Note: – denotes zero catch

LEGEND

Peak season >50% fish ripe, ripe running, spent	
20–50% fish ripe, ripe running, spent	
<20% fish ripe, ripe running, spent	
0% fish ripe, ripe running, spent	
No data	

Note: Numbers quoted are numbers of fish examined

Table 6.13 Breeding seasons of selected fish inside and outside the SHP, February 1993 – February 1994

Habitat Preference	Species name		Inside/	Year: 1993											Year: 1994	
	Scientific	Bengali	Outside MIP	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Riverine species	*Botia dario*	*Rani*	Outside (river)						2	2	4	1	2	1	1	3
	Corica soborna	*Kachki*	Inside (floodplain+beel)						2		2	1	1			
			Outside (floodplain+beel)	4						1			1	2		
			Outside (river)	21	296	4	7	14	20	14	19	18	10	22	52	18
	Clupisoma garua	*Ghaura*	Outside (river)		1	8				3	2	3	2			
Migratory species	*Aorichthys aor*	*Ayre*	Outside (river)	1	2	2	4			1	1	1		1		
	Mystus cavasius	*Kabashi*	Inside (floodplain+beel)			3			3	6	3	1		2		
			Outside (floodplain+beel)				2			20	4	1	1			
			Outside (river)			1				2	3	2	1	12	16	10
	Salmostoma bacaila	*Katari*	Inside (floodplain+beel)									2		4	2	
			Outside (river)	2	5	2	12		1		1	1	2	2	3	
	Securicula gora	*Chora chela*	Outside (floodplain+beel)													7
	Gudusia chapra	*Chapila*	Inside (floodplain+beel)			3	2			5	8	3	5	10	2	
			Outside (floodplain+beel)	6			18				1	10	9		12	3
			Outside (river)	109	60	8	7	1	1	11	14	10	1	6	29	11
	Eutropiichthys vacha	*Bacha*	Outside (river)		26	3										
Floodplain resident species	*Anabas testudineus*	*Koi*	Inside (floodplain+beel)												1	
	Mystus vittatus	*Tengra*	Inside (floodplain+beel)	2	11	5	1		19	19	3	1	4	8	3	
			Outside (floodplain+beel)		1		1	1	1	18	2	5			2	
			Outside (river)	1				1	1	1	5	3	2	10		1
	Colisa fasciatus	*Khalisha*	Inside (floodplain+beel)	1	11	37				2	1	1	2	4		
			Outside (floodplain+beel)		1						1			2		1
	Osteobrama cotio cotio	*Keti*	Inside (floodplain+beel)			5			1			2				
			Outside (floodplain+beel)													
			Outside (river)			5	2	1	1	2	1	2		1		4
	Puntius conchonius	*Canchan puti*	Inside (floodplain+beel)						1	21	3	3	4	21	1	
			Outside (floodplain+beel)					2		8	4	2	9		3	1
			Outside (river)					23	5	5	8	10	5	2	1	

(Contd.)

Table 6.13 (Continued)

LEGEND

Peak season >50% fish ripe, ripe running, spent	
20–50% fish ripe, ripe running, spent	
<20% fish ripe, ripe running, spent	
0% fish ripe, ripe running, spent	
No data	

Note: Numbers quoted are numbers of fish examined

Habitat Preference	Species name		Inside/ Outside MIP	Year: 1993											Year: 1994	
	Scientific	Bengali		Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb
	Puntius sophore	*Puti*	Inside (floodplain+beel)	18	29	3			1	3	4	3	5	14	42	
			Outside (floodplain+beel)	2				1				8	5			
			Outside (river)	69	15		1	4	1	1	2	5	5	6		
	Amblypharygodon mola	*Mola*	Inside (floodplain+beel)							1	1		2		1	
			Outside (river)					2			1	2	1	6		
	Glossogobius giurus	*Bailla*	Inside (floodplain+beel)	3		10			6	6	1	2	1	4		
			Outside (floodplain+beel)	13	10		1	7	2	6	3	3	2	2		4
			Outside (river)	47	69	15	4	1	1	4	11	7	7	22	17	
	Lepidocephalus guntea	*Gutum*	Inside (floodplain+beel)	53	1	9	2				1			6		
			Outside (floodplain+beel)	6	47							1	2		2	
			Outside (river)	108	8	1	9	2	1	2	2		1	6	3	
	Channa punctatus	*Taki*	Inside (floodplain+beel)	1	9	6	3	1	20	5	2	2	1	5	7	
			Outside (floodplain+beel)	2	2		10	19	16	1		7	2			
			Outside (river)	17	2		1			1	1		5	3		
	Heteropneustes fossilis	*Shingi*	Inside (floodplain+beel)	1	4	1	7	2	4	6	3	3	3	12	4	
			Outside (floodplain+beel)	6	4		9	4	1	8	1	5	4			1
			Outside (river)	15	1			1		2	1			1		
	Macrognathus pancalus	*Guchi*	Inside (floodplain+beel)	10	14	8				1	1	1	3	2		
			Outside (floodplain+beel)	5	6					6		1			2	1
			Outside (river)	54	50	24	23	1		1	2	1	5	3	3	6
	Chanda nama	*Nama Chanda*	Inside (floodplain+beel)		13	1				6	4	2	3	3	4	
			Outside (floodplain+beel)	11							2	1				
			Outside (river)	7	13	1	14	6	5	11	10	11	8	1	2	12

Figure 6.11 Seasonal variation in the number of riverine, migratory and floodplain resident fish species from combined floodplains/*beel* (sites NE17+NE18 +NE19, outside SHP)

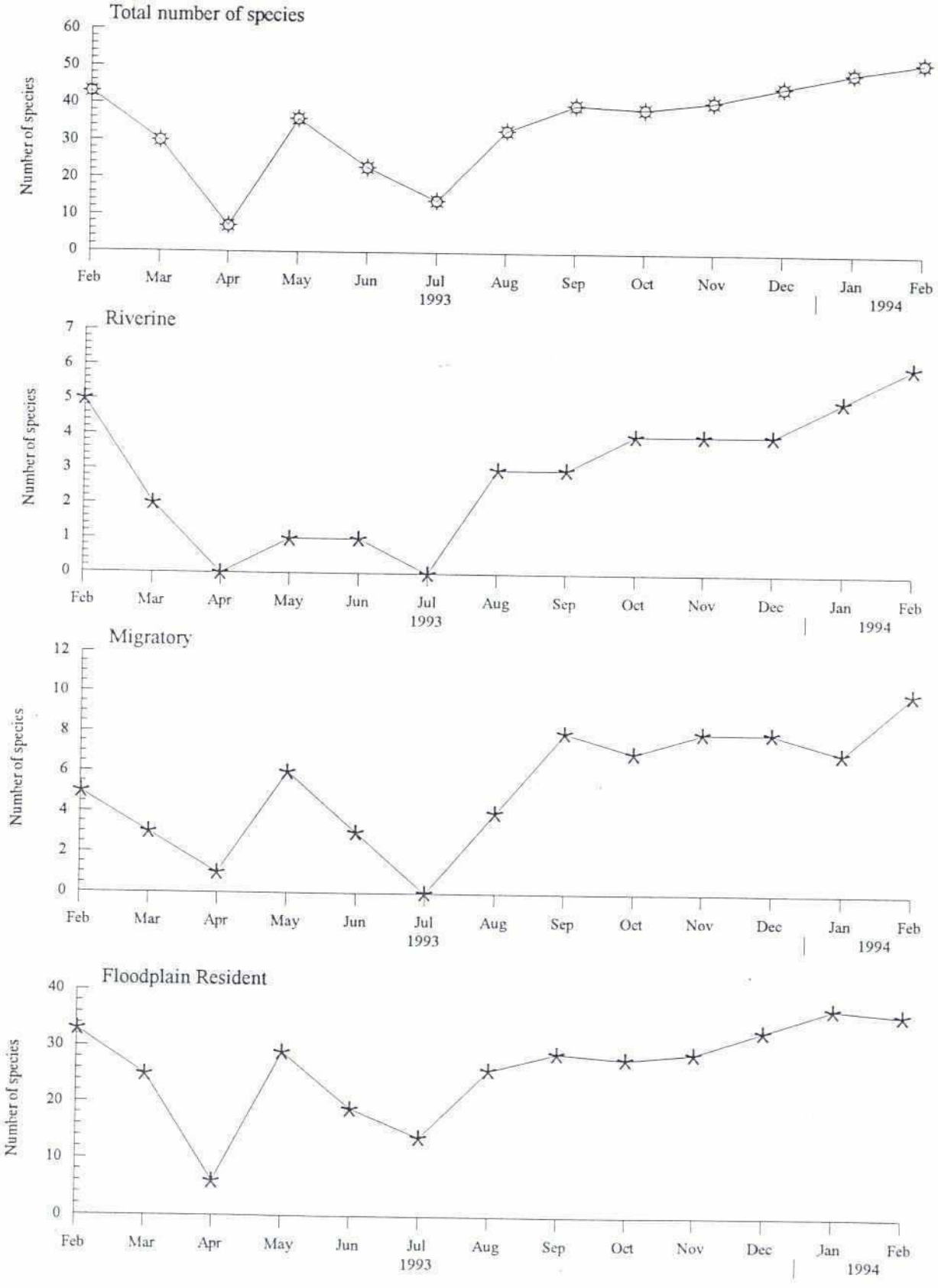
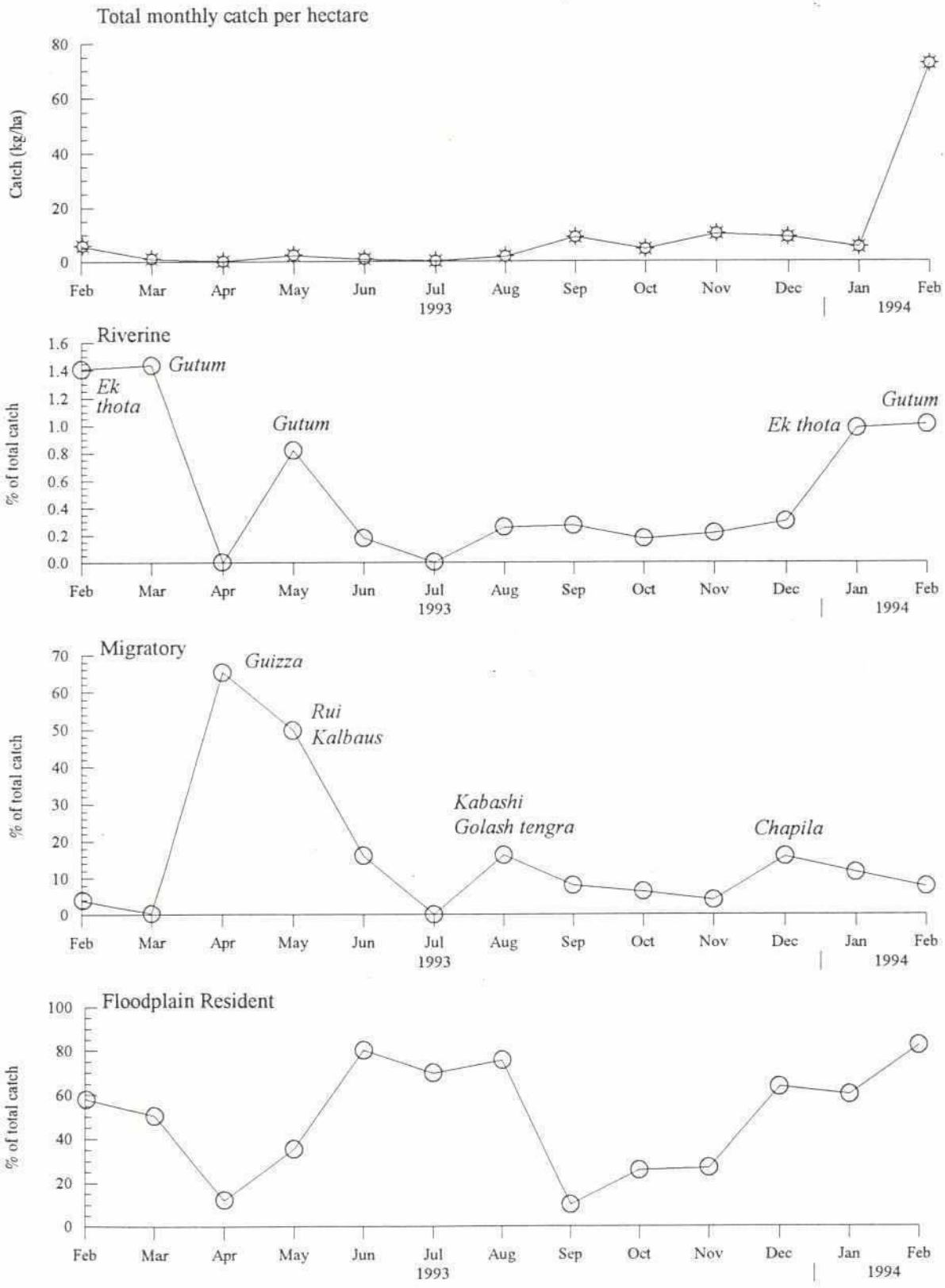


Figure 6.12 Percentage of total monthly catch of riverine, migratory and floodplain resident groups of fish from combined floodplains/*beel* (sites NE17+ NE18 +NE19, outside SHP)



Notes: 1. See text for definition of different categories of fish based on habitat preference (Section 5.3.1)
2. Dominant species are shown for peak relative abundances of riverine and migratory fish

Figure 6.13 Seasonal variation in the number of riverine, migratory and floodplain resident fish species from combined floodplains/*beel* (sites NE12 + NE13 +NE14, inside SHP)

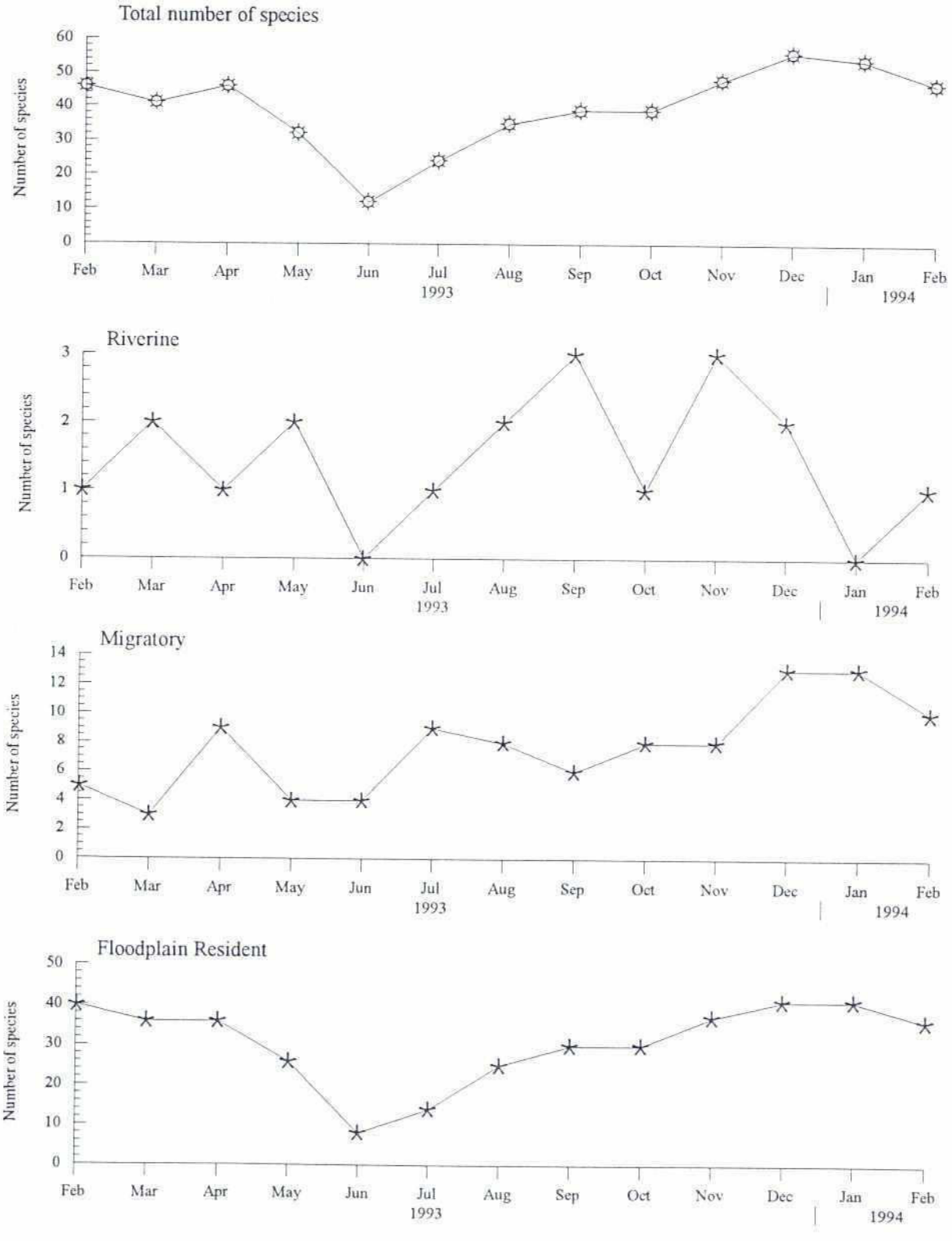
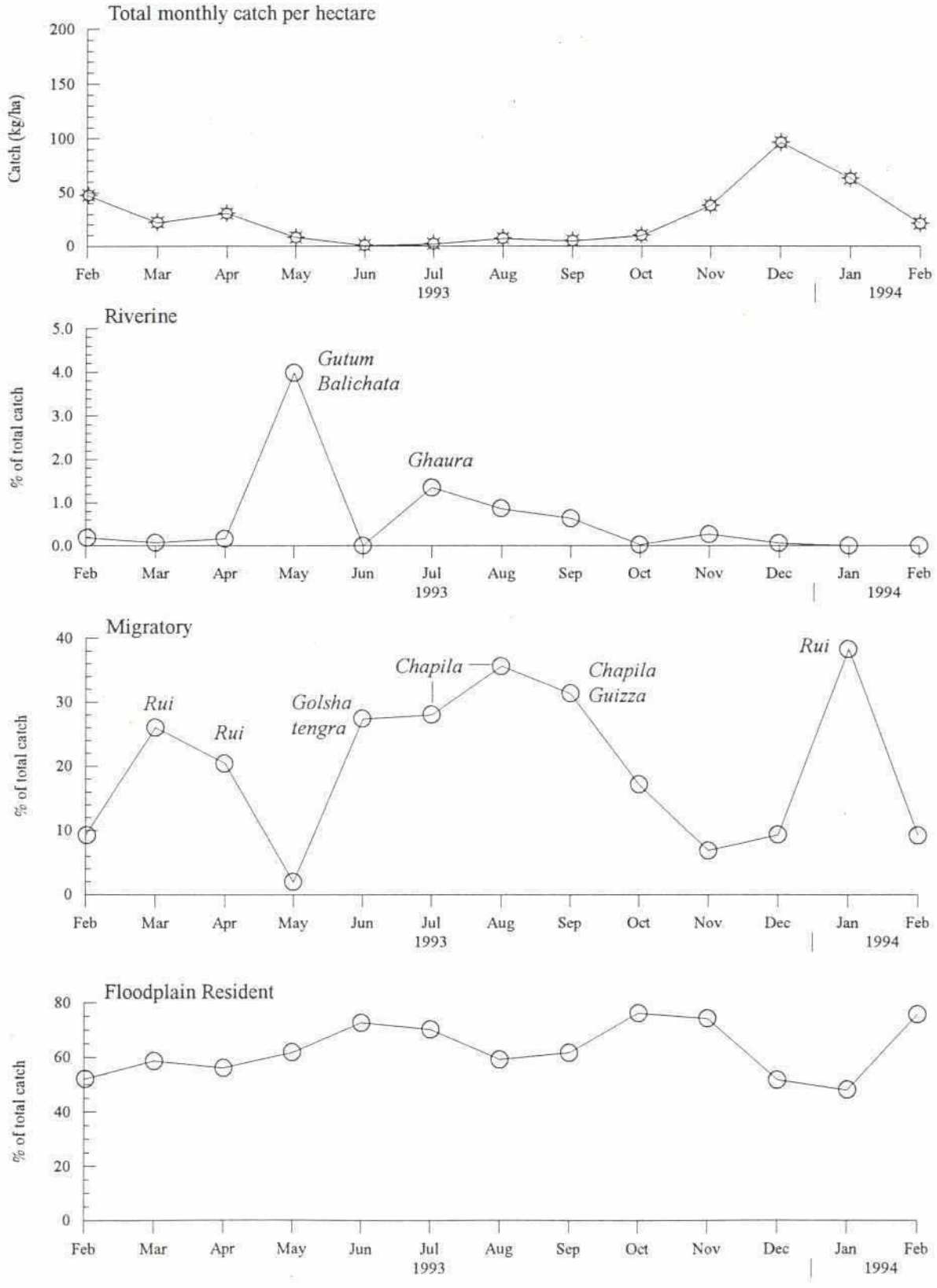


Figure 6.14 Percentage of total monthly catch of riverine, migratory and floodplain resident groups of fish from combined floodplains/*beel* (sites NE12+ NE13+NE14, inside SHP)



Notes: 1. See text for definition of different categories of fish based on habitat preference (Section 5.3.1)
2. Dominant species are shown for peak relative abundances of riverine and migratory fish

Figure 6.15 Seasonal variation in the number of riverine, migratory and floodplain resident fish species from Lumardai *Khal*, (site NE15, inside SHP)

