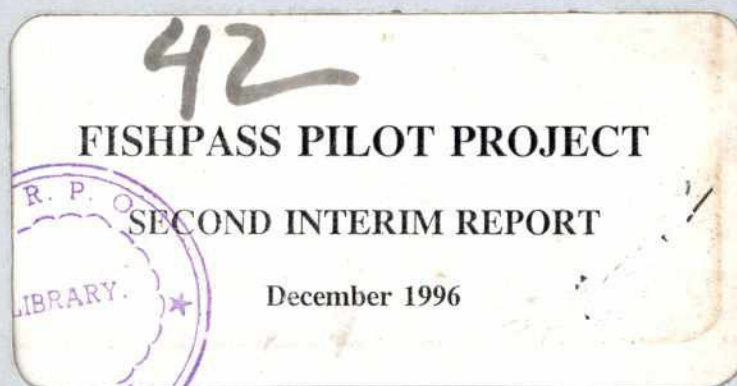


FLOOD ACTION PLAN

NORTHEAST REGIONAL WATER MANAGEMENT PROJECT (FAP 6)



SNC ♦ Lavalin International
Northwest Hydraulic Consultants

in association with

Engineering and Planning Consultants Ltd.
Bangladesh Engineering and Technological Services

Canadian International Development Agency

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Government of the People's Republic of Bangladesh
Bangladesh Water Development Board
Water Resources Planning Organisation

FLOOD ACTION PLAN

NORTHEAST REGIONAL WATER MANAGEMENT PROJECT
(FAP 6)

FISHPASS PILOT PROJECT



SECOND INTERIM REPORT

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SNC ♦ LAVALIN International
Northwest Hydraulic Consultants

in association with

Engineering and Planning Consultants Ltd.
Bangladesh Engineering and Technological Services

Canadian International Development Agency

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ACRONYMS AND ABBREVIATIONS

AOP	Actual Operation Period
CAS	Catch Assessment Survey
CBA	Cost-Benefit Analysis
CO	Community Organizer
C/S	Countryside (= Kawadighi Haor)
DFO	District Fisheries Officer
DOF	Department of Fisheries
D/S	Downstream
DWM	Dominant Water Mass
FCDI	Flood Control, Drainage, and Irrigation Project
FPG	Fish Processors Group
FPP	Fishpass Pilot Project
GOB	Government of Bangladesh
IRR	Internal Rate of Return
KHFA	Kawadighi Haor Fisheries Association
LCC	Local Consultative Committee
MF	Monsoon Flood
MOFL	Ministry of Fisheries and Livestock
MRP	Manu River Flood Control and Irrigation Project
NERP	Northeast Regional Water Management Project
NFMP	New Fisheries Management Policy
NOP	Non Operation Period
NPV	Net Present Value
PMF	Pre-monsoon Flood
PMP	Project Monitoring Programme
POP	Potential Operation Period
PRA	Participatory Rural Appraisal
PWD	Public Works Department standard water level (reference 0 m is at mean sea level)
R/S	Riverside (= Kushiya River)
SOB	Survey of Bangladesh standard water level (reference 0 m is at 0.46 m PWD)
U/S	Upstream



GLOSSARY OF TERMS

<i>aaratdar</i>	Trader with a space for storing commodities
<i>abadi</i>	Outside settler
<i>akai</i>	Gleaning of submerged rice
<i>aman</i>	Monsoon rice crop harvested in November/December
<i>barga</i>	Share cropping
<i>barman</i>	Hindu sub-caste whose major profession is fishing
<i>beel</i>	Floodplain lake which may hold water permanently or dry up during the winter season
<i>bepari</i>	Harvester of <i>boro</i> rice who generally comes from outside the area
<i>bhagi</i>	Share cropping
<i>bhasha</i>	One method of fishing
<i>bigha</i>	Local unit of land measurement (one <i>bigha</i> = 0.13 ha)
<i>bisra</i>	Area adjacent to a homestead and intermediate in height between the homestead and rice fields, on which vegetables are grown
<i>biyash</i>	A tree species used as fuelwood (<i>Salix tetrasperma</i>)
<i>boro</i>	Rice grown in the dry season and harvested in April/May
<i>borun</i>	A tree species used as fuelwood (<i>Crataera nurvala</i>)
<i>chailla</i>	A long grass grown in lowlands (<i>Hematheria potensa</i>)
<i>chada</i>	Contribution
<i>changari</i>	Platform made to dry fish
<i>chhon (ululbinna)</i>	A grass used to thatch house rooves
<i>chukti</i>	Seasonal lease of agricultural land with an agreed fixed amount of the produce to be paid after the harvest
<i>chula</i>	Cooking place (oven)
<i>dair/chhit</i>	Terrace of shallow channels within a rice field
<i>dalal</i>	Commission agent
<i>deta</i>	Rice straw
<i>dhara</i>	Bamboo mat
<i>doba</i>	Smaller water body
<i>don</i>	An indigenous method of manual irrigation
<i>duar</i>	Deep scour hole in a river, usually at a bend or a confluence
<i>durba</i>	A kind of grass (<i>Cynodon dactylon</i>)
<i>ejmali</i>	Jointly owned by co-sharers/villagers
<i>gola</i>	Granary
<i>haal</i>	Local unit of land measurement (1 haal = 12 <i>kare</i> = 1.44 ha)
<i>haor</i>	Depression on floodplain, located between two or more rivers, which functions as a small internal drainage basin
<i>hati</i>	Continuous group of homesteads occupied by a social group sharing lineage and/or other factors
<i>hizal</i>	A wetland tree species used for fuelwood and <i>katha</i> (<i>Barringtonia acutangula</i>)
<i>jagli</i>	An indigenous variety of <i>boro</i> rice
<i>jal</i>	Fishing net
<i>jala</i>	Seedlings
<i>jalmohal</i>	Fishing ground
<i>jangal</i>	Dike-cum-road across crop fields

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<i>kaiborta</i>	Hindu sub-caste whose major profession is fishing
<i>kamla</i>	Wage labourer
<i>kanda</i>	Ridges that are higher than the <i>haor</i> basin but lower than homestead land
<i>katha</i>	Branches of trees or bamboo piles placed in water to provide shelter for fish
<i>kare</i>	Local unit of land measurement (one <i>kare</i> = 0.12 ha)
<i>khal</i>	Drainage channel running across a <i>haor</i> , connecting a <i>beel</i> to a river
<i>khalashi</i>	Sluice gate operator
<i>khariif</i>	Monsoon crop season, including Aus and Aman crop season
<i>khas</i>	Government-owned land
<i>katha</i>	Bush park type fish production system
<i>khet</i>	Agricultural land
<i>khola</i>	Temporary dry season fishing camp
<i>kona jal</i>	A kind of seine net
<i>koroch</i>	A wetland tree species used as fuelwood and for <i>katha</i> (<i>Pongamia pinnata</i>)
<i>mahajan</i>	Local money/rice lender
<i>maimol</i>	Muslims whose major profession is fishing.
<i>majhi</i>	Boatman
<i>maund</i>	Local unit of measurement (one <i>maund</i> = 37.5 kg)
<i>mehagani</i>	A tree species with high timber value
<i>mera</i>	A tree species used as fuelwood
<i>mother fishery</i>	An area with a dense concentration of diverse high quality fishery habitats which controls fish abundance over a much larger area
<i>namasudra</i>	Hindu sub-caste with low status
<i>nara</i>	Rice straw
<i>nikari</i>	Fish retailer
<i>nolkhagra</i>	One type of wild plant used for homestead protection
<i>paharadar</i>	Guard
<i>parishad</i>	Council
<i>patam</i>	Wooden platform of boat
<i>patni</i>	Hindu sub-caste whose major profession is boat plying
<i>pon pratha</i>	Dowry system
<i>purdah</i>	Seclusion
<i>rabi</i>	Dry season
<i>rangjama</i>	Seasonal lease of agricultural land with an agreed advance in cash
<i>samity</i>	Cooperative society
<i>sampad</i>	Resource
<i>shail</i>	A variety of <i>boro</i> rice
<i>shak</i>	Leafy vegetable
<i>shidal</i>	Semi-fermented fish
<i>shutki</i>	Sun-dried fish
<i>singra</i>	A type of water chest nut (<i>Trapa maximawiczee</i>)
<i>sona bang</i>	A frog species (<i>Rana tigrina</i>)
<i>tab</i>	Bamboo poles to shelter fish
<i>thana</i>	Smallest administrative unit; below district (formerly <i>upazila</i>)

<i>ujaiya</i>	Movement of fish against water current
<i>union parishad</i>	Local government council at union level
<i>uthan</i>	Courtyard
<i>zamindar</i>	Feudal landlord
<i>zirati</i>	Immigrant cultivators

Calendar conversion

Bangla calendar	International calendar
	From middle of-To middle of

<i>Baishakh</i>	April	May
<i>Jaishthya</i>	May	June
<i>Ashar</i>	June	July
<i>Sravan</i>	July	August
<i>Bhadra</i>	August	September
<i>Ashwin</i>	September	October
<i>Kartik</i>	October	November
<i>Agrahayan</i>	November	December
<i>Poush</i>	December	January
<i>Magh</i>	January	February
<i>Falgun</i>	February	March
<i>Choitra</i>	March	April

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PREFACE

This report contains the results of the second year of operation and impact monitoring of the Fishpass Pilot Project (FPP) located at Kashimpur. Procedures and findings presented in Interim Report 1 are not repeated in the present report.

This report spans the following time period:

1 January 1996 to 5 November 1996

Studies carried out during Year 2 were generally the same as those done during Year 1. The lessons learned during Year 1 were used to refine the sampling scope and procedures.

The program registered a major improvement in sampling fish traffic in the fishpass. A new sampling gear (two rigid wire mesh cages with entrance traps) was installed during the dry season. This allowed a much better sampling of fish traffic than during Year 1. Results have generally substantiated the preliminary conclusion reached in the first Interim Report; that the fishpass was efficient as an embankment bypass route for migrating fish stocks, and that it resulted in a measurable increase in fish catches inside Kawadighi Haor.

Although some of the farming community still expressed concern about letting water into the *haor* through the fishpass during the pre monsoon season, people generally accepted uninterrupted operation of the fishpass after the *boro* rice crop had been harvested (during the main monsoon).

Many representatives from different organizations visited the fishpass during Year 2 of its operation (Appendix G). There was also continued coverage by the media (Appendix H). There is now considerable interest in constructing more fishpasses in Bangladesh, and project proformas containing fishpass components are being drafted.

This report contains a substantive data report from the various specialist disciplines involved in FPP. Evaluation of the results will allow a further refinement of selected aspects of the monitoring program during Year 3 (which is previewed as the final year of study).

The FPP study team consists of Tarique Akbar Sonet (Fisheries Biologist), Abdur Razzaque (Fisheries Biologist), Tariqul Alam (Junior Fisheries Biologist), Salahuddin Khan (Hydrologist), Mohiuddin Ahmad (Socio-economist), Abu Sarwar (Community Organiser), Jebunnesa Rana (Community Organiser), and Monirul Islam (Community Organiser). The team is headed by Nazmul Islam, Fisheries Specialist and Project Coordinator. Garry Bernacsek acts as external Fisheries Specialist Advisor, and had the main responsibility for compiling this report.

1. FPP PROGRAMMES

The Fishpass Pilot Project was originally conceived as a project whose main component was a structural intervention aimed at restoring fish production in Kawadighi Haor. Intuitive weight was also given to non-structural interventions, though these were not necessarily unique to the MRP/Kawadighi Haor location, or even to FCDI projects.

It has become increasingly clear from FPP experience during the last two years that there is a complex interaction between the technical requirements of FPP and the social responsibilities associated with operating a fishpass. Implementing an apparent solution to one particular problem often leads to other problems coming to the forefront - a process that is not always predictable.

FPP has maintained a flexibility and responsiveness to the changing situation in Kawadighi Haor. This stems from the perception that a fully refined and effective model for a fishpass project that would be applicable throughout Bangladesh must be based on an integrated activity program. It must simultaneously address fishery resource management, environmental quality, social equity, economic efficiency criteria, and must be able to effectively move the target zone into a positive normative state.

The FPP program is now highly diversified, and carefully meters the pace of its interventions with the concerns, aspirations, and capabilities of the participating fishing communities. The structural interventions have laid the groundwork for non-structural improvements. An important objective of Year 3 will be to refine and consolidate the non-structural components of FPP into a powerful and capable model for floodplain fishpass projects elsewhere in Bangladesh.

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2. PILOT DESIGN

The chronology of the main events of FPP is as follows:

May 1994 to Dec 1994	Design Phase
Jan 1995 to May 1995	Construction Phase
24 May 1995 to present	Operation Phase

The FPP is designed to restore the fish migration between the Kushiya River and Kawadighi Haor. Migration was disrupted by the flood embankments constructed under the Manu River Flood Control and Irrigation Project (MRP) (Figure 1).

The criteria used for initial selection of the site were as follows:

- The river channel opposite the fishpass should be perennial;
- Reliable and abundant populations of migratory fish should occur in the river;
- The *haor/beels* inside the FCDI project area should be perennial and contain populations of migratory fish;
- There should be no cross dams in the *khal* which fish use to access the fishpass.

The Kashimpur site best fulfilled the selection criteria. The Kashimpur fishpass site is located within the Kashimpur Pump House compound, 60 m east of the 6-vent Drainage Regulator. A short canal with no cross dams links the fishpass to Karadair Khal.

Salient data of the Kashimpur fishpass are as follows:

<u>Type:</u>	Single-jet vertical-slot
<u>Length:</u>	61.85 m (concrete section) 83.85 m (including protective works)
<u>Maximum Height:</u>	6.54 m
<u>Maximum Width:</u>	5.00 m
<u>Invert Elevation:</u>	3.16 m PWD at C/S 5.46 m PWD at R/S
<u>Deck Elevation:</u>	8.16 m PWD at C/S 11.46 m PWD at R/S
<u>No. of Pools:</u>	17 + 2 observation chambers
<u>Pool Length:</u>	2.90 m
<u>Pool Width:</u>	2.50 m
<u>No. of Baffles:</u>	16
<u>Baffle Height:</u>	4.50 m
<u>Slot Width:</u>	410 mm

The design of the fishpass limits the water velocity through baffle slots to 1.3 m/s, and inlet water velocity to about 0.5 m/s about 95% of the time. The extreme parameters are predicted

from computer simulation of the fishpass using R/S and C/S hydrographs for March, April, and May recorded over a twelve-year period (1983-1994).

<u>Maximum Average Velocity (through baffle):</u>	1.62 m/s *
<u>Maximum Velocity at Inlet:</u>	0.95 m/s
<u>Maximum Total Head (R/S wl - C/S wl):</u>	3.78 m
<u>Maximum Head per Baffle:</u>	0.24 m
<u>Maximum Total Inflow:</u>	1.96 m ³ /s

* Actual velocities observed during operation in 1995 and 1996 are higher (see Section 4.2)

3. PILOT CONSTRUCTION

Construction carried out in Year 2 was limited to building the sampling cages and their facilities, installing electricity, improving the walkway, and erecting a guard shed.

During the first year of operation of the fishpass three different sampling devices (bamboo trap, rigid metal basket, and collapsible metal basket) were used. None of the devices performed efficiently. They were only able to trap a small fraction of the fish migrating through the structure. With a view to reduce the severe sampling underestimation by the inefficient devices, two new sampling cages fitted with internal one-way funnel traps were fabricated and installed in both observation chambers of the structure.

Since there was no electricity at the structure, the lack of light made it difficult to work at night during the first year. An electricity line has been installed at the fishpass structure, and some lights have been provided.

No guard shed or rain shelter was provided at the site in the first year. There was nowhere to take shelter at night and during rainy or sunny periods. In order to improve the situation, a temporary guard shed on the R/S slope of the embankment and two rain shelters on the observation chambers have been built during the second year of the project. A concrete walkway from the embankment to the C/S end of the structure has also been constructed. This facilitates access to the C/S observation chamber during the pre-monsoon and early monsoon seasons.

The schedule of construction activities was as follows:

Activity	Start	Completion
Erection of guard shed and rain shelter	Oct 95	Nov 95
Installation of electricity line and lights	Nov 95	Dec 95
Fabrication of sampling cages	Nov 95	Mar 96
Construction of concrete walkway	Jan 96	Feb 96
Installation of sampling cages	Mar 96	Mar 96

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4. PILOT OPERATION

4.1 Chronological Summary of Events in 1996

Both river and *haor* water levels continuously declined during January and most of February 1996. The first pre-monsoon flood began on 26 February, but was of small magnitude. The second pre-monsoon flood began on 15 March, and surpassed the fishpass R/S invert level for the next six days. The fishpass gate was closed during this flood surge to install the sampling cages.

The magnitude of the third pre-monsoon flood was large. It began on 28 March and lasted until 18 April. Installation of the sampling cages was completed on 3 April, and the R/S gate was opened briefly to test the cages. The gates were again opened for a number of hours on 5 and 6 April, but protests from farmers concerned about the safety of their *boro* rice crops forced their closure. One sample taken during this pre-monsoon flood surge indicated that a large number of fish were migrating from river-to-*haor*.

The fourth pre-monsoon flood began on 23 April but was of small magnitude. On 26 April the river level surpassed the R/S invert for the third time in 1996, and remained above it until the end of the study period (5 November).

The first monsoon flood, which initiated sustained flooding in the river, began on 10 May. The *boro* crop had already been harvested by then, and on 11 May the R/S gate was opened and normal full time operation of the fishpass (and sampling) began. Sampling revealed that a heavy migration of fish from river-to-*haor* took place during the first monsoon flood.

The second monsoon flood surge began on 28 May. This flood produced only a small surge in river-to-*haor* fish traffic through the fishpass.

The third monsoon flood began on 2 July. This was the strongest flood surge of the year, and the river level peaked at 9.03 m PWD on 7 July, its highest level in 1996. Sampling showed a large migration of fish from river-to-*haor*, as well as a significant migration in the opposite direction.

The fourth and last monsoon flood began on 12 August, and was accompanied by a weak fish migration surge. *Haor* water reached its highest level (8.51 m PWD) on 21 August.

The river level began declining after the fourth monsoon flood, but there were small flood surges on 22 September, 6 October, and 30 October. Some minor increase in fish migration was recorded for the first two surges, but none for the last.

4.2 Hydraulic Regulation

Hydrological Monitoring

Hydrological monitoring was carried out at the fishpass structure, MRP, 3-vent regulator, 6-vent regulator, irrigation and drainage system, incoming *chhoras* from the upper catchment, and the Kushiya river. This included data collection of water levels, evaporation and rainfall,

water velocity and discharge measurement at the fishpass structure, drainage regulators, inlet channels, outlet channels, upstream *chhoras*, irrigation canals, drainage channels, and the Kushiya River. Dry season *beel* areas and depth of *beels* were also measured. Specific hydrological monitoring of the MRP area was done by doing detailed topographical studies.

The objective of the hydraulic study is to learn the behaviour and movement of fish in the flow system, verify the hydrological and hydraulic design of the fishpass structure, adjust the structural design, develop design principles for fishpass structures, determine the impact of sediment at the fishpass structure, determine the impact of flow from the fishpass structure within the project area, and establish operating rules for the fishpass. Other objectives include flushing irrigation water into *beel* areas, demarcating dry season *beel* area, determining the flooding extent at MRP, and developing a water balance model representing quantitative inflow/outflow for the project area.

Monitoring Year 1995: Hydrological monitoring started from the middle of July 1995. Measurements were taken at the fishpass, regulators, inlet and outlet channels, and in the Kushiya River.

Monitoring Year 1996: Additional activities performed in 1996 were pre-monsoon measurements at the fishpass, measurement of the dry season flow system, study of the irrigation and drainage system, study of the feasibility of flushing Manu River water, measuring flow from upstream *chhoras*, preparation of a precise topographic map, and studying water balance.

Data Collection

Water Levels: Project and Kushiya River water levels at Kashimpur were collected from the Kashimpur pumping station, BWDB. Data were available from 1983 to October 1996. NERP installed two water level gauges, one at R/S and another at C/S, where water levels are read at twelve hour intervals. The BWDB pumping station records data hourly. There is a small discrepancy between NERP and BWDB water levels as they fluctuate when the pump or fishpass is in operation, or the drainage regulators are open.

Rainfall: There is no rainfall station within the project area, but there are four adjacent stations. These are located at Moulvibazar (R-122), Chandbagh (R-104), Manumukh (R-119), and Langla (R-117). The NERP and Northwest Hydraulic Consultants Ltd. rainfall station at Manumukh (R-119) was abandoned in 1993. For computational purposes, the other three rainfall stations' data were considered. Data were available from 1961 to October 1996.

Velocity and Discharge: Velocity and discharge measurements at the fishpass started from 17 May 1996 and were discontinued at the end of October. This was when the water level fell to less than one meter above the invert level of the fishpass structure. Measurements were taken weekly or as necessary. A total of 30 sets of measurements were taken at the fishpass for a variety of water level and flow conditions. Other discharge measurements were:

- 3-vent and 6-vent regulators' discharge;
- Pumping station discharge;
- Kushiya River discharge;
- Discharge of incoming *chhoras* from the upper catchment;

- Irrigation inflow;
- Dry season outflow.

Pumping hours: Data regarding the number of pumps and operating hours were collected from the Kashimpur pumping station. These data represent the volume of water bailed out from the project area.

Evaporation: Srimangal daily evaporation data from January to October 1996 was collected.

Water Levels

Table 1 presents the statistical distribution and extreme probability of the Kushiya River annual water levels. Water levels vs. return period is plotted on gumbel paper and shown in Figure 2. Maximum river water level in 1996 was 9.02 m PWD. This is close to the 1:1.5 year return period water level of 9.14 m PWD. The maximum project water level in 1996 was 8.52 m PWD.

From the hydrographs of 1983 to 1996 (Figure 3 to 16), it is observed that water level generally begins rising in March and recedes in September. The pre-monsoon season is considered as April-May, the monsoon season as June-September, and the post-monsoon season as October-November. Flash floods, however, are unpredictable. They may occur anytime from March onwards. The flash floods which cause the maximum difference between polder and river water levels (about 2-3 m) are most likely to occur after mid-April.

The 1996 water level hydrograph is similar to the hydrographs of previous years. The pre-monsoon season in 1995, however, started relatively late. The number of sharp rises of water levels was less than in 1996. Project and river water levels in 1995 were both higher than in 1996 because of higher rainfall.

Annual maximum river water level varied from 8.83 to 10.38 m PWD during the period 1983-1996. The highest maximum river water level occurred in 1993, and the lowest maximum river water level occurred in 1994. Annual maximum project water level varied from 8.44 to 10.00 m PWD. The highest maximum project water level occurred in 1993, and the lowest maximum project water level occurred in 1994. Table 2 shows the yearly maximum water levels.

Over the period of record, the maximum head difference when the water was flowing across the structure from R/S to C/S was 3.78 m. When the water was flowing from C/S to R/S, this maximum difference was 1.615 m. Tables 3 and 4 show the maximum head differences for different years when the water was flowing from R/S to C/S and C/S to R/S respectively. Maximum head difference when water flows from R/S to C/S occurs in the pre-monsoon season, and maximum head difference when water flows in the other direction occurs towards the end of the monsoon season.

Rainfall

Average total rainfall during the period January-September 1995 was 2876 mm. It was 2692 mm during the same period in 1996. Rainfall totals in 1995 (from January to September) were 2150, 2509, and 3969 mm respectively at Moulvibazar, Lungla, and Chandbugh. Rainfall totals (for the same period) in 1996 were 2188, 2734, and 3155 mm respectively. Submergence

of the project area is governed by rainfall at Chandbugh. This rainfall data indicate that a substantial volume of water enters the project area from the upper catchment. The hyetograph for 1996 is shown in Figure 17. Monthly rainfall data from 1961 to 1993 are shown in Tables 5 to 8.

Pumping Hours

In 1995, project water level increased abruptly in mid-June, and pumps began operating. They stopped at the end of October. The average number of pumps operating during this period was six.

In 1996, the pumps began operating in mid-March, after the first pre-monsoon flood. They continued until the second week of September. On average, three pumps were in operation from March to May, and six pumps from June to September. The rise in water level in the project area was gradual. Pumping hours are shown in water level hydrographs (Figures 3 and 4).

Water Velocity Measurement

Thirty sets of water velocity measurements were taken. Fifteen measurements were taken when the water was flowing from R/S to C/S, and fifteen measurements when it was flowing in the opposite direction. Data was collected during various conditions of river and project water levels. The width of the vertical slot of the fishpass structure is 0.41 m. Measurements were taken at 0.2, 0.4, and 0.8 unit depths. At each depth, it was possible to measure only the maximum velocity. The average maximum velocity was calculated at each slot. In 1995 and 1996, many C/S baffles were submerged during the monsoon and early post-monsoon seasons. The C/S observation chamber was under water during the monsoon season and part of the post-monsoon season. Due to submergence of the baffles at C/S, the water level profile remained level. A schematic diagram of the flow is shown in Figure 18.

In 1995, velocities were measured at a maximum head difference of 0.90 m across the structure. Computations of velocity, discharge, and turbulence were based on extrapolated data. In 1996, velocities were measured at a maximum head difference of 3.12 m across the structure (during flow from R/S to C/S). Computations in 1996 are from observed data. Measured velocities are shown in Table 9. The measured velocities were analyzed, and computed velocities for water flow in both directions are shown in Tables 10 and 11.

Based on the empirical data, equations were derived to determine the maximum water velocity at critical slots. They are presented below, and the water velocities are shown in Figure 19. These analyses are based on 1996 data.

$$\begin{aligned} \text{Flow from R/S to C/S :} \quad V &= 1.308H^{0.60} \\ V &= 6.220h^{0.58} \text{ (m/sec)} \end{aligned}$$

$$\begin{aligned} \text{Flow from C/S to R/S :} \quad V &= 2.340H^{0.72} \text{ (m/sec)} \\ V &= 5.320h^{0.446} \text{ (m/sec)} \end{aligned}$$

Where :
 V = Velocity (m/sec)
 h = Head loss at vertical slot (m)
 H = Total head loss across structure (m)

The above equations are developed considering pool dimensions of 2.90 m x 2.50 m, 16 slots, and a gradient of 4.63%. The expressions will change with the change of any hydraulic parameter.

Effect of Water Surface Profile

The invert level of the fishpass is 5.46 m PWD at R/S, and 3.16 m PWD at C/S. The elevation difference is 2.30 m. The inclined length of the bed is 49.64 m. Slope of the bed surface profile is 4.63%. When water is flowing from R/S to C/S, the relation of the water surface profile to the bed surface profile is one of the following:

- Situation 1: water surface profile is parallel to bed surface profile ($S_w = S_b$);
- Situation 2: water surface profile is steeper than bed surface profile ($S_w > S_b$);
- Situation 3: water surface profile is milder than bed surface profile ($S_w < S_b$).

If the head difference across the structure is 2.30 m there is equal drop in head at each vertical slot, and the depth of water remains constant along the length of the structure (Situation 1). This results in equal velocities at vertical slots and equal turbulence in pools. This is the most desirable state, but it was not observed. It is usually transitional between Situations 2 and 3.

If the water surface profile is steeper than the bed surface profile (Situation 2), the depth of flow reduces downstream (D/S). This results in higher velocities at D/S slots and higher turbulence in D/S pools. In this case, the critical vertical slot is no. 16 (Figure 19a). This situation was observed during PMF2, PMF3, and MF1 events.

If the water surface profile is milder than the bed surface profile (Situation 3), the depth of flow increases D/S. This results in increased velocities at upstream (U/S) slots and increase in turbulence in U/S pools. In this case, the critical vertical slot is no. 1 (Figure 19a). In 1996, this situation was observed for a longer period.

During flow from C/S to R/S, the slope of the water surface profile is reversed. The water deepens towards C/S. This results in increased velocities at D/S slots, and increased turbulence in D/S pools. For this flow system, the critical vertical slot and critical pool is no.1 (Figure 19a).

Maximum Velocity (R/S to C/S)

Water velocity along the structure can either increase (situation 2) or decrease (situation 3) when it is flowing from R/S to C/S. Measured velocities during situation 2 for a head difference of 3.12 m were 1.976 m/sec at slot 1 and 2.357 m/sec at slot 16. Measured velocities during situation 3 for a head difference of 2.19 m were 2.08 m/sec at slot 1 and 1.767 m/sec at slot 16. The maximum head difference was 3.17 m (when water was flowing from R/S to C/S), for which computed velocity at slot 16 was 2.40 m/sec.

Maximum Velocity (C/S to R/S)

When water is flowing from C/S to R/S, water depth decreases D/S. This results in increased velocities at D/S slots. For a head difference of 1.27 m, water velocity at slot 1 was 2.672 m/s and at slot 16 was 0.664 m/s. Table 12 and Figure 20 show the variation of velocities at vertical slots. Head difference across the structure is shown in Figure 21.

Velocity Distribution

The potential operating period (POP, see page 15) of the fishpass structure was from mid-March until mid-November, except for a few days in March and April. Water levels were recorded twice daily. Water velocities at slot no.1 and slot no.16 were calculated for each set of records. The frequency of occurrence of water velocities at critical slots is shown in Table 13. The design velocity of the fishpass structure is 1.50 m/sec, but distribution shows that velocity was above 1.50 m/s about 36% of the total operating period. The proportion of time that water velocity exceeded the design velocity was the same for water flowing from R/S to C/S as for water flowing from C/S to R/S. Velocity distribution from measurements taken in 1996 is shown graphically in Figure 22.

Variation of Velocities and Discharges at Fishpass

The velocity equation in terms of head loss when water is flowing from R/S to C/S can be written as :

$$V = C_d(2gh)^{1/2} \text{ (m/sec)}$$

Where

V = Average velocity (m/sec)

h = Head loss (m)

g = Acceleration due to gravity (m/sec²)

C_d = Coefficient of discharge

$$\text{Coefficient of discharge } C_d = C_v \times C_c$$

where

C_c = Coefficient of area contraction

C_v = Coefficient of velocity

The average coefficient of discharge C_d (calculated from measured discharges) was 0.62. Since velocity is directly proportional to the square root of head difference, and head difference changes at each vertical slot, velocity varies non-linearly across the fishpass. This is shown in Figure 23.

The above equation does not apply to water flowing from C/S to R/S. For subcritical flow along the fishpass, the required equation is for flow type 4 (BWDB Design Manual) . If the flow is supercritical, the required equation is for flow type 5.

Equation for flow type 4 :

$$q = C_1 d_1 (2gh)^{1/2} \text{ (m}^2\text{/sec)}$$

q = Discharge per unit width (m²/sec)

C₁ = Coefficient of discharge

d₁ = Downstream depth of water (m)

h = Head difference (m)

g = Acceleration due to gravity (m/sec²)

The above equation is valid for froude number (F_r) ≤1, where

$$F_r = V/gD$$

V = Average velocity (m/sec)
 g = Acceleration due to gravity (m/sec²)
 D = Hydraulic depth (m)

and $D = A/P$

A = Wetted area (m²)
 P = Wetted perimeter (m)

The average calculated coefficient of discharge for flow type 4 is 0.95.

Equation for flow type 5 :

$$q = C_2 H^{3/2} \quad (\text{m}^2/\text{sec})$$

q = Discharge per unit width (m²/sec)
 C_2 = Coefficient of discharge
 H = Upstream depth of water (m)

The coefficient of discharge C_2 varies with Fr . The value of C_2 varies between 1.00 and 1.86.

The discharge computation when water is flowing from R/S to C/S is as follows :

$$Q = C_d A (2gh)^{1/2}$$

Where Q = Discharge in m³/sec
 h = Head loss at vertical slot (m)
 g = Acceleration due to gravity (m/s²)
 C_d = Coefficient of discharge

The discharge computation when water is flowing from C/S to R/S is as follows :

$$Q = qW$$

Q = Total discharge (m³/sec)
 W = Width of flow (m)

The discharges for 1996 are shown in Tables 14 and 15. The maximum discharge was 1.32 m³/s when the water was flowing from R/S to C/S, and 2.20 m³/s when it was flowing in the other direction.

Head Drop at Vertical Slots

During measurements, some of the C/S baffles were submerged. Head losses were only measured at vertical slots which were not submerged. Since the bed level of the structure declines towards C/S, the water area at vertical slots increases gradually from slot 1 to slot 16. This increase in area reduces velocities across the slots. This reduction in turn causes head losses to decrease. When water was flowing from R/S to C/S, the changes in head loss were nearly linear. When it was flowing in the other direction, the change in head loss was linear at U/S slots and sharply increased at D/S slots.

When water was flowing from C/S to R/S with a total head difference of 1.27 m, the cumulative head loss at baffles did not account for the total head loss. Some head losses were observed at the R/S inner gate and R/S outer gate.

Head losses in a flowing fluid are due to:

- friction on the sides of the structure;
- change of direction;
- change of section (enlargement and contraction), and
- obstruction in passage.

The derived equation for head loss at critical slots is expressed below (Figure 24):

Flow direction : R/S to C/S $h = 0.079H^{0.80}$

C/S to R/S $h = .006(\exp)^{3H}$

h = Head loss at slot 1 (m)

H = Total head loss across structure

Turbulence within the Fishway

Turbulence within a fishway is determined by the discharge and velocity of the water entering the fishway pool, and the pool volume that is available to dissipate the energy of the water. This is expressed in general terms by the following equation :

$$P = Qht/V$$

where

P = Power (watts/m³)

Q = Discharge (m³/s)

h = Head loss (m)

t = Weight density of water at 25°C (newtons/m³)

V = Pool volume in m³

NERP used the following maximum turbulence values for P as design guidelines :

- Salmon 200 W/m³;
- Non-salmon temperate species 150 W/m³;
- Large migrating fish (Australia) 125 W/m³;
- Small species and juveniles (Australia) 100 W/m³.

For turbulence computation from R/S to C/S, the following parameters have been considered :

- Head difference at slots;
- Water surface profile;
- Bed slope;
- Baffle submergence;
- Pool volume.

If $S_w = S_b$, the turbulence in each pool is equal. If $S_w > S_b$, the turbulence in downstream pools is higher. If $S_w < S_b$, the turbulence in upstream pools is higher. The number of active pools also affects turbulence.

Turbulence effects were computed for the year 1996. Maximum turbulence during the pre-monsoon season, when the water was flowing from R/S to C/S, was estimated at 85 W/m^3 . When the water was flowing from C/S to R/S, it was 227.3 W/m^3 . Turbulence exceeded the limit of 100 W/m^3 about 18% of the time. Computed fishpass turbulences for the year 1996 are shown in Table 16 and Figure 25.

The frequency of occurrence of various turbulences is shown below:

Turbulence w/m^3	No. of Occurrence	Cum. Percent
225-250	2	0.50
225-200	5	1.66
200-175	4	2.59
175-150	2	3.05
150-125	3	3.75
125-100	0	3.75
100-75	61	17.90
75-50	65	32.98
50-25	85	52.70
25-0	204	100.00

4.3 Monitoring Fish Movement through Fishpass

Terminology for Parameters

Improving fish sampling devices has resulted in the acquisition of a massive database. It has become apparent that comprehensive interpretation of the data would require differentiating between the various hydrological phenomenon related to fishpass operation. Accordingly, a number of nomenclature conventions were adopted:

- Dominant Water Mass (DWM): The DWM is responsible for water flow through the fishpass, and could be either the river water mass or the *haor* water mass, depending on which level was higher. DWM is river water during the pre-monsoon and early monsoon seasons, and *haor* water during the late monsoon and post-monsoon seasons. DWM alternated during the mid-monsoon.
- Potential Operation Period (POP): A POP is defined as any period of time when the DWM level was above the R/S invert level of the structure. POPs occurring during the pre-monsoon and early monsoon seasons were due to flood surges in the river. The POP was continuous during the monsoon due to high river water levels. The *haor* water mass

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derived from rainfall and *haor* catchment sustained the POP during the late monsoon and post monsoon seasons, as well as after the river level fell below the R/S invert level. *Haor* drainage during the post-monsoon led to the termination of the POP. This happened when the *haor* water level fell below the R/S invert level. During any POP, the direction of water flow inside the structure was determined by whichever of the two water masses was the DWM.

- Non-Operation Period (NOP): A NOP is defined as any period of time when the level of the DWM was less than the R/S invert level, resulting in zero water flow through the structure.
- Actual Operation Period (AOP): The AOP is defined as any part of a POP during which the gates of the structure were open (opening the gates during a NOP is irrelevant to fish migration).
- Pre-monsoon Flood (PMF): A PMF is a rapid surge in river level which does not result in sustained river flooding and bank overspill. PMFs produce characteristic sharp spikes in R/S water levels when plotted on hydrographs. The number of PMFs varies from year to year, and are numbered consecutively (PMF1, PMF2, and so on). Occasional years have no PMFs, and go directly from dry season recession to MF. A PMF is subdivided into a flood surge phase (the left side, positive slope of the flood spike) and a receding water phase (the right side, negative slope of the flood spike). The magnitude of the flood surge can vary. In general, the recession level of a particular PMF is higher than its initial flood surge level, resulting in abrupt increases of river water level over three or four PMFs.
- Monsoon Flood (MF): The difference between a MF and a PMF is a MF results in a sustained flood level in the river and bank overspill. The sustained monsoon flood level in the river (and eventually in the *haor*) is punctuated by occasional flood surges, each of which is also termed a MF. Numbering conventions applied to MFs are the same as applied to PMFs.

The last MF in a particular year is followed by a gradual recession of both R/S and C/S water levels over a period of several months. A large portion of the monsoon flood recession period is usually a NOP.

Record of Operation of Fishpass in 1996

The record of potential and actual hours of operation during the study period (1 Jan-5 Nov 1996) is summarized in Table 17.

To maximize fisheries benefits, the ideal situation would be for the AOP to equal the POP, and for the POP to include all PMFs and MFs. During Year 2, however, installation of the new sampling cages and protest from farmers interfered with the operation of the fishpass during part of the pre-monsoon period. The AOP (4398.58 hrs) was thus 82.9% of the POP (5309 hrs). Nonetheless, this was a better performance than Year 1, when closure time of the structure resulted in an AOP/POP ratio of 75.8%. The protest from farmers was significantly less in Year 2 (only one complaint) compared to Year 1 (six complaints). This signifies a growing acceptance of the fishpass coupled with a lack of evidence of any real crop damage.

The sampling results presented below indicate that PMFs and MFs are critical periods for fish migration through the fishpass. The low ratio of AOP/POP during the pre-monsoon season in 1996 probably resulted in some reduction of the impact of the fishpass on fish migration and production in the *haor*. PMF1 was missed altogether, and the AOP during PMF2 was only 2.46% (12.42 hrs) of the POP. Operation of the fishpass during the PMFs will be a major issue in the coming year.

Assuming that all construction work during the dry season in 1997 will be complete before PMF1, and that protest from farmers will decline further, the AOP/POP ratio in Year 3 is expected to reach over 90%.

Sampling Procedure and Problems

The only sampling gear used for monitoring in 1996 consisted of rectangular metal frame cages (Figure 26). Two sampling cages were used, one at R/S and another at C/S. The dimensions of a sampling cage are: width 2400 mm, length 2400 mm, and height 2000 mm. The metal frame is covered by wire mesh of size 0.75 cm. In addition, at the top of each sampling cage another metal frame rectangular basket is placed (width 2400 mm, length 2400 mm, and height 400 mm). The top of this basket is uncovered. The purpose of this additional, open cage is to trap any fish migrating above the top of the primary sampling cage (when water level is high) as the trap is raised. Each sampling cage has two openings at R/S, and two openings at C/S. Each opening is tapered from 1000 mm to 300 mm, and is bent downwards (see Figure 26). Bending the opening makes it less likely for fish to escape the cage. The materials used to construct the cages are angles of different sizes from 25 mm x 25 mm x 5 mm to 50 mm x 50 mm x 6 mm, and 25-40 mm flat bars. The total weight of each sampling cage is 860 kg.

The cage is suspended from a truss constructed of I-beams and angles. The base of the cage is three meters above the deck level of the structure. The lifting mechanism is manual, by two chain block pulleys, each capable of lifting two tons.

The sampling procedures using the cages were as same as those used in Year 1, with two exceptions:

- During the three month period when the C/S platform was inundated (13 July-13 October), special sampling in the R/S cage was used to simulate C/S sampling. This involved opening the outside funnel traps of the R/S cage and closing the inside traps. These samples are identified by the sample code number adjuncts 's' and 'ss', and are categorized as 'Direction of Migration: River to Haor'.
- During the latter part of the monsoon flood recession (from 10 October onward), water level in the R/S observation chamber fell below the level of the lower funnel trap. Special sampling in the C/S cage was used to simulate R/S sampling. This involved opening the outside funnel traps of the C/S cage and closing the inside traps. These samples are identified by the sample code number adjuncts 's' and 'ss', and are categorized as 'Direction of Migration: Haor to River'.

Summary of Sampling Schedule

A total of 240 samples were taken from the fishpass in Year 2. This is many more than the 104 samples taken during Year 1. A comparison of the sample types taken during Years 1 and 2 is presented in the following table.

Item	Year 2 (1996)	Year 1 (1995)	% Change
Total no. of samples	240	104	131%
River to Haor migration samples	127	50	154%
Haor to River migration samples	113	54	109%
AOP (hrs)	4398.58	3744	17.5%
No. of sampling hours	904.67	403.75	124%
Sampling hours as % of AOP	20.1%	10.8%	9.3 percentiles
No. of daytime samples	109	96	13.5%
No. of nighttime samples	131	8	1,536%
Ratio of daytime/nighttime samples	0.8:1	12.0:1	

There was much more comprehensive sampling in Year 2 than Year 1. The number of samples, fraction of AOP sampled, and number of nighttime samples increased substantially. The latter is especially important since there is strong evidence that fish migrate more actively at night than during the day.

Sampling Bias and Error

The sampling was also much more efficient in Year 2 due to the installation of high quality metal cages. There is greater confidence in the validity of the sampling results.

Several problems, however, persisted or emerged. The following require attention in the coming year:

- There was an improvement in the sampling of large fish. Specimens of *boal* up to 56.2 cm and *kalibaush* up to 51.0 cm were trapped in the cages. Observation of large fish inside the structure (Table 18), however, suggests that an undersampling of large specimens may still be occurring. The most likely cause of this is the shape of the funnel traps. In the coming year funnel traps with a more elongate (vertically) opening will be tested. A possible design is shown in Figure 27;
- The mortality of sampled fish can sometimes be high, especially if there is a large number of specimens. Every effort is made to reduce mortality and return specimens live to the water. This may become a more serious problem in the coming year as it is intended to study the biology of selected species in greater detail. Fishermen have expressed their concern that FPP sampling should cause as little mortality as possible to the migrating fish. They perceive this to decrease their catch and income;
- A certain number of fish escaped the cages. In one instance three live *ilish* were present in the cage when lifted. The cage was resubmerged, and then lifted a second time, only to reveal that one *ilish* had escaped (and one had died). It is possible that fish escape because of the shape of the funnel traps. This problem may be solved with the new trap design;

- During post-monsoon *haor* drainage, a large quantity of plant debris is swept through the fishpass. This rapidly clogs the mesh of the cages, and can sometimes penetrate them. Sampling duration was shortened to minimize the problem.

Estimate of Fish Traffic through Fishpass

The general results of sampling in Year 2 are in agreement with those of Year 1:

- All 240 samples contained fish. This suggests continuous traffic during the AOP;
- Fish traffic was simultaneously bi-directional;
- Fish traffic moved both concurrently and countercurrently;
- Fish traffic remained high even when the water changed direction within the structure.

The methods used to generate numerical estimates of traffic through the fishpass were the same methods used for the Year 1 Interim Report.

- Pooled Mean Method: The overall mean rates of migration for all samples (unweighted and uncorrected for direction of migration) were multiplied by the AOP hours, and doubled for bi-directional migration (Table 19).
- Direction-Dependent Method: The samples were separated into two groups on the basis of direction of migration. Mean rates of migration (unweighted) were determined for each group, and multiplied by the AOP hours. The sum of the products gave the total traffic in both directions (Table 20).
- Time Series Method: The samples were separated into two groups on the basis of direction of migration. The total traffic for each day was calculated by multiplying the migration rate by 24. In some cases, means for two or more samples were used. When data were missing, interpolation was done by carrying over the traffic value from the previous day(s). This resulted in a complete estimate of traffic through the fishpass over 178 days for both groups. The total of the sums of daily traffic for each group gave the number of fish migrating in both directions (Table 21).

Method of Estimation	Fish	<i>Icha</i>	Total
Pooled Mean	755,072	541,217	1,296,289
Direction-Dependent	727,286	516,282	1,243,568
Time Series	579,394	413,853	993,247

An estimate of the weight of traffic in either direction was generated from the mean migration rate, the median length, and the median weight of each species (Table 22). The estimate is that 10.69 tons of fish and *icha* migrated from river-to-*haor* during the AOP, and 3.03 tons migrated in the opposite direction.

Factors Affecting Fish Migration through Fishpass

Hydraulic Conditions Inside the Fishpass

Water velocities in excess of 2 m/sec were recorded at slots during the pre-monsoon floods and MF1. Countercurrent *haor*-to-river migration rates during this period were relatively low. In

contrast, countercurrent *haor*-to-river migration rates during MF3 were higher. This may be due to the lower water velocities (less than 1.4 m/sec).

Even higher water velocities were recorded during the late monsoon *haor* drainage period, when flow reversal took place inside the fishpass. Countercurrent fish migration (river-to-*haor*) may have been affected by the high velocities (Table 23).

Fish species

A total of 63 species and taxa were sampled from the fishpass during Year 2, compared to 44 during Year 1 (Tables 24 & 25). Species composition of fishpass traffic is shown in Table 26.

Water velocity had a major effect on the number of taxa migrating countercurrently. Thirty-six taxa were recorded when water velocity was less than 1.50 m/sec. At higher velocities the number of taxa decreased. At greater than 2.25 m/sec, only nine taxa were recorded. At the highest observed velocity (2.49 m/sec), only *chanda*, *gutum*, and *puti* were recorded migrating. Concurrent swimming appeared to be unaffected by the water velocity. Forty-one taxa were recorded migrating when the water velocity ranged between 2.25-2.50 m/sec (Table 27 and Figure 28). The lengths of different species of fish sampled in year 2 are provided in Table 28.

Migration Behavior

The sampling capability in Year 2 was better than in Year 1, and the sampling schedule was also more comprehensive. This allowed a more informative interpretation of fish migration behavior. The pattern of migration rates in relation to water and flood levels in the river and *haor* suggests that flood surges in the river and rainfall in the *haor* and its catchment (the Bhatara Hills) are the principal factors triggering migration.

The pattern of fish movement during the river flood surges is shown in Tables 29 to 31 and Figures 29 to 34. The river-to-*haor* migration during MF1 and MF3 had some similarities. In both cases, the migration rate increased as the flood surge progressed. It peaked at about the same time as the flood reached its maximum level. This flood level was maintained for a number of days, but the migration rate fell off rapidly in both cases. A second peak in migration rate occurred during MF3, but it did not appear to be directly flood-induced. The majority of species were small species (*chanda*, *batashi*, *tengra*, *mola*, *chapila*). Large species composed only 4.8% of the total traffic during MF1 and 3.0% during MF3. *Air* and *golda chingri* were the most abundant large species, but a small number of carp (*ruí*, *mrigel*, *kalibaush*, *gonia*), catfish (*bagair*, *boal*), snakehead (*shole*), and *ilish* were also recorded.

The pattern of *haor*-to-river migration is somewhat different. Little migration was recorded during MF1 (Figure 35). A relatively high migration rate was observed during the MF3 surge (Table 32 and Figure 36), but this fell off well before maximum flood level was reached. A second migration peak took place during the sustained flood period, but this was before the second peak observed for river-to-*haor* migration. Small species (*chanda*, *mola*, *chapila*, *puti*, *batashi*) also dominated the *haor*-to-river traffic during MF3 (Figure 37). Large species constituted about 2.1% of the traffic (Figure 38); mainly *golda chingri* and *air* (a few *ruí*, *kalibaush* and *boal* were also recorded).

Considering that the full flood control embankment of the MRP hydrologically isolates the *haor* from the river during the pre-monsoon and monsoon period, it is to be expected that differences would exist between river-to-*haor* and *haor*-to-river migration patterns. River-to-*haor* migration appears to be largely (but not exclusively) triggered by flood surges in the river. *Haor*-to-river migration might be triggered by rainfall in the *haor* and its catchment. More comprehensive analyses of the latter will be carried out in the coming year.

The database collected during Year 2 allows further development of knowledge about the migration behavior and patterns of individual species.

Carp: The numbers and size ranges of carp recorded in samples is given in the following table.

Species	River-to-Haor Migration No. (Size range, cm)	Haor-to-River Migration No. (Size range, cm)
<i>Rui</i>	42 (3.5-51.2)	9 (11.5-13.2)
<i>Mrigel</i>	14 (23.0-44.0)	0
<i>Kalibaush</i>	78 (3.8-51.0)	16 (12.5-22.3)
<i>Gonia</i>	42 (3.9-23.6)	0
<i>Lachu</i>	61 (4.5-19.2)	30 (4.1-21.9)
<i>Bata</i>	0	4 (4.3-6.2)

Most migration of *rui* was in the river-to-*haor* direction. Fingerlings migrated during the early monsoon, and juveniles and adults in the late monsoon (Figure 39). *Kalibaush* traffic was also principally from river-to-*haor*, and consisted largely of juveniles (Figure 40). *Mrigel* movement was only recorded from river-to-*haor* and consisted of juveniles. *Gonia* traffic was also exclusively from river-to-*haor* (Figure 41). Adult *gonia* were recorded in the early monsoon season, and fingerlings in the mid-monsoon season. *Lachu* traffic was in both directions (Figures 42 and 43). Most of the traffic was juveniles and adults. Fingerlings occurred in the mid-monsoon season, suggesting that spawning occurs at least twice during the flood season. *Bata* movement was rare, and only recorded from *haor*-to-river in the mid-monsoon season, both as fingerlings and adults.

Two other carp species inhabit the *haor* but were not recorded in the fishpass, either in Year 2 or in Year 1. *Carpio* is the most abundant carp in the *haor*. It has been observed spawning in the Karadair Khal fish sanctuary, but was not sampled from the fishpass. *Catla* is less common in the *haor*, and was also not sampled from the fishpass. *Catla* of over 40 cm length were caught in the *haor* during the late monsoon season.

Large catfish: Three taxa were recorded in fishpass samples.

Species	River-to-Haor Migration No. (Size range, cm)	Haor-to-River Migration No. (Size range, cm)
<i>Air</i>	903 (4.3-30.3)	64 (9.5-17.7)
<i>Bagair</i>	55 (5.0-6.3)	0
<i>Boal</i>	60 (8.7-56.2)	5 (34.3-41.5)

Air is by far the most common large catfish found in the fishpass. Most traffic is in the river-to-*haor* direction, and consists of fingerlings in the early monsoon season and juveniles in the late monsoon season (Figure 44). Some movement of fingerlings also took place from *haor*-to-

river in the mid-monsoon season. *Bagair* traffic was entirely from river-to-*haor* and consisted only of fingerlings. *Boal* traffic was in both directions (Figure 45). Traffic from river-to-*haor* consisted of fingerlings and juveniles in the early monsoon season and adults in the late monsoon season. Some juveniles moved from *haor*-to-river during the mid-monsoon season.

Rita was recorded in the fishpass in Year 1, but was absent from samples in Year 2.

Other large species: *Ilish* was not recorded in Year 1, but was found in six samples during the mid-monsoon season in Year 2. Traffic (7 specimens) was exclusively from river-to-*haor* and consisted of juveniles (19.3-22.4 cm).

A single *shole* fingerling was recorded moving from river-to-*haor* during the early monsoon (a duplication of the record from Year 1).

No *chitol* were sampled from the fishpass in Year 2.

Golda chingri: Giant prawn were relatively abundant in fishpass samples, and moved in both directions (Figures 46 and 47). Some 900 *golda chingri* were recorded moving from river-to-*haor*. There was an overall trend for body size to increase during the monsoon season (overall range of 6.0 to 19.3 cm). Examination, however, suggests that two or three different cohorts were involved. Waves of juveniles from different cohorts appear to be moving upstream of the coastal breeding grounds. Movement of prawn from river-to-*haor* stopped after the last monsoon flood.

Some 112 giant prawns were recorded moving from *haor*-to-river (Figure 48) during the mid-monsoon season. These were mainly juveniles and first maturity adults. There was a trend for body size to increase over time.

Main small species: Six species of small fish were relatively abundant in fishpass samples, and constituted the bulk of total finfish traffic.

Species	River-to-Haor Migration No. (Size range, cm)	Haor-to-River Migration No. (Size range, cm)
<i>Batashi</i>	2,948 (5.8-11.3)	354 (6.3-10.5)
<i>Chanda</i>	32,404 (2.5-7.8)	8,295 (2.1-7.9)
<i>Chapila</i>	3,214 (3.0-15.0)	998 (3.6-16.6)
<i>Mola</i>	8,571 (3.1-9.9)	1,638 (3.4-9.3)
<i>Puti</i>	2,968 (2.3-10.3)	767 (2.5-9.1)
<i>Tengra</i>	1,476 (3.9-10.3)	69 (4.5-10.7)

Batashi traffic was mainly from river-to-*haor* during the early and mid-monsoon (Figure 49). Fish were all mature adults.

Chanda moved in both directions throughout the year (Figure 50 and 51). There was no apparent trend in changes in body length. *Chanda* likely spawned several times during the flood season.

Chapila moved in both directions throughout the year (Figure 52 and 53). Most of the traffic from river-to-*haor* consisted of fingerlings and juveniles. The traffic from *haor*-to-river showed a possible trend of larger fish moving during the late monsoon season.

Mola traffic from river-to-*haor* was heavier than in the opposite direction (Figure 54). The trend was for larger adults to migrate during the early monsoon season, and smaller adults and juveniles during the mid- and late monsoon seasons (Figure 55). Migration from *haor*-to-river showed a similar trend for body size (figure 56).

Puti migrated in both directions. The trends observed during river-to-*haor* migration suggest at least two cohorts were produced during the flood season (Figures 57 and 58). Movement from *haor*-to-river consisted of juveniles and adults (Figure 59).

Tengra migration was mainly in the river-to-*haor* direction, and occurred during the pre-monsoon and early to middle monsoon seasons (Figure 60). There was a definite trend for body length to increase over time, and two cohorts may be involved. Migration from *haor*-to-river was less frequent. It took place mainly in the middle and late monsoon seasons (Figure 61).

Other small species: Some 30 other small species were recorded in the fishpass. They exhibited various patterns of migration and changes in length over time. A full discussion of each species will be presented at a later date. Only certain highlights are noted below.