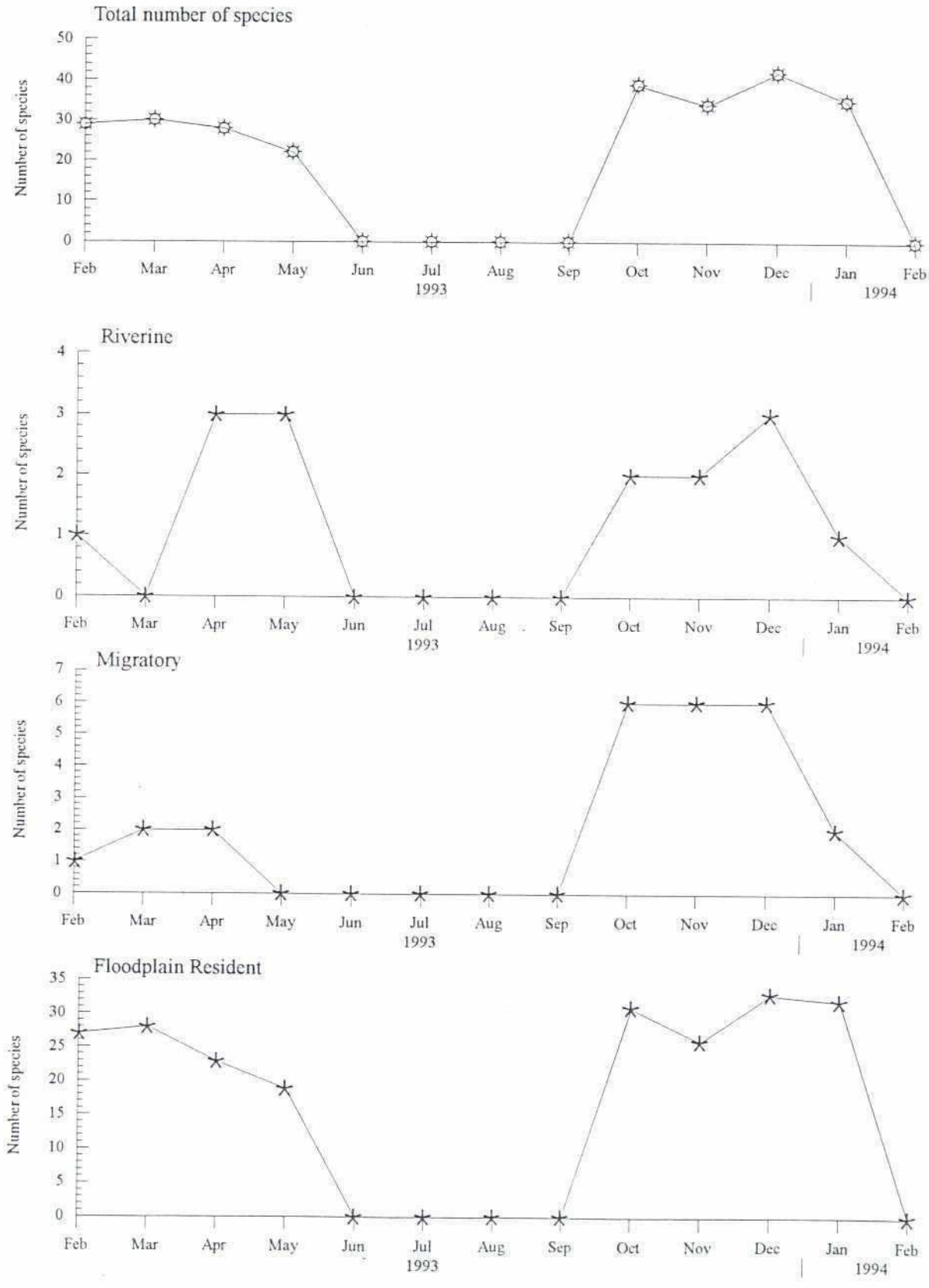
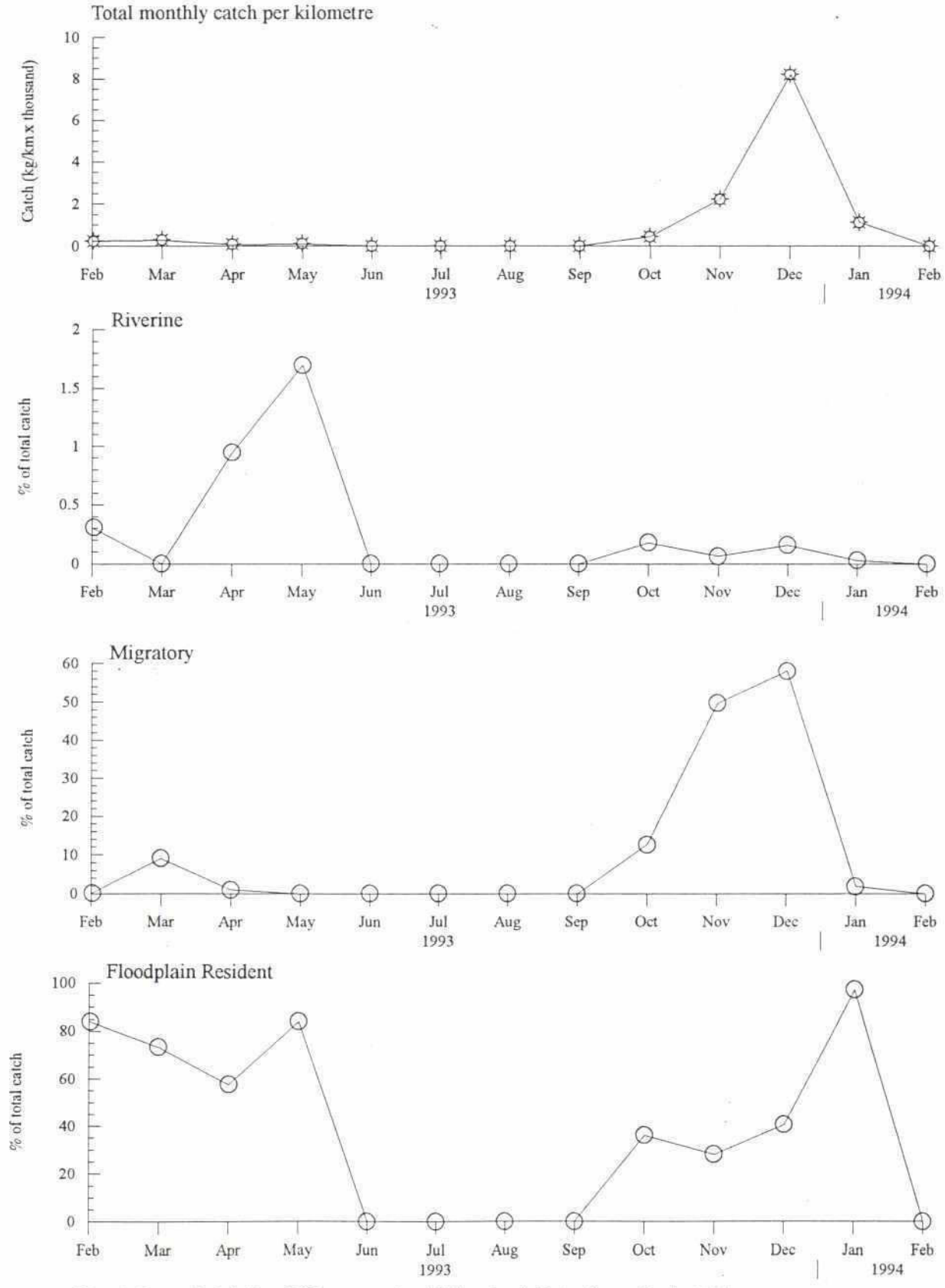


Figure 6.16 Percentage of total monthly catch of riverine, migratory and floodplain resident groups of fish from Lumardai *Khal*, (site NE15, inside SHP)



Notes: 1. See text for definition of different categories of fish based on habitat preference (Section 5.3.1)
2. Dominant species are shown for peak relative abundances of riverine and migratory fish

accounted for 9% to 26% of catches from February to April which, in two months, was higher than those recorded on unregulated floodplains. Since entry of river floodwaters was prevented at this time of year, these groups of fish must have overwintered in perennial water bodies such as Karchabrar *Beel*.

When submersible embankments overtopped in mid-May, no immediate major influx of riverine and migratory species was observed on Shanghair *Haor*. Unlike on unregulated Dekker *Haor* where *kalbaus* and *rui* appeared prominently in catches in May and together comprised 43% of the catch, these species did not appear in catches from Shanghair *Haor* until July and August respectively. *Chapila* did, however, appear on regulated floodplains in May together with two riverine species, *balichata* and *gutum* (*N. maydelli*) but none of these species accounted for more than 3% of the monthly catch.

In June, no riverine species were recorded a Shanghair *Haor* but 4 migratory species accounted for 27% of the catch. These species comprised adults of *golsha tengra* (21 g/indiv), *kabashi* (36 g/indiv), *bacha* (47 g/indiv) and juvenile *guizza* (114 g/indiv). In July, *kalbaus* provided 19% of the catch and the next most abundant species were adult *batasi* and juvenile *guizza*. The total catch contribution made by migratory species increased from 2% in May to 36% in August and declined thereafter.

The results suggest that submersible embankments had little impact on movements of adult and juvenile fish from river to floodplains other than possibly to delay the entry of one year-old juvenile *rui* and *kalbaus* and adult *chapila*.

Other FAP 17 studies[8] of the movements of fish hatchlings by passive downstream drift showed that the first major carp hatchlings appeared in the Surma and Old Surma rivers on 19 May 1993, one day after submersible embankments of the SHP had overtopped by rising river levels. In the year of study, therefore, the ingress of major carp hatchlings on to floodplains was not adversely affected by partial flood control embankments. In previous year, however, when the entry of river floodwaters was delayed by embankments until June or July, it is likely that movement of major carp hatchlings on to the floodplains of the SHP would have been blocked.

Most species of hatchlings found in rivers from March to mid-May were floodplain residents such as *chanda*, *mola*, *bailla*, *canchan puti* and *baral baim* which may have been spawned on upstream floodplains and drifted into rivers when water levels dropped and floodwaters

drained off floodplains and *beel* intermittently . Only two migratory species were recorded during the same period, *fulchela* and *kachki*. The former is probably capable of surviving on floodplains throughout the year while the latter probably spawned in rivers and the passage of its hatchlings on to floodplains in the SHP was delayed by one month.

202

7 RECOMMENDED MITIGATION MEASURES

Several mitigation measures are listed below. The first three concern the SHP directly and are recommended for consideration in the short or near term. The others involve broad institutional development, mainly within BWDB/WARPO, or more general fisheries development initiatives which can be undertaken both inside and outside flood control areas.

Formulation of the mitigation measures listed below drew a distinction between mitigation, i.e. measures to reduce losses to capture fisheries caused by flood control, and compensation, i.e. measures to replace such losses by culture-based techniques. Only mitigation measures are listed below. This does not imply, however, that aquaculture developments should not be encouraged. Indeed, the ODA has supported work in various aspects of fish culture in Bangladesh for many years, covering activities such as pond culture, cage culture, rice-fish culture and open-water stocking of floodplains. Many of these techniques could be developed further inside and outside areas of controlled flooding in regions of high land to avoid the risk of seasonal flooding.

1. Reassessment of the height of submersible embankments

Analysis of the timing of first entry of river floodwaters over embankments into the SHP indicated that their height may be excessive and that floodwaters were delayed longer than necessary to protect the winter rise harvest which ends in early May. It is therefore recommended that a reassessment of the hydrological performance of the SHP be undertaken and that embankments be lowered where possible to allow the earliest entry into the SHP of fish adults, juveniles and hatchlings.

2. Prohibited fishing zones on drainage canals of the SHP

Partial and full flood control projects reduce the number of natural drainage channels linking floodplains, *beel* and rivers. Consequently, during the flood drawdown and winter fish leaving the drying floodplains are concentrated into fewer migration routes where they are more susceptible to capture, especially when leaseholders dam or block these channels with fishing gears. It is therefore recommended that, to reduce fishing pressure at this critical time and place, the main drainage canal, Lumardai *Khal*, be designated as a prohibited fishing zone from the beginning of October until the end of March each year.

2 04

3. Establishment of flooded zones in areas of extensive flood control

In areas such as Sunamganj District where there is extensive development of partial control projects, it is recommended that selected *haor* to be designated free flooding zones where no future flood control will be planned or permitted. This measure would benefit capture fisheries generally in the area especially when combined with further fisheries management measures (mitigation measures nos 4, 5 and 6). It would also serve a very useful river engineering function by reducing siltation rates in river channels, an increasingly serious problem identified in the North East by FAP 6 which threatens to cause greater flooding problem in the future.

4. Fisheries conservation: *beel* management

In a series of staged developments, Karchabrar *Beel* inside the SHP and the largest perennial *beel* in unregulated *haor* (mitigation measure no. 1) should be transformed into fish sanctuaries for the conservation of broodstock fish which provide the biological basis of sustainable fisheries from the surrounding floodplains and smaller *beel* within the *haor*. The first stage should be to ensure that the *jalmahal* of such *beel* are leased for a minimum of three years and that no fishing is undertaken during the dry seasons until the third and final year of the lease. The leaseholder should also be obligated to construct new large *katha* during the first dry season and to maintain and renew the *katha*, if necessary, each year. In the longer term, steps should be taken to prohibit fishing in the *beel* area containing very large *katha*. The installation of large *katha* should automatically prevent fishing by gears such as gill nets, seine nets, drag nets and cast nets and make it difficult to use other gears such as hooks.

5. Fisheries conservation: protection of river (*duar*) fisheries

Qualitative studies carried out by FAP 6 and the present quantitative study of FAP 17 have demonstrated the great importance of river *duar* (scour holes) as winter refuges for large species of fish, particularly catfish and major carps. *Duar* are presently included in riverine *jalmahal* where they are intensively fished by leaseholders during the dry season. FAP 6 has recommended prohibition of fishing *duar* during the dry season and the establishment of river patrols by DoF to enforce protective fisheries regulations. FAP 17 results support this measure as a means of conserving important overwintering broodstock of high value species which form the basis of both riverine and floodplains fisheries. Protection of *duar* in the

rivers of the North East should result in the long term increase in fish production from the region.

6. Habitat rehabilitation and protection

Siltation of perennial *beel* is reported to have reduced water depths and flooded areas during the dry season in the SHP and in unregulated *haor*. Carefully controlled *beel* excavation programmes should therefore be established to counter the adverse effects of further siltation by river floodwaters. Karchabrar *Beel* in the SHP and one large *beel* in unregulated *haor* should be selected as pilot projects to demonstrate the benefits to capture fisheries of excavation work linked with the protection of overwintering fish broodstock (mitigation measure no. 4). The excavation should deepen the *beel* by 1 to 2 metres and the excavated material should be used for flood proofing measures by local communities around the *beel* and for the construction of fisheries conservation infrastructure e.g. guardhouse. An afforestation programme should be established along the *beel* margins to increase cover by flood resistant trees such as *hizal*, one of the many benefits of which would be a local supply of branches for the construction of large *katha* within the *beel*.

7. Monitoring biodiversity

A national capability to provide systematic quantitative information on geographical variations in diversity of aquatic resources of Bangladesh should be established. This measure is designed to enhance knowledge of fish, shrimp and prawn diversity and to identify environmental problems, including flood control, linked with reductions in biodiversity. This information can then be considered at the project identification and planning stage of future developments which impact on aquatic resources. The measure should involve the strengthening of institutions such as DoF and FRI through training in a) fish taxonomics b) procedures for the establishment of fish reference collections c) methods for planning and implementing field surveys and sample collections and d) data analysis. It is anticipated that there would be a need to assist institutions in the design and implementation of national field surveys and sample collections.

8. Strengthening of technical assessment and planning capabilities of BWDB/WARPO

There is a need to establish within BWDB/WARPO a multidisciplinary technical assessment unit comprising expertise from fisheries, agriculture, environment, hydrology and hydraulic

engineering. The unit should be responsible for the re-evaluation of operating procedures of existing structures and for the examination of future flood control projects. Proposals for major new road or rail links should also be assessed by the unit in terms of their impact on flooding patterns, fisheries and agriculture. The eventual siting of the assessment unit would depend on the future roles of BWDB and WARPO.

9. Establishment of national database on FCD/I projects

A detailed and comprehensive national database should be established by BWDB to provide information on all flood control projects in Bangladesh and the major regulatory structures within these projects. The database should provide a basic description of the design and size of each structure, its function within the project area and its state of repair. Daily water level data at each structure should also be provided with computed head differences. The database should be made available, in a user-friendly form, to other government agencies.

10. Improvement of data collection by BWDB

There is an urgent need to improve the quality of data collection by BWDB personnel responsible for the operation of regulatory structures. Supervisory personnel should ensure that accurate detailed daily records are maintained of water levels at the structure (inside and outside), numbers of gates open and height to which each gate is opened. These data should be incorporated into the national database at monthly intervals.

11. Establishment of water-user groups

Local groups of water users should be established in flood control projects to represent the full range of sectors affected by modified flooding patterns. This should include capture fisheries as a water-user group. Representatives from each group should form a local committee in association with relevant government departments to establish operating procedures of regulatory structures. The committee would provide the mechanism for the establishment of local integrated water management.

12. Training within BWDB

An annual series of training courses should be established within BWDB to give engineers a basic understanding of the water requirements within each natural resource sector, focusing

on fisheries and agriculture. The fisheries course should contain descriptions of identified adverse impacts of flood control on fish and various methods of mitigation against such impacts.

13. Development of flood modelling techniques

There is a need to continue the development of flood modelling techniques using the MIKE11 hydrodynamic model. The SWMC and FAP 19 are currently active in this field but require future support, both financial and technical, to continue to make progress. The work would require detailed field surveys to improve basic topographical information.

8 FUTURE RESEARCH REQUIREMENTS

FAP 17 investigations provided quantitative baseline data on several aspects of freshwater fisheries in various regions of Bangladesh. Because of the widespread nature of sampling effort and the relative short duration of field data collection (13-19 months) it was not possible to obtain a detailed understanding of the ecology, biology or population dynamics and movements of even the few most important floodplain fish in relation to changes in flooding patterns. It is therefore important to use the baseline data of FAP 17 as a foundation for further longer term fisheries studies which should provide both greater detail and scope of research activities.

Several areas requiring further research, some basic but most adaptive, are listed below. Many of these are relevant not only to the SHP and Dekker *Haor* but also to other regions of Bangladesh. The research topics below are not listed in order of priority.

1. Investigation of the biology and ecology of selected fish and prawn species dominating floodplain catches inside and outside flood controlled areas. Information collected should include data on age, breeding biology, feeding habits and micro-distributions in relation to seasonal changes in flooding and the distribution of aquatic vegetation including deepwater rice. The study should also include detailed limnological investigations which examine plankton, macroinvertebrates and water quality, particularly nutrient levels. This study will provide an understanding of the overall functioning of the dominant fish and prawn community.

2. Stock assessment using length frequency analysis and ageing techniques to obtain information on the population dynamics of selected species of fish and prawns dominating floodplain catches. This study will provide information on growth, mortality and the status of stocks and allow predictions to be made of the effects on fisheries of further increases in fishing pressure. The current status of the stocks of these species is not known.

3. Establishment of catch assessment surveys to obtain estimates of fish densities and yield per unit area of floodplain/*beel*. These data, when collected over a period of at least five years and linked with a concomitant set of quantitative data on flooding patterns, will provide the first rational basis for the development of a quantitative floodplain fisheries model. This can then be used as a predictive tool to advise on

fisheries management and development.

4. Investigation of the movements of fish and prawns between river and regulated floodplains/*beel*. This study has already started as a pilot project by FAP 6 in the North East Region to monitor the movements of fish and prawns through a newly constructed fish pass in the Manu Irrigation Project.

5. Investigation of the movements by passive downstream drift of fish and prawn hatchlings between rivers and floodplains in relation to seasonal changes in river discharge. This study is needed to assess the impacts of both partial and full flood control on the annual supply of hatchlings of major carps and many other species of fish.

6. Identification of possible spawning grounds of major carps in the North East Region and investigation of upstream breeding migrations in these rivers.

7. Assessment of the impact of FCD/I projects on the diversity of fish and prawns. Standardised systematic, intensive sampling is required to record not only the more common species but also the numerous rarer species which may be more vulnerable to the adverse impacts of partial and full flood control.

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APPENDIX 1

Appendix 1 List of fishing gears recorded during FAP 17 surveys in Bangladesh

Gear Type	Name	Code	Description
Gill Net	*Current jal(Stationary)*	88	Monofilament fixed gill net, usually small mesh
	Current jal(Drifting)	282	Monofilament drifting gill net, usually top set, any mesh size
	Koi jal	123	Multifilament fixed gill net, usually small mesh
	Chandi jal	65	Multifilament drifting gill net, usually top set, any mesh size
	Par jal	315	Multifilament drifting gill net, usually bottom set, large mesh
	Kajuli jal	316	Multifilament drifting gill net, usually bottom set, small mesh
	Awo jal	324	Multifilament fixed gill net set in zig-zag pattern to catch large fish
	Foot jal	327	Very small gill set horizontally at surface in shallow water
	Gai Dasem	132	Drifting net used in rivers, has pockets at base
Seine Net	*Ber jal*	45	Seine net: small, medium or large size
	Baoli jal	306	Medium sized seine net pulled by 2 ropes
	Moi jal	202	Small drag net with pockets at base
	Dora jal	325	Similar to moi jal but pulled by 2 long ropes
	Konaber jal	268	Seine net with pocket at one end
	Dhor jal	89	Small seine usualy pulled by 2 men by sticks on each end of net
	Horhori	297	Seine net with a series of large pockets along net
	Kathi jal	175	Seine net with a series of vertical sticks along net
	Chabi jal	293	Seine/gill net pulled to shore, often used with polo traps
	Hat panch	276	Medium size seine pulled at each end by one man while man in boat beats water to drive fish into net
	Satiber jal	304	Seine net with a series of pockets at base
	Kachitana	277	Type of lift net hung from boat on floodplain or beel. Net used with drag rope to drive fish into net.
	Ferra jal	126	Drag rope used to drive fish into gill net/seine net
Bag Net	*Thaga*	285	Barrier across river with bag nets set perpendicular to it
	Suti jal	271	Single bag net staked to river bed
	Ghori jal	320	Barricade/fence with nets set in gaps to trap fish
	Bhuti jal	328	Clap net on bamboo frame hung from boat anchored in a gap of barrier fence
Lift Net	*Veshal*	266	Triangular lift net on large bamboo frame
	Dharma jal	105	Square or round lift nets on bamboo pole
	Jhali jal	160	Small veshal used on main rivers at night for prawns
	Jhap jal	319	Boat lift net: lifted at 4 corners by men in boats
	Chota jal	323	Gill net fixed horizontally on bottom to catch fish by spines
	Dara jal	329	Lift net and barrier used in canals or small rivers
Scoop Net	*Hat Tana*	287	Oval or triangular scoop nets used with pole and rope or by hand
	Ucha	263	Basket scoop on pole used by hand
	Tukri	296	Small basket scoop used by hand
	Afa/Hat bauli	321	Large thella jal, large mesh, used on boat
	Uttar jal	68	Like a cast net but hung from a boat drifting along river and lifted to catch fish
Clap Net	*Shangla jal*	234	Multifilament drifting bag net on bamboo frame boat used for hilsa fishing
FAD	*Katha*	270	Submerged brush shelter used to attract fish
	Boat Katha	314	Submerged boat filled with branches used to attract fish
	Horgra	149	Submerged basket filled with branches used to attract fish
	Kua	302	Fish pit on floodplain, invariably contains brush shelter

Appendix 1 Continued

Gear Type	Name	Code	Description
Traps	*Polo*	222	Bell-shaped trap used to catch fish by hand
	Doiar trap	95	Small, oval or box traps used for prawns or small fish
	Deal	286	Larger trap, bilaterally divided to catch fish on 2 sides of bana
	Kadum trap	311	Large box traps used to catch larger fish e.g. Koi, Taki
	Kakila bana	310	Bamboo fence pulled downstream to trap fish in small area
	Katra	326	Active trap: fish speared after entering trap
	Kalsi pata	299	Clay pot used to trap fish set in bank side.
	Kotta	318	Bunded area on floodplain used to trap fish as water recedes
	Char jal	322	Tidal fence trap
	Kharia/Kore	330	Fence trap used on floodplain during flood recession
	Malai pata	331	Coconut shell drilled with holes and baited to catch small fish
	Patar savar	332	Large active fence trap used to surround fish on flooplain
	Tui	334	Small polo-type trap used to catch fish in mud on floodplain
Hook/ Lines	*Daun*	272	Long line: many hooks set at intervals on one line
	Sip	30	Rod and line : usually one hook per line
	Nol barsi	278	Hook & line attached to bamboo floats. Many floats/hooks may be joined along line
	Tana barsi	152	Hand line (no rod) from bank or boat with or without groundbait
Spear	*Juti*	170	Spears of various types: fixed or detachable barbs
Other	*Jhaki jal*	164	Multifilament circular net thrown by hand
	Thella jal	255	Small triangular push net set on bamboo frame
	Urani	291	Various barrier nets/fences used to catch jumping fish.
	Akra	298	Pole with metal hooks used to catch mud-dwelling fish e.g. baim
	Chunga	301	Hollow bamboo rod shelter used to attract baim
	Thushi	317	Cloth/basket traps used to drive baim into them
	Hand fishing	307	Picking fish by hand but without dewatering
	By hand/Dewatering	97	Empty water and catch fish by hand in mud
	Net/Basket+Dewatering	98	Empty water through an outlet where net or basket used to trap fish
	Nimbaich	335	Large scale fishing by whole village using many different gears
	Canal dewatering	336	Large section of canal isolated by cross dams and emptied by pumping by other means to catch fish by various methods

Notes:

1. Local names of gears vary between different districts and regions in Bangladesh. Those listed in the table above are generally used in the North Central Region. If gears were not found in this region, the name from the region in which the gear was most recorded was used.
2. Some names e.g. juti (spear), doiar traps and hat tana were used to denote a group of similar gears. A more detailed list and description of individual gears is provided in the FAP 17 database.
3. FAD = Fish Aggregation Device.

APPENDIX 2

Appendix 2, Table I Percentage monthly catch from Surma River by gear type: outside SHP (site NE16)

Gear Code	Gear name	Year: 1993										Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
30	*Sip*	6.118	4.928	6.064	6.884	–	0.303	2.978	9.677	5.359	49.188	1.312	–	0.086	12837.246	18.138
152	*Tana Barsi*	–	–	–	–	–	–	–	–	6.987	17.236	9.707	42.848	38.150	11902.876	16.817
45	*Ber jal*	73.610	12.016	6.024	–	–	11.057	–	–	16.307	2.472	13.567	36.528	15.798	8131.906	11.490
266	*Veshal*	–	–	4.301	20.355	62.002	38.924	16.977	38.241	26.489	0.044	0.413	–	0.374	5764.943	8.145
282	*Current jal (Drifting)*	–	44.571	49.052	41.096	3.747	2.571	6.215	6.153	3.750	0.820	1.659	3.011	8.969	5447.451	7.697
68	*Uttar jal*	2.641	10.145	6.208	5.614	–	–	5.166	10.044	0.997	10.605	1.863	0.293	19.867	5068.362	7.161
65	*Chandi jal*	–	–	–	–	–	–	–	2.541	12.241	14.798	1.665	2.492	4.578	4876.034	6.889
324	*Awo jal*	8.466	7.614	25.818	–	–	–	–	–	–	–	36.086	6.088	–	4632.239	6.545
272	*Daun*	2.138	–	0.853	1.949	–	1.338	45.815	22.739	14.414	1.626	14.493	4.937	5.129	4381.998	6.191
255	*Thella jal*	4.227	0.703	–	10.212	25.329	23.106	12.845	5.713	3.746	–	–	–	–	1916.145	2.707
123	*Koi jal*	1.914	17.949	0.773	–	–	–	–	–	–	–	3.070	2.528	0.395	1234.523	1.744
105	*Dharma jal*	0.206	–	–	10.285	8.547	17.975	0.547	3.102	4.360	–	–	–	–	1218.770	1.722
319	*Jhap jal*	–	–	–	–	–	–	–	–	–	–	10.682	0.918	–	965.492	1.364
164	*Jhaki jal*	0.680	0.278	–	3.604	0.376	4.725	9.458	1.679	4.578	0.008	2.468	–	0.286	804.631	1.137
149	*Horgra*	–	–	–	–	–	–	–	0.111	–	3.007	0.754	–	–	777.172	1.098
315	*Par jal*	–	–	–	–	–	–	–	–	–	–	0.350	0.331	4.407	348.616	0.493
88	*Current jal (Stationary)*	–	–	–	–	–	–	–	–	–	–	0.149	0.026	1.961	142.771	0.202
325	*Dora jal*	–	1.798	0.909	–	–	–	–	–	–	–	–	–	–	96.428	0.136
234	*Shangla jal*	–	–	–	–	–	–	–	–	0.774	0.196	–	–	–	84.665	0.120
170	*Juti*	–	–	–	–	–	–	–	–	–	–	0.990	–	–	81.187	0.115
314	*Boat Katha*	–	–	–	–	–	–	–	–	–	–	0.773	–	–	63.328	0.089
		100	100	100	100	100	100	100	100	100	100	100	100	100	70776.783	100

Note: – denotes zero catch

Appendix 2, Table II Percentage monthly catch from Old Surma River by gear type: outside SHP (site NE11)

Gear Code	Gear name	Year: 1993											Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
45	*Ber jal*	36.727	40.411	67.782	8.689	35.793	–	36.730	51.992	–	89.425	99.254	15.683	14.693	25024.743	59.606
270	*Katha*	6.837	–	4.241	–	–	–	–	–	–	–	–	40.373	57.400	5113.089	12.179
266	*Veshal*	–	–	–	79.282	41.013	95.254	20.756	31.545	64.325	–	–	–	–	3494.744	8.324
68	*Uttar jal*	–	–	0.632	–	–	–	–	0.473	–	–	–	16.962	–	1555.649	3.705
325	*Dora jal*	27.495	15.493	4.949	–	–	–	–	–	–	–	–	9.809	15.473	1526.796	3.637
30	*Sip*	7.261	32.545	7.398	–	–	–	1.799	7.498	23.327	8.505	0.358	–	–	1479.899	3.525
255	*Thella jal*	1.730	7.457	–	8.006	22.797	4.196	28.831	4.048	2.889	1.920	–	0.319	–	1191.297	2.838
88	*Current jal (Stationary)*	–	–	14.128	–	–	0.550	–	–	–	–	0.355	–	7.671	489.036	1.165
222	*Polo*	–	–	–	–	–	–	–	–	–	–	–	4.482	–	405.598	0.966
291	*Urani*	–	–	–	–	–	–	–	–	–	–	–	4.418	–	399.787	0.952
164	*Jhaki jal*	10.555	–	0.589	4.023	–	–	0.547	–	0.187	–	–	3.814	0.132	380.461	0.906
149	*Horgra*	–	–	0.035	–	–	–	–	–	3.287	0.070	–	1.144	3.832	246.402	0.587
89	*Dhor jal*	–	–	–	–	–	–	5.814	3.024	0.375	–	–	0.422	–	178.300	0.425
319	*Jhap jal*	–	–	–	–	–	–	–	–	–	–	–	1.381	–	124.960	0.298
170	*Juti*	–	–	–	–	–	–	–	–	–	–	–	0.943	–	85.318	0.203
95	*Doiar trap*	–	–	–	–	–	–	4.826	–	–	–	–	–	–	60.459	0.144
272	*Daun*	–	–	–	–	–	–	0.697	1.419	0.917	–	–	–	–	50.766	0.121
282	*Current jal (Drifting)*	–	4.094	–	–	–	–	–	–	–	–	–	–	–	47.363	0.113
65	*Chandi jal*	–	–	–	–	–	–	–	–	2.547	–	–	–	–	35.867	0.085
152	*Tana Barsi*	–	–	–	–	–	–	–	–	2.147	0.080	–	–	–	34.144	0.081
314	*Boat Katha*	9.395	–	0.246	–	–	–	–	–	–	–	0.032	0.007	0.799	29.119	0.069
123	*Koi jal*	–	–	–	–	–	–	–	–	–	–	–	0.126	–	11.429	0.027
307	Hand fishing	–	–	–	–	–	–	–	–	–	–	–	0.090	–	8.146	0.019
263	*Ucha*	–	–	–	–	0.397	–	–	–	–	–	–	–	–	7.740	0.018
105	*Dharma jal*	–	–	–	–	–	–	–	–	–	–	–	0.027	–	2.400	0.006
		100	100	100	100	100	100	100	100	100	100	100	100	100	41983.514	100

Note: – denotes zero catch

Appendix 2, Table III Percentage monthly catch from Mahasingh River by gear type: outside SHP (site NE20)

Gear Code	Gear name	Year: 1993											Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
45	*Ber jal*	10.719	76.532	69.434	–	–	–	–	–	–	–	57.944	80.854	86.901	18449.197	46.287
266	*Veshal*	7.267	0.252	–	53.835	99.707	100.000	66.623	76.439	95.336	62.152	2.959	–	–	10336.849	25.934
325	*Dora jal*	46.607	11.796	9.911	–	–	–	–	–	–	–	34.077	6.232	4.652	6580.325	16.509
88	*Current jal (Stationary)*	1.851	–	10.711	38.556	0.293	–	–	–	–	–	0.008	–	6.543	1436.772	3.605
272	*Daun*	–	–	–	–	–	–	27.200	10.068	2.541	6.709	4.658	–	–	1080.113	2.710
270	*Katha*	–	3.392	0.737	–	–	–	–	–	–	–	–	7.756	–	471.074	1.182
282	*Current jal (Drifting)*	19.332	5.973	–	–	–	–	–	–	–	–	–	4.479	1.375	450.399	1.130
164	*Jhaki jal*	2.486	–	0.581	0.310	–	–	–	–	–	27.813	0.354	0.449	–	427.123	1.072
255	*Thella jal*	4.873	1.469	–	4.526	–	–	5.295	3.246	–	–	–	–	–	236.842	0.594
30	*Sip*	–	–	–	–	–	–	0.882	10.247	2.123	3.326	–	–	–	163.046	0.409
123	*Koi jal*	–	–	1.806	2.772	–	–	–	–	–	–	–	–	–	105.686	0.265
317	*Thushi*	–	0.588	3.923	–	–	–	–	–	–	–	–	–	–	67.839	0.170
307	Hand fishing	–	–	2.900	–	–	–	–	–	–	–	–	–	–	33.061	0.083
263	*Ucha*	–	–	–	–	–	–	–	–	–	–	–	0.230	0.529	19.527	0.049
268	*Konaber jal*	6.865	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		100	100	100	100	100	100	100	100	100	100	100	100	100	39857.852	100

Note: – denotes zero catch

APPENDIX 3

Appendix 3, Table I Monthly catch composition (% by weight) from Surma River: outside SHP (site NE16)

Species Code	Habitat Preference	Species name		Year: 1993										Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Scientific	Bengali	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
186	Riverine	*Rita rita*	*Rita*	–	2.652	0.945	0.500	–	0.101	45.918	7.911	1.830	–	0.128	3.847	7.028	1739.037	2.457
99		*Labeo angra*	*Angrot*	–	–	–	–	–	–	0.062	0.031	0.027	–	–	–	–	2.912	0.004
106		*Labeo pangusia*	*Longu*	–	–	–	–	1.046	3.665	0.420	0.470	0.118	–	–	–	–	171.945	0.243
13		*Aspidoparia morar*	*Piali*	–	–	–	0.204	–	–	0.063	1.195	–	–	–	–	–	44.735	0.063
17		*Barilius barila*	*Barali*	–	–	–	–	–	–	–	–	0.042	–	0.088	–	–	9.338	0.013
59		*Crossocheilus latius*	*Kalabata*	–	–	–	–	–	0.570	0.012	0.067	0.057	–	–	0.122	–	36.779	0.052
139		*Nemacheilus botia*	*Balichata*	0.839	0.043	0.014	0.919	0.796	0.046	0.006	0.043	0.038	–	0.008	–	–	32.847	0.046
941		*Neoeucirrhichthys maydelli*	*Gutum*	0.514	0.123	0.011	0.413	0.076	–	–	–	0.005	0.003	0.044	–	–	15.412	0.022
1		*Pangio pangia*	*Panga*	0.005	–	–	1.105	0.444	–	–	–	–	–	–	–	–	20.064	0.028
198		*Somileptes gongota*	*Gharpoia*	–	0.007	0.004	–	–	–	–	–	0.042	–	–	0.326	–	34.396	0.049
28		*Botia dario*	*Rani*	0.032	2.210	0.260	0.459	2.268	42.048	0.436	0.120	0.288	0.088	0.011	1.131	0.950	1797.091	2.539
29		*Botia lohachata*	*Putul*	–	–	–	–	–	22.967	0.037	0.005	–	–	–	–	–	786.366	1.111
89		*Hilsa ilisha*	*Ilish*	–	39.155	24.630	–	3.747	2.257	4.250	1.015	0.002	–	0.012	–	0.741	2520.006	3.560
85		*Gonialosa manmina*	*Goni chapila*	–	–	–	–	–	–	–	–	–	–	0.023	0.491	0.159	60.277	0.085
58		*Corica soborna*	*Kachki*	4.248	2.272	0.064	0.239	0.054	–	0.006	0.498	2.705	1.773	0.279	29.755	5.283	3943.257	5.571
193		*Setipinna phasa*	*Phasa*	0.629	0.705	2.109	0.444	0.345	0.131	0.334	0.089	0.220	–	0.076	–	0.370	154.375	0.218
194		*Setipinna taty*	*Teli phasa*	–	–	–	–	–	–	–	0.212	0.033	0.063	–	–	0.199	36.946	0.052
30		*Brachygobius nunus*	*Nuna bailla*	–	0.047	–	–	–	–	–	–	–	–	–	–	–	1.813	0.003
92		*Hyporhampus gaimardi*	*Ek thota*	–	–	0.001	–	–	–	–	–	0.061	0.058	0.302	–	0.052	44.915	0.063
185		*Rhinomugil corsula*	*Khorsula*	0.867	0.004	–	0.091	–	–	1.533	0.297	0.033	–	0.013	–	–	27.076	0.038
923		*Sicamugil cascasia*	*Bata*	0.771	0.036	0.003	–	–	0.101	0.012	0.282	0.408	0.050	0.089	–	–	54.382	0.077
163		*Pisodonophis boro*	*Kharu*	–	0.010	0.029	0.013	0.047	–	–	–	–	0.010	0.018	0.386	–	43.839	0.062
2		*Ailia coila*	*Kajuli*	1.404	0.002	0.344	0.880	0.803	0.256	2.032	0.124	0.762	–	0.168	–	0.066	121.339	0.171
3		*Ailia punctata*	*Kajuli*	0.926	–	0.010	0.015	–	–	0.016	0.020	0.033	0.010	–	–	–	5.240	0.007
51		*Clupisoma garua*	*Ghaura*	2.546	4.662	8.827	0.074	0.025	0.012	16.089	7.094	6.617	0.966	0.128	1.836	1.962	1708.618	2.414
52		*Clupisoma naziri*	*Muri bacha*	–	–	0.181	–	0.031	–	0.061	0.012	0.053	–	0.111	–	0.034	21.068	0.030
196		*Silonia silondia*	*Shillong*	–	–	–	–	–	–	–	–	–	–	–	–	0.140	9.142	0.013
16		*Bagarius bagarius*	*Baghair*	–	–	–	–	–	0.033	1.298	3.319	0.530	–	0.140	0.027	–	169.374	0.239
74		*Erethistes pussilus*	*Kutakanti*	0.025	0.009	0.004	1.068	0.031	0.010	0.016	0.010	0.022	0.006	–	–	–	15.476	0.022
81		*Gagata youssoufi*	*Gang tengra*	0.019	1.067	0.537	0.388	0.117	0.346	0.282	0.033	0.213	0.048	0.953	0.006	0.877	236.794	0.335
87		*Hara hara*	*Kutakanti*	–	–	–	–	–	–	–	–	0.007	–	0.023	–	–	2.253	0.003
95		*Johnius coitor*	*Koitor*	2.474	0.519	0.420	0.600	0.110	–	0.462	0.590	0.132	0.331	1.345	0.207	3.666	520.235	0.735
155		*Pama pama*	*Poa*	–	0.039	0.011	–	–	–	–	–	–	–	0.273	0.011	–	25.254	0.036
158		*Pangasius pangasius*	*Pangas*	–	–	–	–	–	–	–	–	–	–	0.089	–	–	7.304	0.010
208		*Trypauchen vagina*	*Sada chewa*	–	–	–	–	–	–	–	–	–	–	0.139	–	–	11.428	0.016
	Subtotal			15.297	53.559	38.404	7.412	9.941	72.542	73.346	23.436	14.278	3.407	4.459	38.145	21.526	14431.333	20.390
7	Migratory	*Anguilla bengalensis*	*Bamosh*	–	–	–	–	–	–	–	0.424	–	–	0.233	–	–	34.040	0.048
130		*Acrichthys aor*	*Ayre*	0.370	6.845	–	3.838	0.065	–	–	1.009	0.560	1.355	11.084	6.231	21.284	3593.503	5.077
135		*Acrichthys seenghala*	*Guizza*	6.085	12.847	3.991	1.760	–	1.237	0.019	11.689	12.228	50.703	18.030	4.361	20.947	16959.284	23.962
24		*Batasio batasio*	*Tengra*	–	–	–	0.278	0.031	–	0.115	0.257	0.045	–	–	–	–	15.702	0.022
131		*Mystus bleekeri*	*Golsha tengra*	0.024	0.029	0.203	0.340	0.170	–	–	0.724	0.332	0.004	0.003	–	0.027	59.129	0.084
132		*Mystus cavasius*	*Kabashi*	0.109	0.971	3.957	1.102	0.184	0.150	1.234	0.444	0.763	–	1.639	0.303	0.662	448.821	0.634
134		*Mystus menoda*	*Ghagla*	–	0.902	–	0.247	–	–	–	2.110	–	0.029	–	–	–	118.253	0.167

(Cont.)

Appendix 3, Table I Monthly catch composition (% by weight) from Surma River: outside SHP (site NE16)

Species Code	Habitat Preference	Species name		Year: 1993											Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Scientific	Bengali	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
47		*Cirrhinus mrigala*	*Mrigel*	–	–	–	–	1.243	–	0.305	0.229	1.409	–	–	–	–	104.865	0.148
48		*Cirrhinus reba*	*Raik*	0.068	0.702	15.407	48.115	0.631	1.632	–	1.045	0.909	–	0.321	0.247	0.125	1198.336	1.693
100		*Labeo bata*	*Bata*	–	–	–	–	–	–	–	–	–	–	–	0.017	–	1.637	0.002
101		*Labeo boga*	*Bhangan*	–	–	–	–	–	1.931	0.276	0.278	1.196	–	–	0.020	–	139.384	0.197
102		*Labeo calbasu*	*Kalbaus*	6.738	5.484	18.396	0.966	–	1.574	0.451	3.671	3.098	8.694	22.418	44.631	22.163	10830.084	15.302
104		*Labeo gonius*	*Goni*	0.258	–	–	–	3.982	–	–	–	–	–	–	0.076	1.016	152.255	0.215
107		*Labeo rohita*	*Rui*	1.042	–	–	–	41.831	0.263	–	–	9.793	7.642	4.204	–	–	3471.263	4.905
44		*Chela laubuca*	*Kash khaira*	–	–	–	–	–	–	–	–	0.011	–	–	–	–	0.545	0.001
188		*Salmostoma bacaila*	*Katari*	12.355	0.436	0.304	1.776	1.820	0.216	0.206	0.142	0.662	–	0.054	0.071	2.497	301.255	0.426
189		*Salmostoma phulo*	*Fulchela*	1.340	1.673	0.156	0.716	1.444	6.536	0.491	4.142	2.426	0.050	2.373	1.296	1.067	1001.180	1.415
154		*Securicula gora*	*Chora chela*	–	–	–	–	–	–	0.074	0.953	0.060	–	0.009	–	–	37.924	0.054
86		*Gudusia chapra*	*Chapila*	11.456	2.319	1.097	4.165	4.793	0.830	0.802	16.763	23.213	0.253	3.386	1.876	6.073	2952.037	4.171
76		*Eutropiichthys vacha*	*Bacha*	0.124	5.093	1.265	5.292	0.499	0.093	0.538	1.657	1.276	0.627	0.456	0.457	1.041	724.979	1.024
169		*Pseudeutropius atherinoides*	*Batasi*	0.565	0.158	0.079	0.865	0.671	–	–	0.171	0.529	–	0.448	–	0.012	100.220	0.142
944		*Ompok pabo*	*Pabda*	–	–	0.170	0.650	–	–	–	0.017	–	–	–	–	–	12.455	0.018
209		*Wallagu attu*	*Boal*	4.775	–	3.972	0.955	–	–	–	–	6.987	17.236	7.961	–	–	5207.645	7.358
144		*Notopterus chitala*	*Chital*	2.875	–	8.568	–	–	–	–	11.154	3.318	9.840	13.102	0.428	–	4262.824	6.023
142		*Nemacheilus scaturigina*	*Dari*	–	–	–	–	0.024	–	–	–	–	–	–	–	–	0.465	0.001
161		*Pellona ditchela*	*Chouka*	–	–	–	–	–	–	–	–	0.043	0.010	0.141	0.122	0.155	38.052	0.054
	Subtotal			48.185	37.458	57.565	71.064	57.389	14.461	4.511	56.880	68.856	96.441	85.861	60.137	77.069	51766.137	73.140
136	Floodplain	*Mystus tengara*	*Bajari tengra*	–	–	–	0.006	–	–	–	–	–	–	–	–	–	0.066	0.0001
137	Resident	*Mystus vittatus*	*Tengra*	–	–	–	–	–	–	–	–	–	–	0.034	–	–	2.786	0.004
942		*Rama chandramara*	*Laia*	–	–	–	1.003	–	0.043	–	0.034	0.007	–	0.012	–	–	14.283	0.020
55		*Colisa fasciatus*	*Khalisha*	1.238	–	–	–	1.017	–	0.097	–	–	–	–	–	–	20.853	0.029
57		*Colisa sota*	*Khalisha*	–	–	–	0.044	0.049	–	–	–	–	–	–	–	–	1.425	0.002
210		*Xenentodon cancila*	*Kaikka*	0.100	0.015	0.031	0.494	0.317	0.222	–	0.685	0.892	–	0.055	–	–	93.282	0.132
187		*Osteobrama cotio cotio*	*Keti*	11.393	0.677	0.524	0.431	1.769	2.038	0.364	2.321	1.346	0.019	0.446	0.424	0.738	433.168	0.612
174		*Puntius chola*	*Chala puti*	–	0.024	–	0.289	0.038	0.394	0.195	0.369	0.508	–	0.005	0.329	–	90.488	0.128
175		*Puntius conchonius*	*Canchan puti*	–	–	–	0.486	1.623	1.314	0.026	0.227	0.362	–	–	0.019	–	109.948	0.155
173		*Puntius cosuatis*	*Kosuati*	–	–	–	–	–	–	–	–	0.011	–	–	–	–	0.565	0.001
176		*Puntius gelius*	*Giliputi*	0.158	0.436	0.046	0.190	1.362	0.199	0.003	0.070	0.315	–	–	–	–	71.716	0.101
177		*Puntius guganio*	*Mola puti*	–	–	–	–	–	–	–	0.003	0.017	–	–	–	–	0.964	0.001
178		*Puntius phutunio*	*Phutani puti*	0.082	–	–	0.004	0.468	–	0.097	–	–	–	–	–	–	10.088	0.014
180		*Puntius sophore*	*Puti*	0.018	0.013	–	–	0.267	0.039	0.027	0.098	0.023	–	0.002	–	–	12.069	0.017
181		*Puntius terio*	*Teri punti*	–	–	–	–	0.393	–	0.024	–	–	–	–	–	–	7.954	0.011
212		*Puntius ticto*	*Tit puti*	–	–	–	–	–	–	–	–	0.009	–	–	–	–	0.465	0.001
5		*Amblypharyngodon mola*	*Mola*	0.068	0.011	0.002	0.262	4.041	1.104	0.024	0.017	0.028	–	–	–	–	122.776	0.173
68		*Danio devario*	*Chebli*	–	0.026	–	0.041	0.016	–	–	0.069	0.018	–	0.003	–	–	5.263	0.007
75		*Esomus danricus*	*Darkina*	0.012	0.002	–	0.058	0.031	–	–	–	–	–	–	–	–	1.291	0.002
182		*Rasbora daniconius*	*Darkina*	–	–	–	0.006	0.312	–	0.685	–	–	–	–	–	–	11.956	0.017
83		*Glossogobius giurus*	*Bailla*	1.035	0.210	0.018	0.999	0.276	0.261	1.078	0.455	0.286	–	0.116	0.245	0.103	112.672	0.159
91		*Hypophthalmichthys molitrix*	*Silver carp*	–	–	–	–	0.110	–	–	1.650	–	–	–	–	–	60.346	0.085

(Cont.)