- *Bacha*: migration in both directions; strong trend for increase in body length over time (Figures 62 and 63);
- *Bailla*: migration in both directions; no trend in body length (Figures 64 and 65);
- *Baim*: migration in both directions; moderate decrease in body length over time (Figures 66 and 67);
- *Bheda*: almost all migration from river-to-*haor*; moderate decrease in body length over time (Figure 68);
- *Boicha*: migration from river-to-*haor* only; moderate increase in body length over time (Figure 69);
- *Chela*: most migration from river-to-*haor*; possibility of two cohorts (Figure 70 and 71);
- *Chirka baim*: migration in both directions; moderate decrease in body length (Figure 72);
- *Darkina*: most migration from river-to-*haor*; moderate increase in body length (Figure 73);
- *Dhela*: migration in both directions; no trend in body length (Figure 74 and 75);
- *Foli*: most migration from river-to-*haor*; moderate decrease in body length (Figure 76);
- *Garua*: rare; only river-to-*haor* migration of juveniles;
- *Gulsha*: almost all migration from river-to-*haor*; decrease in body length (Figure 77 and 78);
- *Gutum*: migration in both directions; moderate increase in body length (Figure 79 to 81);
- *Jainzza*: most migration from river-to-*haor*; no trend for body length (Figure 82);

- *Kaikka*: most migration from river-to-haor; moderate increase in body length (Figure 83);
- *Kazoli*: migration in both directions; no trend in body length (Figures 84 and 85);
- *Keitchki*: most migration from river-to-haor; possibility of two cohorts (Figures 86 and 87);
- *Kholisha*: most migration from river-to-haor; no body length trend;
- *Koi*: rare; only river-to-haor migration of fingerlings;
- *Kotibacha*: only river-to-haor migration; moderate increase in body length;
- *Magur*: rare; only river-to-haor migration of juveniles and adults;
- *Matibangra*: only haor-to-river migration of adults;
- *Napit koi*: mainly river-to-haor migration; moderate decrease in body length;
- *Naptani*: almost all migration was of adults from river-to-haor;
- *Pabda*: only river-to-haor migration; possibility of two cohorts;
- *Poa*: rare; only river-to-haor migration of adult;
- *Potka*: migration in both directions; possibility of two cohorts (Figures 88 to 90);
- *Rani*: migration in both directions; possibility of two cohorts (Figures 91 to 93);
- *Shing*: migration in both directions; possible two cohorts (Figures 94 to 96);
- *Taki*: migration in both directions; no trend in body length (Figure 97).

Icha: Small crustaceans were the single most abundant animals caught in the sampling cages. They were present in almost all the samples, and migrated in both directions (Figures 98 and 99). There was no trend for *icha* to change body length.

While some species such as *air* show a conventional migration pattern, the bi-directional migration of other species inside the fishpass is a major divergence from the results of fishpasses elsewhere. It is possible that some species are passively swept into the fishpass, and then try to swim out again countercurrently after having passed through the first few pools. There is a need to better understand the actual behaviors and movements of different species once they are inside the fishpass. This is hampered by the low transparency of the water. During Year 3 some experiments will be conducted using fish marked with dyes to monitor fish movement inside the structure.

Daily Cycles

A series of six samples were taken on 20-22 June to study the daily changes in migration rate (Table 33 and Figure 100). There is a significant and large variation in migration rate over a 24 hour period. Peak rates were observed during the third quarter of the day (approximately 18:00 to 24:00 hrs), and minimum rates during daylight hours (approximately 08:00 to 18:00 hrs). Finfish and *icha* showed similar patterns.

In a separate study, 49 appropriate pairs of samples were compared to determine the difference in daytime and nighttime migration rates (Table 34). The couplets were from adjacent diurnal periods. The difference between daytime and nighttime migration rates for finfish (Figure 101) and *icha* (Figure 102) are plotted separately. Nighttime migration rate was higher for both groups, but especially for *icha*. Finfish tend to have a high proportion of couplets, with migration unaffected by the time of day.

4.4 Design Adjustment

No adjustments were made to the design of the structure during Year 2.

The fishpass design has shown itself to be fully capable of providing concurrent passage to fish migrating from river-to-*haor* during the pre-monsoon and early monsoon seasons. High velocities at the slots, however, may impede countercurrent movement from *haor*-to-river during the same period. It may be desirable to alter the design to mitigate this problem.

Conversely, concurrent *haor*-to-river migration in the late monsoon appears to be unimpeded (after flow reversal occurs inside the structure). Movement from river-to-*haor*, however, is impeded by the high slot velocities (in excess of those encountered during the pre-monsoon and early monsoon). Correcting the design may also be warranted.

It is not presently clear if the design should be altered. It may be argued that migration of fish from *haor*-to-river during the pre-monsoon and early monsoon seasons (in effect, a loss of fish from the *haor*) is undesirable, given that the objective of the project is to rehabilitate the Kawadighi Haor fishery. The recharge of river fish stocks is mainly from the other four mother fisheries in the region and the upper river basin in India and Burma. The contribution from Kawadighi Haor is negligible. The reduction of water velocity at the slots during the pre-monsoon and early monsoon seasons would therefore not be necessary. It might even be desirable to prevent fish from exiting the *haor* by placing funnel-shaped exclusion devices on the C/S gate openings of the fishpass.

Movement of fish into the *haor* during the late monsoon would certainly be desirable. The 6-vent regulator is open at this time to drain the *haor*, but water velocities are too high for many fish species to swim against the current and enter the *haor*. There is also a change in the flow state across the regulator, from subcritical to supercritical, due to the Venturi effect of the regulator opening. Water velocity instantaneously changes from 0.5 m/sec to about 2.0-2.5 m/sec - a transition which most fish are unlikely to tolerate. It is observed, however, that fish are trying to move from river-to-*haor* during this period. Consideration will be given to possible design changes to reduce water velocity inside the fishpass during the late monsoon period.

A second possible design problem concerns the complex layout of the R/S access channels. It could be made for likely for fish to locate the entrance to the fishpass. It is observed that during the pre-monsoon and monsoon seasons, numerous fish are attracted to the pumping channel by the outflowing *haor* water, though they are of course unable to enter the pipework. It is proposed to cut an access channel between the pumping channel, the 6-vent regulator, and the fishpass. This would allow fish to migrate laterally from the pumphouse to the fishpass, and then migrate into the *haor*. Discussions will be held with BWDB concerning the feasibility of establishing this channel.

5. IMPACT MONITORING

5.1 Fisheries Impacts

Fish Production and Abundance

Catch Assessment Surveys

NERP has carried out regular catch assessment surveys in Kawadighi Haor during the monsoon floodplain fishing season and *beel* fishing (dry) season since May 1992. Production data is presented in Tables 35 to 37, and is summarized below and in Figure 103.

	1992/93	1993/94	1994/95	1995/96	1996/97
Monsoon floodplain (tons) [May to November]	314	572	509	539	567
Dry season <i>beels</i> (tons) [December to April]	23	229	92	149	N/A
Haor total (tons)	337	801	601	688	N/A
Flood intensity (mcm-months) *	1,790	2,682	1,650	2,037	N/A

* Calculated as the area under the annual flood volume curves in Figure 130, from May to April.

Monsoon *haor* fish production in Year 2 was 567 tons. The flood level in the current year was moderate (and less than in Year 1), and there were no embankment breeches. This suggests that the improvement in monsoon fish production in the *haor* may be largely due to the effect of the fishpass project (structure, management measures, fish sanctuary; Figure 104). The improvement may be a cumulative effect of the two years of operation.

Catch assessment surveys were also carried in the Kushiya River to assess the fish stock and production trends. The findings of the surveys are provided in Tables 38 to 40.

A direct relationship exists between the flood intensity and the total *haor* fish production, both in the same year and in the following year (Figures 105 and 106).

NERP Sampling

The results of NERP sampling with *kona jal* and *ber jal* (fish nets) are presented in Table 41. Comparison of Year 2 standing crop estimates with previous years shows a large increase in both *haor* and riverside fish abundance (Figures 107 to 110).

Index of Abundance

The indices of abundance for individual *haor* and river species are presented in Table 42 and Figures 111 to 128.

A number of species have become more abundant in the *haor* since construction of the fishpass:

- Among the carps, *kalibaush* (and *rui* to a lesser extent) shows a clear increase in abundance in the *haor* since. *Gonia* and *lachu* also appear to have benefited;

- The large catfish, *air* and *boal*, show signs of greater year-round abundance in the *haor*. *Bagair* appears to be establishing itself;
- *Golda chingri* is now more abundant in the *haor*;
- Among the main small species, impacts of the fishpass are apparent. *Batashi*, *chanda*, *chapila*, *mola*, *puti*, and *tengra* show either greater overall or more stable month-to-month abundance;
- Some of the other small species show strong increases in abundance (particularly *bacha*, *bheda*, and *shing*);
- *Icha* also appears to have increased in abundance.

Fishpass Effects

Changes in fish production in the *haor*, coupled with improved sampling methods, should allow some assessment of the impact of the fishpass on the Kawadighi Haor fish stocks. A discussion to this effect was presented in Interim Report 1, but it is apparent from results in Year 2 that changes in fish abundance is a dynamic process. It may require several years before it stabilizes.

Moreover, this process is not fully predictable. For example, in Year 1 *chitol* and *rita* began appearing in *haor* catches, suggesting that these species might establish themselves in the *haor*. Neither *chitol* nor *rita*, however, were recorded in the fishpass in Year 2, and *rita* was not caught by fishermen during the monsoon *haor* fishing period. Low abundance in the river is the probable explanation. Conversely, no *bagair* were reported in the fishpass samples or the *haor* catches in Year 1, and in Interim Report 1 it was predicted that *bagair* would not use the fishpass. However, in Year 2 *bagair* appeared in both fishpass samples and *haor* catches. *Ilish* was also not sampled from the fishpass during Year 1, but a number of specimens were present in Year 2.

A definitive assessment will only be possible once this process equilibrates. At the present time, it would appear that a number of species which were previously in low abundance in the *haor* (or completely absent) are now increasing in abundance (or establishing themselves). The most interesting species to watch are *kalibaush*, *golda chingri*, *air*, *chapila*, *bacha*, and *bheda*.

Floating Cage Culture Demonstration

The FPP will initiate a demonstration cage culture unit in the adjacent water bodies during Year 3. This will have three main purposes:

- To demonstrate the methods for rearing carp fingerlings in cages;
- To demonstrate methods for holding and fattening fish for marketing during the lean season, when market prices are high;
- To rehabilitate poor fishermen who are currently deprived of fishing from the fish sanctuary area.

In all cases, the primary targets will be female fish farmers, fish processors, and poor fishermen's families.

5.2 Hydrology Impacts

Water Balance Model

The impact of the fishpass on the water levels of Kawadighi Haor were investigated by a *haor* water balance model (Appendix B). Parameters for this model included *haor* and river water levels, local rainfall and evaporation, regulated and pumped outflows, and irrigation inflows.

Rainfall data was obtained from four BWDB rain gauges operating in, and close to, the Manu project area. Data were available from all stations for the period 1961-1993, but the Manumukh rainfall station was abandoned after 1993. For this reason, the data was not used in the Water Balance Model. The remaining data, from Moulvibazar, Chandbagh, and Langla, are presented in Tables 5 to 7. The average daily rainfall over the MRP area is taken to be :

$$\text{Rainfall} = \frac{\text{Moulvibazar rainfall} + \text{Chandbagh rainfall} + \text{Langla rainfall}}{3}$$

Evaporation does not generally vary to the same extent as rainfall. It is assumed to be represented for the project area by pan evaporation data for Srimangal. Average values (mm/day) measured at Srimangal are shown below :

Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
3.71	5.15	4.64	4.57	4.09	3.80	4.00	3.00	2.69

A detailed analysis of inflow and outflow into the project area for the year 1996 is presented in Appendix B. This analysis was done using the Water Balance Model. The impact of the fishpass is also summarized in detail.

Rainfall Analysis

The average annual maximum and minimum total rainfalls recorded during the period 1961-1993 were 4017 mm and 2190 mm respectively. Daily maximum rainfall during the monsoon is about 200 mm. The monthly and annual mean rainfalls from 1961 to 1993 for the four stations are shown in Table 8. Analysis indicates that a gradual increase in annual rainfall has taken place over the last three decades.

Inundation Impact

The MRP is bounded by the Kushiya River to the north, the Manu River to the south and east, and the Bhatara hills to the east. About 11 channels and many culverts carry runoff from the Bhatara hills catchment into MRP. The upper catchment slope is very steep compared to the flat floodplain and *haor* slopes. Any flood or rainfall in the upper catchment usually results in immediate inundation of the *haor*. The MRP water level is therefore not only governed by rainfall within the project area and river levels, but is also highly influenced by the hydrological conditions in the upper catchment. The project area consists of 24,300 ha. The maximum water level in 1996 was 8.52 m PWD. The elevation-area-storage curve (Figure 129) indicates that maximum inundated area of the project (1996) was 15,418 ha.

Annual flood volume curves for 1995 and 1996 are shown in Figure 130. During the pre-monsoon and monsoon seasons, sources of inflow are direct rainfall, upper catchment runoff, and the fishpass. Outflow can occur through the 6-vent regulator, 3-vent regulator, pumping station, and fishpass. The design capacity of the pumping station, which has eight pumps, is 34 m³/s. The maximum water loss through evaporation is 7.62 mm/day. Percolation loss is about 2.00 mm/day. During the pre-monsoon and the first half of the monsoon seasons, the fishpass acts as an inlet structure. During the latter part of the monsoon, it acts as a drainage structure.

The effect of inflow through the fishpass on the MRP water budget was estimated for the year 1996 using measured discharges from the fishpass and the MRP elevation-storage-area curve. The average flow across the fishpass during the pre-monsoon and monsoon seasons is 0.514 m³/s and 0.803 m³/s respectively. The incremental area affected by inflow through the fishpass in 1996 is shown in Table 43. No losses such as evaporation, percolation, and pump outflow are considered for affected area computation. The comparative inflow and outflow system is presented in Appendix B. This illustrates the actual area affected due to inflow from the fishpass. The monthly average incremental area affected for the year 1996 is summarized below.

Month	Average fishpass inflow (m ³ /s)	Average Area Affected (ha/day)
Mar 96	0.257	1.448
Apr 96	0.370	2.650
May 96	0.658	2.620
Jun 96	0.867	3.144
Jul 96	0.973	3.028
Aug 96	0.569	1.596
Sep 96	0.437	1.106

These figures have not actually been demonstrated in the field. The average inflow through the fishpass during the monsoon season is equivalent to 19% of the capacity of a single pump (4.25 m³/s). If all eight pumps are operating, the fishpass inflow is only 2.36% of the pumped outflow. It is therefore difficult to formulate a case for the fishpass presenting any threat to crops.

Under conditions of pump failure or stoppage, the situation would change. A continuous stream of water would enter from the river into the *haor* through the fishpass.

Flooding Extent

The fishpass started operating on 11 May 1996, and continued until mid-November. At that time, the water level inside the project area was 4.62 m PWD. The local committee recommended to open the fishpass from 15 May. The highest water level inside the project area in 1996 was 8.52 m PWD, which is 0.48 m less than in 1995. This is a difference in volume of 8065 ha-m. The average project area submerged and depth of flooding at different

project water levels are shown below. Data are representative of the period from the beginning of the pre-monsoon season to the end of the post-monsoon season. Pre-monsoon and monsoon season flood depth intensity maps are shown in Figures 131 and 132.

Project Water Level (m PWD)	Area Submerged (ha)	Project Volume (ha-m)	Maximum Flooding Depth (m)
5.00	3667	4016	4.00
5.50	4745	6120	4.50
6.00	5645	8715	5.00
6.50	6716	11808	5.50
7.00	8279	15524	6.00
7.50	10377	20169	6.50
8.00	12807	25941	7.00
8.50	15301	32954	7.50
9.00	18266	41340	8.00

5.3 Environmental Quality

Water Hyacinth Infestation and Water quality

Several tests were done (in different months) to assess the water quality in the project area. The results are provided in Table 44. It was observed that dissolved oxygen level in the *haor* was generally lower than in the river during the dry season. A major problem during the middle and end of the monsoon season was the infestation of the fish sanctuary (Koradair Khal) with water hyacinth, a noxious macrophyte introduced to Bangladesh from South America. The coverage was close to 100%. It is unlikely that the environmental conditions in the *khal* during the infestation would have been conducive to fish migration. Fish would have had to swim for a distance of 4 km in water with inadequate oxygen content. Movement of fish inside the *khal* was not monitored, so the real impact of the infestation was not documented. The use of the *khal* by certain species (such as *carpio*) as spawning grounds would have been negatively affected.

Impact of Crop Production on Fisheries

Chemical fertilizers are being used to cultivate HYV rice in higher lands of the MRP area and for tea production in the hilly areas adjacent to the MRP area. Fertilizers are not usually applied to the crops which are cultivated in lowlands. The use of pesticides in crop production is not widespread in the project area. They are only used in tea production in hilly areas, where weedicides are also used.

Heavy rainfall or irrigation following the application of fertilizers, weedicides, and pesticides may cause accumulation of chemical materials from higher fields and upstream hills in the adjoining depression soils and water of the project area. This requires an assessment of changes in the soil properties and water quality. Moreover, greater attention may need to be

paid to more efficient use of fertilizers and pesticides in the project area as well as in adjoining hilly areas.

Hizal Plantation

It was intended to plant several thousand *hizal* trees along the bank of the fish sanctuary during Year 2. The purpose was to improve stream-side environmental conditions, and provide a source of branches for *katha* and fuelwood for smoking fish. Ownership/custodianship of the trees would be given to fish processors belonging to the KHFA (in this case, mostly women). Unfortunately, logistic and financial problems prevented this program from being implemented. It is intended to give a high priority to the *hizal* plantation program during Year 3. If Patasingra Beel is transferred to the KHFA, the *hizal* plantation programmed will likely be extended to circumvent the *beel* and the remaining part of the access channel.

5.4 Agricultural Impacts

Rice Crops

The crops grown during in the MRP area during the AOP of the fishpass were deepwater rice (broadcast *aman*) and *aus*. The transplantation of *aman* crops started in late August. Local *boro* was reported to be completely harvested about ten days before the opening of the structure. The HYV *boro* crops were at a mature stage, and on relatively higher land.

The plantation of broadcast *aman* rice started in lower parts of the medium lowlands in late April. It continued in the relatively higher parts until late May. The crop grown in the lowlands was at the vegetative growth stage when the fishpass structure opened. No farmer complained that the additional flow through fishpass structure had inundated or damaged broadcast *aman* crops. This suggests that the plants had sufficient time to elongate with the gradual rise of flood water.

In the northeast area of the *haor*, transplanted *aman* could not be cultivated because the seed beds were covered by water hyacinth.

This year, the impact of pre-monsoon runoff from the Bhatara Hills on crops was negligible. The volume of pre-monsoon and monsoon floods was not large. Seasonal rainfall was low. It appeared that additional inflow of water into the *haor* through the fishpass structure did not create any problem for cropping. More studies of the hydrological impact on cropping due to fishpass operation, particularly during more severe flooding years, are required.

Study of the 3-Vent Regulator

The Context

A fish conservation strategy is imperative for successful rehabilitation of Kawadighi Haor. It is argued that some water should remain in the *beels* in order to facilitate fish conservation. Lease-holders are very enthusiastic to completely drain the *beels* and catch all the fish. It has also been observed that as the water level starts falling, farmers plant *boro* crops in low-lying areas. Some of these areas are treated as *jalmohals*, and are not supposed to be cropped. Some lease-holders, however, exploit *jalmohal* land by sharecropping it with poor tenant farmers. The 3-vent regulator facilitates this process. It quickens post-monsoon drainage, drains water from the bottom of the *beels*, and helps farmers expand their crop area.

Whether it is at all necessary to allow the usage of the 3-vent regulator is a critical question. The pertinent issues that need to be addressed are how big a catchment does it affect, how much crop benefits are available as a result of its operation, and who are the beneficiaries.

Cropping in Beels

Kawadighi Haor contains many *beels*. Most of these are used as *jalmohals*, and are auctioned to private parties for fishing. Farmers grow *boro* crops along the shallow edges of the *beels*, and fishermen catch fish in the dry season. In the monsoon season, the entire area submerges.

As the water starts receding in the post-monsoon season, fishing activities begin, and farmers start preparing land for *boro* crops. As fishing continues, water recedes and plantation of *boro* seedlings advances into deeper areas of the *beel*.

Actual fishing area in the *beels* has been dwindling every year. This has happened because of siltation on one hand and increasing demand for crop land on the other. Now, farmers grow different varieties of traditional *boro* crops on the edge of the *jalmohals*. This land had previously been used solely as fishing grounds.

According to an estimate based on a reconnaissance survey of 16 *beels* in Kawadighi Haor (April-May 1996), 1,590 ha of land is at a relatively lower elevation (Table 45). Cropped area in these *beels* is subject to late drainage in the post-monsoon season and early inundation in the pre-monsoon season. The 3-vent regulator installed near the Kashimpur Pump House quickens drainage of water from these areas, and makes *boro* cultivation possible. If there is heavy rain or onrush of water from the Bhatara Hills through the *chhoras*, *boro* crops in the *beels* submerge and are ruined.

Crops and Yield

Farmers grow traditional varieties of *boro* rice in the *beels*. Among the varieties grown, *koiyaboro* is the most widely planted. In 1996, farmers grew *koiyaboro* in 14 out of 16 *beels*. Among other dominant varieties are *poshushail* (cultivated in 9 *beels*), *garshishail* (cultivated in 5 *beels*), and *ratashail* (cultivated in 4 *beels*).

Although *koiyaboro* is the dominant variety, its yield of 1.42 tonnes/ha is relatively low. The weighted average of yield for all traditional varieties is 1.90 tonnes per hectare (Table 46).

Farmers reported that higher yields were achieved on certain occasions. The highest yield has been 3.47 tonnes. This was when rainfall, drainage, and other natural factors all favoured cropping.

Land Ownership in Beels

It is difficult to ascertain how much land is actually owned and how much is *khas*. *Jalmohals* are *khas*, and are leased out by the government exclusively for fishing.

It was endeavored to identify the persons who own or control land in the *beels* of Kawadighi Haor. Data on persons controlling more than three hectares of land were collected. In 16 *beels* of the *haor*, 77 large land-owners were identified. Together they own or control 665 ha of

land. This amounts to 42% of the total area of those 16 *beels* under *boro* cultivation. Among them, area under individual control ranges from 3 ha to 53 ha. The average is 8.6 ha.

Most of these landlords engage tenant farmers under various conditions. There were 515 tenant farmers (in 16 *beels*) in the 1995-96 *boro* season. Each landlord has an average of eight tenants. As much as 93% of the crop area in the *beels* is cultivated by tenant farmers.

In five *beels*, about 58 ha of *khas* land was cultivated by 185 small farmers. *Khas* land area accounts for about 10% of the total crop area in those five *beels*. The average farm size of *khas* land farmers is 0.31 ha.

The top ten landlords (possessing land in the *beels*) control 222 ha of land in six *beels*. Together they control 31% of the crop area in those six *beels*. One landlord from Gargaon village controls 67% of the crop area in Ulauly Beel. Another landlord from Dhulijuri village controls 33% of the crop land in Kursha Beel. In Majherbondh Beel, 27% of the crop area is controlled by one landlord from Rokta village, and another 21% in the same *beel* is controlled by another landlord from Gargaon village (Table 47).

Case Studies

Akbar Mia is a farmer of Mohammadpur village. He also owns a grocery shop. He has a brother, and together they own 66 *kares* of agriculture land (about 8 ha).¹ In the local context, he is a large farmer. Out of his total holding, 12 *kares* are located in Rukkua Beel and 18 *kares* in Shalkatua Beel. He has rented out 6 *kares* of land in Rukkua Beel.

Akbar Mia feels that:

- Nearly half of the *haor* remained under water before the construction of the 3-vent regulator. Now the land has become more productive;
- Before the construction of the regulator, he could not cultivate *beel* land by himself. On certain occasions, he used to rent out the land to share-croppers. Most of the time, the land remained fallow. Now the land is cultivable, and he gets a good harvest;
- The main problem of the 3-vent regulator is its structural flaw. There is leakage which inundates crops, particularly in the months of *Falgun-Choitra* (mid-February to Mid-April), if the water in the river rises beyond a certain level.

Razzak is a share-cropper of Kashimpur village. He owns a small homestead, but no cultivable land. He has rented 12 *kares* (about 1.5 ha) of land in Ruzzak Beel this year for subsistence. Razzak feels that the 3-vent regulator is not helpful for crop cultivation. During *Choitra* or *Baishakh* (April-May), crops are ripening. If there is a sudden rise in the Kushiya River water level due to the onrush of water from the hills, crops are threatened by the water leaking through the 3-vent regulator.

¹ *Kare* is local unit of land measurement. One *kare* is equal to about 0.12 hectare.

5.5 Socio-economic Impacts

Social Catchment

Project Boundary

The area affected by the fishpass falls within the MRP, but the people affected are not limited to those living within its geographical boundary. The social catchment includes various interest groups such as lease-holders, fishermen, farmers, fish-traders, and fish-consumers.

Lease-holders are at the top rung of the ladder. There are about seven lease-holders, all from the MRP area, who control all the *beels* in Kawadighi Haor. Fishermen are from different villages of the MRP area. Fishing households are concentrated in the villages around Kawadighi Haor. Farmers, however, are the largest occupational group. There are farmers in every village. Most of the fishermen are also farmers. For them, agriculture is either the principal or secondary source of livelihood. Fish-traders come from different villages in the MRP area. Some fish-traders also come from outside the MRP area, from areas such as Balaganj, Fenchuganj, Sherpur, and Moulvibazar. The catchment area of fish-consumers is very wide. It includes MRP villages, as well as the urban population of Moulvibazar and Srimangal.

For social impact assessment, the MRP area to the west of Rajnagar-Fenchuganj road and Manumukh Sumarai village on the left bank of the Manu River are assumed as the project-impacted zone (Figure 133). The lease-holders, fishermen, and the bulk of the fish-traders are from this area, as are the majority of farmers who cultivate the land of Kawadighi Haor. This may be defined as the social catchment of the FPP.

Area and Population

The project is located in Moulvibazar district. There are 277 villages in the social catchment of the FPP. According to the 1991 population census (Table 48)², they have an area of 26,311 ha and a population of 158,735. The project area accounts for 1.09% of the NERP area and 0.93% of the NERP population.³ Of the total area of the project, 76% is in Rajnagar *thana* and 24% is in Moulvibazar *thana*. Seventy-three percent of the project population is from Rajnagar *thana*, while the rest are from Moulvibazar *thana*.

Population Growth

The population has increased more than six times since the beginning of the century (Figure 134). The population has also almost doubled during the last three decades (1961-1991). The long-term growth rate of population in the project area has been higher than that of the country. During the 90-year period 1901-1991, population in the project area increased at an average annual rate of 2.07%. In Bangladesh, it was only 1.51%. This means that the area may have been experiencing net in-migration for quite a long time. The annual growth rate during the eighties has, however, been low; only 1.10% per year. The growth rate in Bangladesh for the corresponding period was 2.17% (Table 49). These two scenarios (high

² Population statistics are pro-rated from union statistics on the basis of area.

³ NERP population and area have been quoted from the NERP specialist study entitled Population Characteristics and State of Human Development, 1994.

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growth and low growth) may be correlated with the natural resource base of the area. Once it attracted settlers from outside. In the eighties, the era of relative prosperity has perhaps ended, and living conditions have begun deteriorating.

The medium-term growth rate of the population during the intercensus period 1974-1991 was 1.75% per year. Based on projections, the 1995 population is estimated at 169,930.⁴

Demographic Features

According to the 1991 population census, there are 603 persons per km². This is larger than the national density, which is 755 per km². The actual human settlements (the villages), however, are thickly populated. Kawadighi Haor accounts for much of the area where there is practically no settlement.

There is an average of 6.2 persons per household. This is more than the average size of households in Bangladesh (5.6). The sex ratio is 104.⁵ This figure is very close to that of rural Bangladesh, which is 103.

Social Composition

Data Source and Methodology

NERP has attempted to describe the social composition of the project population through a reconnaissance survey of 26 selected villages. The survey was undertaken in November-December 1995. The chosen villages were those with a sizable fisher population, and located around Kawadighi Haor. The villages were identified on the basis of field work over a period of one year. A team of NERP Community Organizers (COs) collected necessary information and tried to gain some sociological insight based on observation, informal interviews, and group discussions. A check list was used to obtain relevant data. Information on the social characteristics of the villages, particularly the ethnic and occupational composition, was collected.

The reconnaissance survey determined that there were 4,112 households in the 26 villages. According to 1995 projected figures, this amounts to 15% of the total households in the project area. The data have been presented in Table 50.

Social Infrastructure

Social infrastructure is described in terms of facilities for education, drinking water, sanitation, and sources of energy.

Education: There are primary schools in most of the villages. According to the 1991 census, the literacy rate in Rajnagar *thana* (7 years and above) was 32% and 23% for male and female

⁴ Estimate of the 1995 population is based on the World Bank projection of growth rate for the country at a future point (year 2025), and assumption of a linear decline in growth rate between 1991 and the future point.

⁵ Sex ratio is defined as the ratio of males to 100 females. A sex ratio higher than 100 is typically perceived to indicate the social plight of women.

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population respectively. The school attendance rate (5-24 years) has increased annually by 5.6% for male and 8.6% for female children during the period 1981-1991.

Water: According to the 1991 census, only 19% of the households in the villages covered by the reconnaissance survey use tubewell water for drinking (Table 51). The majority of households (55%) use pond water for drinking. Access to tubewell water for drinking is very low in the region, only 29% in Rajnagar *thana* and 37% in Moulvibazar district. It is accessible to 76% of the population in Bangladesh.⁶

Sanitation: The state of sanitation is miserable. Only 8% of the households in the villages covered by the reconnaissance survey had sanitary latrines of acceptable standard. In Moulvibazar district, it was comparatively better, at 13%. This is the same as in the rest of Bangladesh. On the other hand, more than one-fifth of the households did not even possess a latrine (Table 52).

Energy: People generally use kerosene lamps to light their houses. Fuel made of cow-dung, paddy straw, husk of paddy, and wild plants is used mainly for cooking. Firewood is used by richer households. Only 4% of the dwellings have electricity. This proportion is 11% in the district and 15% in the country.⁷

Landlessness

The extent of landlessness is quite high. According to the 1991 census, 43% of the households in the villages covered by the reconnaissance survey did not own any cultivable land. The corresponding figure for rural Bangladesh is 41%. In the backdrop of the relative scarcity of land, fish is a critical resource in the region.

Ethnicity

Results of the reconnaissance survey show that 81% of the households are muslims and 19% are hindus (Table 53). The society is fragmented among different *jaats* or castes. The common denominator among members of a *jaat* is a certain occupation, a set of social norms, and cultural practices. Inter-caste social mobility is quite restricted.

The muslim community is primarily composed of three *jaats*. *Maimol* is the largest *jaat* in terms of population, followed by *bangal* and *abadi*. Fishing is the predominant occupation of the *maimol* people. The *bangals* are local farmers, while the *abadi* people are farmers who have migrated into the region and settled. They are mainly immigrants from the greater Mymensingh district. The *hindu* community is fragmented into several *jaats*. Amongst them, *das* is the largest *jaat*, followed by *namasudra*. *Namasudra* is the major fisher caste among the *hindus*. The main occupation of the *das* community is farming (Figure 135).

Occupation

Many households have more than one source of livelihood. Half of the households have different sizes of farms, two-fifths of the households are involved in fishing, and a quarter of them are engaged in fish trade (Table 54). As many as 60% of the households may be

⁶ BBS: Bangladesh Population census 1991.

⁷ BBS: Bangladesh Population Census 1991.

considered fish-dependent. While 28% depend solely on fishing or fish trading, another 32% depend on both agriculture and fishing (Figure 136). In rural Bangladesh, fishing is the main source of livelihood for less than 2% of the households.⁸

Monsoon fishing in the *haor* is common among the residents of the villages around Kawadighi Haor. Fish-traders are called *nikari* or *sowari*. Their enterprises are generally modest. The proportion of households engaged as farm labourers is lower than in other regions; there is a large in-migration of farm labourers during the peak agricultural seasons.

Fishing Communities

Data Source and Methodology

A series of surveys collected data on fishing communities. The first round of survey was undertaken in February-March 1996. It covered fishermen who were fishing in Patasingra Beel. It was found that these fishermen also fished in Majherbondh Beel and Shalkatua Beel. The same lessee had the fishing right over these three *beels*.

It was endeavored to cover all the fishermen present in Patasingra Beel in February-March 1996. In total, 67 “full-time fishermen” were interviewed. Some of them were interviewed at the *beel* site, and the others at their respective houses.

A second round of survey was undertaken in September-October 1996. Among the respondents were the 67 *beel* fishermen who were surveyed earlier, and another 135 “seasonal fishermen” who only fish in the *haor* during the monsoon season. A pre-designed questionnaire was used to obtain the necessary data. Principal areas of concern were household members, household economic base, involvement in *beel* fishing and *haor* fishing, catch consumption, and sale of fish.

Table 55 shows the number of fishermen from the respective villages. Two more rounds of survey will be undertaken, in February-March and September-October 1997.

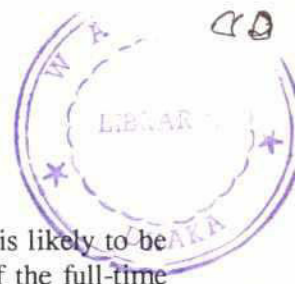
Livelihood Sources

In the project area, particularly in the villages around Kawadighi Haor, almost everybody is an active fisherman or fisherwoman. Some of them fish year-round, and others only in the monsoon season. Although farming is an important source of livelihood, fishing is the principal or second source of income for most of the households.

There is an average of two economically active male members per household. The rate of employment is 88% for full-time fisher households, and 83% for seasonal fisher households. The female population belonging to the civilian labor force (CLF) is overwhelmingly involved in home-based activities.⁹ Among the male population of the CLF, besides fishing and farming, a sizable proportion is engaged in trading and wage labor. The main occupation of the economically active members of the surveyed households has been presented in Table 56.

⁸ BBS: Bangladesh Population Census 1991

⁹ CLF is defined as the population belonging to the age-group of 10 years and above.



Land Ownership

Because the fisher households are relatively poorer, their land-ownership pattern is likely to be different from that of the region. Findings of the survey show that three-fifths of the full-time fishermen do not own any cultivable land (Figure 137). Small farmers owning up to one hectare of cultivable land account for 36% of the surveyed households. The corresponding proportion of medium farmers (owning more than one hectare but not exceeding three hectares of cultivable land) is 3%. Only 1% of them are large farmers owning more than three hectares of cultivable land. Among the seasonal fisher households, the extent of landlessness is 44% (Table 57).

Fishing Gear

All fishermen possess different types of fishing gear, either individually or jointly. Among full-time fishermen 73% own different types of gear individually, and 27% have joint ownership only. Among the seasonal fishermen 72% own gear individually, and the other 28% jointly. A *bori* (hook) is the most widely possessed gear. Among the full-time fishermen, 39% own boat individually. Fifty-one percent of seasonal fishermen own a boat individually (Tables 58 and 59).

Fisheries Organizations

Conventional fishery organizations are known as *Matsyajibi Samabaya Samity* (Fishermen's Cooperative Society). In most cases, these exist only on paper. These are usually formed by influential and rich people who are not necessarily fishermen. In many cases they use the name of fishermen in the cooperative without their knowledge, and lease the *jalmohal* in the name of the cooperative they "own". In Kawadighi Haor, all lease-holders are leaders of such cooperatives. Findings show that only one-fifth of the full-time fishermen (who are involved in *beel* fishing) are members of such cooperatives. They are in coalition with lease-holders in some form or other.

It has been found that female members in one-fourth of the full-time fisher households are members of groups sponsored by different NGOs. They mostly belong to BRAC and Grameen Bank (GB) groups (Table 60).

Knowledge of the Fishpass

After the fishpass began operating in May 95, many people in the area came to know about its existence. According to the survey, the majority of the fishermen are informed about the fishpass. The highest proportion received the information from other fishermen (Table 61).

Women's Perspective

Women's Role: A "fisherman" is the nucleus of fishing activity. That does not necessarily exclude the role of the "fisherwoman", although they are not as prevalent as the "farmwoman". Both fishermen and women make and mend nets and traps. Women are also involved in making *shutki* (a traditional method of fish processing for future consumption).

Women's Groups: Some government and non-government agencies have been operating in this region, targeting women through socio-economic development programs. They are covering the villages on the eastern side of Kawadighi Haor. Activities are implemented through village-based groups. Coverage of these organizations has been summarized in Table 62.

Fishing Activity

Dry Season

Out of 67 full-time fishermen interviewed during the period February-March 1996, 51 were involved in *beel* fishing in Kawadighi Haor during the last dry season (1994-1995). *Beel* fishing usually starts in November and ends in February. Although the average period of employment per fisher was two months, the majority of the fishermen (63%) were engaged for 31 to 60 days. The average seasonal wage earned by a fisher was Tk 3,807, or Tk 61 per day (Table 63).

The fishermen are engaged by the lessee on the basis of catch sharing. Fishermen owning the necessary gear are contracted by the lessee well ahead of the fishing season. In the beginning of the season, the catch is high. The proportion of the catch accruing to the fisher is kept low. As time passes, fish becomes more and more scarce and consequently the fishermen's relative share of the catch increases. With the passage of time wages fall, and the number of fishermen operating in a *beel* decreases.

Fishermen tend to maximize their period of employment by shifting to *beels* where work is still available due to late drainage. Findings show that the majority of fishermen worked in two *beels* in the same season (Table 64).

Monsoon Season

When the people catch fish in the *haor* during the monsoon season, they also shift from one location to another. Data taken during the 1995 monsoon season show that about three-fourths of the fishermen changed location at least three times (Table 65).

Fishing is a regular activity for most people throughout the monsoon season. The average period of *haor* fishing in 1995 was 115 days for full-time fishermen, and 122 days for seasonal fishermen.

Monsoon Catch

Fishing during the monsoon season is a common method of subsistence. The volume of the catch largely depends on the gear used. Some gears are used by a team of fishermen, and the catch is shared by the members of the team. The boat-owner gets an extra share for rent of the boat.

Survey data show that the catches in 1996 were larger than those in 1995 (Tables 66 and 67). Catch data of all fishermen (full-time and seasonal) participating in monsoon *haor* fishing have been analyzed, and weighted averages have been estimated.

Fish Consumption

Two sets of consumption data have been recorded; dry season consumption and monsoon season consumption. The average daily consumption of fish during the 1995 monsoon season was 71 grams per person. In 1996, it was 75 grams per person (Tables 66 and 67). Fish consumption is higher among the medium-farm households.

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These figures reflect the consumption of fish from catches only, and may not necessarily reflect actual consumption. People also buy fish from the market. A reference period of one week has been used to estimate fish consumption. The findings show that the consumption is much higher in the monsoon season than in the dry season. The high consumption figures among large land-owning households suggest that they buy fish from the market more than others (Table 68). The pertinent issue is that poorer households are more dependent on catches for their day to day consumption than richer households. Hence, any factor that controls fish catch is likely to affect the consumption pattern of the poor.

Weekly consumption figures show that *puti* is the most commonly consumed fish, irrespective of the season. This is followed by *taki*, *mola*, and *icha*. There is, however, seasonal variation with respect to the consumption of certain species. For example, *rui* is consumed more in the dry season, while *ilish* is consumed more in the monsoon season (Table 69).

Income from Fishing

Analysis of the average daily income of fishermen shows significant increase in one year (Table 70). Fishermen's wages have increased in both the dry season, when income is dictated by the lessee, and in the monsoon season, when they operate independently. This has occurred due to many factors, including an increase in the catch, increased availability of high value species, and higher market value of fish. Income/wage statistics do not include the value of fish consumed. It has been found that fishermen engaged in *beel* fishing are entitled to about 12% of the catch for consumption before they divide it with the lessee.

Trends in Fish Catch and Consumption

It may be premature to comment on trends pertaining to catch and consumption of fish as a result of the fishpass. It has been observed, however, that certain species of fish are now available which had disappeared after the construction of the MRP dykes. There are several indications that the availability of fish inside the *haor* has increased after opening the fishpass.

Findings of the fishermen's survey show an increasing trend in fish consumption and fishermen's income in one year. Increased availability of fish has a direct bearing on fish consumption.

It appears that the increased catches have benefited all strata of fishermen.

Fish Marketing

An increase in fish marketing has been observed in Year 2. There is an informal monsoon season floating market behind the Kashimpur pumphouse (on the bank of the *khal*, under the open sky). Mostly lower value species are sold; high value species, *golda chingri* especially, are taken to the Sherpur market or Moulvibazar, where a better price will be realized. There has been a noticeable increase in the quantity of prawns originating from the *haor* being sold at Sherpur. Part of this production may reach the Dhaka market, and a small fraction may even be exported.

The growing importance of commercialized *haor* production will be studied in greater detail in the coming year, in order to assess the economic benefits of the fishpass. It will also facilitate the design of project interventions in the post-production sector.

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Consideration should be given to the construction of a small fish wholesale market hall at Kashimpur. It should be under the ownership and management of the KHFA. It is proposed to use the market as a strategic vehicle for drawing some of the female fish processors into fish marketing.

FPP Operation Period

During the first pre-monsoon flood on 3 March, when the water crossed the fishpass R/S invert level, the gate was opened for the first time in Year 2. At that time, farmers asked for the fishpass to be closed. They were apprehensive that the water would be an additional threat to the ripened crops. The crops in low-lying areas were already highly exposed to inundation due to rainfall and water discharged by hilly streams. Immediately after the protest, the fishpass was closed. The water levels subsequently dropped below the R/S invert level. To adopt a strategy for operation of the fishpass and proper management of the sanctuary, and also to address the protests which may occur in the future, a meeting was organized on 24 April. Representatives of local people, farmers, and fishermen, as well as officials from BWDB and DOF participated. In the meeting, the objectives and impacts of the fishpass, the process of inflow of water through fishpass, and areas affected in the previous year were reviewed. When it was realized that the fishpass would not have a significant impact on the water level in the *haor*, a consensus was reached to form a committee to handle the matters required for smooth operation of the fishpass. Immediately after formation of the committee, some decisions were taken to operate the fishpass without interruption. Several meetings were held subsequently to follow up on the decisions of the first meeting. The minutes of the meetings are enclosed in Appendix F. The committee cooperated fully with the FPP team, and the team did not face any objection or protest to the operation of the fishpass.

In the coming year, discussions will be held with the farming community to seek agreement to allow the opening of the fishpass for limited periods during the PMF and MF surge periods - both to allow fish to enter the *haor* and to sample the migrations.

5.6 Economic Evaluation

Cost-Benefit Analysis

Kawadighi Haor was virtually decimated as a result of the full flood embankment which effectively restricted the dynamic recruitment process of the fishery. The natural resource depletion has resulted in a major economic loss to fishing communities in the area. The FPP, which should have originally been a part of the MRP project, offers the possibility to partly recover Kawadighi Haor mother fishery losses by allowing the recruitment process to become re-established.

Rate of Discount & Period of Analysis

The FPCO Guidelines for Project Assessment (May 1992) indicate that the economic analysis should use a discount rate of 12% to determine the net present value (NPV) of the benefit-cost stream. A project with a positive NPV using a 12% discount rate can be considered as a viable project.

The FPCO Guidelines indicate that planners should use a 30-year project cycle for the discounting period. Unlike the FPCO Guidelines, the NERP economists have stipulated Year 1

as the implementation year rather than Year 0. Gittinger (1982:95) suggests that the process used in discounted cash flow analysis implicitly assumes that every transaction falls at the end of the accounting period. This is accomplished by considering the initial investment to take place at the end of Year 1 of the project, regardless of whether it will actually take a full year or only a few months. The FPCO Guidelines indicate that the investment is to fall in Year 0, but this gives rise to problems when cash flows are aggregated.

Incremental Production

Economic benefit generated by the incremental fish production is obtained by comparing the pre-project fish production with the post-project production. Catch Assessment Surveys conducted by NERP in Kawadighi Haor and its adjacent floodplain for the years 1992-93, 1993-94, 1994-95, 1995-96, and 1996 are the basis for the estimation of the incremental fish production. The years 1992-93, 1993-94, and 1994-95 are the pre-project years, and the years 1995-96 and 1996 are the post-project years; the project being in operation since May 1995. The year 1993-94, however, has been excluded from the analysis. The flood water in that year overtopped the embankment, allowing fish to migrate into the *haor*. Moreover, the production year for 1996 is not yet complete. Collection of data is continuing.

The average production during the years 1992-93 and 1994-95 is calculated to find the pre-project production level, and the production of 1995-96 represents the post-project production level. The incremental production is found to be 220 metric tons, an increase of around 47% (Table 71).

Market Prices

The Fish Market Price Survey conducted by NERP collected market prices of the fish species available in the project area. It was done monthly since the beginning of the study. The available species of fish have been grouped into carp species, catfish and other large species, *golda chingri*, and small fishes. The average price has been calculated, with weight given to the catch composition of fishes in a particular year. All prices have been brought to the 1994-95 constant price level using the fisheries sector deflator determined by the Bangladesh Bureau of Statistics.

Economic Prices

FPCO Guidelines suggest to use the standard conversion factor to get the economic price of fish from its market price.

Harvest Cost

Harvest cost per metric ton of fish has been calculated taking into account the partial cost of gears and boats (adjusted according to their expected life-time), other material costs such as bamboo and rope (where applicable), and costs for lease money, guarding, maintenance, and labor.

Benefit

The financial/economic margin of fish production in a year is obtained from the total financial/economic value (production X prices) after deducting the total harvest cost. Benefit generated by the project is the differential between the post-project and pre-project margins. It has been assumed that the benefit generated by the project in the first year of its operation will be maintained throughout the life of the project (Table 71). Incremental fish production due to the project is 220 MT each year. This represents a benefit of Tk 4.3 million per year.

Rice Crops

The FPP will not have any adverse effect on crop production in normal flooding years.

Capital, Development and O & M Costs

The initial capital cost of the project was Tk 7.69 million. The development capital cost was Tk 0.40 million. The capital and development costs of the project have been incurred in the first and second year of the project respectively. The O & M cost in each year is two percent of the initial capital cost.

Net Present Value and Internal Rate of Return

The NPV and the internal rate of return (IRR) have been determined. This will provide an indication of the return of FPP investments. The project generates a positive NPV of Tk 20.7 million, and an IRR to investment of 42.8% (Table 72). The preliminary results show that the project is economically feasible.

Sensitivity Analysis: A 20% fall in the incremental production reduces the NPV to Tk 15.1 million, and the IRR to 35.2%.

Limitations of the Economic Evaluation and Future Course of Action

The basis of the economic evaluation was to estimate the incremental production generated by the project. This has been done with the production data of only three years; two years to evaluate the pre-project situation and one year for the post-project situation. Given the complexities associated with the environment of the fisheries sector, data of fish production for a longer period is essential.

It is evident that there is a direct relationship between the flooding intensity and the fish production. The correlation needs to be estimated. There is sufficient information to construct the index of flooding intensity in the area for the last ten years, but the corresponding information on fish production is not available. Attempts will be made to work out the correlation with data available from secondary sources and similar work done in other parts of the world.

Analyzing the past trends, an estimate of the flooding intensity for the whole life of the project should be made. After this, it will be possible to project the future fish production. NERP has gained sufficient experience in this field to make a reliable estimate.

Options for Cost Recovery of the Fishpass

The preliminary economic results of the fishpass indicate that it has a very high IRR, and is thus economically feasible. Since the capital cost outlay is large, it must be determined who is going to finance the project.

When the government invests in projects that increase the incomes of individual farmers and fishermen, the question arises about how much of the government expenditure should be recovered, if at all, from the project beneficiaries. Only through appropriate cost recovery policies can the government recoup the money expended on a project. A part of the project benefit that individuals receive represents a subsidy paid by others in society who did not benefit from the project.

An alternative option might be for the local people interested in the project to invest. The government can provide easy-access loans to the beneficiaries' association. Since the project is the first of its kind, the people are unfamiliar with it. The Department of Fisheries/GOB may encourage people by providing incentives in the form sharing of capital cost and/or providing loans at a subsidized rate. As the people become familiarized, the government can reduce its role as a financier and private banks/financial institutions can take over.

An acceptable solution for financing the project with less budgetary pressure on the government will promote construction of more fishpass projects in other areas of Bangladesh.

A detailed financial analysis involving different types of fishermen/beneficiaries will be done to build an appropriate model for project financing and cost recovery. Besides the monetary aspect of recovering the cost, setting-up a proper institution/arrangement involving the beneficiaries, the government, and other parties involved will be the major challenge in building such a model.

6. FISHERIES MANAGEMENT AND INSTITUTIONAL DEVELOPMENT

6.1 Karadair Khal Fish Sanctuary

Experience with the fish sanctuary has generally been satisfactory (apart from the water hyacinth infestation experienced during Year 2). It is becoming increasingly clear that the *khal* can act as more than a simple transit route between the river/fishpass and the floodplain/*beels*. *Carpio* has been observed breeding in the *khal*, and eggs and fingerlings have been found. During the dry season the *khal* becomes a relatively secure refuge area for fish stocks inside the *haor*. This is especially important since the *beels* are intensively fished by the leaseholders.

The FPP has come to regard the *khal* as an important component of the *haor*'s aquatic ecosystem, and options are being explored for enhancing its functions as spawning and refuge habitats (which are additional to its transit function). The best option is to install one or more *katha*. They can operate as fish stock conservation and productivity enhancement devices rather than their conventional use as fish concentration and harvesting devices. Different bush layouts will be tested, and their productivity monitored.

6.2 Kawadighi Haor Fisheries Association

Record of KHFA Meetings

Meeting held Jan 04 96

Venue: FPP office at Kashimpur

Participants: 35 members of the KHFA from 16 villages and NERP staff.

Issues discussed:

- Cooperation regarding participation in the Macher Mela (Fish Fair) at Sherpur;
- Discussion on *beel* fishing to assess production trends of the *haor* and the appearance of new species;
- Outbreak of fish disease and remedial measures;
- Organizing meetings to be held at different *kholas* (fish landing center).

Meeting held Feb 07 96

Venue: Patasingra Beel *khola*

Participants: 25 fishermen from Antehori, Ghargaon, Rakta, Amirpur, and Shahpur villages and NERP staff.

Issues discussed:

- Post harvest fish handling, transportation and marketing;
- Fish processing through sun drying;
- Biological management of the fisheries of the *haor*.

Meeting held Feb 14 96

Venue: Shalkatua and Majerbandh Beel *khola*

Participants: 32 fishermen from Rakta, Ghargaon, Amirpur, Banarai, and Noagaon villages and NERP staff.

Issues discussed:

- Post harvest fish handling, transportation, and marketing;
- Fish processing through sun drying;
- Biological management of the fisheries of the *haor*;
- Controlling the aquatic weeds;
- *Beel* management and harvesting technology.

Meeting held Feb 24 96

Venue: Rukka Beel *khola*

Participants: 28 fishermen from Rukka, Ghargaon, Rakta, Shahpur, Amirpur, Rashidpur, and Jahidpur villages and NERP staff.

Issues discussed:

- Post harvest fish handling, transportation and marketing;
- Fish processing through sun drying;
- Biological management of the fisheries of the *haor*;
- Use of illegal fishing gear.

Meeting held Mar 27 96

Venue: FPP office at Kashimpur

Participants: 36 fishermen from Antehory, Kadirpur, Rakta, Ghargaon, Manumukh, Shahpur, Rashidpur, Jahidpur, and Islampur villages and NERP staff.

Issues discussed:

- Cooperation in operation of the fishpass;
- Sanctuary management and public participation;
- Selection of participants for the training program to be held the following month;
- Conflict between the lessee and local fishermen.

Meeting held Apr 24 96

Venue: FPP field office

Participants: 33 participants (Local council representatives, Officials from DOF, Officials from BWDB, fishermen's and farmers' representatives, and NERP staff)

Issues discussed:

- FPP objectives and present status;
- Impact of the fishpass on the fish production of Kawadighi Haor;
- Impact of water on crops by discharges through the fishpass during the pre-monsoon season;
- Smooth operation of the fishpass and proper management of the fish sanctuary.

After discussion on the above issues it was decided to form a local consultative committee (LCC), with the Chairman of the local Union Council as the chairman. Local population, farmers, and fishermen would be represented on the committee. The terms of reference of the committee were also fixed.

Meeting held May 08 96

Venue: FPP field office

Participants: 14 participants (LCC members, officials of BWDB, and NERP staff).

Issues discussed:

- Condition of the rice fields and crop harvesting;

- Fixing the time for beginning the operation of the fishpass;
- Management of the sanctuary;
- Importance of the declaration of one *beel* of the *haor* as a reserve fishery.

As rice harvesting in the low-lying areas was completed, farmers had no disagreement with opening the fishpass as soon as the water levels rose to operating level. It was also decided that the fishpass would remain in operation unless any natural adverse situation occurred.

Meeting held May 18 96

Venue: FPP field office

Participants: LCC members and NERP staff

Issues discussed:

- Organize a public meeting to create mass awareness regarding management of the sanctuary;
- Status of the fishpass operation.

Meeting held May 21

Venue: Kashimpur market

Participants: 200 villagers of different professions (farmers, fishermens, fish-traders, day laborers, shopkeepers, boatmen) and NERP staff. The meeting was chaired by Mr. Abdul Hamid, a widely respected person in the locality.

Issues discussed:

- Explain the objectives of the fishpass;
- Explain the purpose of declaring Karadair Khal a fish sanctuary;
- Seek cooperation for smooth operation of the fishpass and proper management of the sanctuary.

Meeting held Jun 06 96

Venue: FPP field office

Participants: Members of LCC and NERP staff

Issues discussed:

- Cooperation in operation of the fishpass;
- Sanctuary management.

Meeting held June 22 96

Venue: FPP field office

Participants: 35 members of KHFA from 18 villages, District Fisheries Officer of Moulvibazar, Gary Bernacsek, Nazmul Islam, and other biologists and COs.

Issues discussed:

- Biological management of Kawadighi Haor;
- Abundance of new species;
- Implementation of the fish act;
- Conversion of one *beel* into a reserve fishery;
- Strengthening of the association.

After the meeting operation of the fishpass was explained, and sampling procedures were demonstrated to the meeting participants. They witnessed various species migrating through the fishpass.

Meeting held Jul 18 96

Venue: FPP field office

Participants: Members of KHFA and LCC

Issues discussed:

- Fishpass operation;
- Sanctuary management;
- Implementation of the fish act.

Meeting held Aug 10 96

Venue: FPP field office

Participants: Members of LCC and NERP staff

Issues discussed:

- Sanctuary management;
- Fishpass operation.

Meeting held Aug 29 96

Venue: Ghargaon village

Participants: 27 fishermen from Ghargaon, Amirpur, and Banarai villages, KHFA members, and NERP staff.

Issues discussed:

- *Beel* flushing during the dry season to control the outbreak of fish disease;
- On-site training of fish transportation and fish drying;
- Abundance of new species in the *haor* area;
- Impact of the fishpass.

Meeting held Sep 03 96

Venue: Rashidpur village

Participants: Members of KHFA and fishermen from Rashidpur, Zahidpur, and Kashimpur (19 participants).

Issues discussed:

- Conservation of the fish resources of the *haor*;
- Effect of catching juvenile fish;
- Creating awareness regarding the fish act;
- Fish transportation and fish drying.

Meeting held Sep 17 96

Venue: FPP field office

Participants: LCC members and NERP staff

Issues discussed:

- Management of the sanctuary;
- Declaration of Patasingra Beel as a reserve fishery;
- Construction of a new fishpass at Machuakhali;
- Removal of water hyacinth from the sanctuary area.

KHFA Registration and NFMP Application

An application has now been lodged to legally register the KHFA with the Department of Social Welfare. A second application has been lodged to transfer Patasingra Beel from the New Fisheries Management Policy (NFMP) to the KHFA. Assuming both applications will be successful, there will be an immediate need to strengthen the organization of the KHFA. The KHFA committee is currently collecting the names of all the principal fishermen in the *haor* for inclusion in its membership roster. The names of fish processors will also be collected. Membership cards and fee rates will be established during Year 3.

6.3 DOF and GOB Support

During the second year of implementation, FPP received substantial support from BWDB and DOF. Officials from both organizations extended their cooperation to resolve problems regarding the fishpass operation and sanctuary management. Superintending Engineer, O & M Circle, Executive Engineer, O & M Division-1 and Subdivisional Engineer-1 of BWDB, Moulvibazar, and District Fisheries Officer, Moulvibazar constantly showed keen interest and rendered ample support to smoothly implement the project activities. Visits paid to the project by the high officials of BWDB and DOF encouraged the FPP team to perform their job more efficiently. Support was also received from the local administration, especially from the Chairman of Fatehpur union *parishad* under Rajnagar *thana*.

6.4 Handover of Fishpass

Upon completion of FPP in December 1997, the fishpass and its associated assets (Karadair Khal fish sanctuary) and liabilities (maintenance costs) will be transferred to one or more Bangladeshi entities. Exactly which entities needs to be decided, and an orderly handover schedule established. The handover should precede the termination of FPP by about six months. This transitional period will facilitate the transferring of the responsibilities associated with the fishpass.

From a number of perspectives, the best organisation to adopt ownership of the structure is the KHFA. This is because of its vested interest in its successful long-term operation and maintenance. Shared ownership with DOF might also be feasible, given the mandate of DOF to manage fisheries in Bangladesh. DOF would be in a good position to assist KHFA with stock assessment studies, monitoring of fish migration, and other technical, economic, and social aspects of the structure.

Another option is to transfer the structure and its assets to the BWDB. This option is not considered desirable. Apart from the fact that the fishpass is a type of water regulation structure, its functions and impacts are completely unconnected with any mandate currently under the responsibility of BWDB. Although there is a problem regarding the ownership of the land that the fishpass is situated on, this can be solved by the BWDB granting a 25 year lease for the land in question to the new owner(s) of the structure.

It is proposed that multilateral discussions on the future of the fishpass be held among all concerned parties over the next six months. Once a decision is taken on who the new owner(s) will be, transfer of ownership should be carried out with as little delay as possible. FPP should assist the new owner(s) with formulating short- and long-term plans for structural operation and maintenance.

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7. TRAINING & PUBLIC AWARENESS BUILDING

One of the main objectives of the NERP training initiative is to disseminate concepts and technologies of ongoing projects to relevant audiences. This objective will be particularly important during the last year of phase 2 of the project.

The FPP has been built, and a monitoring program is in progress. By this time, a significant amount of experience has been gained. These experiences have been shared with relevant audiences by organizing several training programs at the fishpass project site. A short account of the training activities undertaken during the last year is given below.

7.1 Fisheries Engineering

The fishpass structure was implemented as a pilot project to determine its effect on the problem of fish migration caused by the construction of FCDI projects. If the project is successful, similar structures may be built under the responsibility of Water Board engineers. A short training program was organized to disseminate concepts and design aspects of the fishpass to the engineers of BWDB and DOF. This training program also exposed these engineers to the migratory behavior of fish.

The training program was held on 19-20 November 1995 at Moulvibazar. Half of the program was spent on classroom activities, and the remainder on a practical demonstration at the fishpass site. In all, 11 senior to mid-level engineers (six design engineers and five field engineers working in the vicinity of the project) from the BWDB and four mid-level engineers from the DOF were invited to attend this course. In all, thirteen engineers attended. Mr. Henryk Werszko, Planning/Civil Engineer, Mr. Nazmul Islam, Fisheries Specialist, Mr. Salahuddin Khan, Civil Engineer of NERP, and Mr. A.K.M. Akram Hossain, Design Engineer from outside, worked as resource personnel for the training program. The participants met this training program with enthusiasm.

7.2 Fisheries Management

The construction of the pilot fishpass structure through the Manu embankment between Kawadighi Haor and the Kushiya River created a lot of interest amongst the local fisher community. To make them aware of the community's responsibility towards this pilot project, and to seek cooperation for smooth operation of the fishpass structure, a training program was organized on 27 May 1996 at the pilot project site. The training session also initiated discussions on resource management, fisheries regulation, post-harvest handling, fish processing, and other activities necessary for the development of fisheries. About 25 members of the local fisher community attended this training program.

7.3 Fish Processing and Marketing

While fishing is an outdoor activity traditionally performed by men, women are mainly involved in increasing the market value of the catch through fish processing. In periods of relative abundance, fish processors preserve fish using some indigenous techniques of fish

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drying. Many households are involved in fish processing on a commercial basis. This is an important source of food, as well as income, for many households. Improving the fish processing skills is expected to help the economic and nutritional condition of the fisher households in the project area. This is perceived as an entry point for NERP to involve itself with fisherwomen.

A series of workshops for fisherwomen has been planned. These will impart skill on improved techniques of fish processing to enhance their economic participation and empowerment. A day-long training workshop was arranged on the Kashimpur fishpass campus on 17 October 1996. The workshop was conducted by a team of two trainers, one from the DOF, GOB, and one from Communica, a NGO specialized in training and communication. Forty-nine women from 19 villages participated in the training (Table 73). Among the participants, 69% were muslim and 31% were hindu. Participants were selected by NERP COs through interaction in the villages over a period of two months.

It was decided to introduce more technical training before the onset of *beel* fishing. As a part of the process, two fish processors groups (FPGs) were formed, one in Chandpur village and the other in Ghargaon village. Members of the groups included those who participated in the first training workshop in October 1996, and some new individuals. Besides, there were some trainees from Manumukh village who showed keen interest in the programme. Training was imparted by a fish processing expert from the DOF who had been involved in the first training. The day-long training workshop was held on 23 December 1996. The distribution of participants was as follows:

<u>Village</u>	<u>No. of trainees</u>
Chandpur	10
Gargaon	7
Manumukh	3

FPGs are expected to incorporate the training into activities which they are already very familiar with to improve the quality of their product. These will be treated as "demonstration groups", and they would eventually transmit their knowledge and experience to other village women. NERP will initially provide some low-cost tools used in fish processing and marketing. These include polythene sheets for making solar driers, ovens, earthen pots, and plastic bags.

7.4 *Sherpur Macher Mela*

A fish fair was organised by local fish traders at Sherpur under Moulvibazar district on 13-14 January 1996. Many fishermen in the region attended the fair. It created an opportunity to disseminate the concept of fishpasses to a large gathering of fishermen in the region. NERP had a stall at the fair and displayed pictures, drawings, sample fish, videos on fisheries activities of NERP, and distributed a simple Bengali leaflet on fishpass structures. NERP professionals who attended the fair talked to a large number of people and answered their various questions about the fishpass.

7.5 Reporting FPP Findings to Beneficiaries

During the coming dry season, one or more meetings will be held to report the various Year 2 FPP findings regarding fish movement through the fishpass to the beneficiary groups. These are the findings contained in this report. Feedback from these meetings will be used to make adjustments to the FPP program of activities during Year 3.

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8. CONCLUSIONS & RECOMMENDATIONS

During Year 2 of FPP operation, there was a major improvement and expansion of project activities. The sampling program was able to record the traffic of fish and crustaceans through the fishpass more accurately. Further improvement in *haor* fish production was recorded, and biodiversity increased. Acceptance of the structure by the farming community became more prevalent. Increases in fish consumption and income took place. It may be concluded that FPP is generally advancing towards its goals and objectives in the natural resource, social, and economic spheres.

Further improvements in the structural and non-structural components of the project should be carried out during Year 3. In addition to the normal workplan activities, it is recommended that FPP carry out appropriate activities related to the following items:

- Improvement of access channels to the fishpass on R/S;
- Installation of slot funnel traps on sampling cages;
- Study of fish behavior and movement inside the fishpass (transit times and swimming direction reversals);
- Detailed biological studies of selected species;
- Installation of a device on the C/S gate openings to prevent fish from migrating from haor into river during post-monsoon.
- *Hizal* plantation;
- Dry season *beel* flushing;
- Floating cage culture demonstration;
- Strengthening of KHFA organization and activity programs;
- Promotion of improved fish processing technology involving women;
- Transfer of Patashingra Beel to KHFA under NFMP;
- Study of fish marketing;
- Construction of a fish market shed at Kashimpur.

FPP should monitor *beel* fishing until the end of March 1998. Otherwise, the Year 3 impacts will not be completely documented and understood. Adjustments to the FPP budget and staff will be required in order to carry out the recommended program.

If this further extension is granted, analysis of Year 3 data and writing of the project completion report will require three months, and should be scheduled for April to June 1998. A reduced number of staff (project coordinator, hydrologist, one field biologist, socio-economist, and the external fisheries specialist advisor) would be required to draft the project completion report.

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Table 1

Frequency Analysis of water Level
Station : Kushiyara River at Kashimpur
Period : 1983 – 1996

GEVII/GEVIII Distribution by L – Moment Method

Data Type : Maximum River Water Level (m PWD)

Sample Size : 12

Sample Range : 8.83 to 10.38 (m PWD)

Parameters : A=9.18 : B=0.36 : K=-0.0509

L – Skewness : T3=0.2029 : T3=0.2030 : D3=0.08 %

L – Kurtosis : T4=0.1659 : T4=0.1643 : D4=-1.00 %

T (Years)	Y	P	P(x>)	Adjusted P(x>)	Adjusted P	Adjusted Y	Xp (m PWD)	Var(Xp) (m PWD)	97.5% Confidence Limits	
									LL (m PWD)	UL (m PWD)
1.01	-1.5293	0.0099	0.990	0.990	0.010	-1.529	8.64	0.0865	8.06	9.22
1.1	-0.8746	0.0909	0.909	0.909	0.091	-0.875	8.86	0.1177	8.19	9.54
1.5	-0.0940	0.3333	0.667	0.667	0.333	-0.094	9.14	0.2955	8.08	10.21
2	0.3665	0.5000	0.500	0.500	0.500	0.367	9.31	0.5564	7.85	10.77
3	0.9027	0.6667	0.333	0.333	0.667	0.903	9.51	1.0478	7.51	11.52
5	1.4999	0.8000	0.200	0.200	0.800	1.500	9.74	1.7384	7.16	12.33
10	2.2504	0.9000	0.100	0.100	0.900	2.250	10.04	2.5414	6.92	13.17
20	2.9702	0.9500	0.050	0.050	0.950	2.970	10.34	3.0728	6.91	13.78
25	3.1985	0.9600	0.040	0.040	0.960	3.199	10.44	3.1917	6.94	13.94
50	3.9019	0.9800	0.020	0.020	0.980	3.902	10.75	3.4435	7.11	14.38
100	4.6001	0.9900	0.010	0.010	0.990	4.600	11.06	3.5768	7.36	14.77
200	5.2958	0.9950	0.005	0.005	0.995	5.296	11.39	3.6454	7.65	15.13

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Table 2 : Maximum Water Levels in MRP and Kushiyara River (1983 to 1996)

Year	Maximum Water Level (m PWD)	
	River WL	Project WL
1983	9.45	8.81
1984	9.61	9.36
1986	9.13	8.54
1987	9.29	8.36
1988	10.03	9.67
1989	9.65	8.71
1990	9.21	8.98
1992	8.83	8.44
1993	10.38	10.00
1994	8.88	8.48
1995	9.36	9.00
1996	9.02	8.52

Table 3: Maximum Head Difference Between MRP and Kushiyara River for Flow from R/S to C/S (1983 to 1996)

Year	Head Diff. (meter)	River WL (m PWD)	Project WL (m PWD)
1983	3.26	7.22	3.96
1984	0.914	8.27	7.35
1985	3.780	8.17	4.39
1986	2.407	6.59	4.18
1987	2.484	6.53	4.04
1988	1.798	8.57	6.77
1989	3.215	7.34	4.12
1990	3.246	7.43	4.12
1992	2.82	8.05	5.23
1993	2.470	6.71	4.24
1994	2.41	7.87	5.46
1995	2.34	7.49	5.15
1996	3.17	8.15	4.98

Table 4: Maximum Head Difference between MRP and Kushiya River for Flow from C/S to R/S (1983 to 1996)

Year	Head Diff. (meter)	Project WL (m PWD)	River WL (m PWD)
1983	1.340	6.83	5.49
1984	0.88	9.61	8.72
1986	0.77	7.46	6.68
1987	1.615	7.38	5.77
1988	1.249	7.75	6.50
1989	0.96	7.28	6.32
1990	0.96	7.37	6.41
1992	0.99	6.78	5.79
1993	0.56	10.27	9.71
1994	1.00	6.56	5.56
1995	1.17	6.99	5.82
1996	1.38	7.34	5.96

Table 5: R-104, Chandbagh; Daily Rainfall (mm)
Monthly and Annual Rainfall in mm
From records compiled by NHCL Small Scale Project

year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
1961	-9999.9	-9999.9	-241.4	131.7	399.4	535.1	332.2	228.2	328.3	177.0	.0	.0	-2373.3
1962	.0	42.6	.0	123.5	358.8	773.2	371.5	523.9	164.4	158.9	.0	.0	2516.8
1963	.0	-9999.9	92.9	172.4	827.2	692.2	368.1	333.2	327.8	255.0	.0	.0	-3068.8
1964	9.7	9.1	137.7	446.1	539.9	898.7	648.8	289.0	380.2	298.7	12.2	.0	3670.1
1965	.0	29.9	43.7	168.0	288.5	675.7	570.1	631.4	714.5	138.4	253.3	.0	3513.5
1966	50.6	.0	48.0	409.3	521.7	1218.5	311.8	416.1	179.3	256.6	34.5	31.5	3477.9
1967	37.9	.0	88.0	414.3	371.1	512.6	418.1	357.7	457.1	30.0	.0	.0	2686.8
1968	11.5	.0	42.0	208.1	463.9	656.0	856.8	396.3	302.3	70.8	21.1	.0	3028.8
1969	21.8	.0	110.8	228.9	208.8	665.7	407.5	718.2	112.7	122.9	15.2	.0	2612.5
1970	42.4	49.0	32.7	274.2	229.1	817.9	692.3	347.9	366.9	357.4	19.0	.0	3228.8
1971	6.1	14.2	54.1	261.9	379.5	366.2	349.1	412.8	432.4	300.2	87.9	.0	2664.4
1972	.0	33.0	-44.3	347.0	414.5	572.5	620.9	436.4	168.1	112.8	36.1	.0	-2785.6
1973	6.1	121.4	2.0	364.8	546.4	637.1	312.2	336.5	273.6	.0	85.3	90.4	2775.8
1974	.0	5.3	129.3	570.8	493.7	747.0	584.7	318.5	269.2	115.3	20.6	.0	3254.4
1975	.0	4.1	36.6	449.6	915.3	346.3	637.5	538.4	295.5	152.5	98.4	.0	3474.2
1976	.0	19.8	200.1	223.8	463.4	1075.9	547.2	521.5	306.8	125.5	105.1	.0	3589.1
1977	3.6	14.5	162.5	612.2	686.7	527.9	325.2	427.1	133.4	314.2	33.5	15.7	3256.5
1978	.0	.0	18.7	143.3	661.9	295.5	488.3	237.2	204.7	23.4	.0	.0	2073.0
1979	1.3	7.8	94.2	81.5	203.6	637.7	552.5	248.3	431.3	32.0	7.0	43.7	2340.9
1980	.0	28.5	55.4	403.5	648.3	415.5	462.1	233.1	474.9	229.1	.0	.0	2950.4
1981	26.2	53.4	90.6	313.3	519.1	213.8	488.8	474.5	318.6	18.5	.0	.0	2516.8
1982	.0	29.5	70.2	186.0	301.8	515.0	469.7	497.3	242.2	190.0	9.2	.0	2510.9
1983	17.3	29.0	309.1	435.6	531.0	651.0	413.9	830.5	483.9	148.3	.0	77.5	3927.1
1984	17.3	.0	19.5	220.3	1209.3	376.9	462.9	471.8	597.5	375.0	25.4	22.1	3798.0
1985	1.8	49.8	148.3	452.2	313.3	1311.0	394.2	237.8	726.3	40.6	.0	.0	3675.3
1986	7.1	9.1	23.4	444.2	253.1	284.5	883.4	348.8	394.1	312.4	194.5	.0	3154.6
1987	.0	8.2	134.1	428.6	135.6	988.2	704.9	660.0	302.8	174.0	8.9	2.5	3547.8
1988	.0	84.1	110.5	276.9	1115.3	577.7	483.2	856.1	378.6	267.9	168.6	26.9	4345.8
1989	9.1	19.0	5.6	255.8	681.7	520.9	785.3	501.9	640.3	329.1	.0	.0	3748.7
1990	.0	28.0	123.0	630.0	439.0	381.0	512.0	333.0	455.0	247.0	65.0	4.0	3217.0
1991	19.0	50.0	76.0	498.0	1197.0	716.0	340.0	303.0	473.0	219.0	.0	126.0	4017.0
1992	.0	44.0	133.0	154.0	421.0	384.0	462.0	411.0	232.0	191.0	.0	2.0	2434.0
1993	5.1	18.0	5.0	349.0	711.0	974.0	1155.0	-9999.9	-9999.9	-9999.9	-9999.9	-9999.9	-3217.1
num.	32	31	31	33	33	33	33	32	32	32	32	32	29
min.	.0	.0	.0	81.5	135.6	213.8	311.8	228.2	112.7	.0	.0	.0	2073.0
mean	9.2	25.8	83.8	323.6	528.8	635.2	527.6	433.7	361.5	180.7	40.7	13.8	3172.7
max.	50.6	121.4	309.1	630.0	1209.3	1311.0	1155.0	856.1	726.3	375.0	253.3	126.0	4345.8

NOTE: negative value indicates partial period

-9999.9 designates missing period

partial months are included in annual total (indicated with -)

partial periods are excluded from summary statistics (min, mean, and max)

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Table 6: R-117, Langla; Daily rainfall (mm)
Monthly and Annual Rainfall in mm
From records compiled by NHCL Small Scale Project

year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
1961	-9999.9	17.1	228.5	147.1	379.2	374.8	200.5	399.6	364.8	159.3	.0	.0	-2270.9
1962	11.4	47.0	29.7	164.4	331.7	644.0	374.4	480.3	95.4	202.1	-9999.9	-9999.9	-2380.4
1963	.0	4.8	141.5	140.9	533.4	637.7	372.7	388.8	264.0	398.7	30.8	.0	2913.3
1964	6.1	35.0	195.2	476.9	511.6	556.0	534.8	230.6	261.1	245.4	29.4	.0	3082.1
1965	.0	57.4	64.8	157.1	306.3	507.6	398.7	433.3	349.6	68.3	101.9	9.9	2454.9
1966	27.2	.0	69.4	196.2	342.3	597.6	414.3	309.0	254.5	301.0	21.1	37.1	2569.7
1967	20.1	.0	162.1	318.5	311.2	472.4	382.1	395.1	379.6	50.8	.8	.0	2492.7
1968	43.2	11.4	92.0	301.6	529.3	505.7	791.7	319.7	277.7	136.2	24.1	.0	3032.6
1969	28.2	.0	158.0	258.9	248.5	528.4	314.0	618.3	97.8	128.3	19.3	.0	2399.7
1970	20.2	88.7	32.3	242.4	228.1	662.5	598.5	248.0	268.3	161.2	11.5	.0	2561.7
1971	9.7	10.4	139.2	234.4	369.2	294.7	242.5	362.3	206.9	132.3	33.3	.0	2034.9
1972	.0	6.6	70.2	266.2	315.8	451.3	562.0	391.0	98.1	93.0	.0	.0	2254.2
1973	19.0	93.1	19.3	356.2	758.7	534.3	350.0	485.5	277.5	89.6	129.6	94.0	3206.8
1974	2.8	.0	157.5	368.7	439.6	724.1	495.7	310.9	-212.5	-9999.9	-28.1	7.6	-2747.5
1975	.0	15.5	.0	285.4	609.0	370.2	345.0	430.1	299.1	82.5	43.1	.0	2479.9
1976	.0	11.7	34.3	270.5	290.7	1162.3	353.3	456.4	375.7	43.8	65.3	.0	3064.0
1977	7.6	74.6	127.0	742.8	578.2	519.6	173.7	484.0	83.5	282.8	38.1	13.9	3125.8
1978	.0	5.1	23.4	134.9	698.7	464.2	516.8	187.0	206.3	39.9	7.1	.0	2283.4
1979	2.5	3.3	94.2	147.1	178.0	485.1	468.3	227.8	412.5	103.8	15.0	57.5	2195.1
1980	3.3	5.4	56.2	274.2	564.1	462.5	366.0	373.9	250.3	218.6	.0	3.3	2577.8
1981	17.0	65.5	139.7	416.2	467.4	224.8	538.7	598.7	311.2	.0	.0	4.6	2783.8
1982	.0	100.2	32.2	311.9	282.3	457.6	439.5	438.4	132.8	58.1	23.6	.0	2276.6
1983	33.3	45.5	319.7	441.6	707.1	667.0	368.6	681.3	383.5	231.2	7.6	41.4	3927.8
1984	2.5	.0	10.9	157.8	1224.7	379.3	281.4	396.7	569.6	349.3	1.8	10.9	3384.9
1985	6.6	36.1	221.9	361.5	259.8	1158.4	413.7	336.8	633.8	26.2	.0	9.7	3464.5
1986	7.6	1.8	37.9	403.3	246.6	293.3	524.7	277.2	322.0	324.0	210.6	1.5	2650.5
1987	9.1	.0	65.5	402.9	202.0	1077.9	387.2	557.2	237.4	101.6	16.3	.0	3057.1
1988	.0	45.3	71.7	279.9	809.7	531.6	390.1	716.1	403.1	152.3	90.2	32.3	3522.3
1989	.0	51.9	4.1	28.7	468.1	589.4	569.1	505.3	423.2	571.5	.0	2.0	3213.3
1990	.0	30.0	146.0	423.0	487.0	395.0	207.0	333.0	706.0	245.0	107.0	7.0	3086.0
1991	18.0	69.0	73.0	477.0	1077.0	680.0	261.0	290.0	286.0	239.0	.0	138.0	3608.0
1992	.0	116.0	164.0	118.0	458.0	254.0	283.0	448.0	202.0	218.0	.0	.0	2261.0
1993	28.0	386.4	79.3	270.0	790.0	-775.0	928.0	-9999.9	-9999.9	-9999.9	-9999.9	-9999.9	-3256.7
num.	32	33	33	33	33	32	33	32	31	31	30	31	29
min.	.0	.0	.0	28.7	178.0	224.8	173.7	187.0	83.5	.0	.0	.0	2034.9
mean	10.1	43.5	98.8	290.2	484.9	552.0	419.6	409.7	304.3	175.9	34.2	15.2	2826.4
max.	43.2	386.4	319.7	742.8	1224.7	1162.3	928.0	716.1	706.0	571.5	210.6	138.0	3927.8

NOTE: negative value indicates partial period
-9999.9 designates missing period
partial months are included in annual total (indicated with -)
partial periods are excluded from summary statistics (min, mean, and max)

Table 7: R-122, Moulvibazar; Daily Rainfall (mm)

Monthly and Annual Rainfall in mm

From records compiled by NHCL Small Scale Project

year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
1961	-9999.9	.0	406.5	131.1	350.5	389.3	300.4	292.0	354.5	157.1	.0	.0	-2381.4
1962	11.2	30.2	1.3	148.4	251.7	540.9	405.5	484.6	111.1	162.3	.0	.0	2147.2
1963	.0	.0	138.7	-9999.9	372.5	644.3	388.6	275.4	208.4	262.4	.0	.0	-2290.3
1964	3.8	59.6	116.9	395.2	380.5	551.8	622.8	301.8	249.8	252.5	14.5	.0	2949.2
1965	.0	63.5	61.9	105.2	274.0	567.4	462.8	512.5	237.1	36.8	66.0	7.1	2394.3
1966	39.4	.0	34.5	195.3	369.2	504.9	365.2	551.6	414.8	243.9	49.5	53.3	2821.6
1967	53.3	.0	141.1	317.9	285.0	349.9	389.8	317.3	481.7	103.5	2.0	.0	2441.5
1968	14.2	20.3	117.9	260.1	488.4	551.0	-658.1	283.4	339.0	24.6	39.4	.0	-2796.4
1969	6.1	105.2	105.4	330.9	280.2	521.9	388.9	528.1	110.8	105.4	13.2	.0	2496.1
1970	26.7	67.0	27.7	157.4	182.0	707.5	724.3	367.4	312.2	230.2	42.6	.0	2845.0
1971	6.1	-5.8	-9999.9	-9999.9	-144.9	364.9	358.2	348.4	332.9	113.5	83.1	.0	-1757.8
1972	1.3	25.6	51.3	218.8	189.8	528.8	568.0	381.5	136.5	53.7	2.5	5.1	2162.9
1973	21.1	162.6	20.7	325.9	564.6	611.2	535.5	500.6	213.4	27.6	55.1	88.1	3126.4
1974	2.5	6.6	28.3	320.0	374.6	547.4	469.1	282.6	189.3	134.7	17.0	.0	2372.1
1975	.0	.0	.0	266.0	441.3	333.1	365.2	375.0	195.8	57.9	57.1	.0	2091.4
1976	.0	20.3	53.4	206.4	527.7	1261.4	584.0	309.7	325.1	160.0	36.1	.0	3484.1
1977	12.2	88.3	9.7	800.9	616.5	696.9	354.7	468.3	90.3	288.5	34.3	.0	3460.6
1978	.0	5.6	24.9	267.9	840.8	448.4	271.3	170.8	396.1	72.0	.0	.0	2497.8
1979	.0	10.2	87.2	100.4	153.0	678.3	475.2	299.7	400.7	49.8	1.3	29.4	2285.2
1980	.0	2.0	122.4	274.9	597.4	374.7	468.2	323.3	321.9	179.1	.0	.0	2663.9
1981	.0	33.8	95.5	-9999.9	-9999.9	-9999.9	-9999.9	-9999.9	-9999.9	-9999.9	-9999.9	-9999.9	-129.3
1982	-9999.9	-9999.9	-9999.9	202.3	235.1	530.6	431.7	629.2	193.0	3.8	10.1	.0	-2235.8
1983	24.7	26.9	261.0	344.7	653.6	360.7	386.5	715.7	350.9	185.7	.0	35.6	3346.0
1984	.0	.0	12.4	134.0	1235.7	389.6	338.8	316.2	523.4	135.3	3.8	.0	3089.2
1985	12.7	21.6	190.6	255.7	218.1	835.8	295.1	154.9	426.7	29.4	2.3	2.5	2445.4
1986	.0	2.3	.0	251.6	189.1	199.9	415.7	261.5	283.4	380.6	130.6	.0	2114.7
1987	.0	2.5	48.2	284.3	170.2	778.6	533.8	439.6	210.0	151.3	16.5	8.9	2643.9
1988	.0	33.0	74.9	352.6	882.6	459.6	373.2	667.2	206.8	214.0	67.3	.0	3331.2
1989	2.5	1.0	3.5	198.7	375.8	249.6	427.6	463.4	486.6	386.0	.0	.0	2594.7
1990	.0	10.0	201.0	388.0	590.4	427.7	354.8	561.6	467.0	280.0	43.0	5.0	3328.5
1991	9.0	102.0	26.7	-9999.9	-9999.9	-9999.9	-9999.9	-9999.9	-9999.9	-9999.9	-9999.9	-9999.9	-137.7
1992	-9999.9	-9999.9	-9999.9	63.0	437.0	216.5	290.4	280.7	290.6	91.2	2.0	.0	-1671.4
1993	34.0	113.5	99.7	381.7	842.8	757.0	773.3	-9999.9	-9999.9	-9999.9	-9999.9	-9999.9	-3002.0
num.	30	30	30	29	30	31	30	30	30	30	30	30	24
min.	.0	.0	.0	63.0	153.0	199.9	271.3	154.9	90.3	3.8	.0	.0	2091.4
mean	9.4	33.8	85.4	264.8	445.7	528.4	437.3	395.5	295.3	152.4	26.3	7.8	2713.9
max.	53.3	162.6	406.5	800.9	1235.7	1261.4	773.3	715.7	523.4	386.0	130.6	88.1	3484.1

NOTE: negative value indicates partial period

-9999.9 designates missing period

partial months are included in annual total (indicated with -)

partial periods are excluded from summary statistics (min, mean, and max)

Table 8: Monthly and Annual Mean Rainfall

Station Name & Number	May (mm)	June (mm)	July (mm)	August (mm)	Sep. (mm)	Oct. (mm)	Annual Mean (mm)
Moulvibazar (R-122)	446	528	437	396	295	152	2714
Chandbagh (R-104)	529	635	528	434	362	181	3172
Langla (R-117)	485	552	420	410	304	176	2826
Manumukh (R-119)	482	640	497	416	317	159	2897
Average	486	589	470	414	320	167	2902

Table 9
Velocity Measurement
Location : Fishpass Structure

Measurement No. 1		R/S WL		8.24 (m PWD)		Direction of Flow :		R/S to C/S				
Date: May 18,1996		C/S WL		5.12 (m PWD)								
Head Diff.		3.12 meter										
Water Level	Slot	Water	Depth	Width	Area	Maximum Velocity at Depth (m)				Av. Max.	Remarks	
		(m PWD)				(m)	(m²)	0	0.2			0.4
R/S WL		8.240										
Chamber (R/S)		8.200	2.740									
Pool 1	1	8.160	2.703	0.41	1.108		1.920		2.012	2.065	1.999	
Pool 2	2	8.046	2.700	0.41	1.107		1.933		1.999	2.052	1.995	
Pool 3	3	7.923	2.698	0.41	1.106		1.986		2.111	2.052	2.050	
Pool 4	4	7.793	2.696	0.41	1.105		1.999		2.113	2.036	2.049	
Pool 5	5	7.654	2.691	0.41	1.103		2.013		2.115	2.019	2.049	
Pool 6	6	7.507	2.684	0.41	1.101		2.039		2.118	1.986	2.048	
Pool 7	7	7.352	2.673	0.41	1.096		2.065		2.250	2.184	2.166	
Pool 8	8	7.189	2.657	0.41	1.089		2.118		2.303	2.250	2.224	
Pool 9	9	7.017	2.634	0.41	1.080		2.224		2.276	2.250	2.250	
Pool 10	10	6.838	2.604	0.41	1.068		2.250		2.316	2.290	2.285	
Pool 11	11	6.650	2.565	0.41	1.051		2.224		2.263	2.224	2.237	
Pool 12	12	6.454	2.515	0.41	1.031		2.224		2.224	2.184	2.211	
Pool 13	13	6.250	2.455	0.41	1.006		2.250		2.224	2.118	2.197	
Pool 14	14	6.038	2.382	0.41	0.977		2.316		2.342	2.329	2.329	
Pool 15	15	5.817	2.295	0.41	0.941		2.382		2.382	2.316	2.360	
Pool 16	16	5.589	2.194	0.41	0.899		2.382		2.382	2.329	2.364	
Pool 17		5.352	2.076									
Chamber (C/S)		5.260	2.100									
C/S WL		5.120										

Table 9 (continued)

Velocity Measurement

Location : Fishpass Structure

R/S WL

7.63 (m PWD)

Direction of Flow :

P/S to C/S

C/S WL

5.53 (m PWD)

Head Diff.	2.10	meter
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[illegible]

Table 9 (continued)
Velocity Measurement
Location : Fishpass Structure

Measurement No. 3			R/S WL		8.14 (m PWD)		Direction of Flow :		R/S to C/S			
Date: June 01, 1996			C/S WL		5.95 (m PWD)							
Head Diff.			2.19 meter									
Water Level Location	Slot No.	Water Level (m PWD)	Depth (m)	Width (m)	Area (m ²)	Maximum Velocity at Depth (m)				Av. Max. Velocity (m/s)	Remarks	
						0	0.2	0.4	0.6			0.8
R/S WL		8.140										
Chamber (R/S)		8.140										
Pool 1	1	8.140	2.542	0.41	1.042		2.092		2.118	2.039	2.083	
Pool 2	2	8.006	2.557	0.41	1.048		2.092		2.118	2.052	2.087	
Pool 3	3	7.869	2.571	0.41	1.054		2.065		2.118	2.039	2.074	
Pool 4	4	7.731	2.586	0.41	1.060		2.039		2.118	2.039	2.065	
Pool 5	5	7.593	2.601	0.41	1.066		1.986		2.065	2.039	2.030	
Pool 6	6	7.455	2.615	0.41	1.072		2.012		2.052	2.039	2.034	
Pool 7	7	7.317	2.630	0.41	1.078		1.986		2.039	1.960	1.995	
Pool 8	8	7.180	2.644	0.41	1.084		2.039		2.039	1.986	2.021	
Pool 9	9	7.042	2.659	0.41	1.090		1.986		1.986	1.854	1.942	
Pool 10	10	6.904	2.674	0.41	1.096		1.933		2.012	1.854	1.933	
Pool 11	11	6.766	2.688	0.41	1.102		1.933		2.012	1.854	1.933	
Pool 12	12	6.628	2.703	0.41	1.108		1.854		2.039	1.907	1.933	
Pool 13	13	6.491	2.717	0.41	1.114		1.828		1.986	1.907	1.907	
Pool 14	14	6.353	2.732	0.41	1.120		1.801		1.933	1.907	1.880	
Pool 15	15	6.215	2.747	0.41	1.126		1.748		1.858	1.748	1.785	
Pool 16	16	6.077	2.761	0.41	1.132		1.748		1.762	1.656	1.722	
Pool 17		6.040										
Chamber (C/S)		6.000										
C/S WL		5.950										

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Table 9 (continued)

Velocity Measurement

Location : Fishpass Structure

Measurement No. 4

Date: June 08, 1996

R/S WL	8.61 (m PWD)
1	1
2	2
3	3
4	4
5	5
6	6
7	7
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10	10
11	11
12	12
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81	81
82	82
83	83
84	84
85	85
86	86
87	87
88	88
89	89
90	90
91	91
92	92
93	93
94	94
95	95
96	96
97	97
98	98
99	99
100	100

C/S WL	6.83 (m PWD)
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Head Diff.	1.78	meter
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Direction of Flow :

R/S to C/S

[illegible]

Table 9 (continued)
Velocity Measurement
Location : Fishpass Structure

Measurement No. 5		R/S WL		7.80 (m PWD)		Direction of Flow :		R/S to C/S				
Date: June 16, 1996		C/S WL		6.64 (m PWD)								
		Head Diff.		1.16 meter								
Water Level Location	Slot No.	Water Level (m PWD)	Depth (m)	Width (m)	Area (m ²)	Maximum Velocity at Depth (m)				Av. Max. Velocity (m/s)	Remarks	
						0	0.2	0.4	0.6			0.8
R/S WL		7.800										
Chamber (R/S)		7.790										
Pool 1	1	7.746	2.197	0.41	0.901		1.524		1.511	1.432	1.489	
Pool 2	2	7.652	2.288	0.41	0.938		1.511		1.484	1.432	1.476	
Pool 3	3	7.563	2.379	0.41	0.975		1.458		1.511	1.511	1.493	
Pool 4	4	7.479	2.470	0.41	1.013		1.458		1.511	1.511	1.493	
Pool 5	5	7.400	2.561	0.41	1.050		1.458		1.511	1.511	1.493	
Pool 6	6	7.326	2.652	0.41	1.087		1.405		1.432	1.458	1.432	
Pool 7	7	7.256	2.743	0.41	1.125		1.273		1.326	1.458	1.352	
Pool 8	8	7.191	2.834	0.41	1.162		1.273		1.326	1.458	1.352	
Pool 9	9	7.131	2.925	0.41	1.199		1.220		1.326	1.352	1.299	
Pool 10	10	7.076	3.016	0.41	1.237		1.194		1.273	1.326	1.264	
Pool 11	11	7.026	3.107	0.41	1.274		1.194		1.260	1.260	1.238	
Pool 12	12	6.980	3.198	0.41	1.311		1.194		1.247	1.247	1.229	
Pool 13	13	6.939	3.289	0.41	1.348		1.168		1.194	1.168	1.177	
Pool 14	14	6.903	3.380	0.41	1.386		1.009		1.009	0.956	0.991	
Pool 15	15	6.872	3.471	0.41	1.423		0.930		0.983	0.930	0.948	
Pool 16	16	6.846	3.562	0.41	1.460		0.877		0.904	0.851	0.877	
Pool 17		6.824										
Chamber (C/S)		6.710										
C/S WL		6.640										

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Table 9 (continued)

Velocity Measurement

Location : Fishpass Structure

Measurement No. 6

R/S WL	7.48 (m PWD)
1	1.00
2	1.00
3	1.00
4	1.00
5	1.00
6	1.00
7	1.00
8	1.00
9	1.00
10	1.00
11	1.00
12	1.00
13	1.00
14	1.00
15	1.00
16	1.00
17	1.00
18	1.00
19	1.00
20	1.00
21	1.00
22	1.00
23	1.00
24	1.00
25	1.00
26	1.00
27	1.00
28	1.00
29	1.00
30	1.00
31	1.00
32	1.00
33	1.00
34	1.00
35	1.00
36	1.00
37	1.00
38	1.00
39	1.00
40	1.00
41	1.00
42	1.00
43	1.00
44	1.00
45	1.00
46	1.00
47	1.00
48	1.00
49	1.00
50	1.00
51	1.00
52	1.00
53	1.00
54	1.00
55	1.00
56	1.00
57	1.00
58	1.00
59	1.00
60	1.00
61	1.00
62	1.00
63	1.00
64	1.00
65	1.00
66	1.00
67	1.00
68	1.00
69	1.00
70	1.00
71	1.00
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74	1.00
75	1.00
76	1.00
77	1.00
78	1.00
79	1.00
80	1.00
81	1.00
82	1.00
83	1.00
84	1.00
85	1.00
86	1.00
87	1.00
88	1.00
89	1.00
90	1.00
91	1.00
92	1.00
93	1.00
94	1.00
95	1.00
96	1.00
97	1.00
98	1.00
99	1.00
100	1.00

Direction of Flow :

R/S to C/S

Date: June 22, 1996

C/S WL	6.68 (m PWD)
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
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10	10
11	11
12	12
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86	86
87	87
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89	89
90	90
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93	93
94	94
95	95
96	96
97	97
98	98
99	99
100	100

Head Diff.	0.795	meter
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[illegible]

Table 9 (continued)
Velocity Measurement
Location : Fishpass Structure

Measurement No. 7 R/S WL 7.38 (m PWD) Direction of Flow : R/S to C/S
Date: June 30, 1996 C/S WL 6.94 (m PWD)
Head Diff. 0.44 meter

Water Level Location	Slot No.	Water Level (m PWD)	Depth (m)	Width (m)	Area (m ²)	Maximum Velocity at Depth (m)					Av. Max. Velocity (m/s)	Remarks
						0	0.2	0.4	0.6	0.8		
R/S WL		7.380										
Chamber (R/S)		7.360										
Pool 1	1	7.299	1.998	0.41	0.819		0.824		0.824	0.824	0.824	
Pool 2	2	7.264	2.088	0.41	0.856		0.838		0.785	0.798	0.807	
Pool 3	3	7.231	2.182	0.41	0.895		0.785		0.758	0.732	0.758	
Pool 4	4	7.200	2.280	0.41	0.935		1.138		1.104	1.078	1.107	
Pool 5	5	7.171	2.381	0.41	0.976		0.706		0.692	0.692	0.697	
Pool 6	6	7.143	2.487	0.41	1.020		0.679		0.666	0.666	0.670	
Pool 7	7	7.118	2.597	0.41	1.065		0.666		0.666	0.653	0.662	
Pool 8	8	7.094	2.710	0.41	1.111		0.640		0.640	0.640	0.640	
Pool 9	9	7.073	2.828	0.41	1.159		0.574		0.560	0.600	0.578	
Pool 10	10	7.053	2.949	0.41	1.209		0.560		0.547	0.587	0.565	
Pool 11	11	7.035	3.074	0.41	1.260		0.534		0.560	0.587	0.560	
Pool 12	12	7.019	3.204	0.41	1.314		0.508		0.521	0.547	0.525	
Pool 13	13	7.006	3.337	0.41	1.368		0.481		0.534	0.508	0.508	
Pool 14	14	6.994	3.474	0.41	1.424		0.455		0.494	0.508	0.486	
Pool 15	15	6.984	3.615	0.41	1.482		0.415		0.468	0.468	0.450	
Pool 16	16	6.975	3.760	0.41	1.542		0.336		0.349	0.402	0.362	
Pool 17		6.969										
Chamber (C/S)		6.960										
C/S WL		6.940										

68

Table 9 (continued)

Velocity Measurement

Location : Fishpass Structure

Measurement No. 8

Date: July 06, 1996

R/S WL

C/S WL

Head Diff.

9.02 (m PWD)

8.10 (m PWD)

0.92 meter

Direction of Flow :

R/S to C/S

[illegible]

Table 9 (continued)
Velocity Measurement
Location : Fishpass Structure

Measurement No. 9			R/S WL		9.01 (m PWD)		Direction of Flow :		R/S to C/S			
Date: July 13, 1996			C/S WL		8.15 (m PWD)							
			Head Diff.		0.86 meter							
Water Level Location	Slot No.	Water Level (m PWD)	Depth (m)	Width (m)	Area (m ²)	Maximum Velocity at Depth (m)				Av. Max. Velocity (m/s)	Remarks	
						0	0.2	0.4	0.6			0.8
R/S WL Chamber (R/S)		9.010										
Pool 1	1	8.990										
Pool 2	2	8.888	3.458	0.41	1.418		0.904		0.956	0.996	0.952	
Pool 3	3	8.815	3.515	0.41	1.441		0.930		0.956	0.970	0.952	
Pool 4	4	8.746	3.580	0.41	1.468		0.917		0.930	0.930	0.926	
Pool 5	5	8.681	3.652	0.41	1.497		0.911		0.910	0.884	0.902	
Pool 6	6	8.619	3.732	0.41	1.530		0.904		0.890	0.838	0.877	
Pool 7	7	8.561	3.819	0.41	1.566		0.930		0.877	0.811	0.873	
Pool 8	8	8.506	3.914	0.41	1.605		0.904		0.864	0.732	0.833	
Pool 9	9	8.455	4.017	0.41	1.647		0.904		0.864	0.930	0.899	
Pool 10	10	8.408	4.127	0.41	1.692		0.864		0.824	0.772	0.820	
Pool 11	11	8.364	4.244	0.41	1.740		0.838		0.838	0.772	0.816	
Pool 12	12	8.324	4.369	0.41	1.791		0.824		0.798	0.732	0.785	Baffle submerged
Pool 13	13	8.287										Baffle submerged
Pool 14	14	8.260										Baffle submerged
Pool 15	15	8.230										Baffle submerged
Pool 16	16	8.210										Baffle submerged
Pool 17	17	8.180										Baffle submerged
Chamber (C/S)		8.150										
C/S WL		8.150										

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Measurement No. 10		R/S WL	8.98 (m PWD)	Direction of Flow :		R/S to C/S					
Date: July 20, 1996		C/S WL	8.23 (m PWD)								
Head Diff.		0.75 meter									
Water Level Location	Slot No.	Water Level (m PWD)	Depth (m)	Width (m)	Area (m ²)	Maximum Velocity at Depth (m)		Av. Max. Velocity (m/s)	Remarks		
R/S WL		8.975				0	0.2	0.4	0.6	0.8	
Chamber (R/S)		8.960									
Pool 1	1	8.939	3.455	0.41	1.416		0.956		1.009	1.009	0.991
Pool 2	2	8.885	3.511	0.41	1.440		0.983		1.009	0.983	0.992
Pool 3	3	8.847	3.582	0.41	1.469		0.983		0.983	0.956	0.974
Pool 4	4	8.709	3.667	0.41	1.504		0.924		0.977	0.956	0.952
Pool 5	5	8.651	3.767	0.41	1.544		0.864		0.970	0.956	0.930
Pool 6	6	8.593	3.880	0.41	1.591		0.838		0.956	0.930	0.908
Pool 7	7	8.539	4.008	0.41	1.643		0.798		0.904	0.917	0.873
Pool 8	8	8.500	4.150	0.41	1.701		0.758		0.904	0.904	0.855
Pool 9	9	8.454	4.306	0.41	1.765		0.719		0.851	0.838	0.803
Pool 10	10	8.406	4.476	0.41	1.835		0.613		0.666	0.706	0.662
Pool 11	11	8.355									Baffle submerged
Pool 12	12	8.330									Baffle submerged
Pool 13	13	8.310									Baffle submerged
Pool 14	14	8.300									Baffle submerged
Pool 15	15	8.280									Baffle submerged
Pool 16	16	8.260									Baffle submerged
Pool 17		8.240									Baffle submerged
Chamber (C/S)		8.230									
C/S WL		8.230									

Table 9 (continued)
Velocity Measurement
Location : Fishpass Structure

Measurement No. 11

Direction of Flow : R/S to C/S

Date: July 28, 1996

R/S WL 8.79 (m PWD)

C/S WL 8.21 (m PWD)

Head Diff. 0.58 meter

Water Level Location	Slot No.	Water Level (m PWD)	Depth (m)	Width (m)	Area (m ²)	Maximum Velocity at Depth (m)				Av. Max. Velocity (m/s)	Remarks
						0	0.2	0.4	0.6	0.8	
R/S WL		8.790									
Chamber (R/S)		8.770									
Pool 1	1	8.780	3.330	0.41	1.365		0.798		0.904	0.877	0.860
Pool 2	2	8.723	3.405	0.41	1.396		0.824		0.907	0.877	0.869
Pool 3	3	8.668	3.487	0.41	1.430		0.824		0.904	0.877	0.868
Pool 4	4	8.615	3.573	0.41	1.465		0.811		0.884	0.864	0.853
Pool 5	5	8.566	3.666	0.41	1.503		0.798		0.864	0.851	0.838
Pool 6	6	8.519	3.763	0.41	1.543		0.745		0.851	0.851	0.816
Pool 7	7	8.476	3.866	0.41	1.585		0.666		0.798	0.758	0.741
Pool 8	8	8.435	3.974	0.41	1.629		0.606		0.732	0.640	0.659
Pool 9	9	8.396	4.088	0.41	1.676		0.600		0.719	0.640	0.653
Pool 10	10	8.361	4.207	0.41	1.725		0.587		0.719	0.679	0.662
Pool 11	11	8.328	4.332	0.41	1.776		0.587		0.666	0.666	0.640
Pool 12	12	8.299	4.461	0.41	1.829		0.547		0.626	0.692	0.622
Pool 13	13	8.272	4.597	0.41	1.885		0.376		0.389	0.376	0.380
Pool 14	14	8.247									Baffle submerged
Pool 15	15	8.226									Baffle submerged
Pool 16	16	8.210									Baffle submerged
Pool 17	17	8.210									
Chamber (C/S)		8.210									
C/S WL		8.210									

18

Table 9 (continued)

Velocity Measurement

Location : Fishpass Structure

Measurement No. 12

Date: August 03, 1996

R/S WL

C/S WL

Head Diff.

8.72 (m PWD)

8.27 (m PWD)

0.45 meter

Direction of Flow :

S/O P1 S/H

[illegible]

Table 9 (continued)
Velocity Measurement
Location : Fishpass Structure

Measurement No. 13			Direction of Flow :			C/S to R/S						
Date: August 11, 1996			R/S WL	8.308 (m PWD)		C/S WL	8.320 (m PWD)					
			Head Diff.	0.012 meter								
Water Level Location	Slot No.	Water Level (m PWD)	Depth (m)	Width (m)	Area (m ²)	Maximum Velocity at Depth (m)				Av. Max. Velocity (m/s)	Remarks	
						0	0.2	0.4	0.6			0.8
R/S WL		8.308										
Chamber (R/S)		8.310										
Pool 1	1	8.313	2.836	0.41	1.163	0.138	0.151			0.138	0.142	
Pool 2	2	8.314	2.984	0.41	1.223	0.151	0.138			0.164	0.151	
Pool 3	3	8.315	3.132	0.41	1.284	0.178	0.191			0.112	0.160	
Pool 4	4	8.316	3.28	0.41	1.345	0.158	0.171			0.119	0.149	
Pool 5	5	8.317	3.428	0.41	1.405	0.138	0.151			0.125	0.138	
Pool 6	6	8.317	3.576	0.41	1.466	0.085	0.112			0.112	0.103	
Pool 7	7	8.318	3.724	0.41	1.527	0.085	0.085			0.085	0.085	
Pool 8	8	8.318	3.872	0.41	1.588	0.085	0.085			0.072	0.081	
Pool 9	9	8.319	4.02	0.41	1.648	0.085	0.072			0.125	0.094	
Pool 10	10	8.319	4.168	0.41	1.709	0.085	0.072			0.138	0.098	
Pool 11	11	8.319	4.316	0.41	1.770	0.112	0.138			0.085	0.112	Baffle submerged
Pool 12	12	8.320										Baffle submerged
Pool 13	13	8.320										Baffle submerged
Pool 14	14	8.320										Baffle submerged
Pool 15	15	8.320										Baffle submerged
Pool 16	16	8.320										Baffle submerged
Pool 17		8.320										
Chamber (C/S)		8.320										
C/S WL		8.320										

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[illegible]

Table 9 (continued)

Velocity Measurement

Location : Fishpass Structure

Measurement No. 15

Date: August 25, 1996

R/S WL	8.870 (m PWD)

C/S WL	8,480 (m PWD)
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
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11	11
12	12
13	13
14	14
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100	100

Head Diff,	0.39	meter
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Direction of Flow :

R/S to C/S

[illegible]

20

R/S WL	8.540 (m PWD)
1	1.000
2	1.000
3	1.000
4	1.000
5	1.000
6	1.000
7	1.000
8	1.000
9	1.000
10	1.000
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12	1.000
13	1.000
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93	1.000
94	1.000
95	1.000
96	1.000
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98	1.000
99	1.000
100	1.000

Direction of Flow :

S/O or S/H

[illegible]

Table 9 (continued)
Velocity Measurement
Location : Fishpass Structure

Measurement No. 17			R/S WL		8.420 (m PWD)		Direction of Flow :		C/S to R/S			
Date: September 10, 1996			C/S WL		8.450 (m PWD)							
Head Diff.			0.03 meter									
Water Level Location	Slot No.	Water Level (m PWD)	Depth (m)	Width (m)	Area (m ²)	Maximum Velocity at Depth (m)				Av. Max. Velocity (m/s)	Remarks	
						0	0.2	0.4	0.6			0.8
R/S WL Chamber (R/S)		8.420										
Pool 1	1	8.421	2.95	0.41	1.210		0.270		0.283	0.362	0.305	
Pool 2	2	8.422	3.04	0.41	1.246		0.257		0.270	0.296	0.274	
Pool 3	3	8.424	3.24	0.41	1.328		0.283		0.336	0.323	0.314	
Pool 4	4	8.430	3.39	0.41	1.390		0.303		0.356	0.350	0.336	
Pool 5	5	8.432	3.53	0.41	1.447		0.323		0.376	0.376	0.358	
Pool 6	6	8.435	3.65	0.41	1.497		0.323		0.349	0.362	0.345	
Pool 7	7	8.438	3.78	0.41	1.550		0.270		0.270	0.323	0.288	
Pool 8	8	8.441	3.96	0.41	1.624		0.283		0.270	0.310	0.288	
Pool 9	9	8.443	4.12	0.41	1.689		0.244		0.244	0.270	0.253	
Pool 10	10	8.446	4.30	0.41	1.763		0.244		0.283	0.270	0.266	
Pool 11	11	8.449										Baffle submerged
Pool 12	12	8.450										Baffle submerged
Pool 13	13	8.450										Baffle submerged
Pool 14	14	8.450										Baffle submerged
Pool 15	15	8.450										Baffle submerged
Pool 16	16	8.450										Baffle submerged
Pool 17		8.450										Baffle submerged
Chamber (C/S)		8.450										
C/S WL		8.450										

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Measurement No. 18		R/S WL	8.040 (m PWD)	Direction of Flow :				C/S to R/S	
Date: September 15, 1996		C/S WL	8.370 (m PWD)						
Head Diff.		0.33 meter							
Water Level Location	Slot No.	Water Level (m PWD)	Depth (m)	Width (m)	Area (m ²)	Maximum Velocity at Depth (m)		Av. Max. Velocity (m/s)	Remarks
R/S WL		8.040				0			
Chamber (R/S)		8.060							
Pool 1	1	8.082	2.60	0.41	1.066	0.930	0.943	0.930	0.934
Pool 2	2	8.112	2.77	0.41	1.136	0.930	0.956	0.890	0.925
Pool 3	3	8.141	2.98	0.41	1.222	0.890	0.864	0.877	0.877
Pool 4	4	8.168	3.15	0.41	1.292	0.864	0.844	0.844	0.851
Pool 5	5	8.194	3.32	0.41	1.361	0.838	0.824	0.811	0.824
Pool 6	6	8.218	3.45	0.41	1.415	0.798	0.824	0.811	0.811
Pool 7	7	8.240	3.64	0.41	1.492	0.811	0.811	0.772	0.798
Pool 8	8	8.260	3.81	0.41	1.562	0.772	0.798	0.772	0.781
Pool 9	9	8.279	3.98	0.41	1.632	0.719	0.732	0.679	0.710
Pool 10	10	8.297	4.17	0.41	1.710	0.732	0.666	0.613	0.670
Pool 11	11	8.312	4.36	0.41	1.788	0.666	0.640	0.613	0.640
Pool 12	12	8.320							Baffle submerged
Pool 13	13	8.340							Baffle submerged
Pool 14	14	8.350							Baffle submerged
Pool 15	15	8.360							Baffle submerged
Pool 16	16	8.370							Baffle submerged
Pool 17		8.370							
Chamber (C/S)		8.370							
C/S WL		8.370							

Location : Fishpass Structure

C/S to R/S

Baffle submerged
Baffle submerged
Baffle submerged
Baffle submerged
Baffle submerged

Table 9 (continued)
Velocity Measurement
Location : Fishpass Structure

Measurement No. 20

Date: September 19, 1996

R/S WL

C/S WL

Head Diff.