Appendix 3, Table I Monthly catch composition (% by weight) from Surma River: outside SHP (site NE16)

Species Code	Habitat Preference	Species name		Year: 1993											Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Scientific	Bengali	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
43		*Chela cachius*	*Chep chela*	–	–	–	–	–	–	–	0.067	0.025	–	–	–	–	3.580	0.005
219		*Lepidocephalus annandalei*	*Puiya*	–	–	–	0.021	0.004	–	–	–	–	–	–	–	–	0.293	0.0004
109		*Lepidocephalus berdmorei*	*Puiya*	–	–	–	–	–	–	–	–	0.011	–	–	–	–	0.526	0.001
110		*Lepidocephalus guntea*	*Gutum*	–	–	–	0.526	0.004	0.014	0.024	–	–	–	–	–	–	6.154	0.009
9		*Aplocheilus panchax*	*Kanpona*	–	–	–	–	0.078	–	–	–	–	–	0.004	–	–	1.868	0.003
39		*Channa marulius*	*Gajar*	–	–	–	–	–	–	–	–	–	–	0.050	–	–	4.099	0.006
41		*Channa punctatus*	*Taki*	–	–	–	0.061	0.008	–	–	–	–	–	0.363	–	–	30.527	0.043
49		*Clarias batrachus*	*Magur*	–	–	–	–	–	0.169	–	–	–	–	–	–	–	5.790	0.008
88		*Heteropneustes fossilis*	*Shingi*	–	–	–	–	0.699	–	–	–	–	–	–	–	–	13.775	0.019
121		*Macrognathus aculeatus*	*Tara baim*	–	–	–	–	–	0.418	–	–	–	–	–	–	–	14.296	0.020
123		*Macrognathus pancalus*	*Guchi*	0.617	0.178	0.020	0.199	0.497	–	–	–	0.035	–	0.032	–	–	23.647	0.033
122		*Mastacembelus armatus*	*Baral baim*	–	0.812	1.161	9.628	0.104	0.154	1.551	9.113	4.861	–	0.187	–	–	762.732	1.078
138		*Nandus nandus*	*Bheda*	–	–	–	–	0.101	–	–	–	–	–	–	–	–	1.985	0.003
15		*Badis badis*	*Napit koi*	0.003	0.012	–	0.054	0.500	0.062	0.097	–	0.015	–	–	0.083	–	22.635	0.032
147		*Ompok bimaculatus*	*Kani pabda*	–	–	–	0.165	–	–	–	2.333	0.304	–	–	–	–	99.014	0.140
148		*Ompok pabda*	*Madhu pabda*	–	–	–	1.013	–	–	–	–	–	–	–	–	–	10.380	0.015
145		*Notopterus notopterus*	*Foli*	–	–	–	–	–	–	0.135	0.013	0.009	–	–	–	–	2.043	0.003
203		*Tetraodon cutcutia*	*Potka*	–	–	–	0.022	0.423	0.262	0.030	0.337	2.244	–	–	–	–	140.753	0.199
33		*Chaca chaca*	*Cheka*	0.494	–	0.076	0.486	–	–	–	–	–	–	–	–	–	7.282	0.010
35		*Chanda baculis*	*Chanda*	0.002	0.191	0.078	1.341	0.900	5.450	0.024	0.449	2.271	0.029	3.378	0.245	0.034	666.090	0.941
36		*Chanda nama*	*Nama chanda*	1.161	0.054	–	0.386	0.517	0.479	0.046	0.290	2.786	0.033	0.126	–	–	199.231	0.281
37		*Chanda ranga*	*Lal chanda*	0.099	0.018	0.001	0.196	2.269	0.056	0.170	0.003	0.052	–	–	–	–	53.451	0.076
	Subtotal			16.480	2.679	1.955	18.412	18.194	12.676	4.695	18.603	16.436	0.081	4.811	1.343	0.875	3254.575	4.598
998	Others	Unidentified fish		–	–	–	0.006	0.566	–	–	–	–	–	–	–	–	11.224	0.016
120		*Macrobrachium rosenbergii*	*Golda*	–	–	–	–	–	–	–	–	–	–	–	–	0.203	13.238	0.019
931		Prawn spp.	*Chingri/Icha*	20.038	4.096	2.076	3.104	13.909	0.320	17.447	1.079	0.429	0.070	2.821	0.374	0.328	1048.213	1.481
168		*Potamon*	*Kakra*	–	2.206	–	–	–	–	–	–	–	–	–	–	–	84.345	0.119
207		*Trionyx gangeticus*	*Kachhim*	–	–	–	–	–	–	–	–	–	–	2.047	–	–	167.773	0.237
	Subtotal			20.038	6.303	2.076	3.110	14.475	0.320	17.447	1.079	0.429	0.070	4.868	0.374	0.531	1324.793	1.872
	Grand total			100	100	100	100	100	100	100	100	100	100	100	100	100	70776.842	100

Note: – denotes zero catch

Appendix 3, Table II Monthly catch composition (% by weight) from Old Surma River: outside SHP (site NE11)

Species Code	Habitat Preference	Species name		Year: 1993										Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Scientific	Bengali	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
186	Riverine	*Rita rita*	*Rita*	0.030	–	0.009	–	–	–	0.058	–	–	–	–	0.064	0.809	26.228	0.062
106		*Labeo pangusia*	*Longu*	–	–	–	–	–	9.892	0.181	0.007	–	–	–	–	–	68.582	0.163
12		*Aspidoparia jaya*	*Piali*	–	–	0.090	–	–	–	–	–	–	–	–	–	–	1.565	0.004
59		*Crossocheilus latius*	*Kalabata*	–	–	–	–	–	–	0.146	0.390	0.031	–	–	–	–	10.267	0.024
139		*Nemacheilus botia*	*Balichata*	0.619	0.773	0.309	0.161	0.204	0.154	0.371	0.301	–	0.131	–	0.002	0.371	46.183	0.110
941		*Neoeucirrhichthys maydelli*	*Gutum*	0.179	0.255	0.461	0.050	0.242	0.003	–	0.026	–	–	0.006	–	0.002	17.330	0.041
198		*Somileptes gongota*	*Gharpoia*	0.852	0.542	1.439	–	–	–	–	0.176	–	–	0.363	0.265	0.332	121.735	0.290
28		*Botia dario*	*Rani*	0.025	0.112	0.327	0.201	0.540	10.907	0.812	1.163	–	0.464	0.923	0.060	1.130	319.758	0.762
29		*Botia lohachata*	*Putul*	–	–	–	–	–	1.900	0.312	–	–	–	–	–	–	16.614	0.040
89		*Hilsa ilisha*	*Ilish*	–	0.015	0.209	–	–	–	0.194	0.916	0.056	–	–	–	–	25.818	0.061
85		*Gonialosa manmina*	*Goni chapila*	–	–	0.043	–	–	0.100	–	–	–	–	–	0.144	–	14.484	0.034
58		*Corica soborna*	*Kachki*	1.175	1.635	0.852	0.141	7.666	1.326	15.819	14.335	1.241	27.423	3.756	0.017	1.907	2656.050	6.326
193		*Setipinna phasa*	*Phasa*	–	–	–	–	0.204	0.784	0.260	–	0.074	–	–	0.037	–	16.909	0.040
194		*Setipinna taty*	*Teli phasa*	–	–	–	–	–	–	0.301	0.081	–	–	–	–	–	5.436	0.013
30		*Brachygobius nunus*	*Nunabailla*	–	0.018	0.107	0.020	–	–	0.022	0.033	–	–	–	–	0.002	3.125	0.007
92		*Hyporhampus gaimardi*	*Ek thota*	–	0.135	0.112	–	–	–	0.170	0.063	–	1.131	0.347	0.013	0.197	120.487	0.287
185		*Rhinomugil corsula*	*Khorsula*	–	–	–	–	0.078	–	–	–	–	–	–	–	–	1.512	0.004
923		*Sicamugil cascasia*	*Bata*	–	–	0.035	0.010	0.163	0.036	0.040	0.162	–	–	–	–	–	7.908	0.019
163		*Pisodonophis boro*	*Kharu*	–	0.118	1.597	–	–	–	–	0.044	–	–	–	–	–	30.124	0.072
2		*Ailia coila*	*Kajuli*	1.069	0.397	0.145	0.164	2.826	0.027	–	0.328	0.675	–	–	0.064	0.084	87.024	0.207
3		*Ailia punctata*	*Kajuli*	1.281	0.413	–	–	0.053	0.583	0.060	0.015	–	–	–	0.152	–	24.511	0.058
51		*Clupisoma garua*	*Ghaura*	0.269	0.158	0.312	0.329	0.544	1.993	0.110	1.186	0.173	2.301	2.589	0.007	–	564.138	1.344
52		*Clupisoma naziri*	*Muri bacha*	–	–	–	0.016	0.994	0.036	–	0.004	–	–	–	–	–	19.747	0.047
196		*Silonia silondia*	*Shillong*	–	–	–	–	–	–	–	–	–	–	–	0.005	–	0.450	0.001
74		*Erethistes pussilus*	*Kutakanti*	0.031	0.035	0.090	0.082	0.015	–	0.265	0.073	0.010	–	0.001	–	–	7.651	0.018
80		*Gagata viridescens*	*Gang tengra*	–	–	–	–	–	–	–	–	–	–	–	0.016	–	1.440	0.003
81		*Gagata youssoufi*	*Gang tengra*	0.108	0.015	0.323	0.040	8.690	–	0.950	0.242	0.037	0.142	0.061	0.003	0.238	214.885	0.512
87		*Hara hara*	*Kutakanti*	–	–	–	–	–	–	–	0.050	–	0.017	–	–	0.041	2.853	0.007
961		*Microphis deocata*		–	–	–	–	–	–	–	0.043	–	–	–	–	–	0.884	0.002
95		*Johnius coitor*	*Koitor*	0.474	0.364	0.689	–	0.134	–	–	0.667	–	–	0.121	0.012	0.223	57.289	0.136
155		*Pama pama*	*Poa*	–	0.036	–	–	0.363	–	–	–	–	–	–	0.268	–	31.714	0.076
	Subtotal			6.110	5.018	7.149	1.215	22.715	27.742	20.069	20.304	2.297	31.609	8.166	1.128	5.336	4522.701	10.773
130	Migratory	*Aorichthys aor*	*Ayre*	1.916	1.109	1.968	–	–	–	0.231	0.555	0.068	–	2.127	3.873	4.713	847.715	2.019
135		*Aorichthys seenghala*	*Guizza*	2.483	2.225	8.619	0.232	0.095	–	0.121	0.542	–	–	0.689	6.576	11.222	1161.372	2.766
24		*Batasio batasio*	*Tengra*	0.043	–	–	–	–	–	–	0.243	–	–	0.004	0.0002	0.025	6.204	0.015
131		*Mystus bleekeri*	*Golsha tengra*	3.081	0.993	0.385	0.225	0.035	0.299	2.788	0.316	0.144	0.163	1.969	2.555	2.184	654.111	1.558
132		*Mystus cavasius*	*Kabashi*	8.570	5.170	5.619	0.153	0.152	0.138	0.828	1.178	1.017	0.653	2.824	13.182	12.036	2152.626	5.127
134		*Mystus menoda*	*Ghagla*	–	–	–	–	–	–	–	–	0.208	–	0.054	0.453	1.279	82.917	0.197
32		*Catla catla*	*Catla*	–	–	–	–	–	–	–	–	–	–	–	2.677	–	242.275	0.577
47		*Cirrhinus mrigala*	*Mrigel*	–	–	1.175	–	–	–	–	0.075	–	–	0.026	0.414	–	63.380	0.151
48		*Cirrhinus reba*	*Raik*	4.379	2.652	2.472	1.125	–	1.009	0.066	2.525	–	0.179	2.703	0.756	2.379	679.124	1.618

(Cont.)

Appendix 3, Table II Monthly catch composition (% by weight) from Old Surma River: outside SHP (site NE11)

Species Code	Habitat Preference	Species name		Year: 1993										Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Scientific	Bengali	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
101		*Labeo boga*	*Bhangan*	1.434	–	0.338	–	–	–	–	0.233	–	–	–	–	–	10.670	0.025
102		*Labeo calbasu*	*Kalbaus*	–	–	0.183	–	–	14.775	–	–	5.762	0.040	0.539	4.974	6.525	874.166	2.082
104		*Labeo gonius*	*Goni*	0.523	–	0.470	–	0.020	2.722	–	–	–	–	0.011	0.057	0.535	46.505	0.111
107		*Labeo rohita*	*Rui*	–	–	–	–	–	3.064	–	–	–	–	13.935	13.843	0.795	3395.819	8.088
44		*Chela laubuca*	*Kash khaira*	–	–	–	–	0.025	–	–	–	–	–	–	–	–	0.484	0.001
188		*Salmostoma bacaila*	*Katari*	0.692	0.422	0.775	0.703	0.069	2.274	–	0.741	0.495	0.196	2.975	0.022	0.301	527.149	1.256
189		*Salmostoma phulo*	*Fulchela*	0.589	1.276	1.148	0.745	1.485	8.585	0.651	1.533	0.060	0.563	0.831	0.620	2.324	429.103	1.022
154		*Securicula gora*	*Chora chela*	–	–	–	–	–	–	–	0.405	–	0.258	–	–	–	20.901	0.050
86		*Gudusia chapra*	*Chapila*	7.029	5.395	22.237	3.257	1.852	3.434	5.199	30.558	26.928	16.608	40.011	2.642	6.802	8844.655	21.067
76		*Eutropiichthys vacha*	*Bacha*	0.373	–	0.182	0.077	4.114	2.208	0.241	0.445	0.391	0.309	–	0.361	–	163.866	0.390
169		*Pseudeutropius atherinoides*	*Batasi*	6.632	0.050	0.600	0.137	0.485	–	0.060	0.047	–	1.271	0.527	1.670	1.074	341.318	0.813
944		*Ompok pabo*	*Pabda*	–	–	0.102	–	–	–	–	0.042	–	–	0.001	–	–	2.721	0.006
209		*Wallagu attu*	*Boal*	2.083	1.381	0.607	32.363	–	–	–	–	2.147	0.080	1.456	20.850	3.519	2351.934	5.602
144		*Notopterus chitala*	*Chital*	–	–	–	–	–	–	–	3.646	11.050	–	0.941	13.311	0.087	1579.183	3.761
161		*Pellona ditchela*	*Chouka*	–	–	–	–	–	0.538	–	0.184	0.107	0.069	0.010	–	0.031	14.480	0.034
	Subtotal			39.826	20.672	46.879	39.017	8.332	39.047	10.184	43.267	48.375	20.389	71.631	88.835	55.829	24492.678	58.339
6	Floodplain	*Anabas testudineus*	*Koi*	–	–	–	0.027	0.063	0.120	–	–	–	–	–	–	–	2.117	0.005
136	Resident	*Mystus tengara*	*Bajari tengra*	0.199	–	–	–	0.324	–	0.062	–	–	–	–	–	–	7.100	0.017
137		*Mystus vittatus*	*Tengra*	1.008	0.116	–	–	0.126	0.082	1.610	–	–	–	–	–	0.014	24.854	0.059
942		*Rama chandramara*	*Laia*	–	0.109	–	0.788	0.656	0.111	0.111	0.322	–	0.017	0.00001	–	0.423	36.295	0.086
61		*Ctenops nobilis*	*Neftani*	–	–	–	0.038	–	–	–	–	–	–	–	–	0.065	1.690	0.004
55		*Colisa fasciatus*	*Khalisha*	0.033	–	–	0.269	0.102	–	–	0.008	–	0.023	–	–	0.025	4.710	0.011
211		*Colisa labiosus*	*Khalisha*	–	–	0.001	0.203	–	–	0.009	–	–	–	–	–	–	0.759	0.002
57		*Colisa sota*	*Khalisha*	–	0.011	–	–	0.502	0.019	0.020	0.009	–	–	–	–	–	10.486	0.025
210		*Xenentodon cancila*	*Kaikka*	0.007	0.428	–	3.860	1.283	3.168	–	3.140	0.052	–	0.505	0.046	0.269	215.088	0.512
187		*Osteobrama cotio cotio*	*Keti*	2.720	2.472	2.876	0.408	0.607	0.611	1.603	1.533	0.267	0.665	0.238	1.237	9.260	555.151	1.322
174		*Puntius chola*	*Chala puti*	0.620	1.465	2.490	0.236	–	0.318	0.377	0.072	–	1.115	0.894	0.137	2.115	322.344	0.768
175		*Puntius conchonius*	*Canchan puti*	0.254	0.098	0.062	0.383	2.159	0.887	1.414	0.682	–	0.073	0.019	0.019	0.076	93.225	0.222
176		*Puntius gelius*	*Giliputi*	0.548	0.535	0.089	0.641	0.793	0.028	0.200	0.236	0.016	0.057	–	0.018	0.334	45.363	0.108
178		*Puntius phutunio*	*Phutani puti*	–	0.033	–	0.232	0.459	0.009	0.029	0.026	–	–	–	0.001	0.040	12.103	0.029
180		*Puntius sophore*	*Puti*	3.135	0.134	0.015	0.907	0.375	–	0.183	0.311	–	–	0.824	0.138	–	157.451	0.375
181		*Puntius terio*	*Teri punti*	–	0.020	0.044	–	–	–	0.064	0.031	0.008	0.063	–	–	–	5.616	0.013
212		*Puntius ticto*	*Tit puti*	–	0.043	0.143	0.335	0.003	0.006	0.077	0.009	–	–	–	0.001	–	5.354	0.013
183		*Rasbora elanga*	*Sephatia*	–	–	–	–	–	–	–	0.281	–	–	–	–	–	5.774	0.014
4		*Amblypharyngodon microlepis*	*Mola*	0.178	–	–	–	–	–	–	–	–	–	–	–	–	–	–
5		*Amblypharyngodon mola*	*Mola*	0.344	0.037	–	0.470	1.710	0.474	0.126	0.043	0.083	0.073	0.034	0.219	0.386	79.879	0.190

(Cont.)

Appendix 3, Table II Monthly catch composition (% by weight) from Old Surma River: outside SHP (site NE11)

Species Code	Habitat Preference	Species name		Year: 1993											Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Scientific	Bengali	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
68		*Danio devario*	*Chebli*	0.169	–	–	0.606	0.058	–	–	0.045	–	–	–	0.007	0.192	9.184	0.022
75		*Esomus danricus*	*Darkina*	–	0.015	–	0.038	0.271	0.071	0.102	–	0.003	–	–	–	–	7.371	0.018
182		*Rasbora daniconius*	*Darkina*	0.120	0.097	0.002	2.196	1.551	0.146	–	0.069	0.016	0.015	0.208	–	–	72.894	0.174
83		*Glossogobius giurus*	*Bailla*	10.975	2.994	4.022	1.423	2.271	0.218	4.409	2.160	0.062	0.269	2.325	0.659	2.329	735.307	1.751
91		*Hypophthalmichthys molitrix*	*Silver carp*	–	–	–	–	–	–	–	–	13.029	–	–	–	–	183.507	0.437
43		*Chela cachius*	*Chep chela*	–	–	–	–	–	–	–	0.057	–	–	–	–	0.177	5.449	0.013
109		*Lepidocephalus berdmorei*	*Puiya*	–	–	–	–	–	–	–	–	–	0.049	–	–	–	2.385	0.006
110		*Lepidocephalus guntea*	*Gutum*	0.102	0.467	0.085	0.891	0.438	0.298	0.231	0.263	–	0.031	0.006	0.001	–	30.945	0.074
9		*Aplocheilus panchax*	*Kanpona*	–	–	–	0.444	0.033	–	–	–	–	–	–	–	0.008	2.187	0.005
39		*Channa marulius*	*Gajar*	–	–	–	–	–	–	–	–	–	–	0.097	0.316	1.121	70.328	0.168
41		*Channa punctatus*	*Taki*	0.036	0.388	0.184	–	0.358	0.216	0.235	0.029	–	–	–	–	0.040	20.634	0.049
49		*Clarias batrachus*	*Magur*	–	–	–	–	–	0.015	–	–	–	–	–	–	–	0.103	0.0002
88		*Heteropneustes fossilis*	*Shingi*	–	–	–	0.121	–	0.083	0.725	0.059	–	–	–	–	–	11.223	0.027
121		*Macrognathus aculeatus*	*Tara baim*	–	0.187	2.189	0.192	0.189	0.105	0.839	0.751	–	–	–	–	–	71.269	0.170
123		*Macrognathus pancalus*	*Guchi*	1.051	1.094	3.883	5.380	0.083	0.056	0.524	0.212	0.023	0.098	–	–	0.012	115.313	0.275
122		*Mastacembelus armatus*	*Baral baim*	9.838	33.616	3.166	–	–	0.536	0.641	5.635	22.610	8.507	0.478	0.870	3.271	1535.042	3.656
138		*Nandus nandus*	*Bheda*	0.387	–	0.033	–	–	0.278	0.147	0.395	–	0.022	–	–	0.216	18.679	0.044
15		*Badis badis*	*Napit koi*	–	0.011	–	0.193	0.959	0.006	0.145	0.018	0.008	0.008	–	–	0.002	22.176	0.053
147		*Ompok bimaculatus*	*Kani pabda*	–	–	0.302	0.383	–	0.154	0.461	0.772	–	–	0.047	2.438	3.090	331.455	0.789
148		*Ompok pabda*	*Madhu pabda*	0.151	0.308	0.246	–	0.112	–	0.180	0.194	–	–	0.933	0.018	0.394	168.336	0.401
145		*Notopterus notopterus*	*Foli*	0.831	–	0.017	0.006	0.071	0.037	0.275	1.333	1.351	–	2.343	1.180	4.444	619.562	1.476
203		*Tetraodon cutcutia*	*Potka*	0.023	–	–	0.907	1.179	9.966	4.755	1.294	0.441	0.008	0.052	0.003	0.020	193.860	0.462
33		*Chaca chaca*	*Cheka*	0.378	0.647	1.220	2.293	–	–	–	–	–	–	–	–	–	35.841	0.085
35		*Chanda baculis*	*Chanda*	0.991	0.716	0.799	0.137	6.865	6.786	3.556	5.150	7.346	3.473	1.206	0.398	1.766	885.854	2.110
36		*Chanda nama*	*Nama chanda*	1.403	0.635	0.271	0.232	2.489	1.583	0.117	1.707	0.344	0.834	1.247	0.028	0.528	357.544	0.852
37		*Chanda ranga*	*Lal chanda*	0.336	0.277	0.279	0.642	8.650	0.196	1.148	0.060	0.035	0.025	0.578	0.002	0.039	285.836	0.681
	Subtotal			35.834	46.952	22.418	24.880	34.736	26.585	24.375	26.907	45.694	15.425	12.034	7.738	30.654	7377.643	17.573
998	Others	Unidentified fish		–	–	0.088	0.151	–	–	–	–	–	–	–	0.031	–	4.779	0.011
931		Prawn spp.	*Chingri/Icha*	18.229	27.357	23.463	34.736	34.215	6.624	45.369	9.519	3.632	32.575	8.168	2.267	8.179	5585.658	13.304
	Subtotal			18.229	27.357	23.551	34.887	34.215	6.624	45.369	9.519	3.632	32.575	8.168	2.298	8.179	5590.437	13.316
	Grand total			100	100	100	100	100	100	100	100	100	100	100	100	100	41983.455	100

Note: – denotes zero catch

Appendix 3, Table III Monthly catch composition (% by weight) from Mahasingh River: outside SHP (site NE20)

Species Code	Habitat Preference	Species name		Year: 1993											Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Scientific	Bengali	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
186	Riverine	*Rita rita*	*Rita*	–	–	–	–	–	–	–	0.427	–	–	–	–	–	2.776	0.007
99		*Labeo angra*	*Angrot*	–	–	–	–	–	1.104	1.095	–	–	–	–	–	–	17.484	0.044
106		*Labeo pangusia*	*Longu*	–	–	–	–	–	15.107	–	–	0.234	–	–	–	–	191.401	0.480
139		*Nemacheilus botia*	*Balichata*	1.328	0.169	0.080	0.047	–	–	–	–	0.031	0.615	0.509	1.384	0.421	168.161	0.422
941		*Neoeucirrhichthys maydelli*	*Gutum*	0.200	0.271	0.055	0.213	–	–	–	–	–	0.008	–	0.156	0.010	24.681	0.062
198		*Somileptes gongota*	*Gharpoia*	2.829	1.721	1.290	0.027	–	–	–	0.085	0.023	0.679	1.370	2.368	5.146	515.244	1.293
28		*Botia dario*	*Rani*	0.181	0.206	–	–	0.808	6.597	1.455	2.481	0.303	0.481	0.149	0.039	0.004	175.276	0.440
29		*Botia lohachata*	*Putul*	–	–	–	–	–	0.159	–	–	–	–	–	0.002	–	2.052	0.005
89		*Hilsa ilisha*	*Ilish*	–	–	2.233	–	–	–	0.982	3.084	0.239	0.015	–	–	–	55.228	0.139
85		*Gonialosa manmina*	*Goni chapila*	–	0.034	0.051	–	–	–	–	–	–	–	–	–	–	1.901	0.005
58		*Corica soborna*	*Kachki*	0.303	3.271	0.106	0.015	0.238	2.285	1.257	2.910	5.268	1.361	11.097	1.468	0.253	2245.680	5.634
30		*Brachygobius nunus*	*Nunabailla*	–	–	–	0.012	–	–	–	–	0.027	–	–	–	–	1.021	0.003
92		*Hyporhampus gaimardi*	*Ek thota*	–	0.090	–	0.003	–	6.487	1.196	1.462	0.788	1.210	0.034	0.009	0.048	138.288	0.347
923		*Sicamugil cascasia*	*Bata*	–	–	0.037	–	0.036	–	–	0.110	0.039	–	–	–	–	3.216	0.008
2		*Ailia coila*	*Kajuli*	0.037	2.983	–	–	–	–	0.302	–	–	–	–	0.103	–	122.765	0.308
3		*Ailia punctata*	*Kajuli*	0.021	0.330	–	–	–	–	0.088	–	–	–	–	–	0.222	17.385	0.044
51		*Clupisoma garua*	*Ghaura*	0.091	0.278	–	–	–	0.472	1.662	14.884	2.566	–	0.066	–	–	194.998	0.489
74		*Erethistes pussilus*	*Kutakanti*	0.082	0.015	0.172	–	–	–	0.345	–	–	0.008	–	–	–	3.876	0.010
81		*Gagata youssoufi*	*Gang tengra*	–	0.020	–	–	–	–	–	–	–	–	0.057	0.087	–	13.965	0.035
87		*Hara hara*	*Kutakanti*	–	–	–	–	–	–	–	–	–	0.060	0.030	0.231	0.002	15.603	0.039
961		*Microphis deocata*		–	–	–	–	–	–	–	–	0.048	0.022	–	–	–	1.465	0.004
95		*Johnius coitor*	*Koitor*	–	0.025	–	–	–	–	–	–	–	–	–	–	–	1.000	0.003
108		*Leiognathus equulus*	*Tak chanda*	–	–	–	–	–	–	–	–	–	–	–	0.013	–	0.552	0.001
	Subtotal			5.072	9.412	4.023	0.316	1.081	32.211	8.383	25.443	9.564	4.457	13.313	5.858	6.106	3914.018	9.820
130	Migratory	*Aorichthys aor*	*Ayre*	–	–	–	–	–	–	–	–	0.218	0.348	9.141	0.197	0.547	1544.462	3.875
135		*Aorichthys seenghala*	*Guizza*	0.259	0.168	–	0.007	–	–	–	–	–	–	–	0.071	0.967	27.668	0.069
24		*Batasio batasio*	*Tengra*	–	–	–	–	–	–	0.151	–	–	–	0.045	–	–	8.075	0.020
131		*Mystus bleekeri*	*Golsha tengra*	3.655	0.621	0.125	0.070	–	–	0.938	0.653	0.199	9.521	10.221	3.101	4.322	2061.535	5.172
132		*Mystus cavasius*	*Kabashi*	3.247	2.649	0.774	–	–	–	2.248	1.052	4.929	0.430	6.903	3.865	4.743	1653.690	4.149
134		*Mystus menoda*	*Ghagla*	–	–	–	–	–	–	–	–	–	–	–	0.049	–	2.100	0.005
32		*Catla catla*	*Catla*	–	–	–	–	0.155	–	–	–	–	–	–	–	–	4.780	0.012
47		*Cirrhinus mrigala*	*Mrigel*	–	–	–	–	6.050	–	4.532	1.521	–	–	–	–	–	212.956	0.534
48		*Cirrhinus reba*	*Raik*	0.321	3.453	3.575	0.611	–	1.041	–	8.626	0.234	–	1.853	6.271	–	843.653	2.117

(Cont.)