7.370 (m PWD)

7.900 (m PWD)

0.53 meter

Direction of Flow :

C/S 10 R/S

[illegible]

Table 9 (continued)
Velocity Measurement
Location : Fishpass Structure

Measurement No. 21		R/S WL		7.320 (m PWD)		7.900 (m PWD)		Direction of Flow :		C/S to R/S			
Date: September 21, 1996		C/S WL		7.900 (m PWD)		0.58 meter							
Water Level Location	Slot No.	Water Level (m PWD)	Depth (m)	Width (m)	Area (m ²)	Maximum Velocity at Depth (m)					Av. Max. Velocity (m/s)	Remarks	
						0	0.2	0.4	0.6	0.8			
R/S WL		7.320											
Chamber (R/S)		7.360											
Pool 1	1	7.399	2.35	0.41	0.964		1.405		1.458	1.432	1.432	1.432	
Pool 2	2	7.451	2.56	0.41	1.050		1.405		1.432	1.432	1.432	1.423	
Pool 3	3	7.496	2.79	0.41	1.144		1.352		1.392	1.273	1.392	1.339	
Pool 4	4	7.563	2.99	0.41	1.226		1.319		1.359	1.234	1.359	1.304	
Pool 5	5	7.631	3.18	0.41	1.304		1.286		1.326	1.194	1.326	1.269	
Pool 6	6	7.663	3.34	0.41	1.369		1.286		1.300	1.286	1.300	1.291	
Pool 7	7	7.701	3.54	0.41	1.451		1.141		1.115	1.115	1.115	1.124	
Pool 8	8	7.736	3.73	0.41	1.529		1.141		1.115	1.062	1.115	1.106	
Pool 9	9	7.771	3.94	0.41	1.615		1.022		1.062	0.930	1.062	1.005	
Pool 10	10	7.801	4.13	0.41	1.693		0.798		0.930	0.864	0.930	0.864	
Pool 11	11	7.812	4.32	0.41	1.771		0.798		0.864	0.758	0.864	0.807	
Pool 12	12	7.820											Baffle submerged
Pool 13	13	7.830											Baffle submerged
Pool 14	14	7.850											Baffle submerged
Pool 15	15	7.860											Baffle submerged
Pool 16	16	7.876											Baffle submerged
Pool 17	17	7.880											Baffle submerged
Chamber (C/S)		7.890											
C/S WL		7.900											

Table 9 (continued)

Measurement No. 22

Date: September 24, 1996

R/S WL

C/S WL	8.480 (m PWD)
1	1.000
2	1.000
3	1.000
4	1.000
5	1.000
6	1.000
7	1.000
8	1.000
9	1.000
10	1.000
11	1.000
12	1.000
13	1.000
14	1.000
15	1.000
16	1.000
17	1.000
18	1.000
19	1.000
20	1.000
21	1.000
22	1.000
23	1.000
24	1.000
25	1.000
26	1.000
27	1.000
28	1.000
29	1.000
30	1.000
31	1.000
32	1.000
33	1.000
34	1.000
35	1.000
36	1.000
37	1.000
38	1.000
39	1.000
40	1.000
41	1.000
42	1.000
43	1.000
44	1.000
45	1.000
46	1.000
47	1.000
48	1.000
49	1.000
50	1.000
51	1.000
52	1.000
53	1.000
54	1.000
55	1.000
56	1.000
57	1.000
58	1.000
59	1.000
60	1.000
61	1.000
62	1.000
63	1.000
64	1.000
65	1.000
66	1.000
67	1.000
68	1.000
69	1.000
70	1.000
71	1.000
72	1.000
73	1.000
74	1.000
75	1.000
76	1.000
77	1.000
78	1.000
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85	1.000
86	1.000
87	1.000
88	1.000
89	1.000
90	1.000
91	1.000
92	1.000
93	1.000
94	1.000
95	1.000
96	1.000
97	1.000
98	1.000
99	1.000
100	1.000

Head Diff.	0.41	meter

Direction of Flow :

C/S 10 R/S

[illegible]

Table 9 (continued)
Velocity Measurement
Location : Fishpass Structure

Measurement No. 23 R/S WL 7.960 (m PWD) Direction of Flow : C/S to R/S
 Date: September 27, 1996 C/S WL 8.430 (m PWD)
 Head Diff. 0.47 meter

Water Level Location	Slot No.	Water Level (m PWD)	Depth (m)	Width (m)	Area (m ²)	Maximum Velocity at Depth (m)					Av. Max. Velocity (m/s)	Remarks
						0	0.2	0.4	0.6	0.8		
R/S WL		7.960										
Chamber (R/S)		7.980										
Pool 1	1	8.012	2.54	0.41	1.041		1.419		1.392	1.366	1.392	
Pool 2	2	8.083	2.72	0.41	1.115		1.419		1.379	1.326	1.375	
Pool 3	3	8.119	2.94	0.41	1.205		1.352		1.326	1.260	1.313	
Pool 4	4	8.179	3.13	0.41	1.283		1.313		1.306	1.260	1.293	
Pool 5	5	8.239	3.32	0.41	1.361		1.273		1.286	1.260	1.273	
Pool 6	6	8.280	3.45	0.41	1.415		1.260		1.273	1.247	1.260	
Pool 7	7	8.293	3.62	0.41	1.484		1.247		1.260	1.220	1.242	
Pool 8	8	8.320	3.85	0.41	1.579		1.194		1.220	1.168	1.194	
Pool 9	9	8.338	4.03	0.41	1.652		1.022		1.168	1.128	1.106	
Pool 10	10	8.363	4.20	0.41	1.722		0.943		0.970	0.943	0.952	
Pool 11	11	8.388	4.42	0.41	1.812		0.890		0.904	0.798	0.864	
Pool 12	12	8.390										Baffle submerged
Pool 13	13	8.400										Baffle submerged
Pool 14	14	8.410										Baffle submerged
Pool 15	15	8.420										Baffle submerged
Pool 16	16	8.430										Baffle submerged
Pool 17	17	8.430										
Chamber (C/S)		8.430										
C/S WL		8.430										

Table 9 (continued)

Measurement No. 24

Date: September 30, 1996

R/S WL

C/S WL	8.370 (m PWD)
1	1.000
2	1.000
3	1.000
4	1.000
5	1.000
6	1.000
7	1.000
8	1.000
9	1.000
10	1.000
11	1.000
12	1.000
13	1.000
14	1.000
15	1.000
16	1.000
17	1.000
18	1.000
19	1.000
20	1.000
21	1.000
22	1.000
23	1.000
24	1.000
25	1.000
26	1.000
27	1.000
28	1.000
29	1.000
30	1.000
31	1.000
32	1.000
33	1.000
34	1.000
35	1.000
36	1.000
37	1.000
38	1.000
39	1.000
40	1.000
41	1.000
42	1.000
43	1.000
44	1.000
45	1.000
46	1.000
47	1.000
48	1.000
49	1.000
50	1.000
51	1.000
52	1.000
53	1.000
54	1.000
55	1.000
56	1.000
57	1.000
58	1.000
59	1.000
60	1.000
61	1.000
62	1.000
63	1.000
64	1.000
65	1.000
66	1.000
67	1.000
68	1.000
69	1.000
70	1.000
71	1.000
72	1.000
73	1.000
74	1.000
75	1.000
76	1.000
77	1.000
78	1.000
79	1.000
80	1.000
81	1.000
82	1.000
83	1.000
84	1.000
85	1.000
86	1.000
87	1.000
88	1.000
89	1.000
90	1.000
91	1.000
92	1.000
93	1.000
94	1.000
95	1.000
96	1.000
97	1.000
98	1.000
99	1.000
100	1.000

Head Diff.	0.44	meter
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Direction of Flow :

C/S to R/S

[illegible]

Table 9 (continued)
Velocity Measurement
Location : Fishpass Structure

Measurement No. 25 Direction of Flow : C/S to R/S

R/S WL 7.740 (m PWD)
C/S WL 8.240 (m PWD)
Head Diff. 0.5 meter

Date: October 04, 1996

Water Level Location	Slot No.	Water Level (m PWD)	Depth (m)	Width (m)	Area (m ²)	Maximum Velocity at Depth (m)					Av. Max. Velocity (m/s)	Remarks
						0	0.2	0.4	0.6	0.8		
R/S WL		7.740										
Chamber (R/S)		7.760										
Pool 1	1	7.788	2.30	0.41	0.943		1.564		1.590	1.564	1.573	
Pool 2	2	7.853	2.50	0.41	1.025		1.590		1.590	1.537	1.572	
Pool 3	3	7.901	2.72	0.41	1.115		1.564		1.564	1.524	1.551	
Pool 4	4	7.947	2.91	0.41	1.193		1.524		1.538	1.491	1.518	
Pool 5	5	7.994	3.09	0.41	1.267		1.484		1.511	1.458	1.484	
Pool 6	6	8.038	3.24	0.41	1.328		1.445		1.458	1.379	1.427	
Pool 7	7	8.075	3.42	0.41	1.402		1.405		1.392	1.326	1.374	
Pool 8	8	8.108	3.63	0.41	1.488		1.300		1.379	1.326	1.335	
Pool 9	9	8.123	3.82	0.41	1.566		1.300		1.366	1.326	1.331	
Pool 10	10	8.148	4.00	0.41	1.640		1.326		1.194	1.220	1.247	
Pool 11	11	8.173	4.21	0.41	1.726		1.154		1.062	1.009	1.075	
Pool 12	12	8.193	4.350	0.41	1.784		0.970		1.036	0.864	0.957	
Pool 13	13	8.200										Baffle submerged
Pool 14	14	8.210										Baffle submerged
Pool 15	15	8.220										Baffle submerged
Pool 16	16	8.230										Baffle submerged
Pool 17		8.240										
Chamber (C/S)		8.240										
C/S WL		8.240										

Table 9(continued)

Velocity Measurement

Location : Fishpass Structure

Measurement No. 26

Date: October 08, 1996

R/S WL

8.060 (m PWD)

8.290 (m PWD)

Head Diff.	0.23	meter
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Direction of Flow :

C/S 10 R/S

[illegible]

Table 9 (continued)
Velocity Measurement
Location : Fishpass Structure

C/S to R/S

Measurement No. 27
 Date: October 11, 1996
 R/S WL 7.850 (m PWD)
 C/S WL 8.200 (m PWD)
 Head Diff. 0.35 meter

Direction of Flow :

Water Level Location	Slot No.	Water Level (m PWD)	Depth (m)	Width (m)	Area (m ²)	Maximum Velocity at Depth (m)				Av. Max. Velocity (m/s)	Remarks
						0	0.2	0.4	0.6	0.8	
R/S WL		7.850									
Chamber (R/S)		7.890									
Pool 1	1	7.927	2.44	0.41	1.000		1.220		1.247	1.260	1.242
Pool 2	2	7.953	2.58	0.41	1.058		1.220		1.234	1.207	1.220
Pool 3	3	7.972	2.80	0.41	1.148		1.194		1.207	1.154	1.185
Pool 4	4	7.998	2.96	0.41	1.214		1.168		1.201	1.135	1.168
Pool 5	5	8.024	3.13	0.41	1.283		1.141		1.194	1.115	1.150
Pool 6	6	8.052	3.25	0.41	1.333		1.102		1.141	1.062	1.102
Pool 7	7	8.079	3.45	0.41	1.415		1.062		1.115	0.996	1.058
Pool 8	8	8.097	3.62	0.41	1.484		0.956		0.930	0.930	0.939
Pool 9	9	8.107	3.81	0.41	1.562		0.851		0.904	0.864	0.873
Pool 10	10	8.118	4.00	0.41	1.640		0.824		0.864	0.798	0.829
Pool 11	11	8.132	4.18	0.41	1.714		0.732		0.758	0.732	0.741
Pool 12	12	8.142	4.33	0.41	1.775		0.666		0.692	0.666	0.675
Pool 13	13	8.150									Baffle submerged
Pool 14	14	8.160									Baffle submerged
Pool 15	15	8.170									Baffle submerged
Pool 16	16	8.180									Baffle submerged
Pool 17	17	8.190									
Chamber (C/S)		8.200									
C/S WL		8.200									

200

C/S to R/S

Direction of Flow :

C/S WL	7.910 (m PWD)
1	1.000
2	1.000
3	1.000
4	1.000
5	1.000
6	1.000
7	1.000
8	1.000
9	1.000
10	1.000
11	1.000
12	1.000
13	1.000
14	1.000
15	1.000
16	1.000
17	1.000
18	1.000
19	1.000
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32	1.000
33	1.000
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35	1.000
36	1.000
37	1.000
38	1.000
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41	1.000
42	1.000
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49	1.000
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89	1.000
90	1.000
91	1.000
92	1.000
93	1.000
94	1.000
95	1.000
96	1.000
97	1.000
98	1.000
99	1.000
100	1.000

in PWD)

[illegible]

Table 9 (continued)
Velocity Measurement
Location : Fishpass Structure

Measurement No. 29			R/S WL		6.620 (m PWD)		Direction of Flow :		C/S to R/S				
Date: October 22, 1996			C/S WL		7.700 (m PWD)								
			Head Diff.		1.08 meter								
Water Level Location	Slot No.	Water Level (m PWD)	Depth (m)	Width (m)	Area (m ²)	Maximum Velocity at Depth (m)					Av. Max. Velocity (m/s)	Remarks	
						0	0.2	0.4	0.6	0.8			
R/S WL		6.620											
Chamber (R/S)		6.700											
Pool 1	1	6.802	1.35	0.41	0.554		2.184		2.197	2.171	2.184	2.184	
Pool 2	2	6.954	1.50	0.41	0.615		2.197		2.197	2.184	2.193	2.193	
Pool 3	3	7.105	1.74	0.41	0.713		2.118		2.144	2.105	2.122	2.122	
Pool 4	4	7.193	1.96	0.41	0.804		2.085		2.131	2.085	2.100	2.100	
Pool 5	5	7.280	2.18	0.41	0.894		2.052		2.118	2.065	2.078	2.078	
Pool 6	6	7.355	2.56	0.41	1.050		1.986		2.052	1.986	2.008	2.008	
Pool 7	7	7.420	2.75	0.41	1.128		1.986		1.986	1.946	1.973	1.973	
Pool 8	8	7.475	2.95	0.41	1.210		1.854		1.788	1.722	1.788	1.788	
Pool 9	9	7.490	3.16	0.41	1.296		1.537		1.590	1.564	1.564	1.564	
Pool 10	10	7.528	3.37	0.41	1.382		1.432		1.458	1.352	1.414	1.414	
Pool 11	11	7.568	3.58	0.41	1.468		1.326		1.326	1.260	1.304	1.304	
Pool 12	12	7.600	3.74	0.41	1.533		1.062		1.128	1.088	1.093	1.093	
Pool 13	13	7.617	3.92	0.41	1.607		0.798		1.022	0.798	0.873	0.873	
Pool 14	14	7.647	4.08	0.41	1.673		0.732		0.930	0.798	0.820	0.820	
Pool 15	15	7.670	4.24	0.41	1.738		0.666		0.798	0.692	0.719	0.719	
Pool 16	16	7.680	4.35	0.41	1.784		0.547		0.600	0.560	0.569	0.569	
Pool 17		7.690											
Chamber (C/S)		7.695											
C/S WL		7.700											

Table 9 (continued)
Velocity Measurement
Location : Fishpass Structure

Measurement No. 30		R/S WL		6.210 (m PWD)		Direction of Flow :		C/S to R/S				
Date: October 25, 1996		C/S WL		7.480 (m PWD)		Head Diff.		1.27 meter				
Water Level Location	Slot No.	Water Level	Depth	Width	Area	Maximum Velocity at Depth (m)				Av. Max. Velocity (m/s)	Remarks	
		(m PWD)	(m)	(m)	(m ²)	0	0.2	0.4	0.6			0.8
R/S WL		6.210										
Chamber (R/S)		6.360										
Pool 1	1	6.491	0.92	0.41	0.377		2.646		2.646	2.527	2.606	
Pool 2	2	6.725	1.32	0.41	0.541		2.382		2.382	2.329	2.364	
Pool 3	3	6.880	1.68	0.41	0.689		2.382		2.356	2.342	2.360	
Pool 4	4	6.987	1.84	0.41	0.754		2.250		2.224	2.164	2.213	
Pool 5	5	7.094	2.00	0.41	0.820		2.118		2.092	1.986	2.065	
Pool 6	6	7.174	2.35	0.41	0.964		1.986		2.052	1.986	2.008	
Pool 7	7	7.220	2.52	0.41	1.033		1.854		1.722	1.524	1.700	
Pool 8	8	7.273	2.75	0.41	1.128		1.326		1.260	1.141	1.242	
Pool 9	9	7.311	2.94	0.41	1.205		1.194		1.141	1.009	1.115	
Pool 10	10	7.344	3.14	0.41	1.287		1.119		1.168	1.036	1.108	
Pool 11	11	7.383	3.35	0.41	1.374		1.119		1.168	1.168	1.152	
Pool 12	12	7.402	3.49	0.41	1.431		1.102		1.062	1.036	1.067	
Pool 13	13	7.424	3.70	0.41	1.517		1.022		1.009	0.983	1.005	
Pool 14	14	7.440	3.85	0.41	1.579		0.930		0.956	0.851	0.912	
Pool 15	15	7.451	4.02	0.41	1.648		0.798		0.798	0.772	0.789	
Pool 16	16	7.465	4.15	0.41	1.702		0.587		0.534	0.534	0.552	
Pool 17		7.490										
Chamber (C/S)		7.480										
C/SWL		7.480										

Table 10
Computed Velocities at Vertical Slots
Direction of Flow : R/S to C/S

Measurement No.	1	2	3	4	5	6	7	8	9	10	11	12	14	15	16
Date	May 18,96	May 25,96	Jun 01,96	Jun 08,96	Jun 16,96	Jun 22,96	Jun 30,96	JUL 06,96	Jul 13,96	Jul 20,96	Jul 28,96	Aug 03,96	Aug 18,96	Aug 25,96	Sep 08,96
R/S WL (m PWD)	8.240	7.630	8.140	8.610	7.800	7.480	7.380	9.020	9.010	8.980	8.790	8.720	8.700	8.870	8.540
C/S WL (m PWD)	5.120	5.530	5.950	6.830	6.640	6.680	6.940	8.100	8.150	8.230	8.210	8.270	8.443	8.480	8.450
Head Diff. (m)	3.120	2.100	2.190	1.780	1.160	0.800	0.440	0.920	0.860	0.750	0.580	0.450	0.257	0.390	0.090

Slot No.	Velocity (meter/sec)														
1	1.976	2.054	2.080	1.510	1.490	1.227	0.821	1.060	0.955	0.981	0.886	0.852	0.667	0.859	0.365
2	2.006	2.044	2.076	1.478	1.490	1.233	0.793	1.067	0.940	0.985	0.871	0.839	0.654	0.822	0.360
3	2.035	2.034	2.069	1.448	1.484	1.233	0.766	1.068	0.924	0.980	0.854	0.824	0.640	0.786	0.354
4	2.063	2.024	2.060	1.420	1.472	1.229	0.738	1.063	0.908	0.967	0.833	0.807	0.624	0.752	0.347
5	2.091	2.014	2.049	1.394	1.455	1.219	0.711	1.051	0.892	0.945	0.810	0.789	0.606	0.719	0.338
6	2.118	2.004	2.035	1.370	1.432	1.203	0.683	1.033	0.876	0.914	0.784	0.768	0.586	0.686	0.328
7	2.145	1.994	2.019	1.348	1.403	1.182	0.656	1.008	0.861	0.875	0.754	0.745	0.563	0.655	0.316
8	2.171	1.984	2.001	1.328	1.368	1.156	0.628	0.977	0.845	0.827	0.722	0.720	0.539	0.625	0.303
9	2.196	1.975	1.980	1.309	1.327	1.125	0.601	0.940	0.829	0.771	0.686	0.693	0.513	0.597	0.289
10	2.221	1.965	1.957	1.293	1.281	1.088	0.573	0.896	0.813	0.706	0.648	0.664	0.485	0.569	0.274
11	2.245	1.955	1.931	1.279	1.229	1.046	0.546	0.846	0.797		0.607	0.633			
12	2.269	1.945	1.903	1.266	1.171	0.999	0.518	0.789							
13	2.292	1.935	1.872	1.256	1.107	0.946	0.491	0.726							
14	2.314	1.925	1.839	1.247	1.038	0.888	0.463	0.657							
15	2.336	1.915	1.804	1.241	0.963	0.825	0.436	0.581							
16	2.357	1.905	1.767	1.236	0.882	0.756	0.408	0.499							

Indicates vertical slots submerged

Table 11
Computed Velocities at Vertical Slots
Direction of Flow : C/S to R/S

Measurement No.	13	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Date	Aug 11,96	Sep 10,96	Sep 15,96	Sep 16,96	Sep 19,96	Sep 21,96	Sep 24,96	Sep 27,96	Sep 30,96	Oct 04,96	Oct 08,96	Oct 11,96	Oct 18,96	Oct 22,96	Oct 25,96
R/S WL (m PWD)	8.308	8.420	8.040	7.480	7.370	7.320	8.070	7.960	7.930	7.740	8.060	7.850	7.080	6.620	6.210
C/S WL (m PWD)	8.32	8.450	8.370	7.880	7.900	7.900	8.480	8.430	8.370	8.240	8.290	8.200	7.910	7.700	7.480
Head Diff. (m)	0.012	0.03	0.33	0.4	0.53	0.58	0.41	0.47	0.44	0.5	0.23	0.35	0.83	1.08	1.27

Slot No.	Velocity (meter/sec)														
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
1	0.153	0.324	0.929	0.994	1.338	1.424	1.315	1.357	1.426	1.548	0.734	1.241	1.989	2.249	2.672
2	0.147	0.319	0.908	0.999	1.323	1.403	1.302	1.360	1.412	1.546	0.709	1.224	1.962	2.210	2.478
3	0.140	0.315	0.885	0.994	1.305	1.374	1.281	1.351	1.388	1.534	0.685	1.201	1.946	2.161	2.293
4	0.133	0.310	0.858	0.979	1.283	1.335	1.250	1.332	1.355	1.512	0.661	1.170	1.936	2.102	2.116
5	0.126	0.305	0.829	0.954	1.258	1.288	1.211	1.301	1.312	1.480	0.637	1.132	1.928	2.033	1.948
6	0.119	0.300	0.796	0.918	1.229	1.231	1.164	1.259	1.261	1.438	0.613	1.087	1.917	1.954	1.788
7	0.113	0.295	0.761	0.873	1.197	1.166	1.108	1.206	1.199	1.386	0.589	1.035	1.901	1.865	1.637
8	0.106	0.291	0.722	0.818	1.161	1.091	1.043	1.141	1.129	1.324	0.565	0.977	1.873	1.766	1.494
9	0.099	0.286	0.681	0.753	1.122	1.008	0.970	1.066	1.049	1.252	0.542	0.911	1.831	1.657	1.360
10	0.092	0.281	0.636	0.678	1.080	0.915	0.888	0.979	0.958	1.170	0.519	0.838	1.770	1.538	1.235
11	0.085		0.589	0.593	1.034	0.814	0.797	0.881	0.858	1.078	0.496	0.758	1.686	1.409	1.118
12										0.976	0.473	0.671	1.574	1.270	1.010
13													1.431	1.121	0.911
14													1.252	0.962	0.820
15														0.793	0.738
16														0.614	0.664

Indicates vertical slots submerged

Table 12
Water Level Head Difference and Fishpass Slot Velocity Data
Year 1996

DAY TIME	MARCH			APRIL			MAY			JUNE			JULY			AUGUST			SEPTEMBER			OCTOBER			
	C/S (m PMD)	R/S (m PMD)	Head Diff. (meter)	C/S (m PMD)	R/S (m PMD)	Head Diff. (meter)	C/S (m PMD)	R/S (m PMD)	Head Diff. (meter)	C/S (m PMD)	R/S (m PMD)	Head Diff. (meter)	C/S (m PMD)	R/S (m PMD)	Head Diff. (meter)	C/S (m PMD)	R/S (m PMD)	Head Diff. (meter)	C/S (m PMD)	R/S (m PMD)	Head Diff. (meter)	C/S (m PMD)	R/S (m PMD)	Head Diff. (meter)	
1 07:00	4.08	3.58	---	4.16	7.37	2.55	4.56	5.51	0.95	6.00	8.12	2.12	2.053	7.06	7.43	0.37	0.720	0.78	0.06	8.48	8.66	0.18	8.35	7.95	-0.40
2 07:00	4.09	3.58	---	4.58	7.37	2.55	4.71	5.50	0.79	6.06	8.20	2.14	2.053	7.17	7.45	0.28	0.600	0.69	0.09	8.48	8.66	0.18	8.35	7.95	-0.40
3 07:00	4.09	3.58	---	4.70	7.56	2.86	4.71	5.50	0.79	6.17	8.40	2.23	2.116	7.35	8.03	0.68	1.036	0.78	0.24	8.45	8.65	0.19	8.31	7.90	-0.41
4 07:00	4.09	3.57	---	4.58	7.56	2.98	4.71	5.50	0.79	6.25	8.48	2.24	2.122	7.49	8.28	0.79	1.236	0.86	0.18	8.45	8.65	0.19	8.30	7.86	-0.44
5 07:00	4.05	3.56	---	4.56	7.68	3.12	4.71	5.46	0.75	6.42	8.58	2.18	2.086	7.61	8.51	0.90	1.228	0.87	0.15	8.44	8.64	0.20	8.28	7.81	-0.47
6 07:00	4.05	3.56	---	4.56	7.68	3.12	4.71	5.47	0.70	6.52	8.63	2.21	2.105	7.75	8.69	0.94	1.252	0.86	0.19	8.44	8.63	0.19	8.28	7.80	-0.48
7 07:00	4.05	3.56	---	4.56	7.68	3.12	4.71	5.47	0.69	6.62	8.63	2.21	2.105	7.81	8.85	1.04	1.326	0.82	0.23	8.43	8.62	0.19	8.25	7.75	-0.50
8 07:00	4.03	3.55	---	4.56	7.70	3.24	4.71	5.50	0.69	6.72	8.63	2.11	2.047	7.81	9.05	1.24	1.326	0.82	0.23	8.43	8.62	0.19	8.25	7.75	-0.50
9 07:00	4.02	3.55	---	4.56	7.71	3.11	4.71	5.51	0.77	6.81	8.60	2.00	2.036	7.89	9.21	1.32	1.331	0.62	0.20	8.43	8.60	0.17	8.23	7.74	-0.48
10 07:00	4.00	3.55	---	4.56	7.71	3.13	4.71	5.50	0.74	6.92	8.60	2.00	2.036	7.89	9.38	1.43	1.331	0.62	0.20	8.43	8.59	0.16	8.23	7.74	-0.49
11 07:00	3.98	3.52	---	4.56	7.71	3.13	4.71	5.50	0.74	7.02	8.60	1.97	1.965	8.07	9.52	1.45	1.331	0.62	0.20	8.43	8.57	0.14	8.23	7.74	-0.49
12 07:00	3.97	3.50	---	4.56	7.67	3.01	4.71	5.52	0.81	7.12	8.60	1.97	1.965	8.10	9.65	1.61	1.331	0.62	0.20	8.43	8.56	0.14	8.23	7.74	-0.49
13 07:00	3.96	3.49	---	4.56	7.66	3.05	4.71	5.50	0.84	7.23	8.60	1.91	1.965	8.11	9.78	1.76	1.331	0.62	0.20	8.43	8.55	0.14	8.23	7.74	-0.49
14 07:00	3.94	3.46	---	4.56	7.57	2.96	4.71	5.50	0.84	7.34	8.60	1.84	1.965	8.11	9.91	1.91	1.331	0.62	0.20	8.43	8.54	0.14	8.23	7.74	-0.49
15 07:00	3.91	3.44	---	4.56	7.54	3.08	4.71	5.49	0.81	7.45	8.60	1.78	1.965	8.11	10.04	2.06	1.331	0.62	0.20	8.43	8.53	0.14	8.23	7.74	-0.49
16 07:00	3.88	3.40	---	4.56	7.46	3.00	4.71	5.50	0.84	7.56	8.60	1.71	1.965	8.11	10.17	2.21	1.331	0.62	0.20	8.43	8.52	0.14	8.23	7.74	-0.49
17 07:00	3.84	3.36	---	4.56	7.43	3.07	4.71	5.48	0.86	7.67	8.60	1.64	1.965	8.11	10.30	2.36	1.331	0.62	0.20	8.43	8.51	0.14	8.23	7.74	-0.49
18 07:00	3.80	3.32	---	4.56	7.40	3.04	4.71	5.47	0.86	7.78	8.60	1.57	1.965	8.11	10.43	2.51	1.331	0.62	0.20	8.43	8.50	0.14	8.23	7.74	-0.49
19 07:00	3.77	3.29	---	4.56	7.37	3.01	4.71	5.46	0.86	7.89	8.60	1.50	1.965	8.11	10.56	2.66	1.331	0.62	0.20	8.43	8.49	0.14	8.23	7.74	-0.49
20 07:00	3.73	3.25	---	4.56	7.34	2.97	4.71	5.45	0.86	8.00	8.60	1.43	1.965	8.11	10.69	2.81	1.331	0.62	0.20	8.43	8.48	0.14	8.23	7.74	-0.49
21 07:00	3.69	3.21	---	4.56	7.31	2.94	4.71	5.44	0.86	8.11	8.60	1.36	1.965	8.11	10.82	2.96	1.331	0.62	0.20	8.43	8.47	0.14	8.23	7.74	-0.49
22 07:00	3.65	3.17	---	4.56	7.28	2.91	4.71	5.43	0.86	8.22	8.60	1.29	1.965	8.11	10.95	3.11	1.331	0.62	0.20	8.43	8.46	0.14	8.23	7.74	-0.49
23 07:00	3.61	3.13	---	4.56	7.25	2.88	4.71	5.42	0.86	8.33	8.60	1.22	1.965	8.11	11.08	3.26	1.331	0.62	0.20	8.43	8.45	0.14	8.23	7.74	-0.49
24 07:00	3.57	3.09	---	4.56	7.22	2.85	4.71	5.41	0.86	8.44	8.60	1.15	1.965	8.11	11.21	3.41	1.331	0.62	0.20	8.43	8.44	0.14	8.23	7.74	-0.49
25 07:00	3.53	3.05	---	4.56	7.19	2.82	4.71	5.40	0.86	8.55	8.60	1.08	1.965	8.11	11.34	3.56	1.331	0.62	0.20	8.43	8.43	0.14	8.23	7.74	-0.49
26 07:00	3.49	3.01	---	4.56	7.16	2.79	4.71	5.39	0.86	8.66	8.60	1.01	1.965	8.11	11.47	3.71	1.331	0.62	0.20	8.43	8.42	0.14	8.23	7.74	-0.49
27 07:00	3.45	2.97	---	4.56	7.13	2.76	4.71	5.38	0.86	8.77	8.60	0.94	1.965	8.11	11.60	3.86	1.331	0.62	0.20	8.43	8.41	0.14	8.23	7.74	-0.49
28 07:00	3.41	2.93	---	4.56	7.10	2.73	4.71	5.37	0.86	8.88	8.60	0.87	1.965	8.11	11.73	4.01	1.331	0.62	0.20	8.43	8.40	0.14	8.23	7.74	-0.49
29 07:00	3.37	2.89	---	4.56	7.07	2.70	4.71	5.36	0.86	8.99	8.60	0.80	1.965	8.11	11.86	4.16	1.331	0.62	0.20	8.43	8.39	0.14	8.23	7.74	-0.49
30 07:00	3.33	2.85	---	4.56	7.04	2.67	4.71	5.35	0.86	9.10	8.60	0.73	1.965	8.11	11.99	4.31	1.331	0.62	0.20	8.43	8.38	0.14	8.23	7.74	-0.49
31 07:00	3.29	2.81	---	4.56	7.01	2.64	4.71	5.34	0.86	9.21	8.60	0.66	1.965	8.11	12.12	4.46	1.331	0.62	0.20	8.43	8.37	0.14	8.23	7.74	-0.49
1 08:00	4.08	3.58	---	4.16	7.37	2.55	4.56	5.51	0.95	6.00	8.12	2.12	2.053	7.06	7.43	0.37	0.720	0.78	0.06	8.48	8.66	0.18	8.35	7.95	-0.40
2 08:00	4.09	3.58	---	4.58	7.37	2.55	4.71	5.50	0.79	6.06	8.20	2.14	2.053	7.17	7.45	0.28	0.600	0.69	0.09	8.48	8.66	0.18	8.35	7.95	-0.40
3 08:00	4.09	3.58	---	4.70	7.56	2.86	4.71	5.50	0.79	6.17	8.40	2.23	2.116	7.35	8.03	0.68	1.036	0.78	0.24	8.45	8.65	0.19	8.31	7.90	-0.41
4 08:00	4.05	3.56	---	4.56	7.56	2.98	4.71	5.50	0.79	6.25	8.48	2.24	2.122	7.49	8.28	0.79	1.236	0.86	0.18	8.44	8.64	0.20	8.28	7.81	-0.47
5 08:00	4.05	3.56	---	4.56	7.68	3.12	4.71	5.46	0.75	6.42	8.58	2.18	2.086	7.61	8.51	0.90	1.228	0.87	0.15	8.44	8.64	0.20	8.28	7.81	-0.47
6 08:00	4.05	3.56	---	4.56	7.68	3.12	4.71	5.47	0.70	6.52	8.63	2.21	2.105	7.75	8.69	0.94	1.252	0.86	0.19	8.44	8.63	0.19	8.28	7.80	-0.48
7 08:00	4.03	3.55	---	4.56	7.70	3.24	4.71	5.50	0.69	6.62	8.63	2.11	2.047	7.81	8.85	1.04	1.326	0.82	0.23	8.43	8.62	0.19	8.25	7.75	-0.50
8 08:00	4.02	3.55	---	4.56	7.71	3.11	4.71	5.51	0.77	6.81	8.60	2.00	2.036	7.89	9.21	1.32	1.331	0.62	0.20	8.43	8.60	0.17	8.23	7.74	-0.48
9 08:00	4.00	3.55	---	4.56	7.71	3.13	4.71	5.50	0.74	6.92	8.60	2.00	2.036	7.89	9.38	1.43	1.331	0.62	0.20	8.43	8.59	0.16	8.23	7.74	-0.49
10 08:00	3.98	3.52	---	4.56	7.71	3.13	4.71	5.50	0.74	7.02	8.60	1.97	1.965	8.07	9.52	1.45	1.331	0.62	0.20	8.43	8.57	0.14	8.23	7.74	-0.49
11 08:00	3.97	3.50	---	4.56	7.67	3.01	4.71	5.52	0.81	7.12	8.60	1.97	1.965	8.10	9.65	1.61	1.331	0.62	0.20	8.43	8.56	0.14	8.23	7.74	-0.49
12 08:00	3.96	3.49	---	4.56	7.66	3.05	4.71	5.50	0.84	7.23	8.60	1.91	1.965	8.11	9.78	1.76	1.331	0.62	0.20	8.43	8.55	0.14	8.23	7.74	-0.49
13 08:00	3.94	3.46	---	4.56	7.57	2.96	4.71	5.50	0.84	7.34	8.60	1.84	1.965	8.11	9.91	1.91	1.331	0.62	0.20	8.43	8.54	0.14	8.23	7.74	-0.49
14 08:00	3.91	3.44	---	4.56	7.54	3.08	4.71	5.49	0.81	7.45	8.60	1.78	1.965	8.11	10.04	2.06	1.331	0.62	0.20	8.43	8.53	0.14	8.23	7.74	-0.49
15 08:00	3.88	3.40	---	4.56	7.46	3.00	4.71	5.50	0.84	7.56	8.60	1.71	1.965	8.11	10.17	2.21	1.331	0.62	0.20	8.43	8.52	0.14	8.23	7.74	-0.49
16 08:00	3.84	3.36	---	4.56	7.43	3.07	4.71	5.48	0.86	7.67	8.60	1.64	1.965	8.11	10.30	2.36	1.331	0.62	0.20	8.43	8.51	0.14	8.23	7.74	-0.49
17 08:00	3.80	3.32	---	4.56	7.40	3.04	4.71	5.47	0.86	7.78	8.60	1.57	1.965	8.11	10.43	2.51	1.331	0.62	0.20	8.43	8.50	0.14	8.23	7.74	-0.49
18 08:00	3.77	3.29	---	4.56	7.37	3.01	4.71	5.46	0.86	7.89	8.60														

Table 13: Frequency of Occurrence of Velocity Ranges at Critical Slots
(Slot 1 and Slot 16)

Velocity Range (meter/sec)	Percent of Occurrence		
	R/S to C/S	C/S to R/S	Total
0.00-0.25	2.40	1.90	2.30
0.26-0.50	9.20	1.00	7.20
0.51-0.75	11.90	3.80	10.00
0.76-1.00	7.00	9.60	7.70
1.01-1.25	24.80	18.30	23.20
1.26-1.50	8.30	28.80	13.20
1.51-1.75	5.50	5.80	5.60
1.76-2.00	10.40	6.70	9.50
2.01-2.25	11.30	7.70	10.40
2.26-2.50	9.20	3.80	7.90
2.51-2.75		3.8	0.90
2.76-3.00		8.7	2.10

Table 14

Discharge Measurement
Year 1996

Flow Direction : R/S to C/S

Measurement No.	R/S WL (m PWD)	C/S WL (m PWD)	Head Diff. (Structure) (meter)	Discharge (m ³ /s)	Max. Velocity (m/sec)
1	8.240	5.120	3.120	1.123	1.976
2	7.630	5.530	2.100	0.820	2.054
3	8.140	5.950	2.190	1.035	2.080
4	8.610	6.830	1.780	1.320	1.510
5	7.800	6.640	1.160	0.727	1.490
6	7.480	6.680	0.800	0.583	1.227
7	7.380	6.940	0.440	0.437	0.821
8	9.020	8.100	0.920	1.151	1.060
9	9.010	8.150	0.860	1.009	0.955
10	8.975	8.230	0.745	0.907	0.981
11	8.790	8.210	0.580	0.854	0.886
12	8.720	8.270	0.450	0.742	0.852
14	8.700	8.443	0.257	0.611	0.667
15	8.870	8.480	0.390	0.626	0.859
16	8.540	8.450	0.090	0.293	0.365

Discharge Measurement
Year 1996

Flow Direction : C/S to R/S

Measurement No.	R/S WL (m PWD)	C/S WL (m PWD)	Head Diff. (Structure) (meter)	Discharge (m ³ /s)	Max. Velocity (m/sec)
17	8.420	8.450	0.030	0.437	0.324
20	7.370	7.900	0.530	1.145	1.338
21	7.320	7.900	0.580	1.269	1.424
22	8.070	8.480	0.410	1.148	1.315
23	7.960	8.430	0.470	1.359	1.357
24	7.930	8.370	0.440	1.228	1.426
25	7.740	8.240	0.500	1.121	1.548
26	8.060	8.290	0.230	0.809	0.738
27	7.850	8.200	0.350	1.041	1.241
28	7.080	7.910	0.830	1.452	1.989
29	6.620	7.700	1.080	1.465	2.249
30	6.210	7.480	1.270	1.070	2.672

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Note: Negative values indicate flow direction C/S to R/S

Table 16
Computed Turbulence in Pool No. 1 of Fishpass

(Negative value indicates flow from C/S to R/S)

Date	Prject WL	River WL	Head Diff.	Discharge	Head loss at Pool 1	Pool 1			Volume	Turbulence
	(m PWD)	(m PWD)	(meter)	(m ³ /s)	(m)	Length (m)	Width (m)	Hieght (m)	(m ³)	(W/m ³)
March 01	4.08	3.58				2.90	2.50			
	4.09	3.59				2.90	2.50			
	4.09	3.58				2.90	2.50			
	4.08	3.57				2.90	2.50			
	4.05	3.56				2.90	2.50			
	4.05	3.56				2.90	2.50			
	4.03	3.55				2.90	2.50			
	4.02	3.55				2.90	2.50			
	4.00	3.55				2.90	2.50			
	3.99	3.52				2.90	2.50			
	3.97	3.50				2.90	2.50			
	3.96	3.49				2.90	2.50			
	3.94	3.46				2.90	2.50			
	3.91	3.44				2.90	2.50			
	3.88	3.40				2.90	2.50			
	3.84	3.39				2.90	2.50			
	3.81	3.37				2.90	2.50			
	3.80	3.36				2.90	2.50			
	3.79	3.36				2.90	2.50			
	3.79	3.36				2.90	2.50			
	3.77	3.34				2.90	2.50			
	3.75	3.33				2.90	2.50			
	3.67	3.30				2.90	2.50			
	3.67	3.30				2.90	2.50			
	3.91	3.36				2.90	2.50			
	4.18	3.41				2.90	2.50			
	4.20	3.46				2.90	2.50			
	4.21	3.49				2.90	2.50			
	4.86	5.16				2.90	2.50			
	4.86	5.46				2.90	2.50	0.00	0.00	
	4.44	5.86	1.42	0.147	0.106	2.90	2.50	0.40	2.90	52.35
	4.30	6.01	1.71	0.214	0.119	2.90	2.50	0.55	3.99	62.54
	4.59	8.08	1.49	0.231	0.109	2.90	2.50	0.62	4.49	54.94
	4.42	6.11	1.69	0.252	0.118	2.90	2.50	0.65	4.71	61.88
	4.48	6.11	1.65	0.250	0.117	2.90	2.50	0.65	4.71	60.55
	4.18	6.06	1.90	0.240	0.126	2.90	2.50	0.60	4.35	68.34
	4.28	5.98	1.72	0.203	0.120	2.90	2.50	0.52	3.77	62.86
	4.16	5.96	1.80	0.197	0.123	2.90	2.50	0.50	3.63	65.38
	4.36	5.87	1.51	0.153	0.110	2.90	2.50	0.41	2.97	55.67
	4.26	5.74	1.48	0.104	0.109	2.90	2.50	0.28	2.03	54.58
	4.16	5.67	1.51	0.079	0.110	2.90	2.50	0.21	1.52	55.67
	4.41	5.55	1.14	0.031	0.090	2.90	2.50	0.09	0.65	41.35
	4.21	5.44				2.90	2.50			
	4.21	5.40				2.90	2.50			
	4.21	5.06				2.90	2.50			
	4.21	5.03				2.90	2.50			
	4.16	4.83				2.90	2.50			
	4.16	4.74				2.90	2.50			
	4.56	4.56				2.90	2.50			
	4.61	4.51				2.90	2.50			
	4.68	4.46				2.90	2.50			
	4.64	4.41				2.90	2.50			
	4.61	4.36				2.90	2.50			
	4.61	4.58				2.90	2.50			
	4.58	5.21				2.90	2.50			
	4.58	5.66	1.10	0.067	0.088	2.90	2.50	0.20	1.45	39.71
	4.58	6.01	1.45	0.203	0.107	2.90	2.50	0.55	3.99	53.47
	4.56	6.14	1.58	0.258	0.114	2.90	2.50	0.68	4.93	58.15
	4.86	6.53	1.67	0.413	0.116	2.90	2.50	1.07	7.76	61.22
	4.56	6.66	2.10	0.493	0.133	2.90	2.50	1.20	8.70	73.60
	4.76	7.00	2.24	0.641	0.137	2.90	2.50	1.54	11.17	76.71
	4.63	7.11	2.48	0.699	0.142	2.90	2.50	1.65	11.96	80.90
April 01	4.76	7.31	2.55	0.787	0.143	2.90	2.50	1.85	13.41	81.83
	4.58	7.37	2.79	0.820	0.145	2.90	2.50	1.91	13.85	84.03
	4.70	7.56	2.86	0.903	0.146	2.90	2.50	2.10	15.23	84.37
	4.58	7.56	2.98	0.904	0.146	2.90	2.50	2.10	15.23	84.64
	4.58	7.68	3.12	0.955	0.146	2.90	2.50	2.22	16.09	84.45
	4.58	7.68	3.12	0.955	0.146	2.90	2.50	2.22	16.09	84.45
	4.58	7.70	2.94	0.964	0.146	2.90	2.50	2.24	16.24	84.59
	4.60	7.71	3.11	0.968	0.146	2.90	2.50	2.25	16.31	84.48
	4.58	7.71	3.13	0.968	0.146	2.90	2.50	2.25	16.31	84.42
	4.71	7.70	2.99	0.964	0.146	2.90	2.50	2.24	16.24	84.64
	4.66	7.67	3.01	0.951	0.146	2.90	2.50	2.21	16.02	84.65
	4.61	7.66	3.05	0.947	0.146	2.90	2.50	2.20	15.95	84.61
	5.01	7.57	2.56	0.898	0.143	2.90	2.50	2.11	15.30	81.95
	4.46	7.54	3.08	0.895	0.146	2.90	2.50	2.08	15.08	84.58
	4.46	7.46	3.00	0.861	0.146	2.90	2.50	2.00	14.50	84.65
	4.36	7.43	3.07	0.848	0.146	2.90	2.50	1.97	14.28	84.58
	4.96	7.30	2.34	0.773	0.139	2.90	2.50	1.84	13.34	78.64
	4.46	7.24	2.78	0.764	0.145	2.90	2.50	1.78	12.91	83.97
	4.36	7.15	2.79	0.726	0.145	2.90	2.50	1.69	12.25	84.03

Table 16

Computed Turbulence in Pool No. 1 of Fishpass

(Negative value indicates flow from C/S to R/S)

Date	Project WL	River WL	Head Diff.	Discharge	Head loss at Pool 1	Pool 1			Volume	Turbulence
	(m PWD)	(m PWD)	(meter)	(m ³ /s)	(m)	Length (m)	Width (m)	Height (m)	(m ³)	(W/m ³)
May 01	4.56	7.13	2.57	0.711	0.143	2.90	2.50	1.67	12.11	82.07
	4.71	7.07	2.36	0.677	0.139	2.90	2.50	1.61	11.67	78.99
	4.86	6.95	2.09	0.611	0.133	2.90	2.50	1.49	10.80	73.38
	4.88	6.76	1.88	0.519	0.126	2.90	2.50	1.30	9.43	67.77
	4.63	6.71	2.08	0.512	0.132	2.90	2.50	1.25	9.06	73.12
	4.46	6.56	2.10	0.452	0.133	2.90	2.50	1.10	7.98	73.80
	4.36	6.51	2.15	0.434	0.134	2.90	2.50	1.05	7.61	74.77
	4.38	6.36	1.98	0.365	0.129	2.90	2.50	0.90	6.53	70.56
	4.35	6.31	1.96	0.343	0.129	2.90	2.50	0.85	6.16	70.02
	4.34	6.16	1.82	0.277	0.124	2.90	2.50	0.70	5.07	65.99
	4.25	6.02	1.77	0.220	0.122	2.90	2.50	0.56	4.06	64.45
	4.26	5.90	1.64	0.169	0.116	2.90	2.50	0.44	3.19	60.22
	4.27	5.83	1.56	0.140	0.113	2.90	2.50	0.37	2.68	57.45
	4.31	5.56	1.25	0.035	0.097	2.90	2.50	0.10	0.72	45.78
	4.29	5.54	1.25	0.028	0.097	2.90	2.50	0.08	0.58	45.78
	4.29	5.49	1.20	0.010	0.094	2.90	2.50	0.03	0.22	43.78
	4.26	5.41				2.90	2.50			
	4.24	5.30				2.90	2.50			
	4.21	5.20				2.90	2.50			
	4.18	5.14				2.90	2.50			
	4.21	5.03				2.90	2.50			
	4.31	5.03				2.90	2.50			
	4.26	5.02				2.90	2.50			
	4.26	5.08				2.90	2.50			
	4.26	5.13				2.90	2.50			
	4.30	5.29				2.90	2.50			
	4.30	5.32				2.90	2.50			
	4.26	5.34				2.90	2.50			
	4.24	5.38				2.90	2.50			
	4.81	5.45				2.90	2.50			
	4.84	5.43				2.90	2.50			
	4.82	5.48	0.56	0.005	0.051	2.90	2.50	0.02	0.14	17.28
	4.84	5.50	0.66	0.011	0.058	2.90	2.50	0.04	0.29	21.34
	4.71	5.61	0.90	0.046	0.075	2.90	2.50	0.15	1.09	31.38
	4.71	5.62	0.91	0.050	0.076	2.90	2.50	0.16	1.16	31.80
	4.69	5.69	1.00	0.074	0.082	2.90	2.50	0.23	1.67	35.57
	4.76	5.71	0.95	0.079	0.079	2.90	2.50	0.25	1.81	33.47
	4.71	5.71	1.00	0.081	0.082	2.90	2.50	0.25	1.81	35.57
	4.71	5.72	1.01	0.084	0.082	2.90	2.50	0.28	1.88	35.98
	4.71	5.69	0.98	0.074	0.081	2.90	2.50	0.23	1.67	34.73
	4.61	5.66	1.05	0.066	0.085	2.90	2.50	0.20	1.45	37.65
	4.56	5.51	0.95	0.016	0.079	2.90	2.50	0.05	0.36	33.47
	4.71	5.50	0.79	0.012	0.068	2.90	2.50	0.04	0.29	26.75
	4.71	5.50	0.79	0.012	0.068	2.90	2.50	0.04	0.29	26.75
	4.71	5.46		0.000		2.90	2.50	0.00	0.00	
	4.77	5.47	0.70	0.003	0.061	2.90	2.50	0.01	0.07	23.00
	4.81	5.50	0.69	0.011	0.060	2.90	2.50	0.04	0.29	22.58
	4.74	5.51	0.77	0.015	0.066	2.90	2.50	0.05	0.36	25.92
	4.76	5.50	0.74	0.011	0.064	2.90	2.50	0.04	0.29	24.66
	4.77	5.52	0.75	0.017	0.065	2.90	2.50	0.06	0.43	25.08
	4.71	5.52	0.81	0.018	0.069	2.90	2.50	0.06	0.43	27.59
	4.66	5.50	0.84	0.012	0.071	2.90	2.50	0.04	0.29	28.85
	4.71	5.50	0.79	0.012	0.068	2.90	2.50	0.04	0.29	26.75
	4.68	5.49	0.81	0.009	0.069	2.90	2.50	0.03	0.22	27.59
	4.66	5.50	0.84	0.012	0.071	2.90	2.50	0.04	0.29	28.85
	4.62	5.48	0.86	0.006	0.073	2.90	2.50	0.02	0.14	29.69
	4.61	5.48	0.87	0.006	0.073	2.90	2.50	0.02	0.14	30.11
	4.86	5.47	0.61	0.003	0.054	2.90	2.50	0.01	0.07	19.30
	4.61	5.92	1.31	0.164	0.100	2.90	2.50	0.46	3.34	48.14
	4.61	5.96	1.35	0.180	0.102	2.90	2.50	0.50	3.63	49.69
	4.62	6.43	1.81	0.384	0.123	2.90	2.50	0.97	7.03	65.69
	4.59	6.45	1.86	0.394	0.125	2.90	2.50	0.99	7.18	67.18
	4.61	6.60	1.99	0.462	0.130	2.90	2.50	1.14	8.27	70.82
	4.61	6.62	2.01	0.472	0.130	2.90	2.50	1.16	8.41	71.35
	4.61	6.85	2.24	0.579	0.137	2.90	2.50	1.39	10.08	76.71
	4.61	6.84	2.33	0.621	0.139	2.90	2.50	1.48	10.73	78.46
	4.71	7.23	2.52	0.752	0.142	2.90	2.50	1.77	12.83	81.45
	5.10	7.48	2.36	0.841	0.139	2.90	2.50	2.00	14.50	78.99
	5.10	8.03	2.93	1.106	0.146	2.90	2.50	2.57	18.63	84.58
	5.17	8.16	2.99	1.162	0.146	2.90	2.50	2.70	19.58	84.64
	4.88	8.15	3.17	1.156	0.145	2.90	2.50	2.69	19.50	84.25
	5.02	8.15	3.13	1.157	0.146	2.90	2.50	2.69	19.50	84.42
	5.16	8.26	3.10	1.205	0.146	2.90	2.50	2.80	20.30	84.51
	5.14	8.26	3.12	1.204	0.146	2.90	2.50	2.78	20.16	84.42
	5.11	8.24	3.13	1.196	0.146	2.90	2.50	2.78	20.16	84.45
	5.12	8.24	3.12	1.196	0.146	2.90	2.50	2.76	20.01	83.03
	5.56	8.22	2.66	1.180	0.144	2.90	2.50	2.75	19.94	82.94
	5.56	8.21	2.65	1.176	0.144	2.90	2.50	2.74	19.87	84.59
	5.26	8.20	2.94	1.179	0.146	2.90	2.50	2.73	19.79	82.74
	5.56	8.19	2.63	1.166	0.144	2.90	2.50	2.70	19.58	83.39
	5.46	8.16	2.70	1.156	0.144	2.90	2.50	2.70	19.58	83.39

Table 16
Computed Turbulence in Pool No. 1 of Fishpass

(Negative value indicates flow from C/S to R/S)