Appendix 3, Table III Monthly catch composition (% by weight) from Mahasingh River: outside SHP (site NE20)

Species Code	Habitat Preference	Species name		Year: 1993										Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Scientific	Bengali	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
100		*Labeo bata*	*Bata*	–	–	–	–	–	0.188	1.788	–	0.214	–	–	–	–	14.100	0.035
101		*Labeo boga*	*Bhangan*	–	–	–	–	–	–	0.151	–	–	–	–	–	–	0.542	0.001
102		*Labeo calbasu*	*Kalbaus*	0.064	0.206	0.042	0.418	0.077	0.445	7.932	2.073	1.829	–	–	0.200	0.268	130.638	0.328
104		*Labeo gonius*	*Goni*	–	0.181	1.806	42.605	2.876	0.357	0.881	–	–	–	–	0.028	0.226	1437.262	3.606
107		*Labeo rohita*	*Rui*	–	–	–	0.685	4.705	–	–	–	–	–	–	–	–	166.267	0.417
188		*Salmostoma bacaila*	*Katari*	0.174	1.120	1.205	2.280	0.071	–	0.189	0.126	–	–	0.434	0.051	0.106	207.690	0.521
189		*Salmostoma phulo*	*Fulchela*	0.577	5.430	1.714	0.717	2.934	26.845	0.997	0.516	0.714	0.148	1.452	3.515	3.935	1164.629	2.922
86		*Gudusia chapra*	*Chapila*	3.748	8.186	9.417	0.940	3.691	6.371	18.968	15.114	7.633	1.896	7.756	39.252	5.412	4084.169	10.247
76		*Eutropiichthys vacha*	*Bacha*	–	–	–	0.027	–	–	0.919	–	–	–	–	–	–	4.119	0.010
169		*Pseudeutropius atherinoides*	*Batasi*	0.176	0.490	0.215	1.508	0.024	0.129	0.416	0.746	1.793	–	0.383	0.309	0.016	198.638	0.498
944		*Ompok pabo*	*Pabda*	0.088	–	–	–	–	–	–	1.738	–	–	–	–	–	11.310	0.028
209		*Wallagu attu*	*Boal*	1.554	0.792	–	–	–	3.042	–	–	4.670	–	–	0.452	–	205.078	0.515
142		*Nemacheilus scaturigina*	*Dari*	–	–	–	–	–	–	–	–	–	–	1.086	–	–	180.133	0.452
161		*Pellona ditchela*	*Chouka*	–	–	–	–	–	–	–	–	0.049	0.118	0.383	0.041	–	67.999	0.171
	Subtotal			13.864	23.297	18.873	49.867	20.583	38.417	40.108	32.166	22.481	12.460	39.656	57.402	20.542	14231.493	35.706
6	Floodplain	*Anabas testudineus*	*Koi*	–	–	–	0.185	0.068	0.062	–	–	–	–	–	–	–	8.554	0.021
136	Resident	*Mystus tengara*	*Bajari tengra*	0.123	0.058	1.255	0.418	0.157	–	–	–	–	3.625	0.987	0.704	0.095	273.028	0.685
137		*Mystus vittatus*	*Tengra*	0.224	0.050	–	0.052	0.545	–	–	–	–	0.685	1.978	0.223	0.347	372.536	0.935
942		*Rama chandramara*	*Laia*	0.278	0.213	0.017	0.734	0.582	0.014	0.167	0.148	1.720	0.382	0.238	0.068	–	140.921	0.354
61		*Ctenops nobilis*	*Neftani*	–	–	–	–	–	–	–	–	–	0.022	–	–	–	0.266	0.001
55		*Colisa fasciatus*	*Khalisha*	0.070	–	–	0.138	–	–	0.085	–	0.058	0.008	–	–	–	6.109	0.015
211		*Colisa labiosus*	*Khalisha*	–	0.051	–	0.199	0.019	–	–	0.106	–	–	–	–	–	9.399	0.024
57		*Colisa sota*	*Khalisha*	–	0.026	–	0.078	0.010	–	–	0.010	–	–	–	–	–	3.768	0.009
210		*Xenentodon cancila*	*Kaikka*	0.568	1.864	1.809	0.865	4.601	3.417	2.594	0.786	1.739	0.932	0.822	1.100	2.643	605.507	1.519
187		*Osteobrama cotio cotio*	*Keti*	1.075	1.576	0.602	0.098	0.019	–	1.133	0.079	1.929	0.067	0.778	0.214	0.128	266.756	0.669
174		*Puntius chola*	*Chala puti*	1.399	0.495	0.036	0.207	2.704	0.143	0.101	0.771	0.338	3.020	1.132	0.362	0.070	365.900	0.918
175		*Puntius conchonius*	*Canchan puti*	1.613	0.168	1.839	0.454	35.017	11.147	0.048	0.948	9.509	4.496	0.443	0.052	–	1634.369	4.100
176		*Puntius gelius*	*Giliputi*	0.086	0.269	2.722	0.451	4.126	0.229	0.022	0.260	0.279	0.216	0.157	0.172	0.612	241.733	0.606
177		*Puntius guganio*	*Mola puti*	–	–	–	–	–	–	–	–	0.034	0.008	–	–	–	0.953	0.002
178		*Puntius phutunio*	*Phutani puti*	–	0.026	0.045	0.518	0.233	–	0.009	0.010	0.041	0.068	–	0.013	–	27.136	0.068
180		*Puntius sophore*	*Puti*	4.758	0.915	0.493	1.293	4.060	1.516	–	0.310	0.265	3.559	0.391	1.700	0.740	427.322	1.072
181		*Puntius terio*	*Teri punti*	–	0.007	–	0.675	0.375	–	0.065	0.010	–	0.037	0.023	–	–	37.082	0.093
212		*Puntius ticto*	*Tit puti*	0.070	0.178	0.096	0.065	0.173	0.029	0.810	0.127	1.265	0.118	–	0.006	–	52.972	0.133

(Cont.)

Appendix 3, Table III Monthly catch composition (% by weight) from Mahasingh River: outside SHP (site NE20)

Species Code	Habitat Preference	Species name		Year: 1993											Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Scientific	Bengali	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
4		*Amblypharyngodon microlepis*	*Mola*	0.230	0.007	–	–	–	–	–	–	–	–	–	–	–	0.282	0.001
5		*Amblypharyngodon mola*	*Mola*	–	0.043	0.224	0.670	1.461	0.107	0.201	0.063	0.739	0.124	0.414	0.004	0.104	163.241	0.410
68		*Danio devario*	*Chebli*	0.271	0.147	0.080	0.251	0.082	–	–	–	–	–	0.005	0.005	0.077	19.369	0.049
75		*Esomus danricus*	*Darkina*	0.187	0.001	–	0.080	–	–	–	0.010	–	–	–	–	–	2.547	0.006
182		*Rasbora daniconius*	*Darkina*	0.146	0.309	1.183	1.116	0.887	0.285	–	0.040	0.066	0.444	0.001	–	0.196	101.741	0.255
83		*Glossogobius giurus*	*Bailla*	11.983	4.401	2.336	0.219	0.029	–	4.503	6.822	3.079	8.903	8.816	6.630	3.571	2261.738	5.675
91		*Hypophthalmichthys molitrix*	*Silver carp*	–	–	–	–	–	–	–	–	2.413	–	–	–	–	60.641	0.152
110		*Lepidocephalus guntea*	*Gutum*	12.552	1.205	0.899	0.944	–	–	0.050	0.221	–	0.067	0.704	1.403	2.433	310.153	0.778
9		*Aplocheilus panchax*	*Kanpona*	0.009	0.031	–	0.004	0.050	–	–	–	–	0.008	–	–	–	2.994	0.008
39		*Channa marulius*	*Gajar*	–	0.262	0.464	–	–	–	–	0.138	–	0.470	1.987	0.453	0.161	373.934	0.938
41		*Channa punctatus*	*Taki*	3.777	0.237	0.109	0.248	–	–	0.422	0.469	–	2.405	3.128	0.263	0.651	593.676	1.489
42		*Channa striatus*	*Shol*	–	–	–	–	–	–	–	–	0.992	–	–	–	–	24.938	0.063
150		*Oreochromis mossambica*	*Tilapia*	–	–	–	–	0.019	–	–	–	–	–	–	–	–	0.596	0.001
88		*Heteropneustes fossilis*	*Shingi*	2.199	0.038	–	0.187	–	0.172	0.028	–	–	–	–	–	0.052	10.394	0.026
121		*Macrognathus aculeatus*	*Tara baim*	3.673	2.712	0.957	0.603	–	–	0.201	0.276	0.039	–	0.004	0.096	0.792	158.899	0.399
123		*Macrognathus pancalus*	*Guchi*	11.325	4.493	5.438	1.079	–	–	0.223	0.906	0.039	0.377	0.455	0.592	43.900	1194.267	2.996
122		*Mastacembelus armatus*	*Baral baim*	4.994	4.157	9.693	–	–	–	20.385	5.264	2.015	4.600	3.310	2.504	3.986	1216.027	3.051
138		*Nandus nandus*	*Bheda*	1.728	0.062	0.037	0.061	0.700	–	0.345	1.206	–	1.947	0.325	0.999	–	155.034	0.389
15		*Badis badis*	*Napit koi*	0.033	0.004	0.027	0.090	0.012	–	0.045	0.010	0.015	0.008	0.052	0.148	0.080	20.616	0.052
147		*Ompok bimaculatus*	*Kani pabda*	0.044	0.132	–	1.678	–	0.130	0.239	0.311	–	–	0.030	–	0.039	66.833	0.168
148		*Ompok pabda*	*Madhu pabda*	–	–	–	–	–	–	–	–	–	0.265	0.352	0.210	–	70.474	0.177
145		*Notopterus notopterus*	*Foli*	0.136	0.234	4.293	–	–	–	1.360	3.821	–	–	0.459	0.955	–	204.569	0.513
203		*Tetraodon cutcutia*	*Potka*	–	0.187	0.034	0.336	2.943	3.281	2.142	4.842	2.942	4.017	0.473	0.042	0.259	395.452	0.992
33		*Chaca chaca*	*Cheka*	4.382	9.760	1.582	0.012	–	–	–	–	–	–	1.220	0.057	0.977	625.123	1.568
35		*Chanda baculis*	*Chanda*	0.279	0.646	0.231	0.278	3.530	4.888	4.539	8.373	19.055	7.268	3.173	0.187	0.178	1379.859	3.462
36		*Chanda nama*	*Nama chanda*	0.167	0.333	0.220	0.328	5.111	1.889	2.094	2.353	7.108	0.580	2.196	0.475	0.090	801.218	2.010
37		*Chanda ranga*	*Lal chanda*	0.286	0.334	1.322	0.517	10.763	2.020	0.207	0.130	0.987	1.113	0.193	0.087	0.097	478.302	1.200
	Subtotal			68.662	35.625	38.041	15.130	78.277	29.328	42.017	38.821	56.665	49.836	34.242	19.722	62.278	15167.228	38.053
931	Others	Prawn spp.	*Chingri/Icha*	12.401	31.664	39.061	34.685	0.058	0.043	9.441	3.568	11.288	33.246	12.789	16.986	11.073	6543.643	16.417
945		*Crab sp*	*Kakra*	–	–	–	–	–	–	0.050	–	–	–	–	0.031	–	1.478	0.004
	Subtotal			12.401	31.664	39.061	34.685	0.058	0.043	9.491	3.568	11.288	33.246	12.789	17.017	11.073	6545.121	16.421
	Grand total			100	100	100	100	100	100	100	100	100	100	100	100	100	39857.857	100

Note: – denotes zero catch

APPENDIX 4

Appendix 4, Table I Percentage monthly catch from Lumardai Khal by gear type: inside SHP (site NE15)

Gear Code	Gear name	Year: 1993							Year: 1994	Total annual catch (Mar'93 – Feb'94)	
		Feb	Mar	April	May	Oct	Nov	Dec	Jan	Kg	%
320	*Ghori jal*	–	6.889	–	–	–	72.072	83.264	–	13908.809	67.774
302	*Kua*	–	–	–	–	–	–	13.600	100.000	3674.438	17.905
255	*Thella jal*	21.949	11.621	10.512	88.622	27.802	19.772	–	–	1145.724	5.583
89	*Dhor jal*	21.612	33.958	34.674	11.378	11.367	3.161	3.042	–	843.642	4.111
45	*Ber jal*	–	17.021	12.865	–	23.735	–	–	–	275.137	1.341
30	*Sip*	–	–	–	–	10.973	4.078	–	–	228.893	1.115
88	*Current jal (Stationary)*	34.384	12.376	–	–	13.820	–	0.094	–	174.558	0.851
263	*Ucha*	–	–	–	–	12.302	0.919	–	–	123.458	0.602
97	By hand/Dewatering	–	5.188	31.979	–	–	–	–	–	70.204	0.342
164	*Jhaki jal*	19.241	10.789	9.970	–	–	–	–	–	66.899	0.326
170	*Juti*	–	2.159	–	–	–	–	–	–	10.595	0.052
307	Hand fishing	2.814	–	–	–	–	–	–	–	–	–
		100	100	100	100	100	100	100	100	20522.361	100

Notes: 1. No fishing activities were observed from June to September 1993 and in February 1994

2. – denotes zero catch

Appendix 4, Table II Percentage monthly catch from Dapha floodplain by gear type: outside SHP (site NE17)

Gear Code	Gear name	Year: 1993										Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Feb	Mar	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
255	*Thella jal*	48.749	100.000	92.129	8.395	76.518	83.502	87.593	82.885	34.493	7.004	38.710	23.250	4001.710	61.724
45	*Ber jal*	–	–	–	–	–	–	–	–	63.814	91.446	–	–	1720.000	26.530
88	*Current jal (Stationary)*	–	–	7.871	–	–	–	8.436	14.151	–	1.196	–	–	418.695	6.458
272	*Daun*	–	–	–	91.605	23.482	–	1.297	2.964	–	–	–	–	199.917	3.084
263	*Ucha*	–	–	–	–	–	–	2.675	–	–	–	–	–	71.809	1.108
97	By hand/Dewatering	23.286	–	–	–	–	–	–	–	–	–	–	73.912	29.117	0.449
164	*Jhaki jal*	–	–	–	–	–	–	–	–	1.693	–	–	–	18.840	0.291
270	*Katha*	–	–	–	–	–	–	–	–	–	–	61.290	–	10.100	0.156
89	*Dhor jal*	27.966	–	–	–	–	16.498	–	–	–	–	–	–	8.041	0.124
307	Hand fishing	–	–	–	–	–	–	–	–	–	0.354	–	2.838	5.024	0.077
		100	100	100	100	100	100	100	100	100	100	100	100	6483.253	100

Notes: 1. No fishing activities were observed in April 1993

2. – denotes zero catch

Appendix 4, Table III Percentage monthly catch from Dapha Beel by gear type: outside SHP (site NE18)

Gear Code	Gear name	Year: 1993											Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
45	*Ber jal*	95.865	–	–	–	–	–	–	–	–	–	77.816	24.091	41.543	7720.010	39.176
307	Hand fishing	0.147	66.700	–	–	–	–	–	–	–	–	–	3.359	42.482	6328.702	32.115
97	By hand/Dewatering	–	–	–	–	–	–	–	–	–	–	–	–	9.297	1348.938	6.845
255	*Thella jal*	3.988	33.300	34.695	21.562	–	–	–	82.118	42.599	49.721	17.807	4.918	0.994	1336.324	6.781
320	*Ghori jal*	–	–	–	–	–	–	–	–	–	–	–	46.502	3.373	1053.540	5.346
88	*Current jal (Stationary)*	–	–	–	78.438	40.117	–	15.258	17.882	51.284	24.975	1.102	0.030	–	900.252	4.568
170	*Juti*	–	–	65.305	–	–	–	–	–	–	–	–	–	2.313	377.599	1.916
98	Net/Basket+Dewatering	–	–	–	–	–	–	–	–	–	–	–	21.100	–	256.000	1.299
89	*Dhor jal*	–	–	–	–	–	–	–	–	–	25.304	–	–	–	174.400	0.885
272	*Daun*	–	–	–	–	59.883	100.000	74.532	–	6.117	–	–	–	–	140.460	0.713
164	*Jhaki jal*	–	–	–	–	–	–	–	–	–	–	3.275	–	–	58.925	0.299
263	*Ucha*	–	–	–	–	–	–	10.210	–	–	–	–	–	–	11.036	0.056
		100	100	100	100	100	100	100	100	100	100	100	100	100	19706.189	100

Note: – denotes zero catch

Appendix 4, Table IV Percentage monthly catch from Chatal Beel by gear type: outside SHP (site NE19)

Gear Code	Gear name	Year: 1993								Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Feb	Mar	May	June	Aug	Sep	Nov	Dec	Jan	Feb	Kg	%
45	*Ber jal*	–	–	–	–	–	–	–	–	–	59.989	6025.635	45.888
320	*Ghori jal*	–	–	–	–	–	–	–	–	96.008	27.127	3204.487	24.404
255	*Thella jal*	62.477	99.644	14.746	–	–	53.380	100.000	100.000	0.792	–	1966.166	14.973
97	By hand/Dewatering	–	–	–	–	–	–	–	–	–	12.773	1283.046	9.771
272	*Daun*	–	–	85.254	38.690	63.282	–	–	–	–	–	327.754	2.496
95	*Doiar trap*	–	–	–	–	36.718	46.620	–	–	–	–	233.700	1.780
88	*Current jal (Stationary)*	33.140	–	–	61.310	–	–	–	–	3.200	–	78.769	0.600
307	Hand fishing	–	0.356	–	–	–	–	–	–	–	0.111	11.696	0.089
164	*Jhaki jal*	4.384	–	–	–	–	–	–	–	–	–	–	–
		100	100	100	100	100	100	100	100	100	100	13131.257	100

Notes: 1. No fishing activities were observed in April, July and October 1993

2. – denotes zero catch

Appendix 4, Table V Percentage monthly catch from Mouti Beel by gear type: inside SHP (site NE12)

Gear Code	Gear name	Year: 1993											Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
88	*Current jal (Stationary)*	–	–	–	14.641	89.383	81.591	80.540	47.660	65.337	33.023	3.312	0.366	–	2205.738	22.163
255	*Thella jal*	71.851	31.693	6.872	66.078	–	–	–	–	–	13.806	25.358	13.449	–	1946.413	19.557
302	*Kua*	–	–	–	–	–	–	–	–	–	–	17.082	49.779	–	1347.458	13.539
97	By hand/Dewatering	1.683	16.047	–	–	–	–	–	–	–	–	26.265	3.880	–	816.276	8.202
123	*Koi jal*	–	–	–	4.791	–	–	–	21.999	13.299	20.022	–	0.194	–	653.983	6.571
263	*Ucha*	–	6.005	–	9.677	–	–	9.445	1.314	13.086	13.718	–	0.026	–	540.117	5.427
89	*Dhor jal*	23.534	7.942	–	3.610	–	–	–	–	–	–	16.721	–	–	509.972	5.124
307	Hand fishing	0.751	–	–	–	–	–	–	–	–	–	3.000	20.860	100.000	482.301	4.846
95	*Doiar trap*	1.180	–	–	–	–	7.176	3.986	20.649	0.673	19.430	–	–	–	478.347	4.806
222	*Polo*	–	–	81.499	–	–	–	–	–	–	–	–	4.512	–	353.537	3.552
164	*Jhaki jal*	1.001	15.412	11.629	1.203	–	–	–	–	–	–	2.584	6.934	–	267.882	2.692
272	*Daun*	–	–	–	–	10.617	11.233	6.030	1.909	3.391	–	–	–	–	90.161	0.906
301	*Chunga*	–	–	–	–	–	–	–	–	–	–	3.213	–	–	88.571	0.890
30	*Sip*	–	–	–	–	–	–	–	6.469	4.213	–	–	–	–	69.451	0.698
318	*Kotta*	–	–	–	–	–	–	–	–	–	–	1.306	–	–	36.000	0.362
170	*Juti*	–	22.901	–	–	–	–	–	–	–	–	–	–	–	34.239	0.344
98	Net/Basket+Dewatering	–	–	–	–	–	–	–	–	–	–	1.160	–	–	31.961	0.321
		100	100	100	100	100	100	100	100	100	100	100	100	100	9952.407	100

Note: – denotes zero catch

Appendix 4, Table VI Percentage monthly catch from Karchabrar Beel by gear type: inside SHP (site NE13)

Gear Code	Gear name	Year: 1993								Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Feb	Mar	April	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
45	*Ber jal*	54.374	79.692	60.288	–	–	–	–	38.179	25.614	33.013	12474.399	38.698
255	*Thella jal*	30.195	16.146	16.411	–	18.447	–	–	59.293	5.233	5.953	8561.061	26.558
270	*Katha*	–	2.548	10.234	–	–	–	–	–	49.955	11.054	4759.842	14.766
88	*Current jal (Stationary)*	8.794	0.572	8.589	42.807	61.734	100.000	73.390	0.696	3.132	4.282	2648.044	8.215
89	*Dhor jal*	0.211	–	0.760	–	–	–	–	–	9.842	–	799.796	2.481
276	*Hat panch*	–	–	–	–	–	–	–	–	3.868	13.658	728.000	2.258
302	*Kua*	–	–	–	–	–	–	–	–	–	20.822	650.223	2.017
278	*Nol barsi*	3.068	–	–	–	–	–	–	–	2.047	7.107	381.525	1.184
164	*Jhaki jal*	–	–	3.719	–	–	–	–	–	–	3.317	263.394	0.817
30	*Sip*	–	–	–	–	–	–	14.199	–	–	–	247.203	0.767
272	*Daun*	–	–	–	6.091	–	–	12.411	–	–	–	234.248	0.727
123	*Koi jal*	–	–	–	–	8.008	–	–	1.833	–	–	225.698	0.700
95	*Doiar trap*	1.443	–	–	51.102	11.811	–	–	–	–	–	179.736	0.558
263	*Ucha*	1.799	1.043	–	–	–	–	–	–	0.309	0.795	82.157	0.255
307	Hand fishing	0.117	–	–	–	–	–	–	–	–	–	–	–
		100	100	100	100	100	100	100	100	100	100	32235.327	100

Notes: 1. No fishing activities were observed from May to July 1993

2. – denotes zero catch

Appendix 4, Table VII Percentage monthly catch from Asumura floodplain by gear type: inside SHP (site NE14)

Gear Code	Gear name	Year: 1993									Total annual catch (Mar'93 – Feb'94)	
		Feb	Mar	May	July	Aug	Sep	Oct	Nov	Dec	Kg	%
88	*Current jal (Stationary)*	–	–	–	20.948	–	44.563	70.792	46.520	63.719	1457.346	41.268
255	*Thella jal*	100.000	100.000	82.211	–	–	–	5.975	22.390	–	649.262	18.385
95	*Doiar trap*	–	–	–	–	100.000	–	–	–	–	430.743	12.197
45	*Ber jal*	–	–	–	–	–	–	–	18.665	–	393.750	11.150
123	*Koi jal*	–	–	–	–	–	–	–	–	36.281	190.989	5.408
263	*Ucha*	–	–	–	–	–	–	6.345	7.178	–	160.317	4.540
89	*Dhor jal*	–	–	17.789	–	–	–	–	5.248	–	143.998	4.078
272	*Daun*	–	–	–	79.052	–	55.437	16.888	–	–	105.001	2.973
		100	100	100	100	100	100	100	100	100	3531.40	100

Notes: 1. No fishing activities were observed in April and June 1993 and in January and February 1994

2. – denotes zero catch

APPENDIX 5

Appendix 5, Table I Monthly catch composition (% by weight) from Lumardai Khal: inside SHP (site NE15)

Species Code	Habitat Preference	Species name		Year: 1993							Year: 1994	Total annual catch (Mar'93 – Feb'94)	
		Scientific	Bengali	Feb	Mar	April	May	Oct	Nov	Dec	Jan	Kg	%
17	Riverine	*Barilius barila*	*Barali*	–	–	–	0.560	–	–	–	–	0.947	0.005
139		*Nemacheilus botia*	*Balichata*	0.306	–	0.289	–	–	–	0.002	–	0.615	0.003
941		*Neoeucirrhichthys maydelli*	*Gutum*	–	–	0.322	0.568	–	–	–	–	1.411	0.007
58		*Corica soborna*	*Kachki*	–	–	–	–	0.173	0.014	0.004	–	2.288	0.011
170		*Pseudapocryptes lanceolatus*	*Chewa*	–	–	0.332	–	–	–	–	–	0.464	0.002
92		*Hyporhampus gaimardi*	*Ek thota*	–	–	–	–	0.004	0.049	0.151	0.028	22.765	0.111
2		*Ailia coila*	*Kajuli*	–	–	–	0.568	–	–	–	–	0.961	0.005
	Subtotal			0.306	–	0.943	1.695	0.177	0.063	0.156	0.028	29.451	0.143
131	Migratory	*Mystus bleekeri*	*Golsha tengra*	–	0.608	0.357	–	–	–	–	–	3.486	0.017
134		*Mystus menoda*	*Ghagla*	–	–	–	–	3.278	–	–	–	23.976	0.117
48		*Cirrhinus reba*	*Raik*	–	–	–	–	–	0.973	1.124	–	187.313	0.913
102		*Labeo calbasu*	*Kalbaus*	–	–	–	–	5.800	1.312	1.515	–	294.948	1.437
104		*Labeo gonius*	*Goni*	–	–	–	–	0.795	0.418	0.483	–	86.287	0.420
107		*Labeo rohita*	*Rui*	–	–	–	–	–	4.194	5.082	1.742	871.521	4.246
189		*Salmostoma phulo*	*Fulchela*	0.113	8.454	–	–	0.668	32.163	37.217	0.066	6248.093	30.443
86		*Gudusia chapra*	*Chapila*	–	–	0.575	–	1.367	10.623	12.549	–	2093.412	10.200
76		*Eutropiichthys vacha*	*Bacha*	–	–	–	–	0.605	–	–	–	4.427	0.022
	Subtotal			0.113	9.062	0.932	–	12.512	49.683	57.971	1.808	9813.463	47.815
6	Floodplain	*Anabas testudineus*	*Koi*	–	0.466	–	0.568	–	0.264	0.142	1.047	51.333	0.250
136	Resident	*Mystus tengara*	*Bajari tengra*	–	0.260	2.737	–	–	–	0.119	0.845	36.769	0.179
137		*Mystus vittatus*	*Tengra*	1.528	0.901	–	–	0.038	–	0.243	1.647	67.833	0.331
942		*Rama chandramara*	*Laia*	–	–	–	–	0.017	–	–	–	0.122	0.001
55		*Colisa fasciatus*	*Khalisha*	3.784	4.247	0.161	6.221	1.486	0.317	0.137	0.838	87.972	0.429
211		*Colisa labiosus*	*Khalisha*	2.112	0.416	0.954	1.678	0.224	0.011	0.006	–	9.153	0.045
56		*Colisa lalia*	*Lal khalisha*	–	–	–	–	–	–	0.008	0.057	2.092	0.010
57		*Colisa sota*	*Khalisha*	1.462	0.241	0.515	–	0.109	0.017	–	–	3.328	0.016
210		*Xenentodon cancila*	*Kaikka*	0.346	3.272	0.437	–	–	14.603	17.221	2.423	2919.982	14.227
187		*Osteobrama cotio cotio*	*Keti*	–	1.869	–	–	–	–	–	–	9.171	0.045
174		*Puntius chola*	*Chala puti*	8.627	1.015	–	–	0.728	0.017	–	–	10.934	0.053
175		*Puntius conchonius*	*Canchan puti*	1.060	1.277	–	0.519	0.154	0.339	0.542	0.455	102.202	0.498
176		*Puntius gelius*	*Giliputi*	0.158	0.210	0.958	3.977	2.197	1.783	2.076	0.321	376.453	1.834
178		*Puntius phutunio*	*Phutani puti*	0.090	1.728	0.161	0.070	0.025	0.026	–	–	9.944	0.048
180		*Puntius sophore*	*Puti*	15.862	12.978	7.477	2.841	0.047	–	0.874	5.774	303.502	1.479

(Cont.)

Appendix 5, Table I Monthly catch composition (% by weight) from Lumardai Khal: inside SHP (site NE15)

Species Code	Habitat Preference	Species name		Year: 1993							Year: 1994	Total annual catch (Mar'93 – Feb'94)	
		Scientific	Bengali	Feb	Mar	April	May	Oct	Nov	Dec	Jan	Kg	%
181		*Puntius terio*	*Teri punti*	–	–	0.281	–	0.425	0.027	0.035	0.114	11.354	0.055
212		*Puntius ticto*	*Tit puti*	0.524	–	0.365	–	0.193	0.064	0.017	0.123	8.773	0.043
4		*Amblypharyngodon microlepis*	*Mola*	–	–	–	0.023	–	–	–	–	0.039	0.0002
5		*Amblypharyngodon mola*	*Mola*	0.141	1.220	0.613	–	0.543	–	0.011	0.045	13.070	0.064
75		*Esomus danricus*	*Darkina*	–	–	0.225	1.203	0.013	0.006	–	–	2.652	0.013
182		*Rasbora daniconius*	*Darkina*	0.460	0.289	1.058	–	0.355	0.072	0.022	0.095	12.793	0.062
83		*Glossogobius giurus*	*Bailla*	2.017	5.636	6.006	3.621	1.416	0.312	0.948	4.281	270.579	1.318
43		*Chela cachius*	*Chep chela*	0.451	–	–	–	–	–	–	–	–	–
219		*Lepidocephalus annandalei*	*Puiya*	–	–	–	–	0.049	0.012	–	–	0.804	0.004
110		*Lepidocephalus guntea*	*Gutum*	13.204	7.893	8.381	25.538	0.303	0.126	0.109	0.417	122.886	0.599
9		*Aplocheilus panchax*	*Kanpona*	–	–	–	0.116	0.008	0.011	–	–	0.676	0.003
39		*Channa marulius*	*Gajar*	–	–	–	–	–	–	2.603	19.139	703.238	3.426
41		*Channa punctatus*	*Taki*	3.848	12.785	16.690	14.392	0.095	0.046	0.629	4.200	274.943	1.340
42		*Channa striatus*	*Shol*	–	2.159	–	–	–	–	0.288	2.119	88.457	0.431
49		*Clarias batrachus*	*Magur*	0.251	–	–	2.272	–	–	2.323	17.084	631.575	3.077
88		*Heteropneustes fossilis*	*Shingi*	2.798	0.789	–	–	–	–	3.016	22.179	818.846	3.990
121		*Macrognathus aculeatus*	*Tara baim*	12.564	5.323	2.364	0.490	1.337	–	0.213	0.209	72.655	0.354
123		*Macrognathus pancalus*	*Guchi*	7.878	5.898	6.260	6.150	1.337	0.023	0.373	2.456	154.270	0.752
122		*Mastacembelus armatus*	*Baral baim*	–	–	–	–	11.021	3.444	0.123	0.901	239.287	1.166
138		*Nandus nandus*	*Bheda*	1.400	0.189	0.225	–	1.274	–	0.043	0.190	19.903	0.097
15		*Badis badis*	*Napit koi*	0.166	0.056	0.254	3.048	0.703	0.060	0.016	0.047	16.167	0.079
147		*Ompok bimaculatus*	*Kani pabda*	–	–	–	–	0.028	0.040	–	–	1.668	0.008
148		*Ompok pabda*	*Madhu pabda*	–	–	0.089	–	–	–	0.008	0.062	2.403	0.012
145		*Notopterus notopterus*	*Foli*	–	–	–	–	1.198	–	0.950	6.982	265.326	1.293
203		*Tetraodon cutcutia*	*Potka*	0.861	0.166	–	–	2.273	0.511	0.204	0.882	79.890	0.389
33		*Chaca chaca*	*Cheka*	0.352	–	–	–	–	–	0.031	0.098	5.926	0.029
35		*Chanda baculis*	*Chanda*	0.672	1.009	0.733	0.993	3.563	4.470	5.606	2.078	992.155	4.834
36		*Chanda nama*	*Nama chanda*	–	0.349	–	–	1.640	1.483	1.739	0.142	305.330	1.488
37		*Chanda ranga*	*Lal chanda*	1.423	0.816	0.809	10.584	3.377	0.096	0.009	0.009	52.705	0.257
	Subtotal			84.039	73.456	57.752	84.303	36.177	28.180	40.684	97.262	9159.160	44.627
931	Other	Prawn spp.	*Chingri/Icha*	15.541	17.482	40.373	14.001	51.134	22.074	1.188	0.901	1521.735	7.414
	Subtotal			15.541	17.482	40.373	14.001	51.134	22.074	1.188	0.901	1521.735	7.414
	Grand total			100	100	100	100	100	100	100	100	20523.808	100

Notes: 1. No fishing activities were observed from June to September 1993 and in February 1994

2. – denotes zero catch

Appendix 5, Table II Monthly catch composition (% by weight) from Dapha floodplain: outside SHP (site NE17)

Species Code	Habitat Preference	Species name		Year: 1993										Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Scientific	Bengali	Feb	Mar	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
941	Riverine	*Neoeucirrhichthys maydelli*	*Gutum*	–	–	3.885	–	–	–	–	–	–	–	–	0.822	4.490	0.069
198		*Somilepites gongota*	*Gharpoia*	0.587	–	–	–	–	–	–	–	–	–	–	–	–	–
28		*Botia dario*	*Rani*	–	–	–	–	–	–	0.029	0.032	–	–	–	–	1.170	0.018
30		*Brachygobius nunus*	*Nunabailla*	–	–	–	–	–	0.199	0.055	0.167	0.133	–	–	–	5.059	0.078
961		*Microphis deocata*		–	–	–	–	–	–	0.219	–	–	–	–	–	5.878	0.091
	Subtotal			0.587	–	3.885	–	–	0.199	0.303	0.199	0.133	–	–	0.822	16.597	0.256
135	Migratory	*Aorichthys seenghala*	*Guizza*	–	–	–	–	–	–	0.167	–	–	–	–	–	4.484	0.069
25		*Batasio tengana*	*Tengra*	–	–	–	–	–	–	–	–	0.408	0.585	–	–	11.008	0.170
131		*Mystus bleekeri*	*Golsha tengra*	–	–	0.349	0.484	–	–	0.082	–	0.019	0.027	–	0.079	3.777	0.058
132		*Mystus cavasius*	*Kabashi*	–	–	–	–	–	–	0.134	–	–	–	–	–	3.592	0.055
47		*Cirrhinus mrigala*	*Mrigel*	–	–	–	–	–	–	0.220	0.401	–	–	–	–	10.735	0.166
48		*Cirrhinus reba*	*Raik*	–	–	–	–	–	–	–	–	0.013	0.018	10.809	–	2.125	0.033
102		*Labeo calbasu*	*Kalbaus*	–	–	–	–	–	–	6.020	0.414	–	–	1.699	–	166.874	2.574
188		*Salmostoma bacaila*	*Katari*	–	–	–	–	–	–	–	–	3.089	4.426	–	–	83.248	1.284
189		*Salmostoma phulo*	*Fulchela*	–	–	–	–	–	–	0.012	–	–	–	0.012	0.041	0.333	0.005
86		*Gudusia chapra*	*Chapila*	–	–	2.597	–	–	–	0.116	0.602	6.886	9.867	0.067	0.010	198.757	3.066
209		*Wallagu attu*	*Boal*	–	–	–	–	–	–	–	–	–	–	5.826	–	0.960	0.015
	Subtotal			–	–	2.946	0.484	–	–	6.750	1.417	10.414	14.924	18.413	0.129	485.893	7.495
136	Floodplain	*Mystus tengara*	*Bajari tengra*	–	–	1.480	–	–	0.499	0.062	0.547	0.823	1.199	0.121	0.025	32.526	0.502
137	Resident	*Mystus vittatus*	*Tengra*	–	–	–	–	–	0.287	0.021	–	–	0.034	0.267	7.656	4.133	0.064
942		*Rama chandramara*	*Laia*	–	–	–	–	–	0.398	0.613	0.067	–	0.026	0.067	0.510	17.953	0.277
55		*Colisa fasciatus*	*Khalisha*	5.593	–	–	–	–	0.300	0.308	–	–	0.430	1.408	4.760	15.274	0.236
211		*Colisa labiosus*	*Khalisha*	–	–	1.665	–	–	0.499	–	0.202	–	0.129	–	–	5.898	0.091
57		*Colisa sota*	*Khalisha*	–	–	–	–	–	0.199	–	–	–	0.038	0.012	–	0.518	0.008
210		*Xenentodon cancila*	*Kaikka*	0.522	–	0.892	–	–	–	0.030	0.124	1.474	2.112	5.656	0.053	43.943	0.678
174		*Puntius chola*	*Chala puti*	–	–	0.544	–	–	–	0.027	0.070	0.410	–	–	0.140	6.770	0.104
175		*Puntius conchonius*	*Canchan puti*	1.296	8.934	7.215	–	–	0.597	0.114	0.428	27.006	38.323	4.388	0.525	741.398	11.436
176		*Puntius gelius*	*Giliputi*	–	–	0.370	–	0.259	–	0.061	0.260	0.753	1.079	0.091	0.063	25.552	0.394
178		*Puntius phutunio*	*Phutani puti*	–	–	–	–	–	0.300	0.007	0.334	–	–	–	–	4.364	0.067
180		*Puntius sophore*	*Puti*	–	–	3.330	–	–	–	0.046	0.137	3.076	4.447	0.042	0.980	90.180	1.391
181		*Puntius terio*	*Teri punti*	–	–	–	–	–	–	0.052	0.093	–	0.116	0.127	0.028	3.843	0.059
212		*Puntius ticto*	*Tit puti*	0.257	–	0.740	–	–	–	0.028	–	6.158	8.825	–	–	167.528	2.584
5		*Amblypharyngodon mola*	*Mola*	–	–	–	–	0.259	–	–	–	–	–	0.012	–	0.064	0.001
75		*Esomus danricus*	*Darkina*	0.391	–	–	–	–	–	–	–	–	–	0.030	0.678	0.272	0.004
182		*Rasbora daniconius*	*Darkina*	2.172	–	–	–	–	–	–	–	–	–	0.024	–	0.004	0.00006
184		*Rasbora rasbora*	*Leuzza darkina*	–	–	–	–	–	–	–	–	–	0.032	–	–	0.357	0.006
83		*Glossogobius giurus*	*Bailla*	11.945	23.209	1.665	4.238	1.455	0.199	0.414	0.175	1.982	2.624	3.484	14.782	79.848	1.232
219		*Lepidocephalus annandalei*	*Puiya*	–	–	–	–	–	–	–	–	0.066	–	–	–	0.739	0.011
110		*Lepidocephalus guntea*	*Gutum*	30.705	21.422	9.990	–	–	–	0.012	0.278	0.151	0.751	6.136	15.500	32.606	0.503
9		*Aplocheilus panchax*	*Kanpona*	0.051	–	–	–	–	–	–	–	–	0.039	–	0.218	0.515	0.008
39		*Channa marulius*	*Gajar*	–	–	–	–	–	–	0.207	1.168	–	–	4.188	–	20.315	0.313
41		*Channa punctatus*	*Taki*	14.720	–	–	48.097	19.121	0.300	0.176	2.012	0.248	0.215	0.643	7.918	107.037	1.651
49		*Clarias batrachus*	*Magur*	–	–	11.100	–	–	–	–	–	–	0.143	–	2.061	14.295	0.220
88		*Heteropneustes fossilis*	*Shingi*	–	–	–	1.756	5.687	10.858	0.225	1.337	0.266	–	0.103	3.427	35.521	0.548
121		*Macrognathus aculeatus*	*Tara baim*	–	–	–	–	–	–	0.679	–	–	–	–	0.325	18.349	0.283
123		*Macrognathus pancalus*	*Guchi*	4.091	–	7.955	–	–	–	0.259	–	–	0.011	0.504	4.816	17.596	0.271
122		*Mastacembelus armatus*	*Baral baim*	–	–	3.489	26.034	2.422	0.240	0.543	1.593	0.306	0.881	–	0.259	86.624	1.336
138		*Nandus nandus*	*Bheda*	0.411	–	–	4.057	–	1.295	1.385	10.882	0.651	1.311	7.611	7.456	200.374	3.091

(Cont.)

Appendix 5, Table II Monthly catch composition (% by weight) from Dapha floodplain: outside SHP (site NE17)

Species Code	Habitat Preference	Species name		Year: 1993										Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Scientific	Bengali	Feb	Mar	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
15		*Badis badis*	*Napit koi*	0.099	–	–	0.111	–	0.343	0.336	0.556	0.532	0.123	0.085	0.178	23.412	0.361
149		*Ophisternon bengalense*	*Bamosh*	–	–	–	–	0.484	–	–	–	–	–	–	–	0.116	0.002
147		*Ompok bimaculatus*	*Kani pabda*	–	–	–	2.281	–	–	–	–	–	–	–	–	3.081	0.048
148		*Ompok pabda*	*Madhu pabda*	–	–	–	–	–	–	0.229	–	–	–	6.245	–	7.165	0.111
145		*Notopterus notopterus*	*Foli*	–	–	–	5.147	–	–	1.077	0.386	1.149	1.909	15.616	–	76.964	1.187
203		*Tetraodon cutcutia*	*Potka*	0.424	–	–	–	0.517	0.398	0.452	1.402	7.572	10.445	1.505	1.368	229.747	3.544
33		*Chaca chaca*	*Cheka*	–	–	–	–	–	–	–	–	–	–	–	3.089	1.217	0.019
35		*Chanda baculis*	*Chanda*	0.033	3.574	1.110	–	0.517	1.492	1.025	0.487	2.181	2.806	3.265	3.937	92.955	1.434
36		*Chanda nama*	*Nama chanda*	–	–	–	–	0.517	0.148	–	–	0.001	0.001	0.067	0.018	0.231	0.004
37		*Chanda ranga*	*Lal chanda*	0.821	–	1.850	0.911	4.136	1.044	0.688	1.328	0.818	0.893	0.036	0.053	58.193	0.898
	Subtotal			73.531	57.138	53.396	92.631	35.373	19.393	9.075	23.867	55.622	78.941	61.734	80.823	2267.477	34.974
945	Others	*Crab sp*	*Kakra*	–	–	–	–	–	–	0.141	–	–	–	–	–	3.778	0.058
931		Prawn spp	*Chingri/Icha*	25.882	42.863	39.774	6.885	64.626	80.408	83.730	74.517	33.830	6.134	19.852	18.224	3709.528	57.217
	Subtotal			25.882	42.863	39.774	6.885	64.626	80.408	83.871	74.517	33.830	6.134	19.852	18.224	3713.306	57.275
	Grand total			100	100	100	100	100	100	100	100	100	100	100	100	6483.273	100

Notes: 1. No fishing activities were observed in April 1993

2. – denotes zero catch

Appendix 5, Table III Monthly catch composition (% by weight) from Dapha Beel: outside SHP (site NE18)

Species Code	Habitat Preference	Species name		Year: 1993										Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Scientific	Bengali	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
139	Riverine	*Nemacheilus botia*	*Balichata*	–	–	–	–	–	–	0.287	–	–	–	–	0.029	–	0.658	0.003
941		*Neoeucirrhichthys maydelli*	*Gutum*	0.223	0.873	–	0.343	–	–	–	–	0.058	–	–	0.293	1.038	158.158	0.803
198		*Somileptes gongota*	*Gharpoia*	–	–	–	–	–	–	–	–	–	–	–	0.063	0.021	3.827	0.019
28		*Botia dario*	*Rani*	–	–	–	–	–	–	–	–	–	–	–	–	0.00003	0.005	0.00003
58		*Corica soborna*	*Kachki*	0.318	–	–	–	–	–	–	–	–	–	0.311	0.056	–	6.285	0.032
30		*Brachygobius nunus*	*Nunabailla*	0.186	0.035	–	–	–	–	–	–	–	–	–	–	–	0.065	0.0003
92		*Hyporhampus gaimardi*	*Ek thota*	0.781	–	–	–	–	–	–	–	–	–	0.187	0.507	0.004	10.034	0.051
51		*Clupisoma garua*	*Ghaura*	–	–	–	–	–	–	1.004	–	–	–	–	–	–	1.085	0.006
87		*Hara hara*	*Kutakanti*	–	–	–	–	–	–	–	–	–	–	–	–	0.001	0.132	0.001
961		*Microphis deocata*		–	–	–	–	–	–	–	–	0.014	–	–	–	–	0.043	0.0002
	Subtotal			1.509	0.908	–	0.343	–	–	1.291	–	0.072	–	0.498	0.948	1.063	180.292	0.915
130	Migratory	*Aorichthys aor*	*Ayre*	–	–	–	–	–	–	–	–	–	0.338	–	–	–	2.330	0.012
135		*Aorichthys seenghala*	*Guizza*	–	–	65.304	–	–	–	–	–	1.423	–	–	–	0.200	75.295	0.382
131		*Mystus bleekeri*	*Golsha tengra*	–	–	–	0.553	–	–	–	–	0.840	0.056	0.294	0.053	–	12.359	0.063
132		*Mystus cavasius*	*Kabashi*	–	–	–	1.096	1.502	–	–	–	0.146	0.072	0.054	–	–	9.282	0.047
48		*Cirrhinus reba*	*Raik*	–	–	–	–	–	–	–	–	0.218	–	–	0.003	0.001	0.881	0.004
102		*Labeo calbasu*	*Kalbaus*	–	–	–	21.169	–	–	12.045	–	11.642	0.696	–	0.084	0.641	282.263	1.432
107		*Labeo rohita*	*Rui*	0.576	–	–	30.514	–	–	–	–	–	–	0.521	–	0.006	205.953	1.045
188		*Salmostoma bacaila*	*Katari*	–	–	–	–	–	–	–	–	–	–	0.270	–	–	4.857	0.025
189		*Salmostoma phulo*	*Fulchela*	1.427	–	–	–	–	–	–	–	–	–	0.855	2.220	0.340	91.636	0.465
86		*Gudusia chapra*	*Chapila*	1.266	–	–	5.940	–	–	0.717	8.093	11.509	1.968	15.381	4.963	0.436	498.725	2.531
169		*Pseudeutropius atherinoides*	*Batasi*	–	–	–	–	–	–	–	–	–	–	–	0.0002	–	0.003	0.00002
209		*Wallagu attu*	*Boal*	0.634	–	–	–	–	–	–	9.789	–	–	–	0.084	1.808	277.644	1.409
	Subtotal			3.903	–	65.304	59.273	1.502	–	12.762	17.882	25.777	3.129	17.374	7.407	3.433	1461.228	7.415
6	Floodplain	*Anabas testudineus*	*Koi*	–	–	–	–	1.059	–	–	–	–	–	–	–	–	0.251	0.001
136	Resident	*Mystus tengara*	*Bajari tengra*	0.005	–	–	0.288	–	–	0.229	–	–	–	2.190	0.258	4.640	717.900	3.643
137		*Mystus vittatus*	*Tengra*	–	–	–	–	1.435	1.863	–	–	–	0.064	0.692	0.540	0.440	84.177	0.427
942		*Rama chandramara*	*Laia*	0.633	–	–	–	–	–	–	–	–	–	1.674	0.172	4.067	622.358	3.158
55		*Colisa fasciatus*	*Khalisha*	–	0.211	–	0.206	–	–	–	0.992	–	0.100	0.688	0.009	0.124	34.351	0.174
211		*Colisa labiosus*	*Khalisha*	–	0.563	–	0.473	–	–	0.803	–	–	–	0.040	–	–	5.666	0.029
57		*Colisa sota*	*Khalisha*	–	–	–	0.316	–	–	–	–	0.116	–	–	–	–	2.371	0.012
210		*Xenentodon cancila*	*Kaikka*	5.055	–	–	0.417	–	–	–	–	–	0.159	1.182	7.630	3.633	644.720	3.272
187		*Osteobrama cotio cotio*	*Keti*	–	–	–	–	–	–	–	–	–	–	0.108	–	–	1.934	0.010
174		*Puntius chola*	*Chala puti*	–	–	–	0.982	–	–	–	–	0.595	0.409	–	0.030	0.001	11.389	0.058
175		*Puntius conchonius*	*Canchan puti*	4.249	3.211	–	2.436	–	–	–	–	2.533	11.627	8.268	7.062	1.047	495.678	2.515
176		*Puntius gelius*	*Giliputi*	1.717	1.486	2.239	0.151	–	–	0.459	–	–	0.046	3.697	0.608	0.138	99.830	0.507
178		*Puntius phutunio*	*Phutani puti*	0.230	0.211	–	–	–	–	0.860	–	–	0.034	–	0.008	–	1.653	0.008
180		*Puntius sophore*	*Puti*	0.228	–	–	0.124	0.485	–	–	–	1.846	1.825	2.049	0.680	0.447	128.902	0.654
181		*Puntius terio*	*Teri punti*	–	0.282	1.959	0.069	–	–	0.229	–	–	0.126	1.513	0.085	0.098	45.853	0.233

(Cont.)