Date	Prject WL	River WL	Head Diff.	Discharge	Head loss at Pool 1	Pool 1			Volume	Turbulence
	(m PWD)	(m PWD)	(meter)	(m ³ /s)	(m)	Length (m)	Width (m)	Hieght (m)	(m ³)	(W/m ²)
June 01	5.31	8.18	2.85	1.161	0.145	2.90	2.50	2.70	19.58	84.33
	5.49	8.08	2.59	1.117	0.143	2.90	2.50	2.62	19.00	82.31
	5.48	8.07	2.61	1.114	0.143	2.90	2.50	2.61	18.92	82.53
	5.54	7.92	2.38	1.036	0.140	2.90	2.50	2.46	17.84	79.33
	5.61	7.90	2.29	1.021	0.138	2.90	2.50	2.44	17.69	77.71
	5.51	7.86	2.35	1.009	0.139	2.90	2.50	2.40	17.40	78.82
	5.51	7.83	2.32	0.994	0.138	2.90	2.50	2.37	17.18	78.27
	5.48	7.69	2.23	0.928	0.136	2.90	2.50	2.23	16.17	76.51
	5.46	7.65	2.19	0.908	0.135	2.90	2.50	2.19	15.88	75.68
	5.46	7.56	2.10	0.863	0.133	2.90	2.50	2.10	15.23	73.80
	5.46	7.52	2.06	0.842	0.132	2.90	2.50	2.06	14.94	72.82
	5.45	7.38	1.93	0.773	0.128	2.90	2.50	1.92	13.92	69.19
	5.61	7.40	1.79	0.765	0.122	2.90	2.50	1.94	14.07	65.07
	5.48	7.46	1.98	0.810	0.129	2.90	2.50	2.00	14.50	70.58
	5.50	7.48	1.98	0.818	0.129	2.90	2.50	2.02	14.65	70.58
	5.53	7.57	2.04	0.881	0.131	2.90	2.50	2.11	15.30	72.12
	5.78	7.63	1.85	0.863	0.125	2.90	2.50	2.17	15.73	68.89
	5.72	7.70	1.98	0.907	0.129	2.90	2.50	2.24	16.24	70.58
	5.86	7.82	1.96	0.953	0.129	2.90	2.50	2.36	17.11	70.02
	5.82	8.04	2.22	1.073	0.136	2.90	2.50	2.58	18.71	78.09
	5.83	8.04	2.21	1.072	0.136	2.90	2.50	2.58	18.71	78.09
	6.00	8.12	2.12	1.095	0.133	2.90	2.50	2.66	19.29	74.07
	6.06	8.20	2.14	1.130	0.134	2.90	2.50	2.74	19.67	74.54
	6.17	8.40	2.23	1.223	0.136	2.90	2.50	2.94	21.32	76.51
	6.25	8.49	2.24	1.262	0.137	2.90	2.50	3.03	21.87	78.71
	6.40	8.58	2.18	1.292	0.135	2.90	2.50	3.12	22.62	75.44
	6.42	8.63	2.21	1.317	0.136	2.90	2.50	3.17	22.98	78.09
	6.52	8.63	2.11	1.303	0.133	2.90	2.50	3.17	22.98	73.84
	6.51	8.60	2.09	1.288	0.133	2.90	2.50	3.14	22.77	73.36
	6.60	8.60	2.00	1.275	0.130	2.90	2.50	3.14	22.77	71.09
	6.66	8.63	1.97	1.282	0.129	2.90	2.50	3.17	22.98	70.29
	6.70	8.67	1.97	1.298	0.129	2.90	2.50	3.21	23.27	70.29
	6.78	8.69	1.91	1.296	0.127	2.90	2.50	3.23	23.42	68.63
	6.83	8.67	1.84	1.275	0.124	2.90	2.50	3.21	23.27	68.59
	6.84	8.63	1.79	1.250	0.122	2.90	2.50	3.17	22.98	65.07
	6.87	8.61	1.74	1.232	0.120	2.90	2.50	3.15	22.84	63.50
	6.88	8.57	1.69	1.206	0.118	2.90	2.50	3.11	22.55	61.88
	6.88	8.52	1.64	1.176	0.116	2.90	2.50	3.06	22.19	60.22
	6.85	8.49	1.64	1.164	0.116	2.90	2.50	3.03	21.97	60.22
	6.85	8.44	1.59	1.134	0.114	2.90	2.50	2.98	21.61	58.50
	6.77	8.39	1.62	1.121	0.115	2.90	2.50	2.93	21.24	59.54
	6.80	8.34	1.54	1.085	0.112	2.90	2.50	2.88	20.88	58.74
	6.76	8.31	1.55	1.076	0.112	2.90	2.50	2.85	20.68	57.10
	6.76	8.24	1.48	1.033	0.109	2.90	2.50	2.78	20.16	54.58
	6.77	8.17	1.40	0.989	0.105	2.90	2.50	2.71	19.65	51.60
	6.78	8.08	1.30	0.932	0.100	2.90	2.50	2.62	19.00	47.75
	6.77	8.05	1.28	0.916	0.098	2.90	2.50	2.59	18.78	46.97
	6.77	7.98	1.21	0.873	0.095	2.90	2.50	2.52	18.27	44.18
	6.76	7.96	1.20	0.864	0.094	2.90	2.50	2.50	18.13	43.78
	6.74	7.88	1.14	0.820	0.090	2.90	2.50	2.42	17.55	41.35
	6.72	7.83	1.11	0.795	0.089	2.90	2.50	2.37	17.18	40.12
	6.68	7.80	1.12	0.788	0.089	2.90	2.50	2.34	16.97	40.53
	6.66	7.76	1.10	0.769	0.088	2.90	2.50	2.30	16.68	39.71
	6.65	7.70	1.05	0.736	0.085	2.90	2.50	2.24	16.24	37.65
	6.65	7.67	1.02	0.718	0.083	2.90	2.50	2.21	16.02	36.40
	6.66	7.61	0.95	0.679	0.079	2.90	2.50	2.15	15.59	33.47
	6.69	7.56	0.87	0.640	0.073	2.90	2.50	2.10	15.23	30.11
	6.69	7.52	0.83	0.616	0.070	2.90	2.50	2.06	14.94	28.43
	6.69	7.57	0.88	0.646	0.074	2.90	2.50	2.11	15.30	30.53
	6.68	7.61	0.93	0.673	0.077	2.90	2.50	2.15	15.59	32.84
	6.69	7.58	0.89	0.652	0.075	2.90	2.50	2.12	15.37	30.95
	6.70	7.54	0.84	0.625	0.071	2.90	2.50	2.08	15.08	28.85
	6.71	7.52	0.81	0.610	0.069	2.90	2.50	2.06	14.94	27.59
	6.70	7.48	0.78	0.589	0.067	2.90	2.50	2.02	14.65	26.33
	6.72	7.45	0.73	0.564	0.063	2.90	2.50	1.99	14.43	24.24
	6.74	7.50	0.76	0.588	0.066	2.90	2.50	2.04	14.79	25.50
	6.76	7.53	0.77	0.600	0.066	2.90	2.50	2.07	15.01	25.92
	6.79	7.55	0.76	0.603	0.066	2.90	2.50	2.09	15.15	25.50
	6.80	7.55	0.75	0.600	0.065	2.90	2.50	2.09	15.15	25.08
	6.82	7.56	0.74	0.599	0.064	2.90	2.50	2.10	15.23	24.66
	6.83	7.55	0.72	0.589	0.063	2.90	2.50	2.09	15.15	23.83
	6.84	7.53	0.69	0.573	0.060	2.90	2.50	2.07	15.01	22.58
	6.84	7.51	0.67	0.561	0.059	2.90	2.50	2.05	14.86	21.78
	6.85	7.51	0.66	0.557	0.058	2.90	2.50	2.05	14.86	21.34
	6.85	7.47	0.62	0.532	0.055	2.90	2.50	2.01	14.57	19.70
	6.85	7.44	0.59	0.513	0.053	2.90	2.50	1.98	14.36	18.49
	6.85	7.42	0.57	0.500	0.051	2.90	2.50	1.96	14.21	17.68
	6.86	7.41	0.55	0.490	0.050	2.90	2.50	1.95	14.14	16.88
	6.87	7.40	0.53	0.480	0.048	2.90	2.50	1.94	14.07	16.08
	6.89	7.39	0.50	0.465	0.046	2.90	2.50	1.93	13.99	14.91
	6.90	7.38	0.48	0.455	0.044	2.90	2.50	1.92	13.92	14.13
July 01	7.06	7.43	0.37	0.416	0.035	2.90	2.50	1.97	14.28	10.02

Table 16

Computed Turbulence in Pool No. 1 of Fishpass

(Negative value indicates flow from C/S to R/S)

Date	Prject WL	River WL	Head Diff.	Discharge	Head loss at Pool 1	Pool 1			Volume	Turbulence
	(m PWD)	(m PWD)	(meter)	(m ³ /s)	(m)	Length (m)	Width (m)	Hieght (m)	(m ³)	(W/m ²)
2	7.17	7.45	0.28	0.371	0.027	2.90	2.50	1.99	14.43	6.91
	7.35	8.03	0.68	0.708	0.060	2.90	2.50	2.57	18.63	22.17
	7.49	8.28	0.79	0.827	0.068	2.90	2.50	2.82	20.44	26.75
3	7.61	8.51	0.90	0.943	0.075	2.90	2.50	3.05	22.11	31.38
	7.76	8.69	0.93	1.012	0.077	2.90	2.50	3.23	23.42	32.64
4	7.81	8.85	1.04	1.109	0.084	2.90	2.50	3.39	24.58	37.23
	7.89	8.92	1.03	1.128	0.084	2.90	2.50	3.46	25.09	36.81
	7.99	8.98	0.99	1.130	0.081	2.90	2.50	3.52	25.52	35.15
5	8.07	9.02	0.95	1.124	0.079	2.90	2.50	3.56	25.81	33.47
	8.10	9.02	0.92	1.110	0.077	2.90	2.50	3.56	25.81	32.22
6	8.11	9.02	0.91	1.105	0.076	2.90	2.50	3.56	25.81	31.80
	8.13	9.03	0.90	1.103	0.075	2.90	2.50	3.57	25.88	31.38
	8.13	9.02	0.89	1.095	0.075	2.90	2.50	3.56	25.81	30.95
8	8.15	9.02	0.87	1.085	0.073	2.90	2.50	3.56	25.81	30.11
	8.15	9.02	0.87	1.085	0.073	2.90	2.50	3.56	25.81	30.11
9	8.15	9.01	0.86	1.077	0.073	2.90	2.50	3.55	25.74	29.69
	8.15	9.01	0.86	1.077	0.073	2.90	2.50	3.55	25.74	29.69
10	8.15	9.00	0.85	1.069	0.072	2.90	2.50	3.54	25.67	29.27
	8.15	9.00	0.85	1.069	0.072	2.90	2.50	3.54	25.67	29.27
11	8.15	9.02	0.87	1.085	0.073	2.90	2.50	3.56	25.81	30.11
	8.15	9.02	0.87	1.085	0.073	2.90	2.50	3.56	25.81	30.11
12	8.14	9.02	0.88	1.080	0.074	2.90	2.50	3.56	25.81	30.53
	8.13	9.01	0.88	1.087	0.074	2.90	2.50	3.55	25.74	30.53
13	8.12	9.00	0.88	1.084	0.074	2.90	2.50	3.54	25.67	30.53
	8.12	8.98	0.86	1.068	0.073	2.90	2.50	3.52	25.52	29.69
14	8.12	8.96	0.84	1.052	0.071	2.90	2.50	3.50	25.38	28.85
	8.11	8.96	0.85	1.057	0.072	2.90	2.50	3.50	25.38	29.27
15	8.16	8.96	0.80	1.031	0.068	2.90	2.50	3.50	25.38	27.17
	8.16	8.96	0.80	1.031	0.068	2.90	2.50	3.50	25.38	27.17
16	8.18	8.98	0.80	1.037	0.068	2.90	2.50	3.52	25.52	27.17
	8.19	8.98	0.79	1.032	0.068	2.90	2.50	3.52	25.52	26.75
17	8.22	8.95	0.73	0.990	0.063	2.90	2.50	3.49	25.30	24.24
	8.22	8.95	0.73	0.990	0.063	2.90	2.50	3.49	25.30	24.24
18	8.20	8.94	0.74	0.993	0.064	2.90	2.50	3.48	25.23	24.66
	8.19	8.94	0.75	0.998	0.065	2.90	2.50	3.48	25.23	25.08
19	8.20	8.93	0.73	0.984	0.063	2.90	2.50	3.47	25.16	24.24
	8.20	8.93	0.73	0.984	0.063	2.90	2.50	3.47	25.16	24.24
20	8.22	8.95	0.73	0.990	0.063	2.90	2.50	3.49	25.30	24.24
	8.20	8.95	0.75	1.001	0.065	2.90	2.50	3.49	25.30	25.08
21	8.23	8.95	0.72	0.984	0.063	2.90	2.50	3.49	25.30	23.83
	8.22	8.95	0.73	0.990	0.063	2.90	2.50	3.49	25.30	24.24
22	8.22	8.93	0.71	0.973	0.062	2.90	2.50	3.47	25.16	23.41
	8.22	8.93	0.71	0.973	0.062	2.90	2.50	3.47	25.16	23.41
23	8.22	8.92	0.70	0.964	0.061	2.90	2.50	3.46	25.09	23.00
	8.22	8.92	0.70	0.964	0.061	2.90	2.50	3.46	25.09	23.00
24	8.22	8.91	0.69	0.956	0.060	2.90	2.50	3.45	25.01	22.58
	8.22	8.91	0.69	0.956	0.060	2.90	2.50	3.45	25.01	22.58
25	8.22	8.91	0.69	0.956	0.060	2.90	2.50	3.45	25.01	22.58
	8.23	8.94	0.71	0.976	0.062	2.90	2.50	3.48	25.23	23.41
26	8.23	8.98	0.75	1.010	0.065	2.90	2.50	3.52	25.52	25.08
	8.22	8.94	0.72	0.981	0.063	2.90	2.50	3.48	25.23	23.83
27	8.22	8.88	0.66	0.930	0.058	2.90	2.50	3.42	24.80	21.34
	8.21	8.84	0.63	0.901	0.056	2.90	2.50	3.38	24.51	20.11
28	8.21	8.79	0.58	0.857	0.052	2.90	2.50	3.33	24.14	18.08
	8.21	8.76	0.55	0.830	0.050	2.90	2.50	3.30	23.93	16.88
29	8.21	8.73	0.52	0.802	0.047	2.90	2.50	3.27	23.71	15.69
	8.21	8.71	0.50	0.784	0.046	2.90	2.50	3.25	23.56	14.91
30	8.21	8.69	0.48	0.765	0.044	2.90	2.50	3.23	23.42	14.13
	8.21	8.71	0.50	0.784	0.046	2.90	2.50	3.25	23.56	14.91
31	8.23	8.78	0.55	0.835	0.050	2.90	2.50	3.32	24.07	16.88
	8.23	8.78	0.55	0.835	0.050	2.90	2.50	3.32	24.07	16.88
Aug 01	8.23	8.78	0.55	0.835	0.050	2.90	2.50	3.32	24.07	16.88
	8.24	8.78	0.54	0.828	0.049	2.90	2.50	3.32	24.07	16.48
	8.25	8.74	0.49	0.784	0.045	2.90	2.50	3.28	23.78	14.52
2	8.26	8.73	0.47	0.768	0.043	2.90	2.50	3.27	23.71	13.74
	8.27	8.72	0.45	0.751	0.042	2.90	2.50	3.26	23.64	12.98
3	8.28	8.67	0.39	0.694	0.037	2.90	2.50	3.21	23.27	10.74
	8.29	8.62	0.33	0.634	0.032	2.90	2.50	3.16	22.91	8.60
4	8.33	8.62	0.29	0.599	0.028	2.90	2.50	3.16	22.91	7.24
	8.38	8.62	0.24	0.551	0.024	2.90	2.50	3.16	22.91	5.63
5	8.38	8.62	0.24	0.551	0.024	2.90	2.50	3.16	22.91	5.63
	8.39	8.63	0.24	0.553	0.024	2.90	2.50	3.17	22.98	5.63
6	8.38	8.62	0.24	0.551	0.024	2.90	2.50	3.16	22.91	5.63
	8.38	8.60	0.22	0.527	0.022	2.90	2.50	3.14	22.77	5.02
7	8.37	8.54	0.17	0.461	0.018	2.90	2.50	3.08	22.33	3.57
	8.36	8.49	0.13	0.404	0.014	2.90	2.50	3.03	21.97	2.53
8	8.36	8.46	0.10	0.359	0.011	2.90	2.50	3.00	21.75	1.82
	8.35	8.42	0.07	0.307	0.008	2.90	2.50	2.96	21.46	1.18
9	8.35	8.40	0.05	0.269	0.007	2.90	2.50	2.94	21.32	0.81
	8.34	8.38	0.04	0.247	0.006	2.90	2.50	2.92	21.17	0.64
10	8.32	8.35	0.03	0.223	0.005	2.90	2.50	2.89	20.95	0.49
	8.31	8.30	-0.01	0.352	0.005	2.90	2.50	2.84	20.59	0.78

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Table 16
Computed Turbulence in Pool No. 1 of Fishpass

(Negative value indicates flow from C/S to R/S)

Date	Project WL	River WL	Head Diff.	Discharge	Head loss at Pool 1	Pool 1			Volume	Turbulence
	(m PWD)	(m PWD)	(meter)	(m ³ /s)	(m)	Length (m)	Width (m)	Height (m)	(m ³)	(W/m ³)
12	8.31	8.33	0.02	0.198	0.004	2.90	2.50	2.87	20.81	0.35
	8.31	8.35	0.04	0.245	0.006	2.90	2.50	2.89	20.95	0.64
	8.30	8.36	0.06	0.284	0.008	2.90	2.50	2.90	21.03	0.99
13	8.31	8.40	0.09	0.337	0.010	2.90	2.50	2.94	21.32	1.60
	8.31	8.42	0.11	0.368	0.012	2.90	2.50	2.96	21.48	2.05
	8.31	8.46	0.15	0.426	0.016	2.90	2.50	3.00	21.75	3.04
14	8.30	8.48	0.18	0.464	0.019	2.90	2.50	3.02	21.90	3.85
	8.31	8.49	0.18	0.465	0.019	2.90	2.50	3.03	21.97	3.85
	8.31	8.50	0.19	0.478	0.019	2.90	2.50	3.04	22.04	4.13
16	8.32	8.52	0.20	0.492	0.020	2.90	2.50	3.06	22.19	4.42
	8.33	8.53	0.20	0.494	0.020	2.90	2.50	3.07	22.26	4.42
	8.34	8.60	0.26	0.567	0.026	2.90	2.50	3.14	22.77	6.26
17	8.41	8.65	0.24	0.556	0.024	2.90	2.50	3.19	23.13	5.63
	8.44	8.70	0.26	0.585	0.026	2.90	2.50	3.24	23.49	6.26
	8.45	8.72	0.27	0.599	0.027	2.90	2.50	3.26	23.64	6.58
19	8.47	8.75	0.28	0.614	0.027	2.90	2.50	3.29	23.85	6.91
	8.47	8.78	0.31	0.648	0.030	2.90	2.50	3.32	24.07	7.91
	8.48	8.79	0.31	0.650	0.030	2.90	2.50	3.33	24.14	7.91
20	8.49	8.80	0.31	0.652	0.030	2.90	2.50	3.34	24.22	7.91
	8.51	8.82	0.31	0.656	0.030	2.90	2.50	3.36	24.36	7.91
	8.51	8.84	0.33	0.679	0.032	2.90	2.50	3.38	24.51	8.60
22	8.52	8.87	0.35	0.703	0.033	2.90	2.50	3.41	24.72	9.30
	8.52	8.87	0.35	0.703	0.033	2.90	2.50	3.41	24.72	9.30
	8.51	8.87	0.36	0.712	0.034	2.90	2.50	3.41	24.72	9.66
23	8.50	8.86	0.36	0.710	0.034	2.90	2.50	3.40	24.65	9.66
	8.49	8.87	0.38	0.729	0.036	2.90	2.50	3.41	24.72	10.38
	8.48	8.87	0.39	0.737	0.037	2.90	2.50	3.41	24.72	10.74
25	8.48	8.87	0.39	0.737	0.037	2.90	2.50	3.41	24.72	10.74
	8.47	8.85	0.38	0.725	0.036	2.90	2.50	3.39	24.58	10.38
	8.46	8.85	0.39	0.733	0.037	2.90	2.50	3.39	24.58	10.74
26	8.45	8.84	0.39	0.731	0.037	2.90	2.50	3.38	24.51	10.74
	8.45	8.81	0.36	0.699	0.034	2.90	2.50	3.35	24.29	9.66
	8.43	8.78	0.35	0.684	0.033	2.90	2.50	3.32	24.07	9.30
28	8.43	8.77	0.34	0.673	0.033	2.90	2.50	3.31	24.00	8.95
	8.45	8.75	0.30	0.633	0.029	2.90	2.50	3.29	23.85	7.58
	8.43	8.73	0.30	0.629	0.029	2.90	2.50	3.27	23.71	7.58
29	8.46	8.74	0.28	0.612	0.027	2.90	2.50	3.28	23.78	6.91
	8.48	8.73	0.25	0.580	0.025	2.90	2.50	3.27	23.71	5.94
	8.48	8.73	0.25	0.580	0.025	2.90	2.50	3.27	23.71	5.94
30	8.49	8.69	0.20	0.520	0.020	2.90	2.50	3.23	23.42	4.42
	8.48	8.70	0.22	0.544	0.022	2.90	2.50	3.24	23.49	5.02
Sep 01	8.48	8.66	0.18	0.492	0.019	2.90	2.50	3.20	23.20	3.85
	8.48	8.66	0.18	0.492	0.019	2.90	2.50	3.20	23.20	3.85
	8.46	8.65	0.19	0.502	0.019	2.90	2.50	3.19	23.13	4.13
2	8.46	8.65	0.19	0.502	0.019	2.90	2.50	3.19	23.13	4.13
	8.44	8.64	0.20	0.512	0.020	2.90	2.50	3.18	23.06	4.42
	8.44	8.63	0.19	0.499	0.019	2.90	2.50	3.17	22.98	4.13
3	8.43	8.62	0.19	0.497	0.019	2.90	2.50	3.16	22.91	4.13
	8.43	8.60	0.17	0.470	0.018	2.90	2.50	3.14	22.77	3.57
	8.43	8.59	0.16	0.457	0.017	2.90	2.50	3.13	22.69	3.30
5	8.43	8.57	0.14	0.428	0.015	2.90	2.50	3.11	22.55	2.78
	8.42	8.56	0.14	0.427	0.015	2.90	2.50	3.10	22.48	2.78
	8.42	8.56	0.14	0.427	0.015	2.90	2.50	3.10	22.48	2.78
6	8.45	8.57	0.12	0.401	0.013	2.90	2.50	3.11	22.55	2.28
	8.45	8.57	0.12	0.401	0.013	2.90	2.50	3.11	22.55	2.28
	8.45	8.57	0.12	0.401	0.013	2.90	2.50	3.11	22.55	2.28
8	8.45	8.57	0.12	0.401	0.013	2.90	2.50	3.11	22.55	2.28
	8.44	8.51	0.07	0.316	0.008	2.90	2.50	3.05	22.11	1.18
	8.44	8.47	0.03	0.232	0.005	2.90	2.50	3.01	21.82	0.49
9	8.45	8.42	-0.03	0.434	0.004	2.90	2.50	2.96	21.46	0.76
	8.44	8.40	-0.04	0.447	0.003	2.90	2.50	2.94	21.32	0.72
	8.44	8.36	-0.08	0.506	0.002	2.90	2.50	2.90	21.03	0.52
11	8.43	8.31	-0.12	0.562	0.001	2.90	2.50	2.85	20.66	0.32
	8.43	8.28	-0.15	0.603	0.001	2.90	2.50	2.82	20.44	0.19
	8.42	8.26	-0.16	0.615	0.001	2.90	2.50	2.80	20.30	0.16
12	8.41	8.20	-0.21	0.679	0.000	2.90	2.50	2.74	19.87	0.04
	8.41	8.16	-0.25	0.730	0.000	2.90	2.50	2.70	19.58	0.05
	8.4	8.12	-0.28	0.764	0.000	2.90	2.50	2.66	19.29	0.14
14	8.38	8.08	-0.30	0.782	0.001	2.90	2.50	2.62	19.00	0.24
	8.37	8.04	-0.33	0.814	0.001	2.90	2.50	2.58	18.71	0.47
	8.36	8.00	-0.36	0.844	0.002	2.90	2.50	2.54	18.42	0.80
15	8.34	7.94	-0.40	0.880	0.003	2.90	2.50	2.48	17.98	1.42
	8.33	7.89	-0.44	0.917	0.004	2.90	2.50	2.43	17.62	2.27
	8.32	7.84	-0.48	0.952	0.006	2.90	2.50	2.38	17.26	3.38
16	8.3	7.80	-0.50	0.962	0.007	2.90	2.50	2.34	16.97	4.03
	8.33	7.80	-0.53	1.002	0.009	2.90	2.50	2.34	16.97	5.16
	8.35	7.82	-0.53	1.010	0.009	2.90	2.50	2.36	17.11	5.16
18	8.36	7.83	-0.53	1.015	0.009	2.90	2.50	2.37	17.18	5.16
	8.35	7.80	-0.55	1.028	0.010	2.90	2.50	2.34	16.97	6.02
	8.34	7.78	-0.56	1.033	0.011	2.90	2.50	2.32	16.82	6.47
20	8.33	7.75	-0.58	1.045	0.012	2.90	2.50	2.29	16.60	7.45
	8.36	7.78	-0.58	1.059	0.012	2.90	2.50	2.32	16.82	7.45
	8.36	7.78	-0.58	1.059	0.012	2.90	2.50	2.32	16.82	7.45

2022

Date	Project WL	River WL
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Date	Prject WL	River WL	Head Diff.	Discharge	Head loss at Pool 1	Pool 1			Volume	Turbulence
						Length	Width	Hieght		
						(m PWD)	(m PWD)	(meter)	(m³/s)	(m)
22	8.36	7.85	-0.51	0.996	0.008	2.90	2.50	2.39	17.33	4.39
	8.43	7.97	-0.46	0.976	0.005	2.90	2.50	2.51	18.20	2.79
	8.45	8.06	-0.39	0.908	0.003	2.90	2.50	2.60	18.85	1.25
23	8.46	8.08	-0.38	0.900	0.002	2.90	2.50	2.62	19.00	1.09
	8.48	8.08	-0.40	0.930	0.003	2.90	2.50	2.62	19.00	1.42
24	8.48	8.06	-0.42	0.952	0.004	2.90	2.50	2.60	18.85	1.82
	8.47	8.08	-0.39	0.915	0.003	2.90	2.50	2.62	19.00	1.25
25	8.47	8.03	-0.44	0.970	0.004	2.90	2.50	2.57	18.63	2.27
	8.46	8.01	-0.45	0.977	0.005	2.90	2.50	2.55	18.49	2.52
26	8.46	8.01	-0.45	0.977	0.005	2.90	2.50	2.55	18.49	2.52
	8.44	7.97	-0.47	0.990	0.006	2.90	2.50	2.51	18.20	3.07
27	8.43	7.96	-0.47	0.986	0.006	2.90	2.50	2.50	18.13	3.07
	8.43	7.96	-0.47	0.986	0.006	2.90	2.50	2.50	18.13	3.07
28	8.42	8.02	-0.40	0.908	0.003	2.90	2.50	2.56	18.56	1.42
	8.42	8.02	-0.40	0.908	0.003	2.90	2.50	2.56	18.56	1.42
29	8.40	7.97	-0.43	0.933	0.004	2.90	2.50	2.51	18.20	2.04
	8.39	7.95	-0.44	0.940	0.004	2.90	2.50	2.49	18.05	2.27
30	8.37	7.93	-0.44	0.932	0.004	2.90	2.50	2.47	17.91	2.27
	8.36	7.95	-0.41	0.898	0.003	2.90	2.50	2.49	18.05	1.61
Oct 01	8.35	7.95	-0.40	0.883	0.003	2.90	2.50	2.49	18.05	1.42
2	8.33	7.93	-0.40	0.876	0.003	2.90	2.50	2.47	17.81	1.42
	8.31	7.90	-0.41	0.880	0.003	2.90	2.50	2.44	17.69	1.61
	8.30	7.86	-0.44	0.906	0.004	2.90	2.50	2.40	17.40	2.27
3	8.28	7.81	-0.47	0.927	0.006	2.90	2.50	2.35	17.04	3.07
	8.26	7.80	-0.46	0.909	0.005	2.90	2.50	2.34	16.97	2.79
4	8.25	7.75	-0.50	0.942	0.007	2.90	2.50	2.29	16.60	4.03
	8.23	7.74	-0.49	0.925	0.007	2.90	2.50	2.28	16.53	3.70
5	8.23	7.78	-0.45	0.889	0.005	2.90	2.50	2.32	16.82	2.52
	8.24	7.86	-0.38	0.824	0.002	2.90	2.50	2.40	17.40	1.09
6	8.27	7.94	-0.33	0.782	0.001	2.90	2.50	2.48	17.98	0.47
	8.28	7.98	-0.30	0.752	0.001	2.90	2.50	2.52	18.27	0.24
7	8.28	8.05	-0.23	0.671	0.000	2.90	2.50	2.59	18.78	0.03
	8.28	8.08	-0.20	0.634	0.000	2.90	2.50	2.62	19.00	0.05
8	8.29	8.06	-0.23	0.673	0.000	2.90	2.50	2.60	18.85	0.03
	8.26	8.02	-0.26	0.706	0.000	2.90	2.50	2.56	18.56	0.07
9	8.26	7.98	-0.28	0.724	0.000	2.90	2.50	2.52	18.27	0.14
	8.25	7.95	-0.30	0.743	0.001	2.90	2.50	2.49	18.05	0.24
10	8.23	7.92	-0.31	0.748	0.001	2.90	2.50	2.46	17.84	0.31
	8.23	7.89	-0.34	0.780	0.001	2.90	2.50	2.43	17.62	0.57
11	8.20	7.85	-0.35	0.781	0.002	2.90	2.50	2.39	17.33	0.68
	8.19	7.83	-0.36	0.787	0.002	2.90	2.50	2.37	17.18	0.80
12	8.20	7.78	-0.42	0.849	0.004	2.90	2.50	2.32	16.82	1.82
	8.18	7.75	-0.43	0.851	0.004	2.90	2.50	2.29	16.60	2.04
13	8.13	7.66	-0.47	0.867	0.006	2.90	2.50	2.20	15.95	3.07
	8.10	7.63	-0.47	0.856	0.006	2.90	2.50	2.17	15.73	3.07
14	8.10	7.61	-0.49	0.872	0.007	2.90	2.50	2.15	15.59	3.70
	8.06	7.53	-0.53	0.886	0.009	2.90	2.50	2.07	15.01	5.16
15	8.03	7.45	-0.58	0.908	0.012	2.90	2.50	1.89	14.43	7.45
	8.00	7.33	-0.67	0.948	0.019	2.90	2.50	1.87	13.56	13.01
16	7.97	7.26	-0.71	0.954	0.023	2.90	2.50	1.80	13.05	16.15
	7.95	7.20	-0.75	2.305	0.026	2.90	2.50	1.74	12.62	47.33
17	7.93	7.13	-0.80	2.283	0.032	2.90	2.50	1.67	12.11	58.61
	7.91	7.12	-0.79	2.242	0.031	2.90	2.50	1.66	12.04	55.89
18	7.90	7.08	-0.82	2.228	0.034	2.90	2.50	1.62	11.75	63.13
	7.89	7.07	-0.82	2.208	0.034	2.90	2.50	1.61	11.67	62.95
19	7.88	7.01	-0.87	2.190	0.040	2.90	2.50	1.55	11.24	76.23
	7.86	7.00	-0.86	2.150	0.039	2.90	2.50	1.54	11.17	73.00
20	7.85	6.97	-0.88	2.128	0.041	2.90	2.50	1.51	10.95	78.42
	7.84	6.96	-0.88	2.108	0.041	2.90	2.50	1.50	10.88	78.19
21	7.82	6.94	-0.88	2.067	0.041	2.90	2.50	1.48	10.73	77.73
	7.76	6.88	-0.88	1.948	0.041	2.90	2.50	1.42	10.30	76.34
22	7.70	6.62	-1.08	1.722	0.070	2.90	2.50	1.16	8.41	140.85
	7.67	6.59	-1.08	1.659	0.070	2.90	2.50	1.13	8.19	139.29
23	7.63	6.54	-1.09	1.567	0.072	2.90	2.50	1.08	7.83	140.95
	7.60	6.46	-1.14	1.458	0.081	2.90	2.50	1.00	7.25	158.54
24	7.55	6.36	-1.19	1.303	0.090	2.90	2.50	0.90	6.53	175.07
	7.52	6.31	-1.21	1.219	0.093	2.90	2.50	0.85	6.16	180.75
25	7.48	6.21	-1.27	1.068	0.105	2.90	2.50	0.75	5.44	201.67
	7.45	6.19	-1.26	1.020	0.103	2.90	2.50	0.73	5.29	194.44
26	7.41	6.11	-1.30	0.892	0.111	2.90	2.50	0.65	4.71	206.00
	7.39	6.08	-1.31	0.841	0.113	2.90	2.50	0.62	4.49	207.49
27	7.34	5.96	-1.38	0.656	0.129	2.90	2.50	0.50	3.63	227.29
	7.31	5.94	-1.37	0.617	0.126	2.90	2.50	0.48	3.48	218.80
28	7.30	5.92	-1.38	0.586	0.129	2.90	2.50	0.46	3.34	220.74
	7.33	5.95	-1.38	0.638	0.129	2.90	2.50	0.49	3.55	225.67
29	7.36	6.07	-1.29	0.812	0.109	2.90	2.50	0.61	4.42	186.10
	7.36	6.16	-1.20	0.924	0.092	2.90	2.50	0.70	5.07	162.88
30	7.37	6.38	-0.99	1.154	0.056	2.90	2.50	0.92	6.67	95.29
	7.37	6.58	-0.79	1.275	0.031	2.90	2.50	1.12	8.12	47.11
31	7.35	6.64	-0.71	0.625	0.023	2.90	2.50	1.18	8.56	16.15
	7.34	6.72	-0.62	0.603	0.015	2.90	2.50	1.26	9.13	9.68

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Table 17

SUMMARY OF FISHPASS OPERATION in 1996							
		a	b	b/a	c	c/a	
Month (1996)	No. of days	Elapsed hours	Potential operation period (POP), hrs	POP as % of elapsed hours	Actual operation period (AOP), hrs	AOP as % of POP	Cause of interruption of AOP
Jan	31	744	0	0.0%	0	-	
Feb	29	696	0	0.0%	0	-	
Mar	31	744	221	29.7%	19.00	8.6%	Construction
Apr	30	720	552	76.7%	83.58	15.1%	Protest from farmers
May	31	744	744	100.0%	504	67.7%	Protest from farmers
Jun	30	720	720	100.0%	720	100.0%	
Jul	31	744	744	100.0%	744	100.0%	
Aug	31	744	744	100.0%	744	100.0%	
Sep	30	720	720	100.0%	720	100.0%	
Oct	31	744	744	100.0%	744	100.0%	
Nov	5	120	120	100.0%	120	100.0%	
Dec							
TOTAL	310	7440	5309	71.4%	4398.58	82.9%	

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Table 18 (contd.) Observations of fish inside the fishpass

Date	Time	Species		Pool no.	Inferred direction of migration	Observed by:
		Name & No.	Approx. size (cm)			
Aug 05 96	1800	Kalibaush (1)	45.00	10	River to haor	Nazmul Islam (PC) and all Biologists & COs
Aug 07 96	1730	Rui (1)	35.00	12	River to haor	T. Akbar and T. Alam (Biol.)
Aug 11 96	1045	Kalibaus (2)	25.00	11	River to haor	Surveyor and Guard
Aug 13 96	1200	Boal (2)	60.00	2	River to haor	A. Razzaque and T. Alam (Biol.)
Aug 18 96	1030	Kalibaus (1)	35.00	2	?	Surveyor and Guard
Aug 19 96	1100	Shole (1)	20.00	3	River to Haor	A. Razzaque and T. Alam (Biol.)
		Kaikka (8)	15.00	2	River to haor	A. Razzaque and T. Alam (Biol.)
Aug 20 96	0900	Rui (1)	30.00	2	River to Haor	Local people and Guard
Aug 24 96	0945	Kalibaus (2)	28.00	5	Haor to River	Munir (CO) and Guard
Aug 28 96	1800	Bacha (3)	20.00	2	?	Salahuddin (Hydrologist), T. Akbar and T. Alam (Biol.)
Sep 02 96	0900	Kalibaush (1)	32.00	12	River to haor	T. Alam (Biol.), T. Akbar (Biol.) and Guard
	1130	Kalibaush (1)	30.00	14	?	Guard
Sep 05 96	1200	Gonia (1)	25.00	15	River to haor	A. Razzaque, T. Alam (Biol.) and Guard
Sep 09 96	1730	Boal (1)	45.00	13	River to haor	Guard
Sep 12 96	1430	Kalibaush (1)	35.00	15	?	T. Alam (Biol.), A. Razzaque (Biol.), Guard and local people
Sep 14 96	1800	Kalibaush (1)	35.00	14	Haor to river	T. Alam (Biol.), A. Sarwar (CO), Z Rana (CO) and Guard

Table 18 (contd.)

Sep 19 96	1000	Boal (1)	50.00	15	River to haor	T. Akbar (Biol.) and Guard.
Oct 02 96	1230	Mrigel (1)	31.00	11	River to haor	T. Alam (Biol.), A. Razzaque (Biol.) & Guard
Oct 07 96	1730	Boal (1)	50.00	12	River to haor	T. Alam (Biol.), M. Islam (CO) and Guard
Oct 14 96	1700	Kalibaush (1)	36.00	14	Haor to river	A. Razzaque, T. Akbar, T. Alam (Biol.), M. Islam (CO) & Guard
Oct 16 96	1800	Kalibaush (1)	40.00	14	?	Nazmul Islam (PC), T. Akbar T. Alam (Biol.), A. Sarwar (CO), Z. Rana (CO), M. Islam (CO)
Oct 23 96	1000	Boal (1)	45.00	13	River to haor	A. Razzaque, T. Alam (Biol.), and Guard
Oct 27 96	1300	Catla (1)	32.00	16	River to haor	A. Razzaque (Biol.), Guard and Local People

Table 19 (contd.)

SAMPLING RESULTS - Sorted Chronologically														
Set No	Date	Sampling Time		Duration (hours)	Period		Chamber		Fish no.	Icha no.	Total no.	Fish no. per hr	Icha no. per hr	Total no. per hr
		begin	end		day	nite	R/S	C/S						
125	96.04.03	10.30	10.40	0.17	1			1	124	0	124	729.4	0.0	729.4
126	96.05.11	17.00	20.30	3.50		1		1	548	1750	2298	156.6	500.0	656.6
127	96.05.12	1.00	5.00	4.00		1		1	858	0	858	214.5	0.0	214.5
128	96.05.12a	12.00	14.00	2.00	1			1	753	230	983	376.5	115.0	491.5
129	96.05.13	12.45	14.00	1.25	1			1	752	0	752	601.6	0.0	601.6
130	96.05.15	18.00	21.00	3.00		1		1	3002	14000	17002	1000.7	4666.7	5667.3
131	96.05.16	13.30	14.30	1.00	1			1	636	185	821	636.0	185.0	821.0
132	96.05.17	18.00	21.00	3.00		1		1	1517	0	1517	505.7	0.0	505.7
133	96.05.18	18.00	21.00	3.00		1		1	1319	6340	7659	439.7	2113.3	2553.0
134	96.05.20	13.30	15.30	2.00	1			1	487	0	487	243.5	0.0	243.5
135	96.05.20a	18.15	22.00	3.75		1		1	1069	3850	4919	285.1	1026.7	1311.7
136	96.05.21	18.30	22.30	4.00		1		1	552	2755	3307	138.0	688.8	826.8
137	96.05.22	18.20	19.50	1.50		1	1		13	13	26	8.7	8.7	17.3
138	96.05.23	9.00	12.30	3.50	1		1		9	0	9	2.6	0.0	2.6
139	96.05.24	18.00	22.00	4.00		1	1		3	0	3	0.8	0.0	0.8
140	96.05.25	18.00	24.00	6.00		1		1	164	128	292	27.3	21.3	48.7
141	96.05.26	18.30	22.30	2.00		1		1	136	168	304	68.0	84.0	152.0
142	96.05.28	7.00	9.00	2.00	1				79	0	79	39.5	0.0	39.5
143	96.05.28a	19.00	23.00	4.00		1		1	222	265	487	55.5	66.3	121.8
144	96.05.29	11.30	13.45	2.25	1			1	60	14	74	26.7	6.2	32.9
145	96.05.30	9.00	12.00	3.00	1			1	290	0	290	96.7	0.0	96.7
146	96.05.30a	19.00	23.00	4.00		1		1	229	190	419	57.3	47.5	104.8
147	96.05.31	15.00	19.30	4.50	1			1	359	54	413	79.8	12.0	91.8
148	96.06.01	12.30	14.00	1.50	1			1	150	0	150	100.0	0.0	100.0
149	96.06.01a	18.45	22.45	4.00		1		1	268	1800	2068	67.0	450.0	517.0
150	96.06.02	19.00	23.00	4.00		1		1	421	2320	2741	105.3	580.0	685.3
151	96.06.03	18.30	22.30	4.00		1	1		48	0	48	12.0	0.0	12.0
152	96.06.04	13.00	16.00	3.00	1			1	29	0	29	9.7	0.0	9.7
153	96.06.05	9.00	11.00	2.00	1			1	10	0	10	5.0	0.0	5.0
154	96.06.06	17.00	22.30	5.50		1		1	388	720	1108	70.5	130.9	201.5
155	96.06.07	18.00	22.30	4.50		1		1	219	314	533	48.7	69.8	118.4
156	96.06.08	8.00	11.00	3.00	1			1	195	0	195	65.0	0.0	65.0
157	96.06.09	18.30	23.30	5.00		1		1	190	268	458	38.0	55.6	91.6
158	96.06.10	12.30	15.30	3.00	1			1	22	0	22	7.3	0.0	7.3
159	96.06.11	12.30	15.30	3.00	1			1	67	0	67	22.3	0.0	22.3
160	96.06.12	12.00	14.00	2.00	1			1	80	0	80	40.0	0.0	40.0
161	96.06.13	12.00	14.30	2.50	1			1	74	0	74	29.6	0.0	29.6
162	96.06.14	15.00	18.00	3.00	1			1	26	0	26	8.7	0.0	8.7
163	96.06.14 a	18.00	23.00	5.00		1		1	164	158	322	32.8	31.6	64.4
164	96.06.15	10.00	14.00	4.00	1			1	129	4	133	32.3	1.0	33.3
165	96.06.16	18.00	23.00	5.00		1	1		6	0	6	1.2	0.0	1.2
166	96.06.17	13.00	19.00	6.00	1			1	42	0	42	7.0	0.0	7.0
167	96.06.18	8.00	12.00	4.00	1			1	12	0	12	3.0	0.0	3.0
168	96.06.19	18.00	22.00	4.00		1		1	77	103	180	19.3	25.8	45.0
169	96.06.20	0.00	7.00	7.00		1	1		8	0	8	1.1	0.0	1.1
170	96.06.20 a	13.00	18.00	5.00	1			1	33	0	33	6.6	0.0	6.6
171	96.06.20 b	18.30	23.30	5.00		1		1	182	51	233	36.4	10.2	46.6
172	96.06.21	0.45	7.45	7.00		1		1	103	28	131	14.7	4.0	18.7
173	96.06.21 a	8.30	13.30	5.00	1			1	22	11	33	4.4	2.2	6.6
174	96.06.21 b	14.00	18.30	4.50	1			1	16	0	16	3.6	0.0	3.6
175	96.06.21 c	19.00	23.30	4.50		1		1	65	120	185	14.4	26.7	41.1
176	96.06.22	0.30	8.00	7.50		1		1	76	40	116	10.1	5.3	15.5
177	96.06.22 a	19.00	8.00(+1)	13.00		1	1		13	206	219	1.0	15.8	16.8
177s	96.06.22s	8.30	18.00	9.50	1			1s	72	0	72	7.6	0.0	7.6
178	96.06.23	10.00	18.00	8.00	1			1	18	0	18	2.3	0.0	2.3
179	96.06.23 a	19.00	6.30(+1)	11.50		1		1	136	108	244	11.8	9.4	21.2
180	96.06.24	9.00	17.00	8.00	1			1	80	20	100	10.0	2.5	12.5
181	96.06.24 a	21.00	7.00(+1)	10.00		1	1		14	70	84	1.4	7.0	8.4
182	96.06.25	9.00	15.00	6.00	1			1	30	0	30	5.0	0.0	5.0
183	96.06.25 a	21.00	8.00	11.00		1		1	43	22	65	3.9	2.0	5.9
184	96.06.26	12.00	17.00	5.00	1			1	84	0	84	16.8	0.0	16.8
185	96.06.26 a	11.00	7.00	8.00	1			1	29	10	39	3.6	1.3	4.9
186	96.06.27	9.00	17.00	8.00	1			1	40	0	40	5.0	0.0	5.0
187	96.06.27 a	19.00	8.00(+1)	13.00		1		1	189	35	224	14.5	2.7	17.2
188	96.06.28	12.00	15.00	3.00	1			1	44	0	44	14.7	0.0	14.7
189	96.06.28 a	20.00	6.00(+1)	10.00		1	1		28	33	61	2.8	3.3	6.1
190	96.06.29	10.00	16.00	6.00	1			1	28	0	28	4.7	0.0	4.7
191	96.06.29 a	20.00	7.00(+1)	11.00		1		1	261	73	334	23.7	6.6	30.4

Table 19 (contd.)

192	96.06.30	11.00	16.00	5.00	1			1	92	0	92	18.4	0.0	18.4
193	96.06.30 a	20.00	7.00(+1)	11.00		1	1		39	19	58	3.5	1.7	5.3
194	96.07.01	12.00	17.00	5.00	1		1		1499	0	1499	299.8	0.0	299.8
195	96.07.01 a	19.00	7.00(+1)	12.00		1		1	7406	1455	8861	617.2	121.3	738.4
196	96.07.02	10.00	14.00	4.00	1			1	2194	859	3053	548.5	214.8	763.3
197	96.07.02 a	23.00	7.00(+1)	8.00		1	1		2210	1826	4036	276.3	228.3	504.5
198	96.07.03	9.00	17.00	8.00	1		1		1124	0	1124	140.5	0.0	140.5
199	96.07.03 a	23.00	5.00(+1)	6.00		1		1	6747	1216	7963	1124.5	202.7	1327.2
200	96.07.04	13.00	18.00	5.00	1			1	2089	1222	3311	417.8	244.4	662.2
201	96.07.04 a	22.00	5.00(+1)	7.00		1	1		1039	949	1988	148.4	135.6	284.0
202	96.07.05	10.00	16.00	6.00	1		1		797	0	797	132.8	0.0	132.8
203	96.07.05 a	22.00	6.00(+1)	8.00		1		1	5858	1226	7084	732.3	153.3	885.5
204	96.07.06	11.00	17.00	6.00	1			1	2955	0	2955	492.5	0.0	492.5
205	96.07.06 a	23.00	5.00(+1)	6.00		1	1		1396	1250	2646	232.7	208.3	441.0
206	96.07.08	2.00	6.00	4.00		1		1	698	217	915	174.5	54.3	228.8
207	96.07.08 a	21.00	1.00(+1)	4.00		1	1		1448	842	2290	362.0	210.5	572.5
208	96.07.09	13.00	15.00	2.00	1		1		286	0	286	143.0	0.0	143.0
209	96.07.10	4.00	7.00	3.00		1	1		217	223	440	72.3	74.3	146.7
210	96.07.10 a	10.30	13.00	2.50	1			1	325	0	325	130.0	0.0	130.0
211	96.07.11	3.00	7.00	4.00		1		1	1313	243	1556	328.3	60.8	389.0
212	96.07.11 a	11.00	14.00	3.00	1		1		265	0	265	88.3	0.0	88.3
213	96.07.11 b	22.00	1.00(+1)	3.00		1		1	1128	829	1957	376.0	276.3	652.3
214	96.07.13	3.00	7.00	4.00		1		1	1483	750	2233	370.8	187.5	558.3
215	96.07.13 a	10.00	13.00	3.00	1			1	2073	324	2397	691.0	108.0	799.0
216	96.07.14	0.30	5.00	4.50		1		1	2026	1444	3470	450.2	320.9	771.1
217	96.07.14 a	18.00	22.00	4.00		1	1		145	0	145	36.3	0.0	36.3
218	96.07.15	10.00	12.00	2.00	1		1		110	0	110	55.0	0.0	55.0
219	96.07.16	1.00	5.00	4.00		1		1	139	857	996	34.8	214.3	249.0
220	96.07.16 a	13.00	16.00	3.00	1			1	102	122	224	34.0	40.7	74.7
221	96.07.17	3.00	6.00	3.00		1		1	380	0	380	126.7	0.0	126.7
222	96.07.17 a	12.30	15.30	3.00	1		1		16	0	16	5.3	0.0	5.3
223	96.07.18	18.00	22.00	4.00		1		1	204	177	381	51.0	44.3	95.3
224	96.07.18 a	10.00	12.00	2.00	1			1	171	0	171	85.5	0.0	85.5
225	96.07.19	4.00	7.00	3.00		1	1		29	25	54	9.7	8.3	18.0
226	96.07.19 a	13.00	16.00	3.00	1		1		28	12	40	9.3	4.0	13.3
227	96.07.20	2.00	5.00	3.00		1		1	239	0	239	79.7	0.0	79.7
228	96.07.20 a	12.00	14.00	2.00	1			1	169	0	169	84.5	0.0	84.5
229	96.07.21	19.00	22.30	3.50		1	1		102	77	179	29.1	22.0	51.1
230	96.07.22	3.00	6.00	3.00		1	1		89	189	278	29.7	63.0	92.7
231	96.07.23	5.00	8.00	3.00	1			1	126	117	243	42.0	39.0	81.0
232	96.07.24	21.00	24.00	3.00		1		1	124	179	303	41.3	59.7	101.0
233	96.07.24 a	10.00	12.00	2.00	1		1		9	5	14	4.5	2.5	7.0
234	96.07.25	7.00	10.00	3.00	1			1	110	11	121	36.7	3.7	40.3
235	96.07.25 a	17.30	20.30	3.00		1		1	239	169	408	79.7	56.3	136.0
236	96.07.26	14.00	17.00	3.00	1		1		17	0	17	5.7	0.0	5.7
237	96.07.27	3.00	7.00	4.00		1		1	344	475	819	86.0	118.8	204.8
238	96.07.28	9.00	12.00	3.00	1			1	299	0	299	99.7	0.0	99.7
239	96.07.28 a	22.00	1.00	3.00		1	1		24	47	71	8.0	15.7	23.7
240	96.07.29	12.00	15.30	3.50	1		1		61	0	61	17.4	0.0	17.4
241	96.07.29 a	22.00	0.30	2.50		1	1		33	15	48	13.2	6.0	19.2
242	96.07.30	11.00	13.00	2.00	1			1	96	0	96	48.0	0.0	48.0
243	96.07.31	20.00	24.00	4.00		1		1	118	177	295	29.5	44.3	73.8
244	96.08.01	10.00	12.00	2.00	1		1		55	0	55	27.5	0.0	27.5
245	96.08.01 a	20.00	22.30	2.50		1	1		24	0	24	9.6	0.0	9.6
246	96.08.02	3.00	7.00	4.00		1		1	193	119	312	48.3	29.8	78.0
247	96.08.02 a	14.00	16.00	2.00	1		1		12	0	12	6.0	0.0	6.0
248	96.08.03	7.00	10.30	3.50	1		1		17	0	17	4.9	0.0	4.9
249	96.08.03 a	19.00	22.00	3.00		1	1		21	0	21	7.0	0.0	7.0
250	96.08.04	2.00	5.30	3.50		1	1		50	0	50	14.3	0.0	14.3
251	96.08.05	18.30	22.00	3.50		1	1		49	9	58	14.0	2.6	16.6
252	96.08.05	2.00	6.00	4.00		1	1		38	13	51	9.5	3.3	12.8
253	96.08.07	9.00	13.00	4.00	1		1		30	0	30	7.5	0.0	7.5
254	96.08.08	17.00	20.00	3.00		1	1		34	7	41	11.3	2.3	13.7
254s	96.08.08s	17.00	20.00	3.00		1		1s	60	57	117	20.0	19.0	39.0
255	96.08.09	18.00	22.00	4.00		1	1		36	6	42	9.0	1.5	10.5
255s	96.08.10s	11.00	14.00	3.00	1			1s	158	0	158	52.7	0.0	52.7
255ss	96.08.10ss	17.00	20.00	3.00		1		1s	163	46	209	54.3	15.3	69.7
256	96.08.11	17.00	20.30	3.50		1	1		104	5	109	29.7	1.4	31.1
257	96.08.12	2.30	6.30	4.00		1	1		36	13	49	9.0	3.3	12.3
257s	96.08.12s	21.30	24.00	2.50		1		1s	219	144	363	87.6	57.6	145.2
258	96.08.13	23.30	2.00	3.50		1	1		25	19	44	7.1	5.4	12.6
258ss	96.08.13s	6.00	9.00	3.00		1		1s	167	0	167	55.7	0.0	55.7
259	96.08.14	11.00	13.00	2.00	1		1		50	0	50	25.0	0.0	25.0
259s	96.08.14s	17.00	22.00	5.00		1		1s	182	77	259	36.4	15.4	51.8

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Table 19 (contd.)