Appendix 5, Table III Monthly catch composition (% by weight) from Dapha Beel: outside SHP (site NE18)

Species Code	Habitat Preference	Species name		Year: 1993										Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Scientific	Bengali	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
212		*Puntius ticto*	*Tit puti*	0.065	–	–	–	–	–	–	–	–	–	–	0.038	0.451	65.910	0.334
5		*Amblypharyngodon mola*	*Mola*	0.670	–	–	–	–	–	–	–	–	–	–	0.002	0.00007	0.030	0.0002
75		*Esomus danricus*	*Darkina*	0.003	–	–	0.055	–	–	–	–	0.043	0.163	–	0.0002	0.0001	1.621	0.008
182		*Rasbora daniconius*	*Darkina*	–	0.634	–	–	–	–	–	–	–	–	0.135	0.069	0.308	49.166	0.249
83		*Glossogobius giurus*	*Bailla*	4.443	4.402	–	1.799	4.233	2.540	6.298	–	1.281	0.214	1.988	6.002	5.074	878.364	4.457
110		*Lepidocephalus guntea*	*Gutum*	0.271	5.353	–	1.731	–	–	–	–	0.260	0.234	0.105	1.488	4.375	678.156	3.441
9		*Aplocheilus panchax*	*Kanpona*	–	–	–	–	–	–	–	–	–	–	0.005	–	–	0.090	0.0005
38		*Channa barca*	*Tila shol*	–	–	–	–	–	–	–	–	–	–	–	0.008	–	0.100	0.001
39		*Channa marulius*	*Gajar*	0.922	–	–	–	–	–	–	–	5.226	–	–	2.476	2.742	443.516	2.251
41		*Channa punctatus*	*Taki*	0.081	10.001	–	5.597	42.881	76.983	16.999	–	0.903	0.350	0.599	3.469	1.834	428.173	2.173
42		*Channa striatus*	*Shol*	1.395	–	–	–	–	–	–	–	–	–	–	2.889	0.786	149.082	0.757
49		*Clarias batrachus*	*Magur*	–	–	–	0.027	–	–	–	–	–	–	0.132	0.778	0.710	115.071	0.584
88		*Heteropneustes fossilis*	*Shingi*	0.400	2.078	–	10.107	24.430	4.908	–	–	2.600	1.574	0.302	0.885	6.473	1049.830	5.327
121		*Macrognathus aculeatus*	*Tara baim*	–	1.550	–	0.620	–	–	2.983	–	0.239	0.175	–	0.497	4.959	737.520	3.743
123		*Macrognathus pancalus*	*Guchi*	0.741	10.988	–	1.071	–	–	0.402	–	0.203	–	0.075	2.854	19.444	2885.538	14.643
122		*Mastacembelus armatus*	*Baral baim*	0.196	–	–	–	–	–	47.945	–	6.996	0.974	0.407	1.255	11.462	1765.063	8.957
138		*Nandus nandus*	*Bheda*	1.686	0.880	–	1.320	3.262	3.384	3.923	–	4.865	2.663	2.668	2.423	1.162	294.935	1.497
15		*Badis badis*	*Napit koi*	0.256	0.387	–	0.096	–	–	0.057	0.248	0.420	0.294	0.282	0.052	0.054	18.518	0.094
147		*Ompok bimaculatus*	*Kani pabda*	–	–	–	–	0.342	–	1.491	–	0.231	0.648	0.047	–	0.159	30.780	0.156
148		*Ompok pabda*	*Madhu pabda*	–	–	–	–	–	–	–	–	–	–	–	0.252	–	3.057	0.016
145		*Notopterus notopterus*	*Foli*	7.234	–	–	–	19.704	10.322	–	–	4.656	0.795	0.966	2.033	2.996	503.548	2.555
203		*Tetraodon cutcutia*	*Potka*	6.349	1.620	3.077	0.192	–	–	–	2.233	0.318	0.301	2.844	3.173	2.225	424.970	2.157
33		*Chaca chaca*	*Cheka*	0.796	4.262	–	1.291	–	–	–	–	–	–	–	1.273	1.354	228.135	1.158
35		*Chanda baculis*	*Chanda*	5.175	3.109	2.239	0.510	0.667	–	0.975	0.248	0.800	0.646	17.971	3.402	1.342	578.163	2.934
36		*Chanda nama*	*Nama chanda*	10.279	0.345	0.840	–	–	–	0.115	–	0.026	–	1.947	0.288	0.020	42.797	0.217
37		*Chanda ranga*	*Lal chanda*	2.562	6.704	1.959	0.755	–	–	1.606	1.488	0.101	0.294	3.189	0.700	0.385	146.555	0.744
	Subtotal			55.637	58.277	12.313	30.632	98.498	100.000	85.374	5.210	34.257	23.715	55.761	53.389	82.950	14415.721	73.154
998	Others	Unidentified fish		0.062	–	–	–	–	–	–	–	–	–	–	–	–	–	–
931		Prawn spp.	*Chingri/Icha*	38.888	40.814	22.384	9.751	–	–	0.574	76.908	39.588	73.156	26.366	38.255	12.553	3647.764	18.511
945		*Crab sp*	*Kakra*	–	–	–	–	–	–	–	–	0.304	–	–	–	–	0.906	0.005
	Subtotal			38.950	40.814	22.384	9.751	–	–	0.574	76.908	39.892	73.156	26.366	38.255	12.553	3648.670	18.516
	Grand total			100	100	100	100	100	100	100	100	100	100	100	100	100	19705.914	100

Note: – denotes zero catch

Appendix 5, Table IV Monthly catch composition (% by weight) from Chatal Beel: outside SHP (site NE19)

Species Code	Habitat Preference	Species name		Year: 1993								Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Scientific	Bengali	Feb	Mar	May	June	Aug	Sep	Nov	Dec	Jan	Feb	Kg	%
139	Riverine	*Nemacheilus botia*	*Balichata*	–	–	–	–	–	–	–	0.029	0.159	0.067	7.563	0.058
941		*Neoeucirrhichthys maydelli*	*Gutum*	–	2.068	–	–	–	–	0.114	–	–	0.095	14.586	0.111
198		*Somileptes gongota*	*Gharpoia*	–	–	–	–	–	–	–	0.029	0.147	0.549	55.880	0.426
58		*Corica soborna*	*Kachki*	–	–	–	–	–	–	0.142	0.015	–	–	2.303	0.018
30		*Brachygobius nunus*	*Nunabailla*	–	0.043	–	–	–	–	0.057	–	–	–	0.987	0.008
92		*Hyporhampus gaimardi*	*Ek thota*	–	–	–	–	–	–	–	–	0.787	0.210	25.054	0.191
961		*Microphis deocata*		–	–	–	–	–	–	0.047	–	–	–	0.763	0.006
158		*Pangasius pangasius*	*Pangas*	–	–	–	0.459	–	–	–	–	–	–	0.470	0.004
	Subtotal			–	2.112	–	0.459	–	–	0.361	0.073	1.092	0.921	107.606	0.819
130	Migratory	*Aorichthys aor*	*Ayre*	–	–	–	–	–	–	–	–	–	1.701	170.876	1.301
131		*Mystus bleekeri*	*Golsha tengra*	0.492	–	–	0.619	7.848	10.376	–	–	–	0.399	91.386	0.696
132		*Mystus cavasius*	*Kabashi*	–	–	11.357	0.757	11.224	8.054	–	–	–	0.093	74.059	0.564
102		*Labeo calbasu*	*Kalbaus*	–	–	–	38.519	–	–	–	–	–	0.472	86.872	0.662
188		*Salmostoma bacaila*	*Katari*	–	0.393	–	–	–	–	–	–	–	–	0.616	0.005
189		*Salmostoma phulo*	*Fulchela*	0.134	–	1.019	–	–	–	–	–	10.234	2.742	326.832	2.489
86		*Gudusia chapra*	*Chapila*	7.793	0.087	–	–	–	–	–	–	10.983	7.907	849.234	6.467
209		*Wallagu attu*	*Boal*	–	0.087	–	–	–	–	–	–	–	0.432	43.540	0.332
				8.419	0.568	12.375	39.895	19.072	18.430	–	–	21.217	13.747	1643.415	12.515
6	Floodplain	*Anabas testudineus*	*Koi*	3.205	–	–	0.339	–	–	–	–	–	0.116	11.976	0.091
136	Resident	*Mystus tengara*	*Bajari tengra*	0.457	0.656	–	–	0.167	0.727	–	0.349	0.028	0.011	4.539	0.035
137		*Mystus vittatus*	*Tengra*	1.144	0.109	1.891	–	10.023	3.160	–	0.219	0.356	0.541	104.451	0.795
942		*Rama chandramara*	*Laia*	–	–	–	–	–	–	0.171	–	–	0.010	3.754	0.029
55		*Colisa fasciatus*	*Khalisha*	2.370	0.306	–	–	0.071	–	0.740	–	0.059	0.102	23.210	0.177
211		*Colisa labiosus*	*Khalisha*	–	0.043	1.356	–	–	0.438	0.214	–	–	–	4.635	0.035
57		*Colisa sota*	*Khalisha*	–	0.043	–	–	–	–	–	–	–	–	0.068	0.001
210		*Xenentodon cancila*	*Kaikka*	–	0.480	–	2.293	0.273	–	–	–	35.289	16.940	1882.123	14.333
187		*Osteobrama cotio cotio*	*Keti*	0.716	–	–	–	–	–	–	–	–	–	–	–
174		*Puntius chola*	*Chala puti*	–	–	5.085	1.536	–	–	–	–	–	0.061	9.121	0.069
175		*Puntius conchonius*	*Canchan puti*	–	–	–	1.101	6.536	17.199	–	0.661	4.076	6.072	688.942	5.247
176		*Puntius gelius*	*Giliputi*	0.076	0.087	–	–	–	–	0.390	2.364	–	0.024	11.181	0.085
178		*Puntius phutunio*	*Phutani puti*	–	0.043	–	–	–	–	–	0.244	–	–	0.318	0.002
180		*Puntius sophore*	*Puti*	22.905	–	–	0.344	–	–	–	1.517	0.035	–	2.079	0.016
181		*Puntius terio*	*Teri punti*	–	0.628	–	–	–	–	–	–	0.011	0.001	1.148	0.009
212		*Puntius ticto*	*Tit puti*	–	–	–	–	–	0.438	–	–	1.519	0.320	40.455	0.308
5		*Amblypharyngodon mola*	*Mola*	–	0.043	–	–	–	–	–	–	0.258	–	1.359	0.010
68		*Danio devario*	*Chebli*	–	–	–	–	–	–	–	–	0.300	0.067	8.194	0.062

(Cont.)

Appendix 5, Table IV Monthly catch composition (% by weight) from Chatal Beel: outside SHP (site NE19)

Species Code	Habitat Preference	Species name		Year: 1993								Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Scientific	Bengali	Feb	Mar	May	June	Aug	Sep	Nov	Dec	Jan	Feb	Kg	%
75		*Esomus danricus*	*Darkina*	0.915	–	–	–	–	–	–	–	0.043	0.016	1.793	0.014
182		*Rasbora daniconius*	*Darkina*	0.915	–	–	–	–	–	–	0.650	0.273	0.453	47.498	0.362
83		*Glossogobius giurus*	*Bailla*	1.069	6.300	0.846	4.055	4.898	0.671	1.550	10.278	0.993	5.776	656.493	4.999
43		*Chela cachius*	*Chep chela*	–	–	–	–	–	–	–	0.465	–	–	0.476	0.004
110		*Lepidocephalus guntea*	*Gutum*	1.907	23.512	4.407	–	–	–	0.190	5.318	1.298	2.552	309.415	2.356
9		*Aplocheilus panchax*	*Kanpona*	–	–	–	–	–	–	–	0.217	–	–	0.222	0.002
39		*Channa marulius*	*Gajar*	–	–	–	–	17.298	–	–	–	9.667	8.459	970.415	7.390
41		*Channa punctatus*	*Taki*	3.433	3.153	24.228	18.293	0.610	–	0.529	–	0.411	1.712	215.377	1.640
42		*Channa striatus*	*Shol*	–	–	–	–	–	–	–	–	3.162	4.325	450.268	3.429
49		*Clarias batrachus*	*Magur*	–	–	–	0.147	–	–	–	–	–	1.176	118.235	0.900
88		*Heteropneustes fossilis*	*Shingi*	36.770	–	37.102	1.869	0.271	–	–	0.059	0.291	0.989	114.017	0.868
121		*Macrognathus aculeatus*	*Tara baim*	1.342	0.568	1.740	1.330	–	–	–	–	–	1.801	183.593	1.398
123		*Macrognathus pancalus*	*Guchi*	2.189	3.261	–	–	–	–	–	2.382	0.467	3.970	408.686	3.112
122		*Mastacembelus armatus*	*Baral baim*	–	–	–	7.134	36.209	0.438	0.095	–	–	0.218	183.089	1.394
138		*Nandus nandus*	*Bheda*	3.579	0.327	–	7.394	0.513	–	–	3.203	4.378	4.144	451.645	3.439
15		*Badis badis*	*Napit koi*	0.152	0.107	–	–	–	0.146	0.355	0.636	0.007	0.015	8.325	0.063
147		*Ompok bimaculatus*	*Kani pabda*	–	–	3.030	2.493	0.397	–	–	–	–	0.125	17.612	0.134
148		*Ompok pabda*	*Madhu pabda*	–	–	–	0.527	–	–	–	–	–	–	0.540	0.004
145		*Notopterus notopterus*	*Foli*	3.433	–	5.906	9.806	0.889	–	–	–	5.221	14.048	1452.482	11.061
203		*Tetraodon cutcutia*	*Potka*	1.069	0.262	–	–	1.378	3.855	0.704	3.802	2.222	2.163	256.322	1.952
33		*Chaca chaca*	*Cheka*	–	–	–	–	–	–	–	–	–	0.324	32.556	0.248
35		*Chanda baculis*	*Chanda*	0.497	0.153	–	0.986	0.267	2.321	2.978	2.190	6.218	5.055	595.290	4.533
36		*Chanda nama*	*Nama chanda*	0.089	–	–	–	–	0.112	0.114	0.493	0.044	0.047	7.433	0.057
37		*Chanda ranga*	*Lal chanda*	2.131	0.719	–	–	–	0.292	0.319	2.992	0.033	0.004	10.400	0.079
	Subtotal			90.361	40.801	85.591	59.646	79.799	29.796	8.349	38.039	76.659	81.635	9289.735	70.745
931	Other	Prawn spp.	*Chingri/Icha*	1.220	56.519	2.033	–	1.128	51.773	91.289	61.888	1.033	3.697	2090.582	15.921
	Subtotal			1.220	56.519	2.033	–	1.128	51.773	91.289	61.888	1.033	3.697	2090.582	15.921
	Grand total			100	100	100	100	100	100	100	100	100	100	13131.333	100

Note: 1. No fishing activities were observed in April, July and October 1993

2. – denotes zero catch

Appendix 5, Table V Monthly catch composition (% by weight) from Mouti Beel: inside SHP (site NE12)

Species Code	Habitat Preference	Species name		Year: 1993										Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Scientific	Bengali	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
139	Riverine	*Nemacheilus botia*	*Balichata*	–	–	–	0.024	–	–	–	–	–	–	–	–	–	0.252	0.003
941		*Neoeucirrhichthys maydelli*	*Gutum*	–	–	–	2.346	–	–	0.309	0.008	–	–	–	–	–	25.175	0.253
58		*Corica soborna*	*Kachki*	–	–	–	–	–	–	–	–	–	–	0.031	–	–	0.853	0.009
14		*Awaous stamineus*	*Bele*	–	1.114	–	–	–	–	–	–	–	–	–	–	–	1.666	0.017
92		*Hyporhampus gaimardi*	*Ek thota*	–	–	–	–	–	–	–	–	–	–	0.008	–	–	0.212	0.002
51		*Clupisoma garua*	*Ghaura*	–	–	–	–	–	0.990	–	–	–	–	–	–	–	2.026	0.020
	Subtotal			–	1.114	–	2.370	–	0.990	0.309	0.008	–	–	0.039	–	–	30.184	0.303
130	Migratory	*Acrichthys aor*	*Ayre*	–	–	–	–	–	0.148	–	–	–	–	0.234	6.231	–	116.473	1.170
135		*Acrichthys seenghala*	*Guizza*	–	–	19.854	0.624	5.969	3.182	–	8.884	2.479	–	–	0.341	–	148.824	1.495
131		*Mystus bleekeri*	*Golsha tengra*	–	–	–	–	14.943	–	1.581	3.358	3.854	0.494	0.734	0.194	–	98.563	0.990
132		*Mystus cavasius*	*Kabashi*	–	–	–	0.197	3.055	0.642	0.641	0.509	0.080	–	0.177	0.075	–	15.799	0.159
47		*Cirrhinus mrigala*	*Mrigel*	–	–	–	–	–	0.952	–	–	–	–	–	–	–	1.948	0.020
48		*Cirrhinus reba*	*Raik*	–	–	–	–	–	–	4.720	–	–	–	–	–	–	14.857	0.149
102		*Labeo calbasu*	*Kalbaus*	–	–	–	–	–	22.016	9.007	8.346	–	–	0.284	–	–	113.253	1.138
104		*Labeo gonius*	*Goni*	–	–	–	–	–	–	0.637	–	–	–	–	–	–	2.004	0.020
107		*Labeo rohita*	*Rui*	–	–	–	–	–	–	21.054	–	–	–	1.356	–	–	103.641	1.041
189		*Salmostoma phulo*	*Fulchela*	0.157	–	–	0.193	–	–	–	–	–	–	0.336	0.368	–	17.728	0.178
86		*Gudusia chapra*	*Chapila*	–	–	–	1.348	–	1.062	8.167	5.955	5.166	0.428	0.123	0.017	–	131.087	1.317
76		*Eutropiichthys vacha*	*Bacha*	–	–	–	–	3.421	3.145	–	–	–	–	–	–	–	8.027	0.081
169		*Pseudeutropius atherinoides*	*Batasi*	–	–	–	–	–	–	–	–	–	–	0.011	–	–	0.292	0.003
944		*Ompok pabo*	*Pabda*	–	–	–	–	–	–	–	–	–	0.348	–	–	–	6.534	0.066
209		*Wallagu attu*	*Boal*	–	–	–	–	–	–	–	–	–	–	1.058	–	–	29.165	0.293
	Subtotal			0.157	–	19.854	2.361	27.387	31.146	45.807	27.053	11.580	1.270	4.313	7.225	–	808.195	8.121
6	Floodplain	*Anabas testudineus*	*Koi*	0.033	–	–	4.190	24.166	5.193	1.014	11.765	17.041	0.669	0.180	1.839	–	343.842	3.455
136	Resident	*Mystus tengara*	*Bajari tengra*	–	–	–	–	–	–	–	0.248	0.078	–	–	0.157	–	4.546	0.046
137		*Mystus vittatus*	*Tengra*	0.221	1.300	–	1.597	–	3.240	0.452	2.416	0.137	–	0.070	0.138	–	41.519	0.417
942		*Rama chandramara*	*Laia*	–	0.581	–	–	–	–	–	–	0.080	–	0.135	0.060	–	6.488	0.065
61		*Ctenops nobilis*	*Neftani*	–	–	–	–	–	–	–	–	–	0.065	0.005	0.076	–	2.681	0.027
55		*Colisa fasciatus*	*Khalisha*	6.372	7.537	2.890	9.784	–	–	0.086	0.532	4.217	2.629	3.122	3.693	–	369.253	3.710
211		*Colisa labiosus*	*Khalisha*	0.129	0.956	0.711	0.465	–	–	0.232	–	0.974	0.126	0.524	–	–	36.488	0.367
56		*Colisa lalia*	*Lal khalisha*	–	–	–	–	–	–	–	–	–	–	0.040	–	–	1.116	0.011
57		*Colisa sota*	*Khalisha*	–	–	–	–	–	–	–	–	–	–	–	0.0001	–	0.002	0.00002
210		*Xenentodon cancila*	*Kaikka*	0.769	3.533	1.429	–	0.292	–	6.986	0.182	2.350	0.049	0.376	1.830	–	101.316	1.018
187		*Osteobrama cotio cotio*	*Keti*	–	–	–	–	–	0.767	–	–	–	–	0.013	0.059	–	2.971	0.030
174		*Puntius chola*	*Chala puti*	0.226	–	1.968	0.857	3.567	11.400	5.937	12.716	5.647	11.434	0.005	0.001	–	382.535	3.844
175		*Puntius conchonius*	*Canchan puti*	0.256	0.554	–	0.439	–	1.680	4.279	11.794	16.761	0.241	0.013	0.021	–	250.339	2.515
176		*Puntius gelius*	*Giliputi*	0.379	–	0.279	–	–	–	0.432	0.078	0.092	1.498	0.710	0.228	–	55.296	0.556
178		*Puntius phutunio*	*Phutani puti*	0.531	0.117	–	1.041	–	–	0.185	0.016	0.043	0.148	0.053	–	–	16.232	0.163
180		*Puntius sophore*	*Puti*	1.199	0.805	–	0.144	–	–	4.952	1.595	7.381	12.087	24.054	7.923	–	1132.064	11.375
181		*Puntius terio*	*Teri punti*	1.420	0.496	–	–	1.602	–	0.309	0.141	0.338	2.049	1.249	0.017	–	79.766	0.801
212		*Puntius ticto*	*Tit puti*	0.296	–	0.279	–	–	–	–	0.016	4.301	–	–	0.038	–	47.245	0.475
4		*Amblypharyngodon microlepis*	*Mola*	0.098	0.898	–	–	–	–	–	–	–	–	–	–	–	1.342	0.013
5		*Amblypharyngodon mola*	*Mola*	0.024	0.166	5.218	–	–	–	–	–	–	–	0.531	0.867	–	47.695	0.479
68		*Danio devario*	*Chebli*	–	–	–	–	–	–	–	–	–	–	–	0.017	–	0.298	0.003
75		*Esomus danricus*	*Darkina*	0.422	0.516	–	0.929	–	–	–	–	–	0.025	0.137	0.149	–	17.209	0.173
182		*Rasbora daniconius*	*Darkina*	0.298	0.195	1.187	0.073	–	–	–	–	–	4.233	3.020	0.355	–	173.991	1.748
83		*Glossogobius giurus*	*Bailla*	1.978	0.751	0.274	3.571	–	0.196	0.494	0.065	0.856	0.826	3.113	4.318	1.361	227.916	2.290

(Cont.)

Appendix 5, Table V Monthly catch composition (% by weight) from Mouti Beel: inside SHP (site NE12)

Species Code	Habitat Preference	Species name		Year: 1993											Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Scientific	Bengali	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
110		*Lepidocephalus guntea*	*Gutum*	2.983	2.875	–	5.879	–	–	0.185	–	0.154	0.748	0.510	2.093	9.938	135.247	1.359
9		*Aplocheilus panchax*	*Kanpona*	0.020	–	–	0.195	–	–	–	–	–	0.068	0.005	–	–	3.431	0.034
39		*Channa marulius*	*Gajar*	–	–	37.818	–	–	–	8.978	–	–	–	4.459	2.615	–	324.388	3.259
41		*Channa punctatus*	*Taki*	1.004	17.351	12.891	19.665	12.870	15.003	1.852	3.798	7.851	6.479	2.732	15.239	5.106	879.152	8.833
42		*Channa striatus*	*Shol*	–	22.901	–	–	–	–	–	–	1.347	–	0.178	4.023	–	124.273	1.249
49		*Clarias batrachus*	*Magur*	–	–	–	0.171	–	–	–	–	–	–	0.382	5.987	–	117.732	1.183
150		*Oreochromis mossambica*	*Tilapia*	–	–	–	–	–	–	–	–	–	–	–	0.007	–	0.115	0.001
88		*Heteropneustes fossilis*	*Shingi*	0.137	4.617	–	6.324	13.227	0.709	0.634	0.716	0.399	6.445	0.355	5.946	6.944	326.402	3.280
121		*Macrognathus aculeatus*	*Tara baim*	–	–	–	–	–	–	–	0.649	–	1.736	0.235	2.474	9.870	88.318	0.887
123		*Macrognathus pancalus*	*Guchi*	1.356	1.717	–	1.835	–	–	3.580	0.063	1.057	1.609	5.110	21.150	65.352	608.797	6.117
122		*Mastacembelus armatus*	*Baral baim*	–	–	–	–	11.793	–	2.172	4.432	2.568	2.144	0.289	0.001	–	104.776	1.053
138		*Nandus nandus*	*Bheda*	0.168	2.290	–	0.801	5.096	4.241	3.620	4.244	3.541	5.042	0.165	0.534	–	196.531	1.975
15		*Badis badis*	*Napit koi*	0.977	0.123	–	2.870	–	–	0.556	0.078	0.111	0.788	0.701	0.184	–	70.323	0.707
124		*Monopterus cuchia*	*Kuchia*	–	–	–	–	–	–	–	–	–	–	–	–	1.429	0.461	0.005
147		*Ompok bimaculatus*	*Kani pabda*	–	–	–	–	–	23.664	–	–	–	–	0.056	–	–	49.964	0.502
148		*Ompok pabda*	*Madhu pabda*	–	–	–	0.290	–	–	–	–	–	0.205	0.035	0.046	–	8.609	0.087
145		*Notopterus notopterus*	*Foli*	–	1.644	12.090	–	–	0.770	–	9.753	0.380	4.699	5.126	3.145	–	371.028	3.728
203		*Tetraodon cutcutia*	*Potka*	2.968	0.866	–	–	–	0.075	0.009	1.947	0.195	2.438	0.593	1.208	–	94.386	0.948
33		*Chaca chaca*	*Cheka*	1.393	–	–	–	–	–	–	1.335	–	1.192	0.527	1.269	–	64.368	0.647
35		*Chanda baculis*	*Chanda*	0.015	1.108	–	–	–	0.292	3.059	3.224	1.084	7.565	5.292	0.784	–	337.425	3.390
36		*Chanda nama*	*Nama chanda*	–	0.262	–	–	–	–	0.232	0.022	–	0.145	0.322	0.260	–	17.376	0.175
37		*Chanda ranga*	*Lal chanda*	4.694	0.963	0.309	1.794	–	–	0.955	0.430	1.487	2.641	2.222	0.118	–	154.263	1.550
	Subtotal			30.368	75.120	77.342	62.916	72.613	67.229	51.189	72.253	80.467	80.018	66.645	88.866	100.000	7419.515	74.549
931	Other	Prawn spp.	*Chingri/Icha*	69.474	23.764	2.803	32.353	–	0.634	2.695	0.686	7.952	18.712	29.003	3.909	–	1694.583	17.027
	Subtotal			69.474	23.764	2.803	32.353	–	0.634	2.695	0.686	7.952	18.712	29.003	3.909	–	1694.583	17.027
	Grand total			100	100	100	100	100	100	100	100	100	100	100	100	100	9952.477	100

Note: – denotes zero catch

Appendix 5, Table VI Monthly catch composition (% by weight) from Karchabrar Beel: inside SHP (site NE13)

Species Code	Habitat Preference	Species name		Year: 1993								Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Scientific	Bengali	Feb	Mar	April	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
941	Riverine	*Neoeucirrhichthys maydelli*	*Gutum*	–	0.022	0.176	–	–	–	–	–	–	–	8.259	0.026
28		*Botia dario*	*Rani*	–	–	–	–	0.338	–	–	–	–	–	0.780	0.002
952		*Awaous grammepomus*	*Nonda baila*	–	–	–	–	–	–	–	–	–	0.001	0.041	0.0001
92		*Hyporhampus gaimardi*	*Ek thota*	–	–	–	–	–	–	–	0.066	–	–	7.451	0.023
112		*Lobotes surinamensis*	*Samudra koi*	0.213	–	–	–	–	–	–	–	–	–	–	–
51		*Clupisoma garua*	*Ghaura*	–	–	–	2.693	1.540	–	–	–	–	–	11.586	0.036
	Subtotal			0.213	0.022	0.176	2.693	1.879	–	–	0.066	–	0.001	28.117	0.087
130	Migratory	*Aorichthys aor*	*Ayre*	–	–	–	–	–	–	–	–	2.217	0.420	185.897	0.577
135		*Aorichthys seenghala*	*Guizza*	0.020	–	–	–	–	–	–	–	0.016	0.908	29.616	0.092
24		*Batasio batasio*	*Tengra*	–	–	–	–	–	–	–	0.129	–	–	14.639	0.045
131		*Mystus bleekeri*	*Golsha tengra*	0.001	–	0.188	2.811	4.035	8.687	1.960	–	0.042	0.572	103.320	0.321
132		*Mystus cavasius*	*Kabashi*	–	–	0.081	5.841	–	1.327	–	0.614	0.001	–	93.772	0.291
32		*Catla catla*	*Catla*	–	–	–	–	–	–	–	–	0.292	–	22.755	0.071
48		*Cirrhinus reba*	*Raik*	–	–	0.004	0.187	0.860	–	–	–	–	–	2.720	0.008
102		*Labeo calbasu*	*Kalbaus*	0.016	–	0.017	–	–	–	–	–	1.047	0.218	89.120	0.276
104		*Labeo gonius*	*Goni*	–	–	–	0.644	–	–	–	–	0.097	0.319	19.445	0.060
107		*Labeo rohita*	*Rui*	7.405	23.565	19.705	–	–	–	–	4.850	36.412	3.633	5097.508	15.813
188		*Salmostoma bacaila*	*Katari*	–	–	–	–	–	–	–	0.006	0.467	0.402	49.547	0.154
189		*Salmostoma phulo*	*Fulchela*	3.259	3.599	0.013	–	–	–	–	4.063	1.719	0.859	735.504	2.282
86		*Gudusia chapra*	*Chapila*	–	–	–	31.489	31.883	10.279	3.876	1.141	0.715	0.408	458.817	1.423
76		*Eutropiichthys vacha*	*Bacha*	–	–	–	0.492	–	–	–	–	–	–	1.467	0.005
169		*Pseudeutropius atherinoides*	*Batasi*	–	–	0.005	–	–	–	–	–	–	–	0.200	0.001
209		*Wallagu attu*	*Boal*	–	0.175	0.468	–	–	–	–	–	2.276	1.648	254.543	0.790
140		*Nemacheilus corica*	*Koirka*	–	–	–	–	–	–	–	–	0.005	–	0.389	0.001
	Subtotal			10.699	27.339	20.479	41.464	36.777	20.293	5.835	10.803	45.305	9.385	7159.259	22.209
6	Floodplain	*Anabas testudineus*	*Koi*	0.873	–	0.276	0.101	3.407	–	17.496	0.524	0.323	1.341	450.822	1.399
136	Resident	*Mystus tengara*	*Bajari tengra*	0.012	0.320	0.117	0.220	0.093	–	–	0.367	0.582	0.839	129.088	0.400
137		*Mystus vittatus*	*Tengra*	0.437	–	0.281	7.230	5.759	1.061	1.508	0.167	0.965	2.461	246.917	0.766
942		*Rama chandramara*	*Laia*	0.032	0.068	0.384	–	–	–	–	0.129	0.239	0.963	81.992	0.254
61		*Ctenops nobilis*	*Neftani*	0.047	0.116	–	–	–	–	–	–	–	0.0001	3.700	0.011
55		*Colisa fasciatus*	*Khalisha*	6.401	3.057	2.228	–	0.282	–	–	0.383	0.037	0.048	241.530	0.749
211		*Colisa labiosus*	*Khalisha*	0.144	2.299	3.058	–	–	–	–	0.273	–	–	235.545	0.731
56		*Colisa lalia*	*Lal khalisha*	–	–	–	–	–	–	–	0.041	–	–	4.600	0.014
57		*Colisa sota*	*Khalisha*	0.040	0.162	0.704	–	0.094	–	–	–	–	–	35.608	0.110
210		*Xenentodon cancila*	*Kaikka*	10.953	7.375	10.388	0.697	2.866	3.448	6.180	3.028	8.428	5.570	1979.728	6.141
187		*Osteobrama cotio cotio*	*Keti*	–	–	0.025	–	–	–	–	–	–	0.069	3.226	0.010
174		*Puntius chola*	*Chala puti*	0.118	0.158	1.042	5.432	1.110	13.263	22.170	–	0.122	–	498.077	1.545
175		*Puntius conchonius*	*Canchan puti*	1.526	0.387	0.274	22.041	4.279	5.703	6.267	–	0.918	0.105	298.286	0.925

(Cont.)

Appendix 5, Table VI Monthly catch composition (% by weight) from Karchabrar Beel: inside SHP (site NE13)

Species Code	Habitat Preference	Species name		Year: 1993								Year: 1994		Total annual catch (Mar'93 – Feb'94)	
		Scientific	Bengali	Feb	Mar	April	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Kg	%
176		*Puntius gelius*	*Giliputi*	0.399	6.513	3.883	–	0.125	–	–	5.251	4.265	4.082	1428.379	4.431
178		*Puntius phutunio*	*Phutani puti*	1.012	3.977	0.079	–	0.094	–	–	–	0.020	–	131.896	0.409
180		*Puntius sophore*	*Puti*	5.057	2.862	21.516	1.355	1.809	4.112	13.166	5.147	3.528	12.313	2505.225	7.772
181		*Puntius terio*	*Teri punti*	0.027	0.077	0.642	–	–	–	–	0.313	0.015	0.0001	66.632	0.207
212		*Puntius ticto*	*Tit puti*	0.344	0.034	0.420	–	–	–	–	0.560	0.875	0.636	170.542	0.529
5		*Amblypharyngodon mola*	*Mola*	0.049	0.157	0.273	–	–	–	–	0.301	0.140	0.797	86.582	0.269
68		*Danio devario*	*Chebli*	0.016	1.238	0.034	–	–	–	–	–	–	–	40.929	0.127
75		*Esomus danricus*	*Darkina*	0.008	–	–	–	–	–	–	0.312	–	0.0004	35.281	0.109
182		*Rasbora daniconius*	*Darkina*	2.297	15.933	1.169	–	–	–	–	–	0.302	0.767	605.360	1.878
83		*Glossogobius giurus*	*Bailla*	0.577	0.370	1.256	1.109	0.498	–	–	8.824	1.328	4.340	1307.108	4.055
110		*Lepidocephalus guntea*	*Gutum*	0.574	0.911	–	–	0.068	–	–	0.278	0.020	0.215	68.864	0.214
39		*Channa marulius*	*Gajar*	1.101	0.097	0.490	0.436	–	–	0.689	–	2.209	11.785	577.718	1.792
41		*Channa punctatus*	*Taki*	2.776	0.059	0.892	5.030	1.163	–	2.953	0.388	2.117	5.562	491.824	1.526
42		*Channa striatus*	*Shol*	0.102	–	0.046	–	–	–	6.459	–	0.809	2.486	255.148	0.792
49		*Clarias batrachus*	*Magur*	0.783	–	–	–	–	–	–	0.465	0.774	4.580	255.994	0.794
88		*Heteropneustes fossilis*	*Shingi*	0.929	0.034	0.133	1.175	8.277	12.533	1.809	0.005	0.716	3.590	261.460	0.811
121		*Macrognathus aculeatus*	*Tara baim*	0.230	–	0.223	–	0.279	–	–	0.980	0.279	0.072	145.070	0.450
123		*Macrognathus pancalus*	*Guchi*	0.147	0.781	0.049	–	–	–	–	2.359	0.901	0.478	378.845	1.175
122		*Mastacembelus armatus*	*Baral baim*	0.021	–	0.188	0.141	–	21.883	0.413	–	0.406	0.230	110.618	0.343
138		*Nandus nandus*	*Bheda*	0.205	0.095	0.267	0.319	5.137	2.851	4.944	3.452	0.403	1.318	583.691	1.811
15		*Badis badis*	*Napit koi*	0.454	0.127	0.149	–	0.080	–	–	0.156	0.008	0.004	28.985	0.090
147		*Ompok bimaculatus*	*Kani pabda*	–	–	–	–	3.672	–	0.984	0.002	0.225	0.297	52.689	0.163
148		*Ompok pabda*	*Madhu pabda*	–	–	0.008	–	1.665	7.295	–	–	0.001	–	22.954	0.071
145		*Notopterus notopterus*	*Foli*	0.610	0.632	1.629	–	–	–	3.813	0.704	2.927	6.239	659.055	2.044
203		*Tetraodon cutcutia*	*Potka*	2.068	1.450	0.773	2.315	0.928	–	–	3.953	1.083	0.152	624.601	1.938
33		*Chaca chaca*	*Cheka*	0.021	1.585	0.140	–	–	–	0.878	0.610	0.007	0.098	144.386	0.448
35		*Chanda baculis*	*Chanda*	4.233	1.332	0.466	1.263	1.483	7.560	4.435	5.262	1.941	0.458	926.939	2.876
36		*Chanda nama*	*Nama chanda*	3.553	0.774	0.006	0.235	0.197	–	–	0.317	0.333	0.066	89.910	0.279
37		*Chanda ranga*	*Lal chanda*	7.197	4.845	0.843	–	0.220	–	–	1.498	1.650	3.596	601.387	1.866
	Subtotal			55.369	57.824	54.349	49.098	43.584	79.708	94.164	46.047	38.893	75.556	16867.191	52.325
931	Others	Prawn spp.	*Chingri/Icha*	33.717	14.814	24.994	6.746	17.760	–	–	41.898	15.801	15.055	8047.000	24.963
207		*Trionyx gangeticus*	*Kachhim*	–	–	–	–	–	–	–	1.186	–	–	134.101	0.416
	Subtotal			33.717	14.814	24.994	6.746	17.760	–	–	43.084	15.801	15.055	8181.101	25.379
	Grand total			100	100	100	100	100	100	100	100	100	100	32235.663	100

Notes: 1. No fishing activities were observed from May to July 1993

2. – denotes zero catch

Appendix 5, Table VII Monthly catch composition (% by weight) from Asumura floodplain: inside SHP (site NE14)

Species Code	Habitat Preference	Species name		Year: 1993									Total annual catch (Mar'93 – Feb'94)	
		Scientific	Bengali	Feb	Mar	May	July	Aug	Sep	Oct	Nov	Dec	Kg	%
139	Riverine	*Nemacheilus botia*	*Balichata*	–	–	6.811	–	–	–	–	–	–	12.749	0.361
941		*Neoeucirrhichthys maydelli*	*Gutum*	–	–	6.034	–	–	–	–	0.023	–	11.783	0.334
28		*Botia dario*	*Rani*	–	–	–	–	–	–	0.237	–	–	0.333	0.009
58		*Corica soborna*	*Kachki*	–	–	–	–	–	–	–	0.487	–	10.267	0.291
92		*Hyporhampus gaimardi*	*Ek thota*	–	–	–	–	–	–	–	0.218	–	4.593	0.130
51		*Clupisoma garua*	*Ghaura*	–	–	–	2.663	–	–	–	–	–	1.506	0.043
	Subtotal			–	–	12.845	2.663	–	–	0.237	0.727	–	41.231	1.168
135	Migratory	*Aorichthys seenghala*	*Guizza*	–	–	–	–	–	32.077	23.494	1.788	–	91.843	2.601
131		*Mystus bleekeri*	*Golsha tengra*	–	–	–	0.439	13.113	–	–	6.038	–	184.111	5.213
132		*Mystus cavasius*	*Kabashi*	–	–	–	–	10.958	–	0.891	–	–	48.462	1.372
48		*Cirrhinus reba*	*Raik*	–	–	–	–	–	–	3.566	–	–	5.002	0.142
101		*Labeo boga*	*Bhangan*	–	–	–	–	–	–	–	–	0.644	3.391	0.096
102		*Labeo calbasu*	*Kalbaus*	–	–	–	8.959	–	–	6.034	–	–	13.531	0.383
104		*Labeo gonius*	*Goni*	–	–	–	0.826	–	–	–	–	–	0.467	0.013
188		*Salmostoma bacaila*	*Katari*	–	–	–	–	–	–	1.435	0.099	–	4.108	0.116
189		*Salmostoma phulo*	*Fulchela*	–	–	–	–	–	–	–	0.871	–	18.373	0.520
86		*Gudusia chapra*	*Chapila*	–	–	–	–	–	5.132	17.012	3.482	1.180	106.918	3.028
76		*Eutropiichthys vacha*	*Bacha*	–	–	–	6.477	–	–	–	–	–	3.663	0.104
944		*Ompok pabo*	*Pabda*	–	–	–	–	–	–	1.336	–	–	1.874	0.053
140		*Nemacheilus corica*	*Koirka*	–	–	–	–	–	–	–	0.344	–	7.260	0.206
142		*Nemacheilus scaturigina*	*Dari*	–	–	–	–	–	–	–	–	2.577	13.564	0.384
161		*Pellona ditchela*	*Chouka*	–	–	–	–	–	–	–	0.145	–	3.062	0.087
	Subtotal			–	–	–	16.700	24.071	37.209	53.767	12.767	4.401	505.629	14.318
6	Floodplain	*Anabas testudineus*	*Koi*	–	–	1.091	–	–	–	0.504	4.502	24.787	228.200	6.462
136	Resident	*Mystus tengara*	*Bajari tengra*	–	–	–	–	–	–	–	0.027	–	0.560	0.016
137		*Mystus vittatus*	*Tengra*	–	–	–	0.500	28.750	–	0.544	3.251	0.591	196.595	5.567
942		*Rama chandramara*	*Laia*	–	–	–	–	–	–	0.016	–	–	0.022	0.001
55		*Colisa fasciatus*	*Khalisha*	5.021	5.025	4.564	–	–	–	1.416	1.299	0.202	39.730	1.125
211		*Colisa labiosus*	*Khalisha*	–	–	3.337	–	–	–	0.252	0.412	–	15.298	0.433
210		*Xenentodon cancila*	*Kaikka*	–	–	–	–	–	–	3.316	0.968	19.425	127.331	3.606
187		*Osteobrama cotio cotio*	*Keti*	–	–	–	–	–	–	0.396	–	–	0.555	0.016
174		*Puntius chola*	*Chala puti*	–	–	1.876	–	0.677	2.224	1.435	3.873	–	91.604	2.594
175		*Puntius conchonius*	*Canchan puti*	–	–	–	1.722	34.783	–	0.247	2.314	3.627	219.089	6.204
176		*Puntius gelius*	*Giliputi*	2.511	2.512	1.827	–	–	–	–	1.802	–	41.795	1.183

(Cont.)

Appendix 5, Table VII Monthly catch composition (% by weight) from Asumura floodplain: inside SHP (site NE14)

Species Code	Habitat Preference	Species name		Year: 1993									Total annual catch (Mar'93 – Feb'94)	
		Scientific	Bengali	Feb	Mar	May	July	Aug	Sep	Oct	Nov	Dec	Kg	%
178		*Puntius phutunio*	*Phutani puti*	1.499	1.505	6.661	–	–	–	–	0.069	–	14.153	0.401
180		*Puntius sophore*	*Puti*	–	–	–	0.759	0.123	1.154	1.120	4.388	1.672	104.652	2.963
181		*Puntius terio*	*Teri punti*	–	–	–	–	–	–	–	0.634	–	13.384	0.379
212		*Puntius ticto*	*Tit puti*	18.091	18.090	5.006	–	–	–	–	–	–	12.027	0.341
5		*Amblypharyngodon mola*	*Mola*	–	–	1.299	–	–	–	–	0.353	–	9.877	0.280
75		*Esomus danricus*	*Darkina*	–	–	2.695	–	–	–	–	0.014	–	5.345	0.151
182		*Rasbora daniconius*	*Darkina*	–	–	2.327	–	–	–	–	0.290	–	10.480	0.297
83		*Glossogobius giurus*	*Bailla*	–	–	–	7.203	0.575	–	0.639	1.295	–	34.757	0.984
110		*Lepidocephalus guntea*	*Gutum*	6.542	6.536	3.253	–	0.226	–	–	–	–	8.022	0.227
9		*Aplocheilus panchax*	*Kanpona*	1.012	1.008	–	–	–	–	–	–	–	0.148	0.004
41		*Channa punctatus*	*Taki*	–	–	10.891	63.895	–	–	6.224	1.788	16.719	190.980	5.408
49		*Clarias batrachus*	*Magur*	–	–	3.722	–	–	–	–	3.211	–	74.701	2.115
88		*Heteropneustes fossilis*	*Shingi*	–	–	–	–	1.724	–	0.458	2.997	5.146	98.380	2.786
121		*Macrognathus aculeatus*	*Tara baim*	–	–	0.128	–	–	–	–	–	0.717	4.012	0.114
123		*Macrognathus pancalus*	*Guchi*	9.547	9.545	4.560	–	–	–	1.004	0.003	–	11.405	0.323
122		*Mastacembelus armatus*	*Baral baim*	–	–	–	–	–	55.438	11.089	0.222	–	56.836	1.609
138		*Nandus nandus*	*Bheda*	–	–	–	2.205	–	3.122	1.682	6.719	18.080	242.589	6.869
15		*Badis badis*	*Napit koi*	0.502	0.504	1.227	–	–	–	0.016	0.600	–	15.055	0.426
147		*Ompok bimaculatus*	*Kani pabda*	–	–	–	0.219	–	0.854	–	0.080	–	2.368	0.067
148		*Ompok pabda*	*Madhu pabda*	–	–	–	–	–	–	0.743	–	–	1.042	0.030
145		*Notopterus notopterus*	*Foli*	–	–	–	4.134	–	–	3.163	0.761	–	22.839	0.647
203		*Tetraodon cutcutia*	*Potka*	3.522	3.520	–	–	3.796	–	0.165	0.942	–	36.971	1.047
33		*Chaca chaca*	*Cheka*	–	–	–	–	–	–	–	0.046	0.090	1.432	0.041
35		*Chanda baculis*	*Chanda*	–	–	0.599	–	1.252	–	2.189	8.500	4.545	212.818	6.026
36		*Chanda nama*	*Nama chanda*	–	–	–	–	0.185	–	0.315	0.383	–	9.322	0.264
37		*Chanda ranga*	*Lal chanda*	15.580	15.577	–	–	–	–	0.208	0.805	–	19.569	0.554
	Subtotal			63.827	63.821	55.063	80.637	72.091	62.792	37.139	52.546	95.599	2173.943	61.558
931	Other	Prawn spp.	*Chingri/Icha*	36.174	36.179	32.092	–	3.838	–	8.855	33.958	–	810.705	22.956
	Subtotal			36.174	36.179	32.092	–	3.838	–	8.855	33.958	–	810.705	22.956
	Grand total			100	100	100	100	100	100	100	100	100	3531.508	100

Notes: 1. No fishing activities were observed in April and June 1993 and in January and February 1994

2. – denotes zero catch