259ss	96.08.15s	9.00	11.00	2.00	1			1s	194	0	194	97.0	0.0	97.0
260	96.08.16	3.00	6.30	3.50		1	1		27	40	67	7.7	11.4	19.1
261	96.08.16 a	16.30	20.00	3.50		1	1		46	0	46	13.1	0.0	13.1
261s	96.08.17s	2.00	5.00	3.00		1		1s	95	72	167	31.7	24.0	55.7
261ss	96.08.17s	23.00	5.00	6.00		1		1s	167	23	190	27.8	3.8	31.7
262	96.08.18	21.00	24.00	3.00		1	1		34	25	59	11.3	8.3	19.7
262s	96.08.19s	17.00	20.30	3.50		1		1s	391	145	536	111.7	41.4	153.1
263	96.08.20	16.30	20.30	4.00		1	1		55	70	125	13.8	17.5	31.3
264	96.08.21	2.30	5.00	2.50		1	1		30	7	37	12.0	2.8	14.8
265	96.08.21 a	9.00	12.00	3.00	1		1		31	0	31	10.3	0.0	10.3
266	96.08.22	11.00	14.30	3.50	1		1		22	0	22	6.3	0.0	6.3
266s	96.08.23s	8.00	10.30	2.50	1			1s	206	0	206	82.4	0.0	82.4
266ss	96.08.23ss	13.30	16.00	2.50	1			1s	150	0	150	60.0	0.0	60.0
267	96.08.24	20.00	23.00	3.00	1		1		46	6	52	15.3	2.0	17.3
268	96.08.25	3.00	5.30	2.50		1	1		9	0	9	3.6	0.0	3.6
268s	96.08.26s	18.30	21.30	3.00		1		1s	130	0	130	43.3	0.0	43.3
269	96.08.27	19.00	22.30	3.00		1	1		26	17	43	8.7	5.7	14.3
270	96.08.28	17.00	20.00	3.00		1	1		51	0	51	17.0	0.0	17.0
270s	96.08.29s	7.00	11.00	4.00	1			1s	126	0	126	31.5	0.0	31.5
271	96.08.30	13.00	16.30	3.50	1		1		41	0	41	11.7	0.0	11.7
272	96.08.31	9.00	12.00	3.00	1		1		31	0	31	10.3	0.0	10.3
273	96.09.01	21.00	24.00	3.00		1	1		33	17	50	11.0	5.7	16.7
273s	96.09.02s	9.00	12.30	3.50	1			1s	129	0	129	36.9	0.0	36.9
274	96.09.03	19.00	22.00	3.00		1	1		36	4	40	12.0	1.3	13.3
275	96.09.04	3.00	6.00	3.00		1	1		26	0	26	8.7	0.0	8.7
275s	96.09.04s	15.00	18.00	3.00	1			1s	96	0	96	32.0	0.0	32.0
276	96.09.05	3.00	6.00	3.00		1	1		20	16	36	6.7	5.3	12.0
277	96.09.05 a	13.00	16.00	3.00	1		1		35	0	35	11.7	0.0	11.7
277s	96.09.06s	3.00	6.00	3.00		1		1s	105	72	177	35.0	24.0	59.0
277ss	96.09.06ss	17.00	20.00	3.00		1		1s	109	0	109	36.3	0.0	36.3
278	96.09.07	3.30	6.30	3.00		1	1		22	13	35	7.3	4.3	11.7
279	96.09.07 a	18.30	21.30	3.00		1	1		27	0	27	9.0	0.0	9.0
279s	96.09.08s	2.00	5.00	3.00		1		1s	47	75	122	15.7	25.0	40.7
280	96.09.09	9.00	12.30	3.50	1		1		45	0	45	12.9	0.0	12.9
281	96.09.10	18.00	22.30	4.50		1	1		72	19	91	16.0	4.2	20.2
282	96.09.11	15.00	18.30	3.50	1		1		36	0	36	10.3	0.0	10.3
282s	96.09.11s	4.00	7.30	3.50		1		1s	147	177	324	42.0	50.6	92.6
283	96.09.12	11.30	14.30	3.00	1		1		30	0	30	10.0	0.0	10.0
284	96.09.13	2.30	5.30	3.00		1	1		54	19	73	18.0	6.3	24.3
284s	96.09.13s	12.30	15.30	3.00	1			1s	99	0	99	33.0	0.0	33.0
285	96.09.14	18.30	21.00	2.50		1	1		102	0	102	40.8	0.0	40.8
285s	96.09.15s	10.00	12.30	2.50	1			1s	287	0	287	114.8	0.0	114.8
286	96.09.16	15.30	18.00	2.50	1		1		109	0	109	43.6	0.0	43.6
286s	96.09.16s	3.00	7.00	4.00		1		1s	367	110	477	91.8	27.5	119.3
287	96.09.17	4.00	7.30	3.50		1	1		73	4	77	20.9	1.1	22.0
287s	96.09.18s	6.00	8.00	2.00	1			1s	235	52	287	117.5	26.0	143.5
288	96.09.19	17.00	21.00	4.00		1	1		93	0	93	23.3	0.0	23.3
289	96.09.20	3.00	7.00	4.00		1	1		91	0	91	22.8	0.0	22.8
289s	96.09.20s	18.00	21.00	3.00		1		1s	221	0	221	73.7	0.0	73.7
290	96.09.21	1.00	5.00	4.00		1	1		87	0	87	21.8	0.0	21.8
291	96.09.22	5.00	7.30	2.50	1		1		131	0	131	52.4	0.0	52.4
292	96.09.23	18.30	21.30	3.00		1	1		7	3	10	2.3	1.0	3.3
293	96.09.24	11.00	14.00	3.00	1		1		60	0	60	20.0	0.0	20.0
293s	96.09.24s	8.00	11.00	3.00	1			1s	248	0	248	82.7	0.0	82.7
293ss	96.09.24ss	14.30	17.30	3.00	1			1s	247	0	247	82.3	0.0	82.3
294	96.09.25	0.30	4.30	4.00		1	1		111	3	114	27.8	0.8	28.5
295	96.09.25 a	15.00	18.00	3.00	1		1		18	0	18	6.0	0.0	6.0
295s	96.09.26s	1.00	5.00	4.00		1		1s	211	0	211	52.8	0.0	52.8
295ss	96.09.26ss	18.30	21.30	3.00		1		1s	199	17	216	66.3	5.7	72.0
296	96.09.27	10.30	13.30	3.00	1		1		193	1	194	64.3	0.3	64.7
297	96.09.27 a	20.00	23.00	3.00		1	1		107	7	114	35.7	2.3	38.0
297s	96.09.28s	7.00	10.00	3.00	1			1s	229	0	229	76.3	0.0	76.3
297ss	96.09.28ss	18.30	21.30	3.00		1		1s	32	5	37	10.7	1.7	12.3
298	96.09.29	4.00	7.00	3.00		1	1		152	11	163	50.7	3.7	54.3
299	96.09.29 a	15.00	18.00	3.00	1		1		88	0	88	29.3	0.0	29.3
299s	96.09.30s	7.00	10.00	3.00	1			1s	327	0	327	109.0	0.0	109.0
299ss	96.09.30ss	18.00	20.00	2.00		1		1s	162	0	162	81.0	0.0	81.0
300	96.10.01	9.00	11.00	2.00	1		1		94	0	94	47.0	0.0	47.0
300s	96.10.02s	14.00	16.00	2.00	1			1s	59	0		29.5	0.0	0.0
301	96.10.03	19.00	21.30	2.50		1	1		46	0	46	18.4	0.0	18.4
301s	96.10.04s	22.00	24.00	2.00		1		1s	31	9	40	15.5	4.5	20.0
302	96.10.05	3.00	6.00	3.00		1	1		54	18	72	18.0	6.0	24.0
302s	96.10.05s	15.00	16.30	1.50	1			1s	38	0	38	25.3	0.0	25.3
303	96.10.06	7.00	9.00	2.00	1		1		13	3	16	6.5	1.5	8.0

Table 20 (contd.)

SAMPLING RESULTS - Sorted by Direction of Migration														
Set No	Date	Sampling Time		Duration (hours)	Period		Chamber		Fish no.	Icha no.	Total no.	Fish no. per hr	Icha no. per hr	Total
		begin	end		day	night	R/S	C/S						
Direction of Migration: RIVER TO LAKE														
125	96.04.03	10.30	10.40	0.17	1			1	124	0	124	729.4	0.0	729.4
126	96.05.11	17.00	20.30	3.50		1		1	548	1750	2298	156.6	500.0	656.6
127	96.05.12	1.00	5.00	4.00		1		1	858	0	858	214.5	0.0	214.5
128	96.05.12a	12.00	14.00	2.00	1			1	753	230	983	376.5	115.0	491.5
129	96.05.13	12.45	14.00	1.25	1			1	752	0	752	601.6	0.0	601.6
130	96.05.15	18.00	21.00	3.00		1		1	3002	14000	17002	1000.7	4666.7	5667.3
131	96.05.16	13.30	14.30	1.00	1			1	636	185	821	636.0	185.0	821.0
132	96.05.17	18.00	21.00	3.00		1		1	1517	0	1517	505.7	0.0	505.7
133	96.05.18	18.00	21.00	3.00		1		1	1319	6340	7659	439.7	2113.3	2553.0
134	96.05.20	13.30	15.30	2.00	1			1	487	0	487	243.5	0.0	243.5
135	96.05.20a	18.15	22.00	3.75		1		1	1069	3850	4919	285.1	1026.7	1311.7
136	96.05.21	18.30	22.30	4.00	1			1	552	2755	3307	138.0	688.8	826.8
140	96.05.25	18.00	24.00	6.00		1		1	164	128	292	27.3	21.3	48.7
141	96.05.26	18.30	22.30	2.00		1		1	136	168	304	68.0	84.0	152.0
142	96.05.28	7.00	9.00	2.00	1			1	79	0	79	39.5	0.0	39.5
143	96.05.28a	19.00	23.00	4.00		1		1	222	265	487	55.5	66.3	121.8
144	96.05.29	11.30	13.45	2.25	1			1	60	14	74	26.7	6.2	32.9
145	96.05.30	9.00	12.00	3.00	1			1	290	0	290	96.7	0.0	96.7
146	96.05.30a	19.00	23.00	4.00		1		1	229	190	419	57.3	47.5	104.8
147	96.05.31	15.00	19.30	4.50	1			1	359	54	413	79.8	12.0	91.8
148	96.06.01	12.30	14.00	1.50	1			1	150	0	150	100.0	0.0	100.0
149	96.06.01a	18.45	22.45	4.00		1		1	268	1800	2068	67.0	450.0	517.0
150	96.06.02	19.00	23.00	4.00		1		1	421	2320	2741	105.3	580.0	685.3
154	96.06.06	17.00	22.30	5.50		1		1	388	720	1108	70.5	130.9	201.5
155	96.06.07	18.00	22.30	4.50		1		1	219	314	533	48.7	69.8	118.4
156	96.06.08	8.00	11.00	3.00	1			1	195	0	195	65.0	0.0	65.0
157	96.06.09	18.30	23.30	5.00		1		1	190	268	458	38.0	53.6	91.6
159	96.06.11	12.30	15.30	3.00	1			1	67	0	67	22.3	0.0	22.3
160	96.06.12	12.00	14.00	2.00	1			1	80	0	80	40.0	0.0	40.0
161	96.06.13	12.00	14.30	2.50	1			1	74	0	74	29.6	0.0	29.6
163	96.06.14 a	18.00	23.00	5.00		1		1	164	158	322	32.8	31.6	64.4
164	96.06.15	10.00	14.00	4.00	1			1	129	4	133	32.3	1.0	33.3
166	96.06.17	13.00	19.00	6.00	1			1	42	0	42	7.0	0.0	7.0
168	96.06.19	18.00	22.00	4.00		1		1	77	103	180	19.3	25.8	45.0
171	96.06.20 b	18.30	23.30	5.00		1		1	182	51	233	36.4	10.2	46.6
172	96.06.21	0.45	7.45	7.00		1		1	103	28	131	14.7	4.0	18.7
173	96.06.21 a	8.30	13.30	5.00	1			1	22	11	33	4.4	2.2	6.6
174	96.06.21 b	14.00	18.30	4.50	1			1	16	0	16	3.6	0.0	3.6
175	96.06.21 c	19.00	23.30	4.50		1		1	65	120	185	14.4	26.7	41.1
176	96.06.22	0.30	8.00	7.50		1		1	76	40	116	10.1	5.3	15.5
177s	96.06.22s	8.30	18.00	9.50	1			1s	72	0	72	7.6	0.0	7.6
179	96.06.23 a	19.00	6.30(+1)	11.50		1		1	136	108	244	11.8	9.4	21.2
180	96.06.24	9.00	17.00	8.00	1			1	80	20	100	10.0	2.5	12.5
183	96.06.25 a	21.00	8.00	11.00		1		1	43	22	65	3.9	2.0	5.9
184	96.06.26	12.00	17.00	5.00	1			1	84	0	84	16.8	0.0	16.8
187	96.06.27 a	19.00	8.00(+1)	13.00		1		1	189	35	224	14.5	2.7	17.2
188	96.06.28	12.00	15.00	3.00	1			1	44	0	44	14.7	0.0	14.7
191	96.06.29 a	20.00	7.00(+1)	11.00		1		1	261	73	334	23.7	6.6	30.4
192	96.06.30	11.00	16.00	5.00	1			1	92	0	92	18.4	0.0	18.4
195	96.07.01 a	19.00	7.00(+1)	12.00		1		1	7406	1455	8861	617.2	121.3	738.4
196	96.07.02	10.00	14.00	4.00	1			1	2194	859	3053	548.5	214.8	763.3
199	96.07.03 a	23.00	5.00(+1)	6.00		1		1	6747	1216	7963	1124.5	202.7	1327.2
200	96.07.04	13.00	18.00	5.00	1			1	2089	1222	3311	417.8	244.4	662.2
203	96.07.05 a	22.00	6.00(+1)	8.00		1		1	5858	1226	7084	732.3	153.3	885.5
204	96.07.06	11.00	17.00	6.00	1			1	2955	0	2955	492.5	0.0	492.5
206	96.07.08	2.00	6.00	4.00		1		1	698	217	915	174.5	54.3	228.8
210	96.07.10 a	10.30	13.00	2.50	1			1	325	0	325	130.0	0.0	130.0
211	96.07.11	3.00	7.00	4.00		1		1	1313	243	1556	328.3	60.8	389.0
213	96.07.11 b	22.00	1.00(+1)	3.00		1		1	1128	829	1957	376.0	276.3	652.3
214	96.07.13	3.00	7.00	4.00		1		1	1483	750	2233	370.8	187.5	558.3
215	96.07.13 a	10.00	13.00	3.00	1			1	2073	324	2397	691.0	108.0	799.0
216	96.07.14	0.30	5.00	4.50		1		1	2026	1444	3470	450.2	320.9	771.1
219	96.07.16	1.00	5.00	4.00		1		1	139	857	996	34.8	214.3	249.0
220	96.07.16 a	13.00	16.00	3.00	1			1	102	122	224	34.0	40.7	74.7
221	96.07.17	3.00	6.00	3.00		1		1	380	0	380	126.7	0.0	126.7
223	96.07.18	18.00	22.00	4.00		1		1	204	177	381	51.0	44.3	95.3
224	96.07.18 a	10.00	12.00	2.00	1			1	171	0	171	85.5	0.0	85.5
227	96.07.20	2.00	5.00	3.00		1		1	239	0	239	79.7	0.0	79.7
228	96.07.20 a	12.00	14.00	2.00	1			1	169	0	169	84.5	0.0	84.5
231	96.07.23	5.00	8.00	3.00	1			1	126	117	243	42.0	39.0	81.0
232	96.07.24	21.00	24.00	3.00		1		1	124	179	303	41.3	59.7	101.0
234	96.07.25	7.00	10.00	3.00	1			1	110	11	121	36.7	3.7	40.3
235	96.07.25 a	17.30	20.30	3.00		1		1	239	169	408	79.7	56.3	136.0
237	96.07.27	3.00	7.00	4.00		1		1	344	475	819	86.0	118.8	204.8
238	96.07.28	9.00	12.00	3.00	1			1	299	0	299	99.7	0.0	99.7
242	96.07.30	11.00	13.00	2.00	1			1	96	0	96	48.0	0.0	48.0
243	96.07.31	20.00	24.00	4.00		1		1	118	177	295	29.5	44.3	73.8

Table 20 (contd.)

Direction of Migration: HAOK TO RIVER														
137	96.05.22	18.20	19.50	1.50		1	1		13	13	26	8.7	8.7	17.3
138	96.05.23	9.00	12.30	3.50	1		1		9	0	9	2.6	0.0	2.6
139	96.05.24	18.00	22.00	4.00		1	1		3	0	3	0.8	0.0	0.8
151	96.06.03	18.30	22.30	4.00		1	1		48	0	48	12.0	0.0	12.0
152	96.06.04	13.00	16.00	3.00	1		1		29	0	29	9.7	0.0	9.7
153	96.06.05	9.00	11.00	2.00	1		1		10	0	10	5.0	0.0	5.0
158	96.06.10	12.30	15.30	3.00	1		1		22	0	22	7.3	0.0	7.3
162	96.06.14	15.00	18.00	3.00	1		1		26	0	26	8.7	0.0	8.7
165	96.06.16	18.00	23.00	5.00		1	1		6	0	6	1.2	0.0	1.2
167	96.06.18	8.00	12.00	4.00	1		1		12	0	12	3.0	0.0	3.0
169	96.06.20	0.00	7.00	7.00		1	1		8	0	8	1.1	0.0	1.1
170	96.06.20 a	13.00	18.00	5.00	1		1		33	0	33	6.6	0.0	6.6
177	96.06.22 a	19.00	8.00(+1)	13.00		1	1		13	206	219	1.0	15.8	16.8
178	96.06.23	10.00	18.00	8.00	1		1		18	0	18	2.3	0.0	2.3
181	96.06.24 a	21.00	7.00(+1)	10.00		1	1		14	70	84	1.4	7.0	8.4
182	96.06.25	9.00	15.00	6.00	1		1		30	0	30	5.0	0.0	5.0
185	96.06.26 a	11.00	7.00	8.00	1		1		29	10	39	3.6	1.3	4.9
186	96.06.27	9.00	17.00	8.00	1		1		40	0	40	5.0	0.0	5.0
189	96.06.28 a	20.00	6.00(+1)	10.00		1	1		28	33	61	2.8	3.3	6.1
190	96.06.29	10.00	16.00	6.00	1		1		28	0	28	4.7	0.0	4.7
193	96.06.30 a	20.00	7.00(+1)	11.00		1	1		39	19	58	3.5	1.7	5.3
194	96.07.01	12.00	17.00	5.00	1		1		1499	0	1499	299.8	0.0	299.8
197	96.07.02 a	23.00	7.00(+1)	8.00		1	1		2210	1826	4036	276.3	228.3	504.5
198	96.07.03	9.00	17.00	8.00	1		1		1124	0	1124	140.5	0.0	140.5
201	96.07.04 a	22.00	5.00(+1)	7.00		1	1		1039	949	1988	148.4	135.6	284.0
202	96.07.05	10.00	16.00	6.00	1		1		797	0	797	132.8	0.0	132.8
205	96.07.06 a	23.00	5.00(+1)	6.00		1	1		1396	1250	2646	232.7	208.3	441.0
207	96.07.08 a	21.00	1.00(+1)	4.00		1	1		1448	842	2290	362.0	210.5	572.5
208	96.07.09	13.00	15.00	2.00	1		1		286	0	286	143.0	0.0	143.0
209	96.07.10	4.00	7.00	3.00		1	1		217	223	440	72.3	74.3	146.7
212	96.07.11 a	11.00	14.00	3.00	1		1		265	0	265	88.3	0.0	88.3
217	96.07.14 a	18.00	22.00	4.00		1	1		145	0	145	36.3	0.0	36.3
218	96.07.15	10.00	12.00	2.00	1		1		110	0	110	55.0	0.0	55.0
222	96.07.17 a	12.30	15.30	3.00	1		1		16	0	16	5.3	0.0	5.3
225	96.07.19	4.00	7.00	3.00		1	1		29	25	54	9.7	8.3	18.0
226	96.07.19 a	13.00	16.00	3.00	1		1		28	12	40	9.3	4.0	13.3
229	96.07.21	19.00	22.30	3.50		1	1		102	77	179	29.1	22.0	51.1
230	96.07.22	3.00	6.00	3.00		1	1		89	189	278	29.7	63.0	92.7
233	96.07.24 a	10.00	12.00	2.00	1		1		9	5	14	4.5	2.5	7.0
236	96.07.26	14.00	17.00	3.00	1		1		17	0	17	5.7	0.0	5.7
239	96.07.28 a	22.00	1.00	3.00		1	1		24	47	71	8.0	15.7	23.7
240	96.07.29	12.00	15.30	3.50	1		1		61	0	61	17.4	0.0	17.4
241	96.07.29 a	22.00	0.30	2.50		1	1		33	15	48	13.2	6.0	19.2
244	96.08.01	10.00	12.00	2.00	1		1		55	0	55	27.5	0.0	27.5
245	96.08.01 a	20.00	22.30	2.50		1	1		24	0	24	9.6	0.0	9.6
247	96.08.02 a	14.00	16.00	2.00	1		1		12	0	12	6.0	0.0	6.0
248	96.08.03	7.00	10.30	3.50	1		1		17	0	17	4.9	0.0	4.9
249	96.08.03 a	19.00	22.00	3.00		1	1		21	0	21	7.0	0.0	7.0
250	96.08.04	2.00	5.30	3.50		1	1		50	0	50	14.3	0.0	14.3
251	96.08.05	18.30	22.00	3.50		1	1		49	9	58	14.0	2.6	16.6
252	96.08.06	2.00	6.00	4.00		1	1		38	13	51	9.5	3.3	12.8
253	96.08.07	9.00	13.00	4.00	1		1		30	0	30	7.5	0.0	7.5
254	96.08.08	17.00	20.00	3.00		1	1		34	7	41	11.3	2.3	13.7
255	96.08.09	18.00	22.00	4.00		1	1		36	6	42	9.0	1.5	10.5
256	96.08.11	17.00	20.30	3.50		1	1		104	5	109	29.7	1.4	31.1
257	96.08.12	2.30	6.30	4.00		1	1		36	13	49	9.0	3.3	12.3
258	96.08.13	23.30	2.00	3.50		1	1		25	19	44	7.1	5.4	12.6
259	96.08.14	11.00	13.00	2.00	1		1		50	0	50	25.0	0.0	25.0
260	96.08.16	3.00	6.30	3.50		1	1		27	40	67	7.7	11.4	19.1
261	96.08.16 a	16.30	20.00	3.50		1	1		46	0	46	13.1	0.0	13.1
262	96.08.18	21.00	24.00	3.00		1	1		34	25	59	11.3	8.3	19.7
263	96.08.20	16.30	20.30	4.00		1	1		55	70	125	13.8	17.5	31.3
264	96.08.21	2.30	5.00	2.50		1	1		30	7	37	12.0	2.8	14.8
265	96.08.21 a	9.00	12.00	3.00	1		1		31	0	31	10.3	0.0	10.3
266	96.08.22	11.00	14.30	3.50	1		1		22	0	22	6.3	0.0	6.3
267	96.08.24	20.00	23.00	3.00	1		1		46	6	52	15.3	2.0	17.3
268	96.08.25	3.00	5.30	2.50		1	1		9	0	9	3.6	0.0	3.6
269	96.08.27	19.00	22.30	3.00		1	1		26	17	43	8.7	5.7	14.3
270	96.08.28	17.00	20.00	3.00		1	1		51	0	51	17.0	0.0	17.0
271	96.08.30	13.00	16.30	3.50	1		1		41	0	41	11.7	0.0	11.7
272	96.08.31	9.00	12.00	3.00	1		1		31	0	31	10.3	0.0	10.3
273	96.09.01	21.00	24.00	3.00		1	1		33	17	50	11.0	5.7	16.7
274	96.09.03	19.00	22.00	3.00		1	1		36	4	40	12.0	1.3	13.3
275	96.09.04	3.00	6.00	3.00		1	1		26	0	26	8.7	0.0	8.7
276	96.09.05	3.00	6.00	3.00		1	1		20	16	36	5.7	5.3	12.0
277	96.09.05 a	13.00	16.00	3.00	1		1		35	0	35	11.7	0.0	11.7
278	96.09.07	3.30	6.30	3.00		1	1		22	13	35	7.3	4.3	11.7
279	96.09.07 a	18.30	21.30	3.00		1	1		27	0	27	9.0	0.0	9.0
280	96.09.09	9.00	12.30	3.50	1		1		45	0	45	12.9	0.0	12.9
281	96.09.10	18.00	22.30	4.50		1	1		72	19	91	15.0	4.2	20.2
282	96.09.11	15.00	18.30	3.50	1		1		36	0	36	10.3	0.0	10.3
283	96.09.12	11.30	14.30	3.00	1		1		30	0	30	10.0	0.0	10.0
284	96.09.13	2.30	5.30	3.00		1	1		54	19	73	18.0	6.3	24.3

Table 21 (contd.)

DAILY TRAFFIC ESTIMATE for fish							
for actual operational period							
	Date 1996		Daytime		Nite-time		Total Traffic
Day No	Month	Day	fish/hr	12 hr subtotal	fish/hr	12 hr subtotal	24 total
Direction of Migration: RIVER to HAOR							
1	Jan	1	0.0	0	0.0	0	0
2		2	0.0	0	0.0	0	0
3		3	0.0	0	0.0	0	0
4		4	0.0	0	0.0	0	0
5		5	0.0	0	0.0	0	0
6		6	0.0	0	0.0	0	0
7		7	0.0	0	0.0	0	0
8		8	0.0	0	0.0	0	0
9		9	0.0	0	0.0	0	0
10		10	0.0	0	0.0	0	0
11		11	0.0	0	0.0	0	0
12		12	0.0	0	0.0	0	0
13		13	0.0	0	0.0	0	0
14		14	0.0	0	0.0	0	0
15		15	0.0	0	0.0	0	0
16		16	0.0	0	0.0	0	0
17		17	0.0	0	0.0	0	0
18		18	0.0	0	0.0	0	0
19		19	0.0	0	0.0	0	0
20		20	0.0	0	0.0	0	0
21		21	0.0	0	0.0	0	0
22		22	0.0	0	0.0	0	0
23		23	0.0	0	0.0	0	0
24		24	0.0	0	0.0	0	0
25		25	0.0	0	0.0	0	0
26		26	0.0	0	0.0	0	0
27		27	0.0	0	0.0	0	0
28		28	0.0	0	0.0	0	0
29		29	0.0	0	0.0	0	0
30		30	0.0	0	0.0	0	0
31		31	0.0	0	0.0	0	0
32	Feb	1	0.0	0	0.0	0	0
33		2	0.0	0	0.0	0	0
34		3	0.0	0	0.0	0	0
35		4	0.0	0	0.0	0	0
36		5	0.0	0	0.0	0	0
37		6	0.0	0	0.0	0	0
38		7	0.0	0	0.0	0	0
39		8	0.0	0	0.0	0	0
40		9	0.0	0	0.0	0	0
41		10	0.0	0	0.0	0	0
42		11	0.0	0	0.0	0	0
43		12	0.0	0	0.0	0	0
44		13	0.0	0	0.0	0	0
45		14	0.0	0	0.0	0	0
46		15	0.0	0	0.0	0	0
47		16	0.0	0	0.0	0	0
48		17	0.0	0	0.0	0	0
49		18	0.0	0	0.0	0	0
50		19	0.0	0	0.0	0	0
51		20	0.0	0	0.0	0	0
52		21	0.0	0	0.0	0	0
53		22	0.0	0	0.0	0	0
54		23	0.0	0	0.0	0	0
55		24	0.0	0	0.0	0	0
56		25	0.0	0	0.0	0	0
57		26	0.0	0	0.0	0	0
58		27	0.0	0	0.0	0	0
59		28	0.0	0	0.0	0	0
60		29	0.0	0	0.0	0	0

Table 21 (contd.)

61	Mar	1	0.0	0	0.0	0	0
62		2	0.0	0	0.0	0	0
63		3	0.0	0	0.0	0	0
64		4	0.0	0	0.0	0	0
65		5	0.0	0	0.0	0	0
66		6	0.0	0	0.0	0	0
67		7	0.0	0	0.0	0	0
68		8	0.0	0	0.0	0	0
69		9	0.0	0	0.0	0	0
70		10	0.0	0	0.0	0	0
71		11	0.0	0	0.0	0	0
72		12	0.0	0	0.0	0	0
73		13	0.0	0	0.0	0	0
74		14	0.0	0	0.0	0	0
75		15	0.0	0	0.0	0	0
76		16	0.0	0	0.0	0	0
77		17	0.0	0	0.0	0	0
78		18	0.0	0	0.0	0	0
79		19	0.0	0	0.0	0	0
80		20	0.0	0	0.0	0	0
81		21	0.0	0	0.0	0	0
82		22	0.0	0	0.0	0	0
83		23	0.0	0	0.0	0	0
84		24	0.0	0	0.0	0	0
85		25	0.0	0	0.0	0	0
86		26	0.0	0	0.0	0	0
87		27	0.0	0	0.0	0	0
88		28	0.0	0	0.0	0	0
89		29	0.0	0	0.0	0	0
90		30	0.0	0	0.0	0	0
91		31	0.0	0	0.0	0	0
92	Apr	1	0.0	0	0.0	0	0
93		2	0.0	0	0.0	0	0
94		3	729.4	8753	729.4	8753	17506
95		4	0.0	0	0.0	0	0
96		5	0.0	0	0.0	0	0
97		6	0.0	0	0.0	0	0
98		7	0.0	0	0.0	0	0
99		8	0.0	0	0.0	0	0
100		9	0.0	0	0.0	0	0
101		10	0.0	0	0.0	0	0
102		11	0.0	0	0.0	0	0
103		12	0.0	0	0.0	0	0
104		13	0.0	0	0.0	0	0
105		14	0.0	0	0.0	0	0
106		15	0.0	0	0.0	0	0
107		16	0.0	0	0.0	0	0
108		17	0.0	0	0.0	0	0
109		18	0.0	0	0.0	0	0
110		19	0.0	0	0.0	0	0
111		20	0.0	0	0.0	0	0
112		21	0.0	0	0.0	0	0
113		22	0.0	0	0.0	0	0
114		23	0.0	0	0.0	0	0
115		24	0.0	0	0.0	0	0
116		25	0.0	0	0.0	0	0
117		26	0.0	0	0.0	0	0
118		27	0.0	0	0.0	0	0
119		28	0.0	0	0.0	0	0
120		29	0.0	0	0.0	0	0
121		30	0.0	0	0.0	0	0
122	May	1	0.0	0	0.0	0	0
123		2	0.0	0	0.0	0	0
124		3	0.0	0	0.0	0	0
125		4	0.0	0	0.0	0	0
126		5	0.0	0	0.0	0	0
127		6	0.0	0	0.0	0	0
128		7	0.0	0	0.0	0	0
129		8	0.0	0	0.0	0	0

Table 21 (contd.)

130		9	0.0	0	0.0	0	0
131		10	0.0	0	0.0	0	0
132		11	156.6	1879	156.6	1879	3758
133		12	376.5	4518	214.5	2574	7092
134		13	601.6	7219	601.6	7219	14438
135		14	601.6	7219	601.6	7219	14438
136		15	1000.7	12008	1000.7	12008	24017
137		16	636.0	7632	636.0	7632	15264
138		17	505.7	6068	505.7	6068	12137
139		18	439.7	5276	439.7	5276	10553
140		19	439.7	5276	439.7	5276	10553
141		20	243.5	2922	285.1	3421	6343
142		21	138.0	1656	138.0	1656	3312
143		22	138.0	1656	138.0	1656	3312
144		23	138.0	1656	138.0	1656	3312
145		24	138.0	1656	138.0	1656	3312
146		25	27.3	328	27.3	328	655
147		26	68.0	816	68.0	816	1632
148		27	68.0	816	68.0	816	1632
149		28	39.5	474	55.5	666	1140
150		29	26.7	320	26.7	320	641
151		30	96.7	1160	57.3	688	1848
152		31	79.8	958	79.8	958	1915
153	Jun	1	100.0	1200	67.0	804	2004
154		2	105.3	1264	105.3	1264	2527
155		3	105.3	1264	105.3	1264	2527
156		4	105.3	1264	105.3	1264	2527
157		5	105.3	1264	105.3	1264	2527
158		6	70.5	846	70.5	846	1692
159		7	48.7	584	48.7	584	1169
160		8	65.0	780	65.0	780	1560
161		9	38.0	456	38.0	456	912
162		10	38.0	456	38.0	456	912
163		11	22.3	268	22.3	268	535
164		12	40.0	480	40.0	480	960
165		13	29.6	355	29.6	355	710
166		14	32.8	394	32.8	394	787
167		15	32.3	388	32.3	388	775
168		16	32.3	388	32.3	388	775
169		17	7.0	84	7.0	84	168
170		18	7.0	84	7.0	84	168
171		19	19.3	232	19.3	232	463
172		20	36.4	437	36.4	437	874
173		21	4.0	48	14.6	175	223
174		22	7.6	91	10.1	121	212
175		23	11.8	142	11.8	142	283
176		24	10.0	120	10.0	120	240
177		25	3.9	47	3.9	47	94
178		26	16.8	202	16.8	202	403
179		27	14.5	174	14.5	174	348
180		28	14.7	176	14.7	176	353
181		29	23.7	284	23.7	284	569
182		30	18.4	221	18.4	221	442
183	Jul	1	617.2	7406	617.2	7406	14813
184		2	548.5	6582	548.5	6582	13164
185		3	1124.5	13494	1124.5	13494	26988
186		4	417.8	5014	417.8	5014	10027
187		5	732.3	8788	732.3	8788	17575
188		6	492.5	5910	492.5	5910	11820
189		7	492.5	5910	492.5	5910	11820
190		8	174.5	2094	174.5	2094	4188
191		9	174.5	2094	174.5	2094	4188
192		10	130.0	1560	130.0	1560	3120
193		11	352.2	4226	352.2	4226	8453
194		12	352.2	4226	352.2	4226	8453
195		13	691.0	8292	370.8	4450	12742
196		14	450.2	5402	450.2	5402	10805
197		15	450.2	5402	450.2	5402	10805
198		16	34.0	408	34.8	418	826

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Table 21 (contd.)

199		17	126.7	1520	126.7	1520	3041
200		18	85.5	1026	51.0	612	1638
201		19	85.5	1026	51.0	612	1638
202		20	84.5	1014	79.7	956	1970
203		21	84.5	1014	79.7	956	1970
204		22	84.5	1014	79.7	956	1970
205		23	42.0	504	42.0	504	1008
206		24	41.3	496	41.3	496	991
207		25	36.7	440	79.7	956	1397
208		26	36.7	440	79.7	956	1397
209		27	86.0	1032	86.0	1032	2064
210		28	99.7	1196	99.7	1196	2393
211		29	99.7	1196	99.7	1196	2393
212		30	48.0	576	48.0	576	1152
213		31	29.5	354	29.5	354	708
214	Aug.	1	29.5	354	29.5	354	708
215		2	48.3	580	48.3	580	1159
216		3	48.3	580	48.3	580	1159
217		4	48.3	580	48.3	580	1159
218		5	48.3	580	48.3	580	1159
219		6	20.0	240	20.0	240	480
220		7	20.0	240	20.0	240	480
221		8	20.0	240	20.0	240	480
222		9	20.0	240	20.0	240	480
223		10	52.7	632	54.3	652	1284
224		11	52.7	632	54.3	652	1284
225		12	87.6	1051	87.6	1051	2102
226		13	55.7	668	55.7	668	1337
227		14	36.4	437	36.4	437	874
228		15	97.0	1164	97.0	1164	2328
229		16	97.0	1164	97.0	1164	2328
230		17	59.5	714	59.5	714	1428
231		18	59.5	714	59.9	719	1433
232		19	111.7	1340	111.7	1340	2681
233		20	111.7	1340	111.7	1340	2681
234		21	111.7	1340	111.7	1340	2681
235		22	71.2	854	71.2	854	1709
236		23	71.2	854	71.2	854	1709
237		24	71.2	854	71.2	854	1709
238		25	43.3	520	43.3	520	1039
239		26	43.3	520	43.4	521	1040
240		27	43.3	520	43.4	521	1040
241		28	31.5	378	31.5	378	756
242		29	31.5	378	31.5	378	756
243		30	31.5	378	31.5	378	756
244		31	31.5	378	31.5	378	756
245	Sep	1	36.9	443	36.9	443	886
246		2	36.9	443	36.9	443	886
247		3	36.9	443	36.9	443	886
248		4	32.0	384	32.0	384	768
249		5	32.0	384	32.0	384	768
250		6	35.7	428	35.7	428	857
251		7	35.7	428	35.7	428	857
252		8	15.7	188	15.7	188	377
253		9	15.7	188	15.7	188	377
254		10	15.7	188	15.7	188	377
255		11	42.0	504	42.0	504	1008
256		12	42.0	504	42.0	504	1008
257		13	33.0	396	33.0	396	792
258		14	33.0	396	33.0	396	792
259		15	114.8	1378	114.8	1378	2755
260		16	91.8	1102	91.8	1102	2203
261		17	91.8	1102	91.8	1102	2203
262		18	117.5	1410	117.5	1410	2820
263		19	117.5	1410	117.5	1410	2820
264		20	73.7	884	73.7	884	1769
265		21	73.7	884	73.7	884	1769
266		22	73.7	884	73.7	884	1769
267		23	73.7	884	73.7	884	1769

Table 21 (contd.)

268		24	82.5	990	82.5	990	1980
269		25	82.5	990	82.5	990	1980
270		26	59.6	715	59.6	715	1430
271		27	59.6	715	59.6	715	1430
272		28	76.3	916	10.7	128	1044
273		29	76.3	916	10.7	128	1044
274		30	109.0	1308	81.0	972	2280
275	Oct	1	29.5	354	29.5	354	708
276		2	29.5	354	29.5	354	708
277		3	15.5	186	15.5	186	372
278		4	15.5	186	15.5	186	372
279		5	25.3	304	25.3	304	607
280		6	10.5	126	10.5	126	252
281		7	10.5	126	10.5	126	252
282		8	6.0	72	6.0	72	144
283		9	6.0	72	6.0	72	144
284		10	15.0	180	15.0	180	360
285		11	16.0	192	16.0	192	384
286		12	16.0	192	16.0	192	384
287		13	11.0	132	11.0	132	264
288		14	11.0	132	11.0	132	264
289		15	16.8	202	16.8	202	403
290		16	16.8	202	16.8	202	403
291		17	16.8	202	16.8	202	403
292		18	16.8	202	16.8	202	403
293		19	16.0	192	16.0	192	384
294		20	16.0	192	16.0	192	384
295		21	8.4	101	8.4	101	202
296		22	11.0	132	11.0	132	264
297		23	11.0	132	11.0	132	264
298		24	10.0	120	10.0	120	240
299		25	10.0	120	10.0	120	240
300		26	10.0	120	10.0	120	240
301		27	10.0	120	10.0	120	240
302		28	10.0	120	10.0	120	240
303		29	10.0	120	10.0	120	240
304		30	10.0	120	10.0	120	240
305		31	10.0	120	10.0	120	240
306	Nov	1	14.4	173	14.4	173	346
307		2	14.4	173	14.4	173	346
308		3	21.0	252	21.0	252	504
309		4	21.0	252	21.0	252	504
310		5	17.5	210	17.5	210	420
311		6	0.0	0	0.0	0	0
312		7	0.0	0	0.0	0	0
313		8	0.0	0	0.0	0	0
314		9	0.0	0	0.0	0	0
315		10	0.0	0	0.0	0	0
316		11	0.0	0	0.0	0	0
317		12	0.0	0	0.0	0	0
318		13	0.0	0	0.0	0	0
319		14	0.0	0	0.0	0	0
320		15	0.0	0	0.0	0	0
321		16	0.0	0	0.0	0	0
322		17	0.0	0	0.0	0	0
323		18	0.0	0	0.0	0	0
324		19	0.0	0	0.0	0	0
325		20	0.0	0	0.0	0	0
326		21	0.0	0	0.0	0	0
327		22	0.0	0	0.0	0	0
328		23	0.0	0	0.0	0	0
329		24	0.0	0	0.0	0	0
330		25	0.0	0	0.0	0	0
331		26	0.0	0	0.0	0	0
332		27	0.0	0	0.0	0	0
333		28	0.0	0	0.0	0	0
334		29	0.0	0	0.0	0	0
335		30	0.0	0	0.0	0	0
336	Dec	1	0.0	0	0.0	0	0

Table 21 (contd.)

337		2	0.0	0	0.0	0	0
338		3	0.0	0	0.0	0	0
339		4	0.0	0	0.0	0	0
340		5	0.0	0	0.0	0	0
341		6	0.0	0	0.0	0	0
342		7	0.0	0	0.0	0	0
343		8	0.0	0	0.0	0	0
344		9	0.0	0	0.0	0	0
345		10	0.0	0	0.0	0	0
346		11	0.0	0	0.0	0	0
347		12	0.0	0	0.0	0	0
348		13	0.0	0	0.0	0	0
349		14	0.0	0	0.0	0	0
350		15	0.0	0	0.0	0	0
351		16	0.0	0	0.0	0	0
352		17	0.0	0	0.0	0	0
353		18	0.0	0	0.0	0	0
354		19	0.0	0	0.0	0	0
355		20	0.0	0	0.0	0	0
356		21	0.0	0	0.0	0	0
357		22	0.0	0	0.0	0	0
358		23	0.0	0	0.0	0	0
359		24	0.0	0	0.0	0	0
360		25	0.0	0	0.0	0	0
361		26	0.0	0	0.0	0	0
362		27	0.0	0	0.0	0	0
363		28	0.0	0	0.0	0	0
364		29	0.0	0	0.0	0	0
365		30	0.0	0	0.0	0	0
366		31	0.0	0	0.0	0	0
Subtotal				242370		234739	477109
Direction of Migration: HAOR to RIVER							
1	Jan	1	0.0	0	0.0	0	0
2		2	0.0	0	0.0	0	0
3		3	0.0	0	0.0	0	0
4		4	0.0	0	0.0	0	0
5		5	0.0	0	0.0	0	0
6		6	0.0	0	0.0	0	0
7		7	0.0	0	0.0	0	0
8		8	0.0	0	0.0	0	0
9		9	0.0	0	0.0	0	0
10		10	0.0	0	0.0	0	0
11		11	0.0	0	0.0	0	0
12		12	0.0	0	0.0	0	0
13		13	0.0	0	0.0	0	0
14		14	0.0	0	0.0	0	0
15		15	0.0	0	0.0	0	0
16		16	0.0	0	0.0	0	0
17		17	0.0	0	0.0	0	0
18		18	0.0	0	0.0	0	0
19		19	0.0	0	0.0	0	0
20		20	0.0	0	0.0	0	0
21		21	0.0	0	0.0	0	0
22		22	0.0	0	0.0	0	0
23		23	0.0	0	0.0	0	0
24		24	0.0	0	0.0	0	0
25		25	0.0	0	0.0	0	0
26		26	0.0	0	0.0	0	0
27		27	0.0	0	0.0	0	0
28		28	0.0	0	0.0	0	0
29		29	0.0	0	0.0	0	0
30		30	0.0	0	0.0	0	0
31		31	0.0	0	0.0	0	0
32	Feb	1	0.0	0	0.0	0	0
33		2	0.0	0	0.0	0	0
34		3	0.0	0	0.0	0	0
35		4	0.0	0	0.0	0	0

26 2
Table 21 (contd.)

36		5	0.0	0	0.0	0	0
37		6	0.0	0	0.0	0	0
38		7	0.0	0	0.0	0	0
39		8	0.0	0	0.0	0	0
40		9	0.0	0	0.0	0	0
41		10	0.0	0	0.0	0	0
42		11	0.0	0	0.0	0	0
43		12	0.0	0	0.0	0	0
44		13	0.0	0	0.0	0	0
45		14	0.0	0	0.0	0	0
46		15	0.0	0	0.0	0	0
47		16	0.0	0	0.0	0	0
48		17	0.0	0	0.0	0	0
49		18	0.0	0	0.0	0	0
50		19	0.0	0	0.0	0	0
51		20	0.0	0	0.0	0	0
52		21	0.0	0	0.0	0	0
53		22	0.0	0	0.0	0	0
54		23	0.0	0	0.0	0	0
55		24	0.0	0	0.0	0	0
56		25	0.0	0	0.0	0	0
57		26	0.0	0	0.0	0	0
58		27	0.0	0	0.0	0	0
59		28	0.0	0	0.0	0	0
60		29	0.0	0	0.0	0	0
61	Mar	1	0.0	0	0.0	0	0
62		2	0.0	0	0.0	0	0
63		3	0.0	0	0.0	0	0
64		4	0.0	0	0.0	0	0
65		5	0.0	0	0.0	0	0
66		6	0.0	0	0.0	0	0
67		7	0.0	0	0.0	0	0
68		8	0.0	0	0.0	0	0
69		9	0.0	0	0.0	0	0
70		10	0.0	0	0.0	0	0
71		11	0.0	0	0.0	0	0
72		12	0.0	0	0.0	0	0
73		13	0.0	0	0.0	0	0
74		14	0.0	0	0.0	0	0
75		15	0.0	0	0.0	0	0
76		16	0.0	0	0.0	0	0
77		17	0.0	0	0.0	0	0
78		18	0.0	0	0.0	0	0
79		19	0.0	0	0.0	0	0
80		20	0.0	0	0.0	0	0
81		21	0.0	0	0.0	0	0
82		22	0.0	0	0.0	0	0
83		23	0.0	0	0.0	0	0
84		24	0.0	0	0.0	0	0
85		25	0.0	0	0.0	0	0
86		26	0.0	0	0.0	0	0
87		27	0.0	0	0.0	0	0
88		28	0.0	0	0.0	0	0
89		29	0.0	0	0.0	0	0
90		30	0.0	0	0.0	0	0
91		31	0.0	0	0.0	0	0
92	Apr	1	0.0	0	0.0	0	0
93		2	0.0	0	0.0	0	0
94		3	0.0	0	0.0	0	0
95		4	0.0	0	0.0	0	0
96		5	0.0	0	0.0	0	0
97		6	0.0	0	0.0	0	0
98		7	0.0	0	0.0	0	0
99		8	0.0	0	0.0	0	0
100		9	0.0	0	0.0	0	0
101		10	0.0	0	0.0	0	0
102		11	0.0	0	0.0	0	0
103		12	0.0	0	0.0	0	0
104		13	0.0	0	0.0	0	0

Table 21 (contd.)

105		14	0.0	0	0.0	0	0
106		15	0.0	0	0.0	0	0
107		16	0.0	0	0.0	0	0
108		17	0.0	0	0.0	0	0
109		18	0.0	0	0.0	0	0
110		19	0.0	0	0.0	0	0
111		20	0.0	0	0.0	0	0
112		21	0.0	0	0.0	0	0
113		22	0.0	0	0.0	0	0
114		23	0.0	0	0.0	0	0
115		24	0.0	0	0.0	0	0
116		25	0.0	0	0.0	0	0
117		26	0.0	0	0.0	0	0
118		27	0.0	0	0.0	0	0
119		28	0.0	0	0.0	0	0
120		29	0.0	0	0.0	0	0
121		30	0.0	0	0.0	0	0
122	May	1	0.0	0	0.0	0	0
123		2	0.0	0	0.0	0	0
124		3	0.0	0	0.0	0	0
125		4	0.0	0	0.0	0	0
126		5	0.0	0	0.0	0	0
127		6	0.0	0	0.0	0	0
128		7	0.0	0	0.0	0	0
129		8	0.0	0	0.0	0	0
130		9	0.0	0	0.0	0	0
131		10	0.0	0	0.0	0	0
132		11	0.0	0	0.0	0	0
133		12	0.0	0	0.0	0	0
134		13	0.0	0	0.0	0	0
135		14	0.0	0	0.0	0	0
136		15	0.0	0	0.0	0	0
137		16	0.0	0	0.0	0	0
138		17	0.0	0	0.0	0	0
139		18	0.0	0	0.0	0	0
140		19	0.0	0	0.0	0	0
141		20	0.0	0	0.0	0	0
142		21	0.0	0	0.0	0	0
143		22	8.7	104	8.7	104	209
144		23	2.6	31	2.6	31	62
145		24	0.8	10	0.8	10	19
146		25	0.8	10	0.8	10	19
147		26	0.8	10	0.8	10	19
148		27	0.8	10	0.8	10	19
149		28	0.8	10	0.8	10	19
150		29	0.8	10	0.8	10	19
151		30	12.0	144	12.0	144	288
152		31	12.0	144	12.0	144	288
153	Jun	1	12.0	144	12.0	144	288
154		2	12.0	144	12.0	144	288
155		3	12.0	144	12.0	144	288
156		4	9.7	116	9.7	116	233
157		5	5.0	60	5.0	60	120
158		6	5.0	60	5.0	60	120
159		7	5.0	60	5.0	60	120
160		8	7.3	88	7.3	88	175
161		9	7.3	88	7.3	88	175
162		10	7.3	88	7.3	88	175
163		11	7.3	88	7.3	88	175
164		12	7.3	88	7.3	88	175
165		13	8.7	104	8.7	104	209
166		14	8.7	104	8.7	104	209
167		15	8.7	104	8.7	104	209
168		16	1.2	14	1.2	14	29
169		17	1.2	14	1.2	14	29
170		18	3.0	36	3.0	36	72
171		19	3.0	36	3.0	36	72
172		20	6.6	79	1.1	13	92
173		21	6.6	79	1.1	13	92

Table 21 (contd.)

174		22	1.0	12	1.0	12	24
175		23	2.3	28	2.3	28	55
176		24	1.4	17	1.4	17	34
177		25	5.0	60	5.0	60	120
178		26	3.6	43	3.6	43	86
179		27	5.0	60	5.0	60	120
180		28	2.8	34	2.8	34	67
181		29	4.7	56	4.7	56	113
182		30	3.5	42	3.5	42	84
183	Jul	1	299.8	3598	299.8	3598	7195
184		2	276.3	3316	276.3	3316	6631
185		3	140.5	1686	140.5	1686	3372
186		4	148.4	1781	148.4	1781	3562
187		5	132.8	1594	132.8	1594	3187
188		6	232.7	2792	232.7	2792	5585
189		7	232.7	2792	232.7	2792	5585
190		8	362.0	4344	362.0	4344	8688
191		9	143.0	1716	143.0	1716	3432
192		10	72.3	868	72.3	868	1735
193		11	88.3	1060	88.3	1060	2119
194		12	88.3	1060	88.3	1060	2119
195		13	88.3	1060	88.3	1060	2119
196		14	36.3	436	36.3	436	871
197		15	55.0	660	55.0	660	1320
198		16	55.0	660	55.0	660	1320
199		17	5.3	64	5.3	64	127
200		18	5.3	64	5.3	64	127
201		19	9.3	112	9.7	116	228
202		20	9.3	112	9.7	116	228
203		21	29.1	349	29.1	349	698
204		22	29.7	356	29.7	356	713
205		23	29.7	356	29.7	356	713
206		24	4.5	54	4.5	54	108
207		25	4.5	54	4.5	54	108
208		26	5.7	68	5.7	68	137
209		27	5.7	68	5.7	68	137
210		28	8.0	96	8.0	96	192
211		29	17.4	209	13.2	158	367
212		30	17.4	209	13.2	158	367
213		31	17.4	209	13.2	158	367
214	Aug	1	27.5	330	9.6	115	445
215		2	6.0	72	6.0	72	144
216		3	4.9	59	7.0	84	143
217		4	14.3	172	14.3	172	343
218		5	14.0	168	14.0	168	336
219		6	9.5	114	9.5	114	228
220		7	7.5	90	7.5	90	180
221		8	11.3	136	11.3	136	271
222		9	9.0	108	9.0	108	216
223		10	9.0	108	9.0	108	216
224		11	29.7	356	29.7	356	713
225		12	9.0	108	9.0	108	216
226		13	7.1	85	7.1	85	170
227		14	25.0	300	25.0	300	600
228		15	25.0	300	25.0	300	600
229		16	10.4	125	10.4	125	250
230		17	10.4	125	10.4	125	250
231		18	11.3	136	11.3	136	271
232		19	11.3	136	11.3	136	271
233		20	13.8	166	13.8	166	331
234		21	10.3	124	12.0	144	268
235		22	6.3	76	6.3	76	151
236		23	6.3	76	6.3	76	151
237		24	15.3	184	15.3	184	367
238		25	3.6	43	3.6	43	86
239		26	3.6	43	3.6	43	86
240		27	8.7	104	8.7	104	209
241		28	17.0	204	17.0	204	408
242		29	17.0	204	17.0	204	408

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Table 21 (contd.)

243		30	11.7	140	11.7	140	281
244		31	10.3	124	10.3	124	247
245	Sep	1	11.0	132	11.0	132	264
246		2	11.0	132	11.0	132	264
247		3	12.0	144	12.0	144	288
248		4	8.7	104	8.7	104	209
249		5	11.7	140	6.7	80	221
250		6	11.7	140	6.7	80	221
251		7	8.2	98	8.2	98	197
252		8	8.2	98	8.2	98	197
253		9	12.9	155	12.9	155	310
254		10	16.0	192	16.0	192	384
255		11	10.3	124	10.3	124	247
256		12	10.0	120	10.0	120	240
257		13	18.0	216	18.0	216	432
258		14	40.8	490	40.8	490	979
259		15	40.8	490	40.8	490	979
260		16	43.6	523	43.6	523	1046
261		17	20.9	251	20.9	251	502
262		18	20.9	251	20.9	251	502
263		19	23.3	280	23.3	280	559
264		20	22.8	274	22.8	274	547
265		21	21.8	262	21.8	262	523
266		22	52.4	629	52.4	629	1258
267		23	20.0	240	20.0	240	480
268		24	20.0	240	20.0	240	480
269		25	6.0	72	27.8	334	406
270		26	64.3	772	35.7	428	1200
271		27	64.3	772	35.7	428	1200
272		28	29.3	352	50.7	608	960
273		29	29.3	352	50.7	608	960
274		30	47.0	564	47.0	564	1128
275	Oct	1	47.0	564	47.0	564	1128
276		2	18.4	221	18.4	221	442
277		3	18.4	221	18.4	221	442
278		4	18.0	216	18.0	216	432
279		5	18.0	216	18.0	216	432
280		6	6.5	78	6.5	78	156
281		7	8.5	102	8.5	102	204
282		8	8.5	102	8.5	102	204
283		9	2.5	30	2.5	30	60
284		10	2.5	30	2.5	30	60
285		11	6.0	72	6.0	72	144
286		12	6.0	72	6.0	72	144
287		13	5.0	60	5.0	60	120
288		14	5.0	60	5.0	60	120
289		15	2.5	30	2.5	30	60
290		16	2.5	30	2.5	30	60
291		17	2.5	30	2.5	30	60
292		18	2.5	30	2.5	30	60
293		19	7.2	86	7.2	86	173
294		20	7.2	86	7.2	86	173
295		21	8.8	106	8.8	106	211
296		22	7.5	90	7.5	90	180
297		23	7.5	90	7.5	90	180
298		24	7.5	90	7.5	90	180
299		25	7.5	90	7.5	90	180
300		26	7.5	90	7.5	90	180
301		27	7.5	90	7.5	90	180
302		28	7.5	90	7.5	90	180
303		29	7.5	90	7.5	90	180
304		30	7.5	90	7.5	90	180
305		31	7.5	90	7.5	90	180
306	Nov	1	9.6	115	9.6	115	230
307		2	9.6	115	9.6	115	230
308		3	2.0	24	2.0	24	48
309		4	2.0	24	2.0	24	48
310		5	22.3	268	22.3	268	535
311		6	0.0	0	0.0	0	0

Table 21 (contd.)

312		7	0.0	0	0.0	0	0
313		8	0.0	0	0.0	0	0
314		9	0.0	0	0.0	0	0
315		10	0.0	0	0.0	0	0
316		11	0.0	0	0.0	0	0
317		12	0.0	0	0.0	0	0
318		13	0.0	0	0.0	0	0
319		14	0.0	0	0.0	0	0
320		15	0.0	0	0.0	0	0
321		16	0.0	0	0.0	0	0
322		17	0.0	0	0.0	0	0
323		18	0.0	0	0.0	0	0
324		19	0.0	0	0.0	0	0
325		20	0.0	0	0.0	0	0
326		21	0.0	0	0.0	0	0
327		22	0.0	0	0.0	0	0
328		23	0.0	0	0.0	0	0
329		24	0.0	0	0.0	0	0
330		25	0.0	0	0.0	0	0
331		26	0.0	0	0.0	0	0
332		27	0.0	0	0.0	0	0
333		28	0.0	0	0.0	0	0
334		29	0.0	0	0.0	0	0
335		30	0.0	0	0.0	0	0
336	Dec	1	0.0	0	0.0	0	0
337		2	0.0	0	0.0	0	0
338		3	0.0	0	0.0	0	0
339		4	0.0	0	0.0	0	0
340		5	0.0	0	0.0	0	0
341		6	0.0	0	0.0	0	0
342		7	0.0	0	0.0	0	0
343		8	0.0	0	0.0	0	0
344		9	0.0	0	0.0	0	0
345		10	0.0	0	0.0	0	0
346		11	0.0	0	0.0	0	0
347		12	0.0	0	0.0	0	0
348		13	0.0	0	0.0	0	0
349		14	0.0	0	0.0	0	0
350		15	0.0	0	0.0	0	0
351		16	0.0	0	0.0	0	0
352		17	0.0	0	0.0	0	0
353		18	0.0	0	0.0	0	0
354		19	0.0	0	0.0	0	0
355		20	0.0	0	0.0	0	0
356		21	0.0	0	0.0	0	0
357		22	0.0	0	0.0	0	0
358		23	0.0	0	0.0	0	0
359		24	0.0	0	0.0	0	0
360		25	0.0	0	0.0	0	0
361		26	0.0	0	0.0	0	0
362		27	0.0	0	0.0	0	0
363		28	0.0	0	0.0	0	0
364		29	0.0	0	0.0	0	0
365		30	0.0	0	0.0	0	0
366		31	0.0	0	0.0	0	0
Subtotal				51379		50905	102284
TOTAL (for actual operational period)				293749		285644	579394

Table 22

WEIGHT OF TRAFFIC THROUGH FISHPASS																	
Direction of Migration: RIVER to HAOR										Direction of Migration: HAOR to RIVER							
Species	No per hr	Length median (cm)	Weight median (g)	per hr (g)	AOP (hr)	Subtotal (kg)	% subtotal	Species	No per hr	Length median (cm)	Weight median (g)	per hr (g)	AOP (hr)	Subtotal (kg)	% subtotal	TOTAL (kg)	% Total
Air	6.68	13.9	12.5	83.5	4398.58	367	3.4%	Air	5.79	12.5	9.0	52.1	4398.58	229	7.6%	596	4.3%
Bacha	2.14	13.9	19.0	40.6	4398.58	179	1.7%	Bacha	1.55	16.0	31.5	48.8	4398.58	215	7.1%	393	2.9%
Bagair	1.92	5.6	2.0	3.8	4398.58	17	0.2%							0	0.0%	17	0.1%
Bailla	3.16	8.0	6.2	19.6	4398.58	86	0.8%	Bailla	0.56	7.0	4.5	2.5	4398.58	11	0.4%	97	0.7%
Balm	2.72	17.9	14.0	38.1	4398.58	168	1.6%	Balm	1.90	13.0	5.4	10.2	4398.58	45	1.5%	213	1.5%
Bamosh	1.17	30.6	10.5	12.2	4398.58	54	0.5%	Bamosh	0.25	28.8	6.4	1.6	4398.58	7	0.2%	61	0.4%
						0	0.0%	Bata	0.62	11.9	16.0	9.9	4398.58	44	1.4%	44	0.3%
Batashi	25.45	8.6	4.2	106.9	4398.58	470	4.4%	Batashi	13.00	8.2	3.6	46.8	4398.58	206	6.8%	676	4.9%
Bheda	4.99	8.8	9.6	47.9	4398.58	211	2.0%	Bheda	0.45	8.7	8.8	4.0	4398.58	17	0.6%	228	1.7%
Boal	1.94	35.8	150.0	291.3	4398.58	1281	12.0%	Boal	0.39	38.2	195.0	75.8	4398.58	334	11.0%	1615	11.8%
Boicha	4.28	4.9	2.3	9.8	4398.58	43	0.4%							0	0.0%	43	0.3%
Chanda	68.04	4.9	2.4	159.9	4398.58	703	6.6%	Chanda	20.54	5.0	2.4	49.3	4398.58	217	7.1%	920	6.7%
Chapila	8.97	7.5	5.7	51.1	4398.58	225	2.1%	Chapila	7.45	7.4	5.6	41.7	4398.58	184	6.1%	409	3.0%
Cheka	1.03	15.5	62.2	63.8	4398.58	281	2.6%	Cheka	0.50	4.3	2.0	1.0	4398.58	4	0.1%	285	2.1%
Chela	7.40	8.3	3.8	28.1	4398.58	124	1.2%	Chela	3.49	8.2	3.7	12.9	4398.58	57	1.9%	180	1.3%
Chirka balm	5.40	9.4	3.6	19.4	4398.58	85	0.8%	Chirka balm	0.52	9.5	4.0	2.1	4398.58	9	0.3%	95	0.7%
Darkina	4.09	5.2	1.5	6.1	4398.58	27	0.3%	Darkina	0.82	7.0	2.0	1.6	4398.58	7	0.2%	34	0.2%
Dhela	4.82	5.3	2.5	11.8	4398.58	52	0.5%	Dhela	1.96	5.1	2.2	4.3	4398.58	19	0.6%	71	0.5%
Foli	0.90	16.1	29.0	26.2	4398.58	115	1.1%	Foli	0.83	19.1	42.0	35.0	4398.58	154	5.1%	269	2.0%
Garua	0.26	11.5	12.0	3.1	4398.58	14	0.1%							0	0.0%	14	0.1%
Golda chingri	5.87	13.0	22.0	129.2	4398.58	568	5.3%	Golda chingri	1.92	14.1	30.0	57.7	4398.58	254	8.4%	822	6.0%
Gonia	5.00	13.0	18.0	90.0	4398.58	396	3.7%							0	0.0%	396	2.9%
Gulsha	2.63	11.4	4.6	12.1	4398.58	53	0.5%	Gulsha	0.27	11.4	4.6	1.2	4398.58	5	0.2%	59	0.4%
Gutum	2.35	7.3	2.6	6.1	4398.58	27	0.3%	Gutum	0.82	7.3	2.5	2.1	4398.58	9	0.3%	36	0.3%
Icha	190.59	5.1	2.0	381.2	4398.58	1677	15.7%	Icha	22.42	4.9	1.4	30.3	4398.58	133	4.4%	1810	13.2%
Ilish	0.36	20.7	74.0	26.7	4398.58	118	1.1%							0	0.0%	118	0.9%
Jainzza	1.74	6.1	2.3	4.0	4398.58	18	0.2%	Jainzza	3.37	5.7	2.2	7.4	4398.58	33	1.1%	50	0.4%
Kaikka	1.48	13.8	5.6	8.3	4398.58	36	0.3%	Kaikka	1.94	15.0	7.0	13.6	4398.58	60	2.0%	96	0.7%
Kailbaush	1.38	19.6	88.0	121.7	4398.58	535	5.0%	Kailbaush	0.50	16.4	47.0	23.4	4398.58	103	3.4%	638	4.6%
Kazoli	9.12	9.4	4.6	42.0	4398.58	185	1.7%	Kazoli	4.22	9.0	4.4	18.6	4398.58	82	2.7%	266	1.9%
Ketchki	11.37	4.2	0.5	5.7	4398.58	25	0.2%	Ketchki	3.37	4.4	0.6	2.0	4398.58	9	0.3%	34	0.2%
Kholisha	2.31	6.1	4.8	11.1	4398.58	49	0.5%	Kholisha	1.90	8.4	10.6	20.1	4398.58	89	2.9%	137	1.0%
Kol	0.50	4.4	1.5	0.8	4398.58	3	0.0%							0	0.0%	3	0.0%
Kotbacha	0.40	8.2	3.7	1.5	4398.58	7	0.1%							0	0.0%	7	0.0%
Lachu	1.60	13.9	26.0	41.6	4398.58	183	1.7%	Lachu	0.79	13.0	22.0	17.4	4398.58	77	2.5%	260	1.9%
Magur	0.33	15.4	23.0	7.5	4398.58	33	0.3%	Matibangra	0.23	6.0	2.5	0.6	4398.58	3	0.1%	35	0.3%
						0	0.0%	Matibangra	0.23	6.0	2.5	0.6	4398.58	3	0.1%	3	0.0%
Mola	22.92	6.4	2.6	59.6	4398.58	262	2.5%	Mola	8.05	6.1	2.4	19.3	4398.58	85	2.8%	347	2.5%
Mrigel	0.69	30.0	350.0	242.1	4398.58	1065	10.0%							0	0.0%	1065	7.8%
Napit koi	1.31	4.2	0.7	0.9	4398.58	4	0.0%	Napit koi	0.75	4.4	0.8	0.6	4398.58	3	0.1%	7	0.0%
Naptani	0.65	5.6	2.4	1.6	4398.58	7	0.1%	Naptani	0.08	5.8	2.7	0.2	4398.58	1	0.0%	8	0.1%
Pabda	1.07	11.6	13.0	14.0	4398.58	61	0.6%							0	0.0%	61	0.4%
Poa	0.33	9.9	10.6	3.5	4398.58	16	0.1%							0	0.0%	16	0.1%
Potka	2.65	6.0	6.8	18.1	4398.58	79	0.7%	Potka	1.92	5.7	6.0	11.5	4398.58	51	1.7%	130	0.9%
Puti	7.72	5.7	4.1	31.6	4398.58	139	1.3%	Puti	3.77	5.6	4.0	15.1	4398.58	66	2.2%	206	1.5%
Rani	2.92	6.5	4.5	13.1	4398.58	58	0.5%	Rani	1.52	6.3	4.1	6.2	4398.58	27	0.9%	85	0.6%
Rui	0.89	14.6	25.0	22.3	4398.58	98	0.9%	Rui	1.13	12.4	18.0	20.3	4398.58	89	2.9%	187	1.4%
Shing	1.67	9.6	3.7	6.2	4398.58	27	0.3%	Shing	1.01	11.4	6.5	6.6	4398.58	29	1.0%	56	0.4%
Shole	0.50	5.1	1.2	0.6	4398.58	3	0.0%							0	0.0%	3	0.0%
Taki	0.76	12.3	20.0	15.2	4398.58	67	0.6%	Taki	0.44	10.5	12.0	5.3	4398.58	23	0.8%	90	0.7%
Tengra	24.73	6.4	3.6	89.0	4398.58	392	3.7%	Tengra	2.11	7.0	4.5	9.5	4398.58	42	1.4%	433	3.2%
Total						10690	100.0%							3032	100.0%	13722	100.0%

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Table 23 (contd.)

COMPARISON OF DAILY FISH TRAFFIC WITH WATER LEVELS & VELOCITY							
DAILY FISH TRAFFIC			WATER LEVELS & VELOCITY				
Day	River-to-Haor	Haor-to-River	Day	WL r/s	WL c/s	WL diff	Velocity m/sec
1	0	0	1	3.86	4.32	-0.46	0.00
2	0	0	2	3.83	4.29	-0.46	0.00
3	0	0	3	3.80	4.17	-0.37	0.00
4	0	0	4	3.77	4.12	-0.35	0.00
5	0	0	5	3.74	4.09	-0.35	0.00
6	0	0	6	3.71	4.04	-0.33	0.00
7	0	0	7	3.66	3.96	-0.30	0.00
8	0	0	8	3.64	3.93	-0.29	0.00
9	0	0	9	3.62	3.88	-0.26	0.00
10	0	0	10	3.61	3.86	-0.25	0.00
11	0	0	11	3.59	3.85	-0.26	0.00
12	0	0	12	3.58	3.83	-0.25	0.00
13	0	0	13	3.56	3.81	-0.25	0.00
14	0	0	14	3.56	3.80	-0.24	0.00
15	0	0	15	3.55	3.78	-0.23	0.00
16	0	0	16	3.54	3.77	-0.23	0.00
17	0	0	17	3.53	3.76	-0.23	0.00
18	0	0	18	3.51	3.73	-0.22	0.00
19	0	0	19	3.49	3.70	-0.21	0.00
20	0	0	20	3.48	3.68	-0.20	0.00
21	0	0	21	3.47	3.66	-0.19	0.00
22	0	0	22	3.47	3.65	-0.18	0.00
23	0	0	23	3.45	3.63	-0.18	0.00
24	0	0	24	3.44	3.62	-0.18	0.00
25	0	0	25	3.43	3.60	-0.17	0.00
26	0	0	26	3.42	3.59	-0.17	0.00
27	0	0	27	3.40	3.57	-0.17	0.00
28	0	0	28	3.38	3.54	-0.16	0.00
29	0	0	29	3.36	3.52	-0.16	0.00
30	0	0	30	3.35	3.51	-0.16	0.00
31	0	0	31	3.34	3.50	-0.16	0.00
32	0	0	32	3.32	3.48	-0.16	0.00
33	0	0	33	3.30	3.48	-0.18	0.00
34	0	0	34	3.29	3.47	-0.18	0.00
35	0	0	35	3.25	3.46	-0.21	0.00
36	0	0	36	3.25	3.46	-0.21	0.00
37	0	0	37	3.16	3.46	-0.30	0.00
38	0	0	38	3.13	3.45	-0.32	0.00
39	0	0	39	3.11	3.43	-0.32	0.00
40	0	0	40	3.10	3.42	-0.32	0.00
41	0	0	41	3.08	3.39	-0.31	0.00
42	0	0	42	3.07	3.38	-0.31	0.00

Table 23 (contd.)

43	0	0	43	3.06	3.37	-0.31	0.00
44	0	0	44	3.05	3.36	-0.31	0.00
45	0	0	45	3.04	3.34	-0.30	0.00
46	0	0	46	3.03	3.32	-0.29	0.00
47	0	0	47	3.01	3.29	-0.28	0.00
48	0	0	48	3.00	3.28	-0.28	0.00
49	0	0	49	2.98	3.26	-0.28	0.00
50	0	0	50	2.97	3.25	-0.28	0.00
51	0	0	51	2.96	3.24	-0.28	0.00
52	0	0	52	2.95	3.21	-0.26	0.00
53	0	0	53	2.94	3.20	-0.26	0.00
54	0	0	54	2.94	3.20	-0.26	0.00
55	0	0	55	2.96	3.22	-0.26	0.00
56	0	0	56	2.97	3.24	-0.27	0.00
57	0	0	57	3.24	3.46	-0.22	0.00
58	0	0	58	3.39	3.79	-0.40	0.00
59	0	0	59	3.46	3.90	-0.44	0.00
60	0	0	60	3.48	3.94	-0.46	0.00
61	0	0	61	3.53	3.97	-0.44	0.00
62	0	0	62	3.58	4.08	-0.50	0.00
63	0	0	63	3.58	4.09	-0.51	0.00
64	0	0	64	3.56	4.05	-0.49	0.00
65	0	0	65	3.55	4.05	-0.50	0.00
66	0	0	66	3.53	4.00	-0.47	0.00
67	0	0	67	3.50	3.97	-0.47	0.00
68	0	0	68	3.46	3.94	-0.48	0.00
69	0	0	69	3.40	3.86	-0.46	0.00
70	0	0	70	3.37	3.81	-0.44	0.00
71	0	0	71	3.34	3.77	-0.43	0.00
72	0	0	72	3.30	3.67	-0.37	0.00
73	0	0	73	3.36	3.91	-0.55	0.00
74	0	0	74	3.46	4.20	-0.74	0.00
75	0	0	75	5.16	4.86	0.30	0.00
76	0	0	76	5.86	4.44	1.42	1.61
77	0	0	77	6.08	4.59	1.49	1.66
78	0	0	78	6.15	4.47	1.68	1.79
79	0	0	79	5.98	4.26	1.72	1.81
80	0	0	80	5.87	4.36	1.51	1.67
81	0	0	81	5.67	4.16	1.51	1.67
82	0	0	82	5.44	4.21	1.23	0.00
83	0	0	83	5.06	4.21	0.85	0.00
84	0	0	84	4.81	4.16	0.65	0.00
85	0	0	85	4.56	4.56	0.00	0.00
86	0	0	86	4.46	4.68	-0.22	0.00
87	0	0	87	4.36	4.61	-0.25	0.00
88	0	0	88	4.61	4.58	0.03	0.00
89	0	0	89	6.01	4.46	1.55	1.70
90	0	0	90	6.53	4.86	1.67	1.78
91	0	0	91	6.98	4.81	2.17	2.08

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Table 23 (contd.)

92	0	0	92	7.31	4.76	2.55	2.23
93	0	0	93	7.56	4.73	2.83	2.31
94	17506	0	94	7.68	4.56	3.12	2.39
95	0	0	95	7.70	4.76	2.94	2.34
96	0	0	96	7.71	4.58	3.13	2.39
97	0	0	97	7.67	4.66	3.01	2.36
98	0	0	98	7.57	5.01	2.56	2.23
99	0	0	99	7.46	4.96	2.50	2.22
100	0	0	100	7.30	4.96	2.34	2.17
101	0	0	101	7.15	4.36	2.79	2.30
102	0	0	102	7.06	4.71	2.35	2.17
103	0	0	103	6.76	4.88	1.88	1.91
104	0	0	104	6.56	4.46	2.10	2.04
105	0	0	105	6.36	4.38	1.98	1.97
106	0	0	106	6.16	4.34	1.82	1.87
107	0	0	107	5.90	4.26	1.64	1.76
108	0	0	108	5.56	4.31	1.25	1.50
109	0	0	109	5.48	4.29	1.19	1.45
110	0	0	110	5.30	4.24	1.06	0.00
111	0	0	111	5.14	4.18	0.96	0.00
112	0	0	112	4.98	4.30	0.68	0.00
113	0	0	113	5.08	4.26	0.82	0.00
114	0	0	114	5.29	4.30	0.99	0.00
115	0	0	115	5.34	4.81	0.53	0.00
116	0	0	116	5.45	4.81	0.64	0.00
117	0	0	117	5.48	4.92	0.56	0.92
118	0	0	118	5.61	4.61	1.00	1.31
119	0	0	119	5.69	4.69	1.00	1.31
120	0	0	120	5.71	4.71	1.00	1.31
121	0	0	121	5.69	4.71	0.98	1.29
122	0	0	122	5.51	4.56	0.95	1.27
123	0	0	123	5.50	4.71	0.79	1.14
124	0	0	124	5.52	4.71	0.81	1.15
125	0	0	125	5.50	4.81	0.69	1.05
126	0	0	126	5.50	4.76	0.74	1.09
127	0	0	127	5.52	4.71	0.81	1.15
128	0	0	128	5.50	4.71	0.79	1.14
129	0	0	129	5.50	4.66	0.84	1.18
130	0	0	130	5.48	4.61	0.87	1.20
131	0	0	131	5.92	4.61	1.31	1.54
132	3758	209	132	6.43	4.62	1.81	1.87
133	7092	209	133	6.60	4.61	1.99	1.98
134	14438	209	134	6.85	4.61	2.24	2.12
135	14438	209	135	7.23	4.71	2.52	2.22
136	24017	209	136	8.03	5.06	2.97	2.34
137	15264	209	137	8.15	4.98	3.17	2.40
138	12137	209	138	8.26	5.16	3.10	2.38
139	10553	209	139	8.24	5.12	3.12	2.39
140	10553	209	140	8.22	5.56	2.66	2.26

Table 23 (contd.)

141	6343	209	141	8.20	5.34	2.86	2.31
142	3312	209	142	8.10	5.37	2.73	2.28
143	3312	209	143	8.09	5.48	2.61	2.25
144	3312	62	144	7.92	5.54	2.38	2.18
145	3312	19	145	7.74	5.46	2.28	2.14
146	655	19	146	7.53	5.48	2.05	2.01
147	1632	19	147	7.56	5.46	2.10	2.04
148	1632	19	148	7.38	5.44	1.94	1.95
149	1140	19	149	7.46	5.48	1.98	1.97
150	641	19	150	7.57	5.53	2.04	2.01
151	1848	288	151	7.70	5.72	1.98	1.97
152	1915	288	152	8.04	5.82	2.22	2.11
153	2004	288	153	8.12	6.00	2.12	2.05
154	2527	288	154	8.44	6.17	2.27	2.14
155	2527	288	155	8.58	6.40	2.18	2.09
156	2527	233	156	8.63	6.52	2.11	2.05
157	2527	120	157	8.60	6.60	2.00	1.98
158	1692	120	158	8.67	6.70	1.97	1.96
159	1169	120	159	8.67	6.83	1.84	1.89
160	1560	175	160	8.61	6.87	1.74	1.82
161	912	175	161	8.52	6.88	1.64	1.76
162	912	175	162	8.44	6.85	1.59	1.73
163	535	175	163	8.34	6.80	1.54	1.69
164	960	175	164	8.24	6.76	1.48	1.65
165	710	209	165	8.08	6.78	1.30	1.53
166	787	209	166	7.98	6.77	1.21	1.47
167	775	209	167	7.88	6.74	1.14	1.41
168	775	29	168	7.80	6.68	1.12	1.40
169	168	29	169	7.70	6.65	1.05	1.35
170	168	72	170	7.61	6.66	0.95	1.27
171	463	72	171	7.52	6.69	0.83	1.17
172	874	92	172	7.61	6.68	0.93	1.25
173	223	92	173	7.54	6.70	0.84	1.18
174	212	24	174	7.48	6.70	0.78	1.13
175	283	55	175	7.50	6.74	0.76	1.11
176	240	34	176	7.55	6.79	0.76	1.11
177	94	120	177	7.56	6.82	0.74	1.09
178	403	86	178	7.53	6.84	0.69	1.05
179	348	120	179	7.51	6.85	0.66	1.02
180	353	67	180	7.44	6.85	0.59	0.95
181	569	113	181	7.41	6.86	0.55	0.91
182	442	84	182	7.39	6.89	0.50	0.86
183	14813	7195	183	7.43	7.06	0.37	0.72
184	13164	6631	184	8.03	7.35	0.68	1.04
185	26988	3372	185	8.51	7.61	0.90	1.23
186	10027	3562	186	8.85	7.81	1.04	1.34
187	17575	3187	187	8.98	7.99	0.99	1.30
188	11820	5585	188	9.02	8.10	0.92	1.24
189	11820	5585	189	9.03	8.13	0.90	1.23

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Table 23 (contd.)

190	4188	8688	190	9.02	8.15	0.87	1.20
191	4188	3432	191	9.01	8.15	0.86	1.19
192	3120	1735	192	9.00	8.15	0.85	1.19
193	8453	2119	193	9.02	8.15	0.87	1.20
194	8453	2119	194	9.02	8.15	0.87	1.20
195	12742	2119	195	9.00	8.14	0.86	1.19
196	10805	871	196	8.96	8.12	0.84	1.18
197	10805	1320	197	8.96	8.16	0.80	1.14
198	826	1320	198	8.98	8.18	0.80	1.14
199	3041	127	199	8.95	8.22	0.73	1.08
200	1638	127	200	8.94	8.20	0.74	1.09
201	1638	228	201	8.93	8.20	0.73	1.08
202	1970	228	202	8.95	8.22	0.73	1.08
203	1970	698	203	8.95	8.23	0.72	1.07
204	1970	713	204	8.93	8.22	0.71	1.07
205	1008	713	205	8.92	8.22	0.70	1.06
206	991	108	206	8.91	8.22	0.69	1.05
207	1397	108	207	8.91	8.22	0.69	1.05
208	1397	137	208	8.98	8.23	0.75	1.10
209	2064	137	209	8.88	8.22	0.66	1.02
210	2393	192	210	8.79	8.21	0.58	0.94
211	2393	367	211	8.73	8.21	0.52	0.88
212	1152	367	212	8.69	8.21	0.48	0.84
213	708	367	213	8.78	8.23	0.55	0.91
214	708	445	214	8.78	8.23	0.55	0.91
215	1159	144	215	8.74	8.25	0.49	0.85
216	1159	143	216	8.72	8.27	0.45	0.81
217	1159	343	217	8.62	8.29	0.33	0.67
218	1159	336	218	8.62	8.38	0.24	0.56
219	480	228	219	8.63	8.39	0.24	0.56
220	480	180	220	8.60	8.38	0.22	0.53
221	480	271	221	8.49	8.36	0.13	0.38
222	480	216	222	8.42	8.35	0.07	0.27
223	1284	216	223	8.38	8.34	0.04	0.19
224	1284	713	224	8.30	8.31	-0.01	-0.09
225	2102	216	225	8.35	8.31	0.04	0.19
226	1337	170	226	8.40	8.31	0.09	0.31
227	874	600	227	8.46	8.31	0.15	0.42
228	2328	600	228	8.49	8.31	0.18	0.47
229	2328	250	229	8.52	8.32	0.20	0.50
230	1428	250	230	8.60	8.34	0.26	0.58
231	1433	271	231	8.70	8.44	0.26	0.58
232	2681	271	232	8.75	8.47	0.28	0.61
233	2681	331	233	8.79	8.48	0.31	0.65
234	2681	268	234	8.82	8.51	0.31	0.65
235	1709	151	235	8.87	8.52	0.35	0.70
236	1709	151	236	8.87	8.51	0.36	0.71
237	1709	367	237	8.87	8.49	0.38	0.73
238	1039	86	238	8.87	8.48	0.39	0.74

Table 23 (contd.)

239	1040	86	239	8.85	8.46	0.39	0.74
240	1040	209	240	8.81	8.45	0.36	0.71
241	756	408	241	8.77	8.43	0.34	0.68
242	756	408	242	8.73	8.43	0.30	0.64
243	756	281	243	8.73	8.48	0.25	0.57
244	756	247	244	8.69	8.49	0.20	0.50
245	886	264	245	8.66	8.48	0.18	0.47
246	886	264	246	8.65	8.46	0.19	0.48
247	886	288	247	8.63	8.44	0.19	0.48
248	768	209	248	8.62	8.43	0.19	0.48
249	768	221	249	8.57	8.43	0.14	0.40
250	857	221	250	8.56	8.42	0.14	0.40
251	857	197	251	8.57	8.45	0.12	0.37
252	377	197	252	8.57	8.45	0.12	0.37
253	377	310	253	8.50	8.44	0.06	0.24
254	377	384	254	8.40	8.44	-0.04	-0.23
255	1008	247	255	8.34	8.43	-0.09	-0.42
256	1008	240	256	8.27	8.43	-0.16	-0.63
257	792	432	257	8.17	8.41	-0.24	-0.84
258	792	979	258	8.08	8.38	-0.30	-0.99
259	2755	979	259	8.00	8.35	-0.35	-1.10
260	2203	1046	260	7.89	8.33	-0.44	-1.30
261	2203	502	261	7.84	8.32	-0.48	-1.38
262	2820	502	262	7.80	8.35	-0.55	-1.53
263	2820	559	263	7.76	8.36	-0.60	-1.62
264	1769	547	264	7.78	8.36	-0.58	-1.58
265	1769	523	265	7.78	8.36	-0.58	-1.58
266	1769	1258	266	7.97	8.43	-0.46	-1.34
267	1769	480	267	8.08	8.48	-0.40	-1.21
268	1980	480	268	8.08	8.48	-0.40	-1.21
269	1980	406	269	8.05	8.47	-0.42	-1.26
270	1430	1200	270	8.01	8.46	-0.45	-1.32
271	1430	1200	271	7.96	8.43	-0.47	-1.36
272	1044	960	272	8.02	8.42	-0.40	-1.21
273	1044	960	273	7.98	8.41	-0.43	-1.28
274	2280	1128	274	7.93	8.37	-0.44	-1.30
275	708	1128	275	7.95	8.35	-0.40	-1.21
276	708	442	276	7.90	8.31	-0.41	-1.24
277	372	442	277	7.81	8.28	-0.47	-1.36
278	372	432	278	7.75	8.25	-0.50	-1.42
279	607	432	279	7.78	8.23	-0.45	-1.32
280	252	156	280	7.99	8.27	-0.28	-0.94
281	252	204	281	8.05	8.28	-0.23	-0.82
282	144	204	282	8.06	8.29	-0.23	-0.82
283	144	60	283	7.98	8.26	-0.28	-0.94
284	360	60	284	7.92	8.23	-0.31	-1.01
285	384	144	285	7.85	8.20	-0.35	-1.10
286	384	144	286	7.78	8.20	-0.42	-1.26
287	264	120	287	7.66	8.13	-0.47	-1.36

Table 23 (contd.)

288	264	120	288	7.61	8.10	-0.49	-1.40
289	403	60	289	7.45	8.03	-0.58	-1.58
290	403	60	290	7.26	7.97	-0.71	-1.83
291	403	60	291	7.13	7.93	-0.80	-1.99
292	403	60	292	7.08	7.90	-0.82	-2.03
293	384	173	293	7.01	7.88	-0.87	-2.12
294	384	173	294	6.97	7.85	-0.88	-2.14
295	202	211	295	6.94	7.82	-0.88	-2.14
296	264	180	296	6.62	7.70	-1.08	-2.47
297	264	180	297	6.54	7.63	-1.09	-2.49
298	240	180	298	6.36	7.55	-1.19	-2.65
299	240	180	299	6.21	7.48	-1.27	-2.78
300	240	180	300	6.11	7.41	-1.30	-2.82
301	240	180	301	5.96	7.34	-1.38	-2.95
302	240	180	302	5.92	7.30	-1.38	-2.95
303	240	180	303	6.07	7.36	-1.29	-2.81
304	240	180	304	6.38	7.37	-0.99	-2.32
305	240	180	305	6.64	7.35	-0.71	-1.83
306	346	230	306	6.77	7.32	-0.55	-1.53
307	346	230	307	6.74	7.27	-0.53	-1.49
308	504	48	308	6.70	7.20	-0.50	-1.42
309	504	48	309	6.76	7.19	-0.43	-1.28
310	420	535	310	6.66	7.14	-0.48	-1.38
311	0	0	311	6.56	7.07	-0.51	-1.44
312	0	0	312	6.44	6.95	-0.51	-1.44
313	0	0	313	6.32	6.86	-0.54	-1.51
314	0	0	314	6.28	6.79	-0.51	-1.44
315	0	0	315				
316	0	0	316				
317	0	0	317				
318	0	0	318				
319	0	0	319				
320	0	0	320				
321	0	0	321				
322	0	0	322				
323	0	0	323				
324	0	0	324				
325	0	0	325				
326	0	0	326				
327	0	0	327				
328	0	0	328				
329	0	0	329				
330	0	0	330				
331	0	0	331				
332	0	0	332				
333	0	0	333				
334	0	0	334				
335	0	0	335				
336	0	0	336				

Table 23 (contd.)

337	0	0	337				
338	0	0	338				
339	0	0	339				
340	0	0	340				
341	0	0	341				
342	0	0	342				
343	0	0	343				
344	0	0	344				
345	0	0	345				
346	0	0	346				
347	0	0	347				
348	0	0	348				
349	0	0	349				
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352	0	0	352				
353	0	0	353				
354	0	0	354				
355	0	0	355				
356	0	0	356				
357	0	0	357				
358	0	0	358				
359	0	0	359				
360	0	0	360				
361	0	0	361				
362	0	0	362				
363	0	0	363				
364	0	0	364				
365	0	0	365				
366	0	0	366				

Table 24

Fish species recorded inside fishpass during samplig 1996

Family	Local name	English name	Scientific name
Anguillidae	Bamosh	Freshwater eel	<i>Anguilla bengalensis</i>
	Bamosh	Freshwater eel	<i>Ophisternon bengalensis</i>
Tetradontidae	Potka	Puffer	<i>Tetraodon cutcutia</i>
Belonidae	Kaikka	Needle fish	<i>Xenentodon cancila</i>
Channidae	Taki	Shakehead	<i>Channa punctatus</i>
	Shole	Shakehead	<i>Channa striatus</i>
Cyprinodontidae	Kanpona	Top-minnows	<i>Aplocheilichthys panchax</i>
Cyprinidae	Rui	Carp	<i>Labeo rohita</i>
	Mrigel	Carp	<i>Labeo mrigala</i>
	Gonia	Carp	<i>Labeo gonius</i>
	Kalibaush	Carp	<i>Labeo calbasu</i>
	Bata	Carp	<i>Labeo bata</i>
	Lachu	Carp	<i>Cirrhinus reba</i>
	Puti	Barb	<i>Puntius sophore</i>
	Puti	Barb	<i>Puntius conchoniensis</i>
	Puti	Barb	<i>Puntius chola</i>
	Puti	Barb	<i>Puntius gelius</i>
	Puti	barb	<i>Puntius ticto</i>
	Mola	Barb	<i>Amblypharyngodon mola</i>
	Dhela	Barb	<i>Rohtee cotio</i>
	Chela	Barb	<i>Salmostoma phulo</i>
	Chela	Barb	<i>Salmostoma bacaila</i>
	Darkina	Barb	<i>Rasbora rasbora</i>
Cobitidae	Gutum	Loach	<i>Lepidocephalus guntea</i>
	Pahari gutum	Loach	<i>Somileptes gongota</i>
	Rani	Loach	<i>Botia dario</i>
	Matibangra	Loach	<i>Nemachilus botia</i>
Siluridae	Boal	Freshwater shark	<i>Wallago attu</i>
	Pabda	Catfish	<i>Ompok bimaculatus</i>
Heteropneustidae	Shing	Catfish	<i>Heteropneustes fossilis</i>
Clariidae	Magur	Catfish	<i>Clarias batrachus</i>
Chacidae	Cheka	Catfish	<i>Chaca chaca</i>
	Garua	Catfish	<i>Clupisoma garua</i>
Schibeidae	Bacha	Catfish	<i>Eutropiichthys vacha</i>
	Koti Bacha	Catfish	<i>Clupisoma muriei</i>
	Kazoli	Catfish	<i>Ailia coila</i>
	Batashi	Catfish	<i>Pseudeutropius atherinoides</i>
Bagridae	Baghair	Catfish	<i>Bagarius yarrellii</i>
	Air	Catfish	<i>Aorichthys aor</i>
	Guizza	Catfish	<i>Mystus Seenghala</i>
	Gulsha	Catfish	<i>Mystus cavasius</i>
	Bazari Tengra	Catfish	<i>Mystus tengara</i>
	Jainzza	Catfish	<i>Gagata youssoufi</i>
	Tengra	Catfish	<i>Mystus vittatus</i>
Notopteridae	Foli	Knife fish	<i>Notopterus notopterus</i>
	Ilish	Hilsha	<i>Hilsa ilisha</i>
Clupidae	Chapila	Sardine	<i>Gudusia chapra</i>
	Ketchki	Sardine	<i>Corica soborna</i>
Mastacembelidae	Baim	Spiny eel	<i>Mastacembelus armatus</i>
	Tara baim	Spiny eel	<i>Macrognathus aculeatus</i>
	Chirka baim	Spiny eel	<i>Mastacembelus pancalus</i>
Anabantidae	Boicha	Gouramy	<i>Colisa sota</i>
	Kholisha	Gouramy	<i>Colisa fasciatus</i>
	Naptani	Gouramy	<i>Ctenops nobilis</i>
	Koi	Perches	<i>Anabas testudineus</i>
Scianidae	Poa	Croaker	<i>Johnius cujus</i>
Gobiidae	Bailla	Goby	<i>Glossogobius giuris</i>
Nandidae	Bheda	Mud perch	<i>Nandus nandus</i>
Ambasiidae	Chanda	Glassfish	<i>Chanda nama</i>
	Chanda	Glassfish	<i>Chanda ranga</i>
Pristolepidae	Napit koi	Perch	<i>Badis badis</i>
Palaemonidae	Icha	Icha (small prawn)	<i>Macrobrachium species</i>
	Golda chingri	Prawn	<i>Macrobrachium rosenbergii</i>

2000

Table 25

Species recorded inside fishpass
during Year-1 and Year- 2

Species	Year-1	Year-2
Air	x	x
Bacha	x	x
Bagair		x
Bailla	x	x
Baim	x	x
Bamosh(anguiila)		x
Bamosh	x	x
Bata	x	x
Batashi	x	x
Bheda	x	x
Boal	x	x
Boicha	x	x
Bajari tengra		x
Chanda (ranga)	x	x
Chanda (nama)	x	x
Chapila	x	x
Checka	x	x
Chela puti		x
Chela(phulo)		x
Chela	x	x
Chitol	x	
Chirka baim	x	x
Darkina		x
Dhela	x	x
Foli	x	x
Garua		x
Ghagot		x
Golda chingri	x	x
Gonia	x	x
Gulsha	x	x
Gila puti	x	x
Gutum	x	x
Icha	x	x
Ilish		x
Jati puti	x	x
Jainzza		x
Kaikka	x	x
Kalibaush	x	x
Kazoli	x	x
Ketchki		x
Kholisha	x	x
Koi		x
Kotibacha		x
Kanchan puti		x
Kanpona		x
Lachu	x	x
Magur		x
Matibangra		x
Mola	x	x
Mrigel	x	x
Napit koi		x
Naptani	x	x
Pabda		x
Poa	x	x
Potka	x	x
Pahari gutum		x
Rani	x	x
Rita	x	
Rui	x	x
Shing	x	x
Shole	x	x
Taki		x
Tit puti	x	x
Tara baim	x	x
Tengra	x	x

Table 26 (contd.)

SPECIES COMPOSITION		
of fishpass traffic		
Species	Number	Percentage
Air	966	0.78
Bacha	772	0.62
Bagair	55	0.04
Bailla	737	0.59
Baim	234	0.19
Bamosh	42	0.03
Bata	5	0.00
Batashi	3301	2.65
Bheda	463	0.37
Boal	62	0.05
Boicha	145	0.12
Buritengra	91	0.07
Chanda	36556	29.39
Chapila	3982	3.20
Chata	17	0.01
Cheka	18	0.01
Chela	1742	1.40
Chirka	247	0.20
Darkina	168	0.14
Dhela	919	0.74
Foli	35	0.03
Garua	3	0.00
Ghagot	1	0.00
Gila chanda	24	0.02
Gilachaki	93	0.07
Golda	993	0.80
Gonia	42	0.03
Gulsha	277	0.22
Gutum	443	0.36
Icha	54452	43.78
Ilish	7	0.01
Jainzza	189	0.15
Kaikka	202	0.16
Kalibaush	79	0.06
Kazoli	803	0.65
Ketchki	758	0.61
Kholisha	77	0.06
Koi	2	0.00
Koi bandi	1	0.00
Kotibacha	9	0.01
Lachu	81	0.07
Magur	3	0.00
Matibangra	6	0.00
Meni	95	0.08
Mola	9009	7.24
Mrigel	11	0.01

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Table 26 (contd.)

Napit koi	26	0.02
Naptani	96	0.08
Pabda	36	0.03
Poa	1	0.00
Potka	477	0.38
Puti	3098	2.49
Rani	556	0.45
Rui	48	0.04
Shing	319	0.26
Shole	1	0.00
Taki	52	0.04
Tengra	1442	1.16
Titputi	3	0.00
Total	124372	100

Table 27

OCCURENCE OF SPECIES IN FISHPASS SAMPLES								
as a function of water velocity at vertical slot								
WATER VELOCITY RANGES @ VERTICAL SLOT (m/sec)								
	0.00-0.99	1.00-1.24	1.25-1.49	1.50-1.74	1.75-1.99	2.00-2.24	2.25-2.50	
	COUNTERCURRENT SWIMMING							CONCURRENT
Air		1						1
Bacha	1	1	1	1	1	1	1	1
Bagair								
Bailla	1	1	1			1		1
Baim	1	1	1	1				1
Bamosh						1		
Bata	1							
Batashi	1	1	1			1		1
Bheda	1	1	1					1
Boal		1						1
Boicha								1
Chanda	1	1	1	1	1	1	1	1
Chapila	1	1	1			1		1
Cheka		1	1					1
Chela	1	1	1			1		1
Chirka baim	1	1	1					1
Darkina			1			1	1	1
Dhela	1	1	1	1		1		1
Foli	1	1			1			1
Garua								1
Golda chingri	1	1						1
Gonia								1
Gulsha		1						1
Gutum	1	1	1	1		1	1	1
Icha	1	1	1	1		1	1	1
Ilish								
Jainzza	1	1				1		1
Kaikka	1	1	1					1
Kalibaush	1	1	1					1
Kazoli	1	1						1
Ketchki	1	1						1
Kholisha								1
Koi								
Kotibacha								1
Lachu	1	1	1	1			1	1
Magur								
Matibangra		1	1					
Mola	1	1	1	1	1	1		1
Mrigel		1	1					
Napit koi	1	1						
Naptani		1						1
Pabda								1
Poa								1
Potka	1	1	1	1				1
Poti	1	1	1	1	1	1	1	1
Rani	1	1	1	1	1	1	1	1
Rui		1		1				1
Shing	1	1	1	1		1	1	1
Shole								
Taki	1	1				1		1
Tengra	1	1				1		1
TOTAL	29	36	24	13	6	18	9	41

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Table 28 (contd.)

SPECIES LENGTH CHARACTERISTIC (1996)

Species	smallest size recorded in fishpass sampling (cm)	Largest size recorded in fishpass sampling (cm)	size at first maturity (cm)	Maximum size of species (cm)	Age of first Maturity (year)
Air	4.30	30.30	45.00	120.00	2.00
Bacha	3.00	23.60	17.00	30.00	1.00
Bagair	5.00	6.30	75.00	200.00	5.00
Bailla	4.10	22.90	15.00	30.00	1.00
Baim	6.90	55.00	40.00	100.00	1.00
Bamosh	21.30	38.00	50.00	118.00	1.00
Bata	4.30	16.20	12.00	25.00	1.00
Batashi	5.80	11.30	4.50	11.30	1.00
Bheda	4.20	16.90	8.00	20.00	1.00
Boal	8.70	41.50	50.00	180.00	1.00
Boicha	3.60	6.80	3.50	8.00	1.00
Bajari tengra	6.80	7.50	5.00	9.00	1.00
Chanda nama	2.50	7.90	4.50	11.00	0.25
Chanda ranga	2.10	7.80	4.00	10.00	0.25
Chapila	3.00	16.60	10.00	20.00	1.00
Cheka	3.30	29.10	12.00	30.00	1.00
Chela	4.30	13.90	5.00	14.00	1.00
Chala puti	3.50	8.50	6.00	12.00	1.00
Chirka baim	3.10	17.20	10.00	18.00	1.00
Darkina	3.20	10.20	4.00	12.00	1.00
Dhela	3.40	9.00	5.00	10.00	1.00
Foli	5.80	27.80	22.00	35.00	1.00
Garua	11.50	12.40	18.00	35.00	1.00
Ghagot	6.50	6.50	45.00	112.00	3.00
Golda chingri	6.00	19.30	15.00	27.00	1.00
Gonia	3.90	23.60	23.00	61.00	1.00
Gulsha	4.20	24.20	12.00	25.00	1.00
Gutum	4.70	11.30	5.00	12.00	1.00
Gila puti	2.30	3.50	2.50	5.00	0.50
Icha	2.60	13.90	4.00	10.00	0.50
Ilish	19.30	22.40	30.00	60.00	1.00
Jainzza	3.50	9.10	5.00	10.00	1.00
Jati puti	3.60	10.30	6.00	15.00	1.00
Kaikka	5.00	22.00	15.00	28.00	1.00
Kalibaush	13.20	51.00	30.00	75.00	2.00
Kazoli	5.10	12.70	7.00	15.00	1.00
Ketchki	2.90	5.80	3.50	7.00	1.00
Kholisha	3.30	10.80	4.00	12.70	1.00
Koi	4.10	4.70	17.00	22.00	1.00
Kotibacha	6.00	12.70	8.00	13.00	1.00
Kanchan puti	3.50	8.50	6.00	12.00	1.00

Table 28 (contd.)

SPECIES LENGTH CHARACTERISTIC (1996)

Species	smallest size recorded in fishpass sampling (cm)	Largest size recorded in fishpass sampling (cm)	size at first maturity (cm)	Maximum size of species (cm)	Age of first Maturity (year)
Lachu	4.10	21.90	18.00	32.00	1.00
Magur	12.10	20.50	18.00	30.00	1.00
Matibangra	6.10	7.30	3.00	8.00	1.00
Mola	3.10	9.90	5.00	15.00	1.00
Mrigel	27.50	29.50	45.00	84.00	2.00
Napit koi	3.10	6.10	4.00	9.00	1.00
Naptani	3.00	7.20	4.00	10.00	1.00
Pabda	6.20	24.70	14.00	28.00	1.00
Poa	9.90	9.90	10.00	19.00	1.00
Potka	2.80	9.30	5.00	13.20	1.00
Pahari gutum	6.50	10.50	7.00	15.00	1.00
Rani	3.20	10.90	7.00	15.00	1.00
Rui	4.60	17.50	50.00	90.00	2.00
Shing	4.50	23.60	13.00	27.00	1.00
Shole	5.10	5.10	28.00	40.00	1.00
Taki	7.10	24.70	15.00	27.00	1.00
Tit puti	3.50	7.50	4.00	10.00	1.00
Tara baim	7.00	18.50	15.00	37.00	1.00
Tengra	3.90	10.70	7.00	15.00	1.00

Table 29

MONSOON FLOOD No 1

Water levels and fish migration rate in fishpass

Direction of migration: river to haor

Date 1996	Day No.	Time (hrs)	Elapsed hours	WL@R/S (m PWD)	Fish per hr
9-May	130	6	0	5.02	
		12	6	5.01	
		18	12	5.01	
		24	18	5.10	
10-May	131	6	24	5.45	
		12	30	5.48	
		18	36	5.51	
		24	42	5.75	
11-May	132	6	48	5.97	
		12	54	5.98	
		18	60	5.99	156.6
		24	66	6.08	
12-May	133	6	72	6.14	214.5
		12	78	6.15	376.5
		18	84	6.17	
		24	90	6.25	
13-May	134	6	96	6.38	
		12	102	6.45	601.6
		18	108	6.48	
		24	114	6.60	
14-May	135	6	120	6.75	
		12	126	6.82	
		18	132	7.01	
		24	138	7.10	
15-May	136	6	144	7.55	
		12	150	7.64	
		18	156	7.70	1000.7
		24	162	7.69	
16-May	137	6	168	7.69	
		12	174	7.69	636
		18	180	7.69	
		24	186	7.71	
17-May	138	6	192	7.80	
		12	198	7.80	
		18	204	7.80	505.7
		24	210	7.81	
18-May	139	6	216	7.78	
		12	222	7.78	
		18	228	7.78	439.7
		24	234	7.77	
19-May	140	6	240	7.76	
		12	246	7.75	
		18	252	7.75	
		24	258	7.79	
20-May	141	6	264	7.76	
		12	270	7.76	243.5
		18	276	7.76	285.1
		24	282	7.76	
21-May	142	6	288	7.70	
		12	294	7.70	
		18	300	7.70	138
		24	306	7.69	
22-May	143	6	312	7.62	
		12	318	7.61	
		18	324	7.61	
		24	330	7.61	
23-May	144	6	336	7.46	
		12	342	7.45	
		18	348	7.44	
		24	354	7.44	
24-May	145	6	360	7.40	
		12	366	7.38	
		18	372	7.37	
		24	378	7.27	
25-May	146	6	384	7.23	
		12	390	7.21	
		18	396	7.19	27.3
		24	402	7.16	
26-May	147	6	408	7.10	
		12	414	7.08	
		18	420	7.06	68
		24	426	6.98	

Table 30

MONSOON FLOOD No 3					
Water levels and fish migration rate in fishpass					
Direction of migration: river to haor					
Date	Day	Time	Elapsed	WL@R/S	Fish
1996	No.	(hrs)	hours	(m PWD)	per hr
29-Jun	181	6	0	6.96	
		12	6	6.96	
		18	12	6.96	
		24	18	6.96	23.7
30-Jun	182	6	24	6.96	
		12	30	6.96	18.4
		18	36	6.96	
		24	42	6.97	
1-Jul	183	6	48	6.98	
		12	54	6.98	
		18	60	7.04	617.2
		24	66	7.20	
2-Jul	184	6	72	7.52	
		12	78	7.68	548.5
		18	84	7.74	
		24	90	7.84	
3-Jul	185	6	96	8.02	
		12	102	8.12	
		18	108	8.19	
		24	114	8.21	
4-Jul	186	6	120	8.35	1124.5
		12	126	8.41	417.8
		18	132	8.45	
		24	138	8.47	
5-Jul	187	6	144	8.50	
		12	150	8.52	
		18	156	8.55	
		24	162	8.55	
6-Jul	188	6	168	8.55	732.3
		12	174	8.55	492.5
		18	180	8.55	
		24	186	8.55	
7-Jul	189	6	192	8.56	
		12	198	8.56	
		18	204	8.56	
		24	210	8.56	
8-Jul	190	6	216	8.56	174.5
		12	222	8.56	
		18	228	8.56	
		24	234	8.56	
9-Jul	191	6	240	8.55	
		12	246	8.53	
		18	252	8.54	
		24	258	8.53	
10-Jul	192	6	264	8.52	
		12	270	8.52	130.0
		18	276	8.51	
		24	282	8.51	
11-Jul	193	6	288	8.53	328.3
		12	294	8.54	
		18	300	8.55	
		24	306	8.55	376.0
12-Jul	194	6	312	8.56	
		12	318	8.54	
		18	324	8.53	
		24	330	8.53	
13-Jul	195	6	336	8.52	370.8
		12	342	8.52	691.0
		18	348	8.52	
		24	354	8.52	
14-Jul	196	6	360	8.51	450.2
		12	366	8.51	
		18	372	8.50	
		24	378	8.50	
15-Jul	197	6	384	8.51	
		12	390	8.52	
		18	396	8.52	
		24	402	8.52	
16-Jul	198	6	408	8.53	34.8
		12	414	8.53	34.0
		18	420	8.53	
		24	426	8.52	

Table 31

MONSOON FLOOD No 3					
Water levels and fish migration rate in fishpass					
Direction of migration: haor to river					
Date 1996	Day No.	Time (hrs)	Elapsed hours	WL@C/S (m PWD)	Fish per hr
29-Jun	181	6	0	6.38	2.8
		12	6	6.38	4.7
		18	12	6.52	
		24	18	6.52	
30-Jun	182	6	24	6.55	
		12	30	6.56	
		18	36	6.57	
		24	42	6.58	
1-Jul	183	6	48	6.62	3.5
		12	54	6.65	299.8
		18	60	6.75	
		24	66	6.78	
2-Jul	184	6	72	6.91	
		12	78	6.95	
		18	84	7.00	
		24	90	7.10	
3-Jul	185	6	96	7.21	276.3
		12	102	7.18	140.5
		18	108	7.24	
		24	114	7.25	
4-Jul	186	6	120	7.35	
		12	126	7.40	
		18	132	7.42	
		24	138	7.47	148.4
5-Jul	187	6	144	7.55	
		12	150	7.56	132.8
		18	156	7.58	
		24	162	7.63	
6-Jul	188	6	168	7.66	
		12	174	7.66	
		18	180	7.66	
		24	186	7.67	232.7
7-Jul	189	6	192	7.69	
		12	198	7.69	
		18	204	7.69	
		24	210	7.75	
8-Jul	190	6	216	7.71	
		12	222	7.71	
		18	228	7.71	
		24	234	7.71	362.0
9-Jul	191	6	240	7.73	
		12	246	7.75	143.0
		18	252	7.71	
		24	258	7.72	
10-Jul	192	6	264	7.72	72.3
		12	270	7.72	
		18	276	7.72	
		24	282	7.75	
11-Jul	193	6	288	7.73	
		12	294	7.74	88.3
		18	300	7.74	
		24	306	7.78	
12-Jul	194	6	312	7.73	
		12	318	7.72	
		18	324	7.72	
		24	330	7.76	
13-Jul	195	6	336	7.72	
		12	342	7.72	
		18	348	7.71	
		24	354	7.76	
14-Jul	196	6	360	7.70	
		12	366	7.70	
		18	372	7.69	36.3
		24	378	7.76	
15-Jul	197	6	384	7.74	
		12	390	7.74	55.0
		18	396	7.78	
		24	402	7.78	

Table 32

SPECIES COMPOSITION OF FISH MIGRATION DURING MONSOON FLOOD SURGES					
MONSOON FLOOD No. 1		MONSOON FLOOD No. 3		MONSOON FLOOD No. 3	
Direction of migration: river to haor		Direction of migration: river to haor		Direction of migration: haor to river	
Period: 9 May to 26 May 1996		Period: 29 June to 16 July 1996		Period: 29 June to 15 July 1996	
Chanda	49.2%	Chanda	51.7%	Chanda	59.6%
Batashi	11.0%	Mola	17.0%	Mola	10.4%
Tengra	4.5%	Chapila	5.7%	Chapila	8.4%
Mola	4.5%	Batashi	4.3%	Puti	5.5%
Bheda	3.8%	Puti	4.0%	Batashi	3.5%
Puti	2.7%	Chela	2.2%	Chela	3.0%
Ketchki	2.6%	Dhela	1.7%	Dhela	1.7%
Chela	2.2%	Tengra	1.7%	Golda chingri	1.2%
Chirka baim	2.1%	Kazoli	1.7%	Bacha	1.2%
Air	2.0%	Air	1.5%	Rani	1.0%
Golda chingri	1.9%	Ketchki	1.4%	Potka	0.9%
Chapila	1.7%	Bailla	1.1%	Air	0.7%
Bailla	1.6%	Golda chingri	1.0%	Kazoli	0.6%
Gutum	1.5%	Rani	0.8%	Ketchki	0.5%
Boicha	1.4%	Bheda	0.5%	Jainzza	0.5%
Dhela	1.08%	Gulsha	0.5%	Gutum	0.4%
Darkina	0.9%	Potka	0.4%	Baim	0.2%
Potka	0.8%	Bacha	0.4%	Bailla	0.2%
Bacha	0.7%	Shing	0.3%	Tengra	0.2%
Gulsha	0.6%	Kaikka	0.2%	Kalibaush	0.1%
Kaikka	0.5%	Gutum	0.2%	Rui	0.1%
Baim	0.5%	Naptani	0.2%	Boal	0.0%
Boal	0.3%	Darkina	0.2%	Napit koi	0.0%
Shing	0.3%	Baim	0.2%	Cheka	0.0%
Gonia	0.3%	Chirka baim	0.1%	Chirka baim	0.0%
Kholisha	0.3%	Jainzza	0.1%	Gulsha	0.0%
Kalibaush	0.3%	Rui	0.1%	Kaikka	0.0%
Rani	0.2%	Gonia	0.1%	Matibangra	0.0%
Lachu	0.1%	Lachu	0.1%		
Cheka	0.1%	Napit koi	0.1%	TOTAL	100.0%
Taki	0.1%	Bagair	0.1%		
Foli	0.1%	Bamosh	0.1%		
Naptani	0.05%	Taki	0.1%		
Pabda	0.04%	Kalibaush	0.1%		
Jainzza	0.0%	Pabda	0.04%		
Shole	0.01%	Foli	0.03%		
Ghagot	0.01%	Mrigel	0.03%		
Garua	0.01%	Cheka	0.0%		
Poa	0.01%	Ilish	0.02%		
Kazoli	0.01%	Boal	0.02%		
Rui	0.01%	Magur	0.004%		
TOTAL	100.0%	TOTAL	100.0%		

Table 33

DIURNAL VARIATION IN MIGRATION RATE					
Direction of migration : River to haor					
Set No.	Date	Sampling Time	Migration Rates (no per hr)		
			Fish	Icha	Total
171	96.06.20	18.30-23.30	36.4	10.2	46.6
172	96.06.21	00.45-07.45	14.7	4.0	18.7
173	96.06.21	08.30-13.30	4.4	2.2	6.6
174	96.06.21	14.00-18.30	3.6	0.0	3.6
175	96.06.21	19.00-23.30	14.4	26.7	41.1
176	96.06.22	00.30-08.00	10.1	5.3	15.5

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Table 34

DIFFERENCES BETWEEN DAYTIME AND NITETIME MIGRATION RATES							
Direction of migration: RIVER to HAOR							
units = no per hr							
F I S H				I C H A			
	<i>a-b</i>	<i>a</i>	<i>b</i>		<i>a-b</i>	<i>a</i>	<i>b</i>
Set Couplet	Difference	Day	Nite	Set Couplet	Difference	Day	Nite
127/128	162.0	376.5	214.5	127/128	115.0	115.0	0.0
130/131	-364.7	636.0	1000.7	130/131	185.0	185.0	0.0
131/132	130.3	636.0	505.7	131/132	185.0	185.0	0.0
134/135	-1068.2	243.5	1311.7	134/135	0.0	0.0	0.0
142/143	-16.0	39.5	55.5	142/143	-66.3	0.0	66.3
143/144	-28.8	26.7	55.5	143/144	-60.1	6.2	66.3
145/146	39.4	96.7	57.3	145/146	-47.5	0.0	47.5
146/147	22.5	79.8	57.3	146/147	-35.5	12.0	47.5
148/149	33.0	100.0	67.0	148/149	-450.0	0.0	450.0
155/156	16.3	65.0	48.7	155/156	-69.8	0.0	69.8
156/157	27.0	65.0	38.0	156/157	-53.6	0.0	53.6
161/163	-3.2	29.6	32.8	161/163	-31.6	0.0	31.6
163/164	-0.5	32.3	32.8	163/164	-30.6	1.0	31.6
172/173	-10.3	4.4	14.7	172/173	-1.8	2.2	4.0
174/175	-10.8	3.6	14.4	174/175	-26.7	0.0	26.7
176/177s	-2.5	7.6	10.1	176/177s	-5.3	0.0	5.3
177s/179	-4.2	7.6	11.8	177s/179	-9.4	0.0	9.4
179/180	-1.8	10.0	11.8	179/180	-6.9	2.5	9.4
180/183	6.1	10.0	3.9	180/183	0.5	2.5	2.0
183/184	12.9	16.8	3.9	183/184	-2.0	0.0	2.0
184/187	2.3	16.8	14.5	184/187	-2.7	0.0	2.7
187/188	0.2	14.7	14.5	187/188	-2.7	0.0	2.7
188/191	-9.0	14.7	23.7	188/191	-6.6	0.0	6.6
191/192	-5.3	18.4	23.7	191/192	-6.6	0.0	6.6
192/195	-598.8	18.4	617.2	192/195	-121.3	0.0	121.3
195/196	-68.7	548.5	617.2	195/196	93.5	214.8	121.3
196/199	576.0	1124.5	548.5	196/199	-12.1	202.7	214.8
199/200	-706.7	417.8	1124.5	199/200	41.7	244.4	202.7
200/203	-314.5	417.8	732.3	200/203	91.1	244.4	153.3
203/204	-239.8	492.5	732.3	203/204	-153.3	0.0	153.3
210/211	-198.3	130.0	328.3	210/211	-60.8	0.0	60.8
214/215	320.2	691.0	370.8	214/215	-79.5	108.0	187.5
215/216	-240.8	450.2	691.0	215/216	212.9	320.9	108.0
219/220	-0.8	34.0	34.8	219/220	-173.6	40.7	214.3
220/221	-92.7	34.0	126.7	220/221	40.7	40.7	0.0
223/224	34.5	85.5	51.0	223/224	-44.3	0.0	44.3
227/228	4.8	84.5	79.7	227/228	0.0	0.0	0.0
231/232	0.7	42.0	41.3	231/232	-20.7	39.0	59.7
232/234	-4.6	36.7	41.3	232/234	-56.0	3.7	59.7
234/235	-43.0	36.7	79.7	234/235	-52.6	3.7	56.3
237/238	13.7	99.7	86.0	237/238	-118.8	0.0	118.8
242/243	18.5	48.0	29.5	242/243	-44.3	0.0	44.3
255s/255ss	-1.6	52.7	54.3	255s/255ss	-15.3	0.0	15.3
259s/259ss	60.6	97.0	36.4	259s/259ss	-15.4	0.0	15.4
285s/286s	23.0	114.8	91.8	285s/286s	-27.5	0.0	27.5
297s/297ss	65.6	76.3	10.7	297s/297ss	-1.7	0.0	1.7
299s/299ss	28.0	109.0	81.0	299s/299ss	0.0	0.0	0.0
301s/302s	9.8	25.3	15.5	301s/302s	-4.5	0.0	4.5
310/311	7.6	16.0	8.4	310/311	-2.8	0.0	2.8

Table 35

Catch composition from Kawadighi Haor (May 95 to April 96)

Species	Floodplain		Beel		Haor	
	Quantity (ton)	Percentage	Quantity (ton)	Percentage	Quantity (ton)	Percentage
Air	11.97	2.22	5.85	3.93	17.82	6.15
Baila	10.3	1.91	2.61	1.75	12.91	3.66
Baim	12.03	2.23	3.16	2.12	15.19	4.35
Bheda	22.17	4.11	3.44	2.31	25.61	6.42
Boal	17.31	3.21	14.32	9.62	31.63	12.83
Cargo	18.17	3.37	10.94	7.35	29.11	10.72
Catla	0.65	0.12	6.1	4.10	6.75	4.22
Chanda	39.86	7.39	7.04	4.73	46.9	12.12
Chapila	23.68	4.39	4.35	2.92	28.03	7.31
Chela	18.66	3.46	3.59	2.41	22.25	5.87
Foli	12.57	2.33	3.08	2.07	15.65	4.40
Gonia	6.26	1.16	2.5	1.68	8.76	2.84
Gozar	4.37	0.81	3.57	2.40	7.94	3.21
Icha	43.79	8.12	27.87	18.72	71.66	26.84
Kaikka	15.75	2.92	3.22	2.16	18.97	5.08
Kalibaus	7.71	1.43	2.61	1.75	10.32	3.18
Kholisha	17.96	3.33	2.13	1.43	20.09	4.76
Koi	14.67	2.72	1.34	0.90	16.01	3.62
Magur	1.24	0.23	0.67	0.45	1.91	0.68
Mola	28.21	5.23	5.67	3.81	33.88	9.04
Mrigal	1.83	0.34	1.55	1.04	3.38	1.38
Puti	100.37	18.61	7.82	5.25	108.19	23.86
Rui	3.88	0.72	3.5	2.35	7.38	3.07
Shing	9.76	1.81	1.12	0.75	10.88	2.56
Shole	3.99	0.74	1.91	1.28	5.9	2.02
Taki	14.18	2.63	4.06	2.73	18.24	5.36
Tengra	14.24	2.64	3.53	2.37	17.77	5.01
Others	63.73	11.82	11.33	7.61	75.06	19.43
Total	539.31	100	148.88	100	688.19	100

Table 36

Catch composition from Kawadighi Haor(May 96 to Nov 96)
, (May, 1996 – Nov, 1996)

Species	Floodplain		Beel		Haor	
	Quantity (ton)	Percentage	Quantity (ton)	Percentage	Quantity (ton)	Percentage
Air	14.18	2.50				
Baila	8.51	1.50				
Baim	14.29	2.52				
Bheda	28.07	4.95				
Boal	19.56	3.45				
Bata	3.40	0.60				
Batashi	14.18	2.50				
Carpo	14.91	2.63				
Catla	0.57	0.10				
Chanda	43.66	7.70				
Chapila	26.76	4.72				
Chela	14.18	2.50				
Cheka	0.85	0.15				
Dhela	6.80	1.20				
Darkina	4.25	0.75				
Foli	7.09	1.25				
Golda chingri	3.12	0.55				
Gonia	3.18	0.56				
Gozar	5.67	1.00				
Gulsha	4.25	0.75				
Gutum	7.94	1.40				
Icha	55.79	9.84				
Kaikka	9.64	1.70				
Kalibaus	13.32	2.35				
Kholisha	21.26	3.75				
Koi	17.58	3.10				
Lachu	4.54	0.80				
Magur	4.25	0.75				
Mola	31.19	5.50				
Mrigal	0.85	0.15				
Puti	74.28	13.10				
Potka	6.80	1.20				
Rui	1.25	0.22				
Rani	2.84	0.50				
Shing	12.64	2.23				
Shole	7.09	1.25				
Taki	15.59	2.75				
Tengra	15.31	2.70				
Others	27.39	4.83				
Total	567.00	100.00				

Table 37

CATCH ASSESSMENT SURVEY						
Fish production in tons						
Flood intensity in mcm-months						
		1992/93	1993/94	1994/95	1995/96	1996/97
Monsoon floodplain		314	572	509	539	567
Dry season beel		23	229	92	149	
Haor total		337	801	601	688	567
Flood intensity		1790	2682	1650	2037	
Haor total		337	801	601	688	567
Flood intensity		1790	2682	1650	2037	
Haor total (y1+y2)		1138	1402	1289	1255	



Table 38

CATCH COMPOSITION IN KUSHIYARA RIVER (NOV 95–OCT 96)

Species	Total Quantity (kg)	Percentage
Air	668.25	1.81
Bacha	2955.07	8.02
Baim	312.67	0.85
Batashi	613.10	1.66
Boal	1951.01	5.30
Bata	465.95	1.27
Chitol	155.54	0.42
Catla	51.25	0.14
Chanda	694.97	1.89
Chapila	1063.13	2.89
Chela	460.22	1.25
Dhela	298.41	0.81
Foli	178.54	0.48
Garua	3070.15	8.34
Gonia	59.02	0.16
Golda chingri	685.09	1.86
Gulsha	504.25	1.37
Icha	1706.76	4.63
Ilish	5623.06	15.27
Jainzza	1276.76	3.47
Kalibaus	720.38	1.96
Khorsula	333.61	0.91
Kazuli	1588.68	4.31
Ketchki	272.49	0.74
Lachu	741.31	2.01
Mola	649.30	1.76
Mrigal	20.89	0.06
Matibangra	61.79	0.17
Poa	353.40	0.96
Puti	677.94	1.84
Rui	765.39	2.08
Rani	541.25	1.47
Rita	636.17	1.73
Taki	278.71	0.76
Tengra	540.00	1.47
Others	5858.50	15.91
Total	36833	100.00

Table 39

SPECIES COMPOSITION IN KUSHIYARA RIVER (site: 107)
(Period: Nov 95– Oct 96)

Group	Species	Monthly catch (kg)											
Major carp													
	Rui	39.53	15.64	16.5	37.57	79.94	152.1	174.7	80.11	21.05	30.96	56.34	60.98
	Catla	0	5.21	2.7	3.58	6.66	12.17	13.97	3.05	0	0.97	1.41	1.52
	Kalibaush	27.11	23.45	18.6	41.15	94.15	136.9	157.2	66.76	26.31	29.03	47.89	51.83
	Mrigel	0	0	1.2	1.79	2.22	7.3	8.38	0	0	0	0	0
a. Subtotal		66.64	44.3	39	84.09	183	308.5	354.2	149.9	47.36	60.96	105.6	114.3
Introduced carp													
	Common carp	0	0	0	0	0	0	0	0	0	0	0	0
	Grass carp	0	0	0	0	0	0	0	0	0	0	0	0
	Silver carp	0	0	0	0	0	0	0	0	0	0	0	0
b. Subtotal													
Large catfish, Knifefish, Snakeheads and others													
	Air	33.89	22.8	22.2	62.62	124.4	115.6	132.7	40.06	18.42	22.25	35.21	38.11
	Boal	113	71.67	35.1	122.6	233.2	372.4	427.5	157.2	72.26	82.24	126.8	137.2
	Chitol	6.78	5.21	4.5	13.54	19.98	30.43	34.93	13.35	4.39	4.84	8.45	9.15
	Foli	4.52	3.26	3.9	15.03	35.53	36.51	41.92	15.26	7.02	3.87	5.63	6.1
	Gonia	3.39	1.95	0	4.47	4.44	15.21	17.47	0.38	0	2.9	4.23	4.57
	Lachu	45.18	26.06	12.9	37.57	81.27	127.8	146.7	80.11	31.57	34.83	56.34	60.98
	Ilish	350.2	97.73	33	153.9	453	754.5	936.1	705.8	359.6	448.9	653.5	676.9
c. Subtotal		556.9	228.7	111.6	409.6	951.7	1453	1737	1012	493.2	599.9	890.2	933
A. Intertotal large finfish (a+b+c)		623.5	273	150.6	493.7	1135	1761	2092	1162	540.6	660.8	995.8	1047
Small catfish													
	Bacha	154.7	97.73	36.9	112.7	329.5	471.6	541.4	351	161.4	179	249.3	269.8
	Garua	186.4	106.9	43.2	96.61	325.1	502	506.5	352.5	179.6	198.3	260.6	312.5
	Rita	22.59	13.03	13.2	31.84	82.16	143	164.2	66.76	17.54	23.22	28.17	30.49
	Tengra	33.89	35.83	12	39.36	98.59	79.11	90.82	49.6	22.8	19.35	28.17	30.49
	Gulsha	28.24	32.58	13.2	33.99	77.72	91.28	104.8	47.69	20.17	13.55	19.72	21.34
	Batashi	33.89	15.64	15.6	31.31	67.95	116.8	134.1	55.32	25.43	29.03	42.26	45.74
	Kazoli	124.3	95.77	20.52	63.51	163.4	231.2	265.5	152.6	70.16	99.65	145.1	157
d. Subtotal		584	397.4	154.6	409.3	1144	1635	1807	1075	497.1	562.1	773.3	867.4
Other small species													
	Puti	60.99	32.58	17.4	52.78	91.48	99.79	114.6	62.57	28.77	29.03	42.26	45.74
	Chapila	79.07	48.86	24.6	59.93	127	156.4	179.5	105.3	48.41	58.05	84.51	91.47
	Chela	28.24	15.64	11.52	30.77	63.06	74.24	85.23	42.35	19.47	22.25	32.4	35.06
	Mola	39.53	22.8	11.64	29.52	76.39	115.6	132.7	72.49	31.57	29.03	42.26	45.74
	Dhela	18.07	10.42	3.24	12.52	33.31	51.72	59.38	32.43	14.91	15.48	22.54	24.39
	Bata	33.89	15.64	11.22	25.94	55.07	79.11	90.82	49.6	22.8	23.22	28.17	30.49
	Taki	14.68	14.98	10.2	26.84	57.73	43.81	50.3	17.17	7.89	8.71	12.68	13.72
	Ketchki	33.89	19.55	4.5	14.31	42.63	34.08	39.12	19.08	8.77	12.58	21.13	22.87
	Rani	25.98	14.98	9.6	28.62	74.61	108.3	124.4	45.78	19.29	22.25	32.4	35.06
	Poa	18.07	5.21	5.7	17	39.97	66.94	76.85	41.97	19.29	15.48	22.54	24.39
	Jainzza	79.07	35.18	22.2	61.54	158.1	219.1	251.5	137.3	63.14	61.92	90.14	97.57
	Khorsula	22.59	15.64	5.16	15.21	35.53	57.81	66.37	36.24	16.66	15.48	22.54	24.39
	Chanda	33.89	22.15	13.2	38.46	105.7	130.8	150.2	57.23	26.31	29.03	42.26	45.74
	Baim	16.94	11.08	8.76	27.19	53.29	51.72	59.38	20.98	9.65	9.68	21.3	22.87
	Matibangra	5.65	3.26	0	0	0	12.17	13.97	7.63	3.51	3.87	5.63	6.1
	Misc.	423.6	244.3	99	326.4	781.6	958.4	1100	625.3	285.6	251.6	366.2	396.4
e. Subtotal		934.1	532.3	257.9	767	1796	2260	2595	1373	626	607.6	889	962
B. Intertotal small finfish (d+e)		1518	929.7	412.6	1176	2940	3895	4402	2449	1123	1170	1662	1829
Prawns													
	Golda chingri	49.7	15.64	2.04	8.95	48.85	106.5	122.3	82.02	39.47	48.38	77.47	83.85
	Icha	67.77	84.7	34.8	110	317.5	322.5	370.3	122.1	50.87	56.12	81.69	88.42
Total Prawas		117.5	100.3	36.84	119	366.4	429	492.5	204.1	90.34	104.5	159.2	172.3
Summary Data													
	Finfish (A+B)	2142	1203	563.2	1670	4075	5656	6494	3611	1664	1831	2658	2877
	Prawns	117.5	100.3	36.84	119	366.4	429	492.5	204.1	90.34	104.5	159.2	172.3
Grand total		2259	1303	600	1789	4441	6085	6986	3815	1754	1935	2817	3049

Table 40

SPECIES COMPOSITION IN KUSHIYARA RIVER (site: 107)
(PERIOD: NOV 95 – OCT 96)

Group		Monthly Standing crop kg/ha											
		Nov 95	Dec 95	Jan 96	Feb 96	Mar 96	Apr 96	May 96	Jun 96	Jul 96	Aug 96	Sep 96	Oct 96
Major carp													
	Rui	0.28	0.11	0.12	0.27	0.57	1.09	1.25	0.57	0.15	0.22	0.40	0.44
	Catla	0.00	0.04	0.02	0.03	0.05	0.09	0.10	0.02	0.00	0.01	0.01	0.01
	Kalibaush	0.19	0.17	0.13	0.29	0.67	0.98	1.12	0.48	0.19	0.21	0.34	0.37
	Mrigel	0.00	0.00	0.01	0.01	0.02	0.05	0.06	0.00	0.00	0.00	0.00	0.00
a. Subtotal		0.48	0.32	0.28	0.60	1.31	2.20	2.53	1.07	0.34	0.44	0.75	0.82
Introduced carp													
	Common carp	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	Grass carp	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	Silver carp	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
b. Subtotal													
Large catfish, Knifefish, Snakeheads and others													
	Air	0.24	0.16	0.16	0.45	0.89	0.83	0.95	0.29	0.13	0.16	0.25	0.27
	Boal	0.81	0.51	0.25	0.88	1.67	2.66	3.05	1.12	0.52	0.59	0.91	0.98
	Chitol	0.05	0.04	0.03	0.10	0.14	0.22	0.25	0.10	0.03	0.03	0.06	0.07
	Foli	0.03	0.02	0.03	0.11	0.25	0.26	0.30	0.11	0.05	0.03	0.04	0.04
	Gonia	0.02	0.01	0.00	0.03	0.03	0.11	0.12	0.00	0.00	0.02	0.03	0.03
	Lachu	0.32	0.19	0.09	0.27	0.58	0.91	1.05	0.57	0.23	0.25	0.40	0.44
	Ilish	2.50	0.70	0.24	1.10	3.24	5.39	6.69	5.04	2.57	3.21	4.67	4.83
c. Subtotal		3.98	1.63	0.80	2.93	6.80	10.38	12.41	7.23	3.52	4.28	6.36	6.66
A. Intertotal large finfish (a+b+c)		4.45	1.95	1.08	3.53	8.10	12.58	14.94	8.30	3.86	4.72	7.11	7.48
Small catfish													
	Bacha	1.11	0.70	0.26	0.81	2.35	3.37	3.87	2.51	1.15	1.28	1.78	1.93
	Garua	1.33	0.76	0.31	0.69	2.32	3.59	3.62	2.52	1.28	1.42	1.86	2.23
	Rita	0.16	0.09	0.09	0.23	0.59	1.02	1.17	0.48	0.13	0.17	0.20	0.22
	Tengra	0.24	0.26	0.09	0.28	0.70	0.57	0.65	0.35	0.16	0.14	0.20	0.22
	Gulsha	0.20	0.23	0.09	0.24	0.56	0.65	0.75	0.34	0.14	0.10	0.14	0.15
	Batashi	0.24	0.11	0.11	0.22	0.49	0.83	0.96	0.40	0.18	0.21	0.30	0.33
	Kazoli	0.89	0.68	0.15	0.45	1.17	1.65	1.90	1.09	0.50	0.71	1.04	1.12
d. Subtotal		4.17	2.84	1.10	2.92	8.17	11.68	12.91	7.68	3.55	4.02	5.52	6.20
Other small species													
	Puti	0.44	0.23	0.12	0.38	0.65	0.71	0.82	0.45	0.21	0.21	0.30	0.33
	Chapila	0.56	0.35	0.18	0.43	0.91	1.12	1.28	0.75	0.35	0.41	0.60	0.65
	Chela	0.20	0.11	0.08	0.22	0.45	0.53	0.61	0.30	0.14	0.16	0.23	0.25
	Mola	0.28	0.16	0.08	0.21	0.55	0.83	0.95	0.52	0.23	0.21	0.30	0.33
	Dhela	0.13	0.07	0.02	0.09	0.24	0.37	0.42	0.23	0.11	0.11	0.16	0.17
	Bata	0.24	0.11	0.08	0.19	0.39	0.57	0.65	0.35	0.16	0.17	0.20	0.22
	Taki	0.10	0.11	0.07	0.19	0.41	0.31	0.36	0.12	0.06	0.06	0.09	0.10
	Ketchki	0.24	0.14	0.03	0.10	0.30	0.24	0.28	0.14	0.06	0.09	0.15	0.16
	Rani	0.19	0.11	0.07	0.20	0.53	0.77	0.89	0.33	0.14	0.16	0.23	0.25
	Poa	0.13	0.04	0.04	0.12	0.29	0.48	0.55	0.30	0.14	0.11	0.16	0.17
	Jainzza	0.56	0.25	0.16	0.44	1.13	1.56	1.80	0.98	0.45	0.44	0.64	0.70
	Khorsula	0.16	0.11	0.04	0.11	0.25	0.41	0.47	0.26	0.12	0.11	0.16	0.17
	Chanda	0.24	0.16	0.09	0.27	0.76	0.93	1.07	0.41	0.19	0.21	0.30	0.33
	Baim	0.12	0.08	0.06	0.19	0.38	0.37	0.42	0.15	0.07	0.07	0.15	0.16
	Matibangra	0.04	0.02	0.00	0.00	0.00	0.09	0.10	0.05	0.03	0.03	0.04	0.04
	Misc.	3.03	1.75	0.71	2.33	5.58	6.85	7.86	4.47	2.04	1.80	2.62	2.83
e. Subtotal		6.67	3.80	1.84	5.48	12.83	16.14	18.53	9.81	4.47	4.34	6.35	6.87
B. Intertotal small finfish (d+e)		10.84	6.64	2.95	8.40	21.00	27.82	31.44	17.49	8.02	8.36	11.87	13.07
Prawns													
	Golda chingri	0.36	0.11	0.01	0.06	0.35	0.76	0.87	0.59	0.28	0.35	0.55	0.60
	Icha	0.48	0.61	0.25	0.79	2.27	2.30	2.64	0.87	0.36	0.40	0.58	0.63
Total Prawns		0.84	0.72	0.26	0.85	2.62	3.06	3.52	1.46	0.65	0.75	1.14	1.23
Summary Data													
	Finfish (A+B)	15.30	8.59	4.02	11.93	29.10	40.40	46.38	25.79	11.88	13.08	18.99	20.55
	Prawns	0.84	0.72	0.26	0.85	2.62	3.06	3.52	1.46	0.65	0.75	1.14	1.23
Grand total		16.14	9.31	4.29	12.78	31.72	43.46	49.90	27.25	12.53	13.82	20.12	21.78

Table 41

STANDING CROP ESTIMATES BASED ON NERP SAMPLING (1992 to 1996)				
Period	Standing crop (kg/ha)	Range		No. of hauls
		Lower	Upper	
KONA JAL				
Haor				
92.07	7.2	1.1	10	5
92.10	10.25	6.7	18.5	8
93.09	21.1	9.3	63.3	11
94.09	15.36	6	38.33	9
94.10	25.46	8.66	43.33	5
95.07	26.66	6.6	53.3	4
95.08	22.46	2.66	46.66	5
95.09	27.73	3	104.33	5
96.6	17.66	12	23.33	3
96.7	78.33	50	100	4
96.8	68.33	50	93.33	4
96.9	76.66	46.67	103.33	4
96.10	80	50	106.67	5
River				
92.07	9.15	8.3	10	2
92.10	20.4	7.5	46.6	10
93.09	n/a	n/a	n/a	0
94.09	n/a	n/a	n/a	0
94.10	36.83	20.33	53.33	2
95.07	39.16	8.3	70	2
95.08	38.16	3	73.3	2
95.09	n/a	n/a	n/a	0
96.6	29		29	1
96.7	93.33		93.33	1
96.8	103.3		103.3	1
96.9	n/a	n/a	n/a	0
96.10	99.99		99.99	1
BER JAL				
Haor				
92.07	4.3	0.8	8.3	8
92.10	n/a	n/a	n/a	0
93.09	13.7	1	34.7	10
94.09	19.94	3.66	44	6
94.10	23.83	12.66	36.66	4
95.07	23.91	5	58.33	4
95.08	22.91	5.66	40	5
95.09	17.86	4.33	26	5
96.6	18.11	7	32.66	3
96.7	45.41	40	60	4
96.8	68.33	25	56.66	4
96.9	55.83	36.67	66.67	4
96.10	64.66	46.67	93.33	5
River				
92.07	2.68	1.16	5	5
92.10	34.9		34.9	1
93.09	n/a	n/a	n/a	0
94.09	n/a	n/a	n/a	0
94.10	21.66	16	27.33	2
95.07	17.33	6.33	28.33	2
95.08	32.16	19.33	45	2
95.09	276.66	246.66	306.66	2
96.6	35		35	1
96.7	76.66		76.66	1
96.8	89.99		89.99	1
96.9	n/a	n/a	n/a	0
96.10	93.32		93.32	1

Table 42

ABUNDANCE IN KUSHIYARA RIVER																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
	g		2		a		s		o		n		d		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f		m		a		m		f	

Table 42 (contd.)

INDEX OF ABUNDANCE OF FISH SPECIES					
ABUNDANCE IN KAWADIGHI HAOR					
m82	j	a	s	n	d
Air	0	0	1	1	1
Bacha	0	0	0	0	0
Bagair	0	0	0	0	0
Balla	0	1	1	2	2
Balm	1	1	1	2	2
Bamosh	0	0	0	0	0
Bata	0	0	0	0	0
Betashi	0	0	1	2	2
Bhedra	0	1	1	2	2
Boal	1	1	1	2	2
Bocha	0	0	1	2	2
Carpio	0	0	0	0	0
Catia	0	0	0	0	0
Chakra	0	1	1	2	2
Chranda	2	2	2	2	2
Chapila	0	0	1	1	1
Chela	1	2	2	2	2
Cirka barm	1	2	2	2	2
Chitol	0	0	0	0	0
Darkina	1	2	2	2	2
Dhela	0	0	1	2	2
Fel	0	0	1	2	2
Gana	0	0	0	0	0
Goda chigri	0	0	1	1	1
Gonia	0	0	0	0	0
Gozer	0	0	1	2	2
Gulsha	0	0	1	1	1
Gutum	1	1	1	2	2
Ilish	2	2	2	2	2
Kalkika	0	0	0	0	0
Kalibauash	0	0	0	0	0
Kazoli	0	0	0	0	0
Kechki	0	0	0	0	0
Kholisa	1	1	1	2	2
Koi	0	0	0	0	0
Lachu	0	0	0	0	0
Magar	0	0	1	1	1
Mathangra	0	0	1	1	1
Mola	1	1	1	2	2
Mitgel	0	0	0	0	0
Naptari	0	1	2	2	2
Papa	0	0	0	0	0
Poka	1	1	2	2	2
Puli	1	1	2	2	2
Rani	0	0	1	1	1
Rila	0	0	0	0	0
Rui	0	0	1	1	1
Sring	0	0	1	1	1
Shole	0	1	1	2	2
Taki	1	1	1	2	2
Tara balm	1	1	2	2	2
Tengra	0	1	1	2	2

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Table 43
Inundation Impact (March 1996)

DAY	TIME	C/S	R/S	Head Diff.	Discharge through Fishpass	Area Submergd	Project Storage	Incremental Storage for Fishpass	Total Storage	Area Corresponding Total Storage	Area Affected
		(m PWD)	(m PWD)	meter	m ³ /s	(ha)	(ha - m)	(ha - m)	(ha - m)	(ha)	(ha)
1	07:00	4.08	3.58			1926.14	1493.97	0.00	1493.97	1926.14	
	17:00	4.09	3.59			1945.28	1514.09	0.00	1514.09	1945.27	
2	07:00	4.09	3.58			1945.28	1514.09	0.00	1514.09	1945.27	
	17:00	4.08	3.57			1926.14	1493.97	0.00	1493.97	1926.14	
3	07:00	4.05	3.56			1868.74	1433.60	0.00	1433.60	1868.74	
	17:00	4.05	3.56			1868.74	1433.60	0.00	1433.60	1868.74	
4	07:00	4.03	3.55			1830.47	1393.36	0.00	1393.36	1830.47	
	17:00	4.02	3.55			1811.34	1373.23	0.00	1373.23	1811.33	
5	07:00	4.00	3.55			1773.07	1332.99	0.00	1332.99	1773.07	
	17:00	3.99	3.52			1758.02	1317.14	0.00	1317.14	1758.02	
6	07:00	3.97	3.50			1727.91	1285.44	0.00	1285.44	1727.91	
	17:00	3.96	3.49			1712.86	1269.59	0.00	1269.59	1712.86	
7	07:00	3.94	3.46			1682.76	1237.89	0.00	1237.89	1682.75	
	17:00	3.91	3.44			1637.60	1190.35	0.00	1190.35	1637.60	
8	07:00	3.86	3.40			1562.34	1111.10	0.00	1111.10	1562.34	
	17:00	3.84	3.39			1532.24	1079.40	0.00	1079.40	1532.24	
9	07:00	3.81	3.37			1487.08	1031.86	0.00	1031.86	1487.09	
	17:00	3.80	3.36			1472.03	1016.01	0.00	1016.01	1472.20	
10	07:00	3.79	3.36			1456.98	1000.16	0.00	1000.16	1456.98	
	17:00	3.79	3.36			1456.98	1000.16	0.00	1000.16	1456.98	
11	07:00	3.77	3.34			1426.87	968.46	0.00	968.46	1426.88	
	17:00	3.75	3.33			1396.77	936.76	0.00	936.76	1396.77	
12	07:00	3.67	3.30			1280.44	839.56	0.00	839.56	1280.44	
	17:00	3.67	3.30			1280.44	839.56	0.00	839.56	1280.44	
13	07:00	3.91	3.36			1637.60	1190.35	0.00	1190.35	1637.60	
	17:00	4.16	3.41			2079.21	1654.95	0.00	1654.95	2079.22	
14	07:00	4.20	3.46			2155.75	1735.44	0.00	1735.44	2155.75	
	17:00	4.21	3.49			2174.88	1755.56	0.00	1755.56	2174.88	
15	07:00	4.66	5.16			3338.73	3543.37	0.00	3543.37	3338.73	
	17:00	4.66	5.46			3338.73	3543.37	0.00	3543.37	3338.73	
16	07:00	4.44	5.86	1.42	0.147	2576.18	2304.42	0.63	2305.05	2576.61	0.430
	17:00	4.30	6.01	1.71	0.214	2336.88	1959.30	0.92	1960.22	2337.50	0.620
17	07:00	4.59	6.08	1.49	0.231	2823.39	2711.49	1.00	2712.49	2823.93	0.540
	17:00	4.42	6.11	1.69	0.252	2542.00	2255.11	1.09	2256.20	2542.72	0.720
18	07:00	4.46	6.11	1.65	0.250	2610.37	2353.72	1.08	2354.80	2611.09	0.720
	17:00	4.16	6.06	1.90	0.240	2079.21	1654.95	1.04	1655.99	2080.17	0.960
19	07:00	4.26	5.98	1.72	0.203	2268.51	1860.70	0.88	1861.58	2269.10	0.590
	17:00	4.16	5.96	1.80	0.197	2079.21	1654.95	0.85	1655.80	2080.00	0.790
20	07:00	4.36	5.87	1.51	0.153	2439.44	2107.21	0.66	2107.87	2439.89	0.450
	17:00	4.26	5.74	1.48	0.104	2268.51	1860.70	0.45	1861.15	2268.82	0.310
21	07:00	4.16	5.67	1.51	0.079	2079.21	1654.95	0.34	1655.29	2079.53	0.320
	17:00	4.41	5.55	1.14	0.031	2524.90	2230.46	0.13	2230.59	2524.99	0.090
22	07:00	4.21	5.44			2174.88	1755.56	0.00	1755.56	2174.88	
	17:00	4.21	5.40			2174.88	1755.56	0.00	1755.56	2174.88	
23	07:00	4.21	5.06			2174.88	1755.56	0.00	1755.56	2174.88	
	17:00	4.21	5.03			2174.88	1755.56	0.00	1755.56	2174.88	
24	07:00	4.16	4.83			2079.21	1654.95	0.00	1654.95	2079.22	
	17:00	4.16	4.74			2079.21	1654.95	0.00	1654.95	2079.22	
25	07:00	4.56	4.56			2775.17	2625.10	0.00	2625.10	2775.18	
	17:00	4.61	4.51			2855.54	2769.08	0.00	2769.08	2855.54	
26	07:00	4.68	4.46			2968.04	2970.66	0.00	2970.66	2968.05	
	17:00	4.64	4.41			2903.75	2855.47	0.00	2855.47	2903.75	
27	07:00	4.61	4.36			2855.54	2769.08	0.00	2769.08	2855.54	
	17:00	4.61	4.58			2855.54	2769.08	0.00	2769.08	2855.54	
28	07:00	4.58	5.21			2807.32	2682.69	0.00	2682.69	2807.32	
	17:00	4.56	5.66	1.10	0.067	2775.17	2625.10	0.29	2625.39	2775.33	0.160
29	07:00	4.56	6.01	1.45	0.203	2775.17	2625.10	0.88	2625.98	2775.65	0.480
	17:00	4.56	6.14	1.58	0.258	2775.17	2625.10	1.12	2626.22	2775.78	0.610
30	07:00	4.86	6.53	1.67	0.413	3338.73	3543.37	1.79	3545.16	3339.93	1.200
	17:00	4.56	6.66	2.10	0.493	2775.17	2625.10	2.13	2627.23	2776.33	1.160
31	07:00	4.76	7.00	2.24	0.641	3104.02	3205.97	2.77	3208.74	3105.95	1.930
	17:00	4.63	7.11	2.48	0.699	2887.68	2826.67	3.02	2829.69	2889.36	1.680

Average Discharge (m³/s) 0.257

Average Area (ha)

0.724

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Table 43 (continued)
Inundation Impact (April 1996)

DAY	TIME	C/S	R/S	Head Diff.	Discharge through Fishpass	Area Submergd	Project Storage	Incremental Storage for Fishpass	Total Storage	Area Corresponding Total Storage	Area Affected
		(m PWD)	(m PWD)	meter	m ³ /s	(ha)	(ha-m)	(ha-m)	(ha-m)	(ha)	(ha)
1	07:00	4.76	7.31	2.55	0.762	3104.02	3205.97	3.29	3209.26	3106.35	2.33
	17:00	4.58	7.37	2.79	0.794	2807.32	2682.69	3.43	2686.12	2809.31	1.99
2	07:00	4.70	7.56	2.86	0.874	3000.19	3028.25	3.77	3032.02	3002.39	2.20
	17:00	4.58	7.56	2.98	0.875	2807.32	2682.69	3.78	2686.47	2809.56	2.24
3	07:00	4.56	7.68	3.12	0.924	2775.17	2625.10	3.99	2629.09	2777.59	2.42
	17:00	4.56	7.68	3.12	0.924	2775.17	2625.10	3.99	2629.09	2777.59	2.42
4	07:00	4.76	7.70	2.94	0.933	3104.02	3205.97	4.03	3210.00	3106.98	2.96
	17:00	4.60	7.71	3.11	0.937	2839.46	2740.28	4.05	2744.33	2841.90	2.44
5	07:00	4.58	7.71	3.13	0.936	2807.32	2682.69	4.05	2686.74	2809.76	2.44
	17:00	4.71	7.70	2.99	0.933	3016.26	3057.04	4.03	3061.07	3018.65	2.39
6	07:00	4.66	7.67	3.01	0.921	2935.90	2913.06	3.98	2917.04	2938.26	2.36
	17:00	4.61	7.66	3.05	0.916	2855.54	2769.08	3.96	2773.04	2857.90	2.36
7	07:00	5.01	7.57	2.56	0.869	3689.01	4055.10	3.76	4058.86	3691.11	2.10
	17:00	4.46	7.54	3.08	0.866	2610.37	2353.72	3.74	2357.46	2613.16	2.79
8	07:00	4.46	7.46	3.00	0.833	2610.37	2353.72	3.60	2357.32	2613.03	2.66
	17:00	4.36	7.43	3.07	0.820	2439.44	2107.21	3.54	2110.75	2442.08	2.64
9	07:00	4.96	7.30	2.34	0.748	3573.44	3880.76	3.23	3883.99	3575.70	2.26
	17:00	4.46	7.24	2.78	0.739	2610.37	2353.72	3.19	2356.91	2610.49	0.12
10	07:00	4.36	7.15	2.79	0.702	2439.44	2107.21	3.03	2110.24	2441.63	2.19
	17:00	4.56	7.13	2.57	0.688	2775.17	2625.10	2.97	2628.07	2776.87	1.70
11	07:00	4.71	7.07	2.36	0.655	3016.26	3057.04	2.83	3059.87	3017.85	1.59
	17:00	4.86	6.95	2.09	0.592	3338.73	3543.37	2.56	3545.93	3340.51	1.78
12	07:00	4.88	6.76	1.88	0.503	3385.67	3610.84	2.17	3613.01	3387.17	1.50
	17:00	4.63	6.71	2.08	0.496	2887.68	2826.67	2.14	2828.81	2888.87	1.19
13	07:00	4.46	6.56	2.10	0.437	2610.37	2353.72	1.89	2355.61	2611.68	1.31
	17:00	4.36	6.51	2.15	0.420	2439.44	2107.21	1.81	2109.02	2440.70	1.26
14	07:00	4.38	6.36	1.98	0.353	2473.63	2156.51	1.52	2158.03	2474.68	1.05
	17:00	4.35	6.31	1.96	0.332	2422.35	2082.56	1.44	2084.00	2423.34	0.99
15	07:00	4.34	6.16	1.82	0.268	2405.26	2057.91	1.16	2059.07	2406.06	0.80
	17:00	4.25	6.02	1.77	0.213	2251.42	1836.05	0.92	1836.97	2252.06	0.64
16	07:00	4.26	5.90	1.64	0.164	2268.51	1860.70	0.71	1861.41	2269.00	0.49
	17:00	4.27	5.83	1.56	0.135	2285.61	1885.35	0.58	1885.93	2286.01	0.40
17	07:00	4.31	5.56	1.25	0.034	2353.98	1983.95	0.15	1984.10	2354.08	0.10
	17:00	4.29	5.54	1.25	0.027	2319.79	1934.65	0.12	1934.77	2319.87	0.08
18	07:00	4.29	5.49	1.20	0.010	2319.79	1934.65	0.04	1934.69	2319.82	0.03
	17:00	4.26	5.41			2268.51	1860.70	0.00	1860.70	2268.51	
19	07:00	4.24	5.30			2232.29	1815.93	0.00	1815.93	2232.29	
	17:00	4.21	5.20			2174.88	1755.56	0.00	1755.56	2174.88	
20	07:00	4.18	5.14			2117.48	1695.19	0.00	1695.19	2117.48	
	17:00	4.21	5.03			2174.88	1755.56	0.00	1755.56	2174.88	
21	07:00	4.31	5.03			2353.98	1983.95	0.00	1983.95	2353.97	
	17:00	4.26	5.02			2268.51	1860.70	0.00	1860.70	2268.51	
22	07:00	4.26	5.08			2268.51	1860.70	0.00	1860.70	2268.51	
	17:00	4.26	5.13			2268.51	1860.70	0.00	1860.70	2268.51	
23	07:00	4.30	5.29			2336.88	1959.30	0.00	1959.30	2336.88	
	17:00	4.30	5.32			2336.88	1959.30	0.00	1959.30	2336.88	
24	07:00	4.26	5.34			2268.51	1860.70	0.00	1860.70	2268.51	
	17:00	4.24	5.36			2232.29	1815.93	0.00	1815.93	2232.29	
25	07:00	4.81	5.45			3221.37	3374.67	0.00	3374.67	3221.38	
	17:00	4.84	5.43			3291.79	3475.89	0.00	3475.89	3291.79	
26	07:00	4.92	5.48	0.56	0.005	3479.55	3745.80	0.02	3745.82	3479.57	0.02
	17:00	4.84	5.50	0.66	0.011	3291.79	3475.89	0.05	3475.94	3291.82	0.03
27	07:00	4.71	5.61	0.90	0.045	3016.26	3057.04	0.19	3057.23	3016.37	0.11
	17:00	4.71	5.62	0.91	0.048	3016.26	3057.04	0.21	3057.25	3016.38	0.12
28	07:00	4.69	5.69	1.00	0.072	2984.12	2999.45	0.31	2999.76	2984.29	0.17
	17:00	4.76	5.71	0.95	0.076	3104.02	3205.97	0.33	3206.30	3104.26	0.24
29	07:00	4.71	5.71	1.00	0.078	3016.26	3057.04	0.34	3057.38	3016.45	0.19
	17:00	4.71	5.72	1.01	0.081	3016.26	3057.04	0.35	3057.39	3016.46	0.20
30	07:00	4.71	5.69	0.98	0.071	3016.26	3057.04	0.31	3057.35	3016.43	0.17
	17:00	4.61	5.66	1.05	0.064	2855.54	2769.08	0.27	2769.35	2855.69	0.15
31	07:00										
	17:00										

Average Discharge (m³/s)

0.370

Average Area (ha)

1.325

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Table 43 (continued)
Inundation Impact (May 1996)

DAY	TIME	C/S	R/S	Head Diff.	Discharge through Fishpass	Area Submergd	Project Storage	Incremental Storage for Fishpass	Total Storage	Area Corresponding Total Storage	Area Affected
		(m PWD)	(m PWD)	meter	m ³ /s	(ha)	(ha-m)	(ha-m)	(ha-m)	(ha)	(ha)
1	07:00	4.56	5.51	0.95	0.016	2775.17	2625.10	0.068	2625.17	2775.21	0.04
	17:00	4.71	5.50	0.79	0.012	3016.26	3057.04	0.051	3057.09	3016.29	0.03
2	07:00	4.71	5.50	0.79	0.012	3016.26	3057.04	0.051	3057.09	3016.29	0.03
	17:00	4.71	5.50	0.79	0.012	3016.26	3057.04	0.051	3057.09	3016.29	0.03
3	07:00	4.71	5.46			3016.26	3057.04	0.000	3057.04	3016.26	
	17:00	4.77	5.47	0.70	0.003	3127.49	3239.71	0.012	3239.72	3127.5	0.01
4	07:00	4.81	5.50	0.69	0.011	3221.37	3374.67	0.048	3374.72	3221.41	0.04
	17:00	4.74	5.51	0.77	0.015	3064.48	3143.43	0.063	3143.49	3064.51	0.03
5	07:00	4.76	5.50	0.74	0.011	3104.02	3205.97	0.049	3206.02	3104.06	0.04
	17:00	4.77	5.52	0.75	0.017	3127.49	3239.71	0.074	3239.78	3127.54	0.05
6	07:00	4.71	5.52	0.81	0.018	3016.26	3057.04	0.077	3057.12	3016.3	0.04
	17:00	4.66	5.50	0.84	0.012	2935.90	2913.06	0.052	2913.11	2935.92	0.02
7	07:00	4.71	5.50	0.79	0.012	3016.26	3057.04	0.051	3057.09	3016.29	0.03
	17:00	4.68	5.49	0.81	0.009	2968.04	2970.66	0.038	2970.70	2968.07	0.03
8	07:00	4.66	5.50	0.84	0.012	2935.90	2913.06	0.052	2913.11	2935.92	0.02
	17:00	4.62	5.48	0.86	0.006	2871.61	2797.88	0.026	2797.91	2871.63	0.02
9	07:00	4.61	5.48	0.87	0.006	2855.54	2769.08	0.026	2769.11	2855.55	0.01
	17:00	4.86	5.47	0.61	0.003	3338.73	3543.37	0.011	3543.38	3338.74	0.01
10	07:00	4.61	5.92	1.31	0.164	2855.54	2769.08	0.708	2769.79	2855.92	0.38
	17:00	4.61	5.96	1.35	0.180	2855.54	2769.08	0.778	2769.86	2855.96	0.42
11	07:00	4.62	6.43	1.81	0.384	2871.61	2797.88	1.657	2799.54	2872.5	0.89
	17:00	4.59	6.45	1.86	0.394	2823.39	2711.49	1.704	2713.19	2824.31	0.92
12	07:00	4.61	6.60	1.99	0.462	2855.54	2769.08	1.997	2771.08	2856.61	1.07
	17:00	4.61	6.62	2.01	0.472	2855.54	2769.08	2.037	2771.12	2856.64	1.10
13	07:00	4.61	6.85	2.24	0.579	2855.54	2769.08	2.501	2771.58	2856.89	1.35
	17:00	4.61	6.94	2.33	0.621	2855.54	2769.08	2.683	2771.76	2856.99	1.45
14	07:00	4.71	7.23	2.52	0.752	3016.26	3057.04	3.249	3060.29	3018.04	1.78
	17:00	5.10	7.46	2.36	0.841	3884.17	4409.56	3.634	4413.19	3886.12	1.95
15	07:00	5.10	8.03	2.93	1.106	3884.17	4409.56	4.777	4414.34	3886.86	2.69
	17:00	5.17	8.16	2.99	1.162	4035.97	4685.24	5.020	4690.26	4038.81	2.64
16	07:00	4.98	8.15	3.17	1.156	3620.38	3948.24	4.994	3953.23	3624.04	3.66
	17:00	5.02	8.15	3.13	1.157	3710.69	4094.49	4.997	4099.49	3713.58	2.89
17	07:00	5.16	8.26	3.10	1.205	4014.28	4645.86	5.204	4651.06	4017.27	2.99
	17:00	5.14	8.26	3.12	1.204	3970.91	4567.09	5.202	4572.29	3973.91	3.00
18	07:00	5.11	8.24	3.13	1.196	3905.86	4448.94	5.165	4454.10	3908.84	2.98
	17:00	5.12	8.24	3.12	1.196	3927.54	4488.32	5.165	4493.49	3930.52	2.98
19	07:00	5.56	8.22	2.66	1.180	4850.82	6417.56	5.099	6422.66	4852.61	1.79
	17:00	5.56	8.21	2.65	1.176	4850.82	6417.56	5.078	6422.64	4852.61	1.79
20	07:00	5.26	8.20	2.94	1.179	4230.88	5045.08	5.094	5050.17	4233.37	2.49
	17:00	5.56	8.19	2.63	1.166	4850.82	6417.56	5.037	6422.60	4852.59	1.77
21	07:00	5.46	8.16	2.70	1.156	4659.48	5940.56	4.995	5945.56	4661.87	2.39
	17:00	5.31	8.16	2.85	1.161	4338.03	5268.95	5.014	5273.96	4340.46	2.43
22	07:00	5.49	8.08	2.59	1.117	4723.77	6074.88	4.826	6079.71	4726.05	2.28
	17:00	5.46	8.07	2.61	1.114	4659.48	5940.56	4.812	5945.37	4661.76	2.28
23	07:00	5.54	7.92	2.38	1.036	4815.61	6318.26	4.476	6322.74	4817.16	1.55
	17:00	5.61	7.90	2.29	1.021	4938.84	6665.82	4.409	6670.23	4940.35	1.51
24	07:00	5.51	7.86	2.35	1.009	4762.80	6169.30	4.357	6173.66	4764.31	1.51
	17:00	5.51	7.83	2.32	0.994	4762.80	6169.30	4.293	6173.59	4764.28	1.48
25	07:00	5.46	7.69	2.23	0.928	4659.48	5940.56	4.009	5944.57	4661.34	1.86
	17:00	5.46	7.65	2.19	0.908	4659.48	5940.56	3.922	5944.48	4661.3	1.82
26	07:00	5.46	7.56	2.10	0.863	4659.48	5940.56	3.726	5944.29	4661.21	1.73
	17:00	5.46	7.52	2.06	0.842	4659.48	5940.56	3.639	5944.20	4661.16	1.68
27	07:00	5.45	7.38	1.93	0.773	4638.05	5895.78	3.337	5899.12	4639.59	1.54
	17:00	5.61	7.40	1.79	0.765	4938.84	6665.82	3.304	6669.12	4939.97	1.13
28	07:00	5.48	7.46	1.98	0.810	4702.34	6030.10	3.499	6033.60	4703.96	1.62
	17:00	5.50	7.48	1.98	0.818	4745.20	6119.65	3.534	6123.18	4746.41	1.21
29	07:00	5.53	7.57	2.04	0.861	4798.01	6268.61	3.719	6272.33	4799.28	1.27
	17:00	5.78	7.63	1.85	0.863	5240.39	7523.40	3.730	7527.13	5241.61	1.22
30	07:00	5.72	7.70	1.98	0.907	5132.47	7211.99	3.919	7215.91	5133.81	1.34
	17:00	5.86	7.82	1.96	0.953	5387.33	7956.59	4.119	7960.71	5388.68	1.35
31	07:00	5.82	8.04	2.22	1.073	5313.86	7739.99	4.633	7744.62	5315.38	1.52
	17:00	5.83	8.04	2.21	1.072	5332.23	7794.14	4.629	7798.77	5333.75	1.52

Average Discharge (m³/s)

0.658

Average Area (ha)

1.310

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Table 43 (continued)
Inundation Impact (June 1996)

DAY	TIME	C/S	R/S	Head Diff.	Discharge through Fishpass	Area Submergd	Project Storage	Incremental Storage for Fishpass	Total Storage	Area Corresponding Total Storage	Area Affected
		(m PWD)	(m PWD)	meter	m ³ /s	(ha)	(ha - m)	(ha - m)	(ha - m)	(ha)	(ha)
1	07:00	6.00	8.12	2.12	1.095	5644.49	8714.68	4.730	8719.41	5646.18	1.69
	17:00	6.06	8.20	2.14	1.130	5776.13	9069.8	4.883	9074.68	5777.88	1.75
2	07:00	6.17	8.40	2.23	1.223	6017.47	9720.86	5.285	9726.14	6019.37	1.90
	17:00	6.25	8.49	2.24	1.262	6192.99	10194.36	5.451	10199.81	6194.70	1.71
3	07:00	6.40	8.58	2.18	1.292	6506.78	11162.53	5.582	11168.11	6508.53	1.75
	17:00	6.42	8.63	2.21	1.317	6548.62	11291.62	5.688	11297.31	6550.41	1.79
4	07:00	6.52	8.63	2.11	1.303	6768.02	11948.81	5.631	11954.44	6770.04	2.02
	17:00	6.51	8.60	2.09	1.288	6742	11878.39	5.566	11883.96	6743.99	1.99
5	07:00	6.60	8.60	2.00	1.275	6976.2	12512.11	5.508	12517.62	6978.17	1.97
	17:00	6.66	8.63	1.97	1.282	7132.34	12934.58	5.539	12940.12	7134.31	1.97
6	07:00	6.70	8.67	1.97	1.298	7236.43	13216.24	5.609	13221.85	7238.43	2.00
	17:00	6.78	8.69	1.91	1.296	7475.98	13802.98	5.599	13808.58	7478.50	2.52
7	07:00	6.83	8.67	1.84	1.275	7658.39	14194.10	5.509	14199.61	7660.87	2.48
	17:00	6.84	8.63	1.79	1.250	7694.87	14272.33	5.399	14277.73	7697.30	2.43
8	07:00	6.87	8.61	1.74	1.232	7804.32	14507.01	5.321	14512.33	7806.72	2.40
	17:00	6.88	8.57	1.69	1.206	7840.80	14585.23	5.208	14590.44	7843.15	2.35
9	07:00	6.88	8.52	1.64	1.176	7840.80	14585.23	5.078	14590.31	7843.09	2.29
	17:00	6.85	8.49	1.64	1.164	7731.36	14350.56	5.028	14355.59	7733.62	2.26
10	07:00	6.85	8.44	1.59	1.134	7731.36	14350.56	4.898	14355.46	7733.57	2.21
	17:00	6.77	8.39	1.62	1.121	7439.50	13724.75	4.844	13729.59	7441.69	2.19
11	07:00	6.80	8.34	1.54	1.085	7548.95	13959.43	4.686	13964.12	7551.07	2.12
	17:00	6.76	8.31	1.55	1.076	7403.02	13646.53	4.647	13651.18	7405.12	2.10
12	07:00	6.76	8.24	1.48	1.033	7403.02	13646.53	4.465	13650.99	7405.04	2.02
	17:00	6.77	8.17	1.40	0.989	7439.50	13724.75	4.272	13729.02	7441.44	1.94
13	07:00	6.78	8.08	1.30	0.932	7475.98	13802.98	4.024	13807.00	7477.81	1.83
	17:00	6.77	8.05	1.28	0.916	7439.50	13724.75	3.956	13728.71	7441.3	1.80
14	07:00	6.77	7.98	1.21	0.873	7439.50	13724.75	3.772	13728.52	7441.22	1.72
	17:00	6.76	7.96	1.20	0.864	7403.02	13646.53	3.730	13650.26	7404.72	1.70
15	07:00	6.74	7.88	1.14	0.820	7340.52	13497.89	3.543	13501.43	7341.8	1.28
	17:00	6.72	7.83	1.11	0.795	7288.47	13357.06	3.435	13360.50	7289.71	1.24
16	07:00	6.68	7.80	1.12	0.788	7184.38	13075.41	3.403	13078.81	7185.61	1.23
	17:00	6.66	7.76	1.10	0.769	7132.34	12934.58	3.322	12937.90	7133.54	1.20
17	07:00	6.65	7.70	1.05	0.736	7106.32	12864.17	3.178	12867.35	7107.47	1.15
	17:00	6.65	7.67	1.02	0.718	7106.32	12864.17	3.101	12867.27	7107.44	1.12
18	07:00	6.66	7.61	0.95	0.679	7132.34	12934.58	2.934	12937.51	7133.4	1.06
	17:00	6.69	7.56	0.87	0.640	7210.41	13145.82	2.766	13148.59	7211.41	1.00
19	07:00	6.69	7.52	0.83	0.616	7210.41	13145.82	2.662	13148.48	7211.38	0.97
	17:00	6.69	7.57	0.88	0.646	7210.41	13145.82	2.792	13148.61	7211.42	1.01
20	07:00	6.68	7.61	0.93	0.673	7184.38	13075.41	2.909	13078.32	7185.44	1.06
	17:00	6.69	7.58	0.89	0.652	7210.41	13145.82	2.818	13148.64	7211.43	1.02
21	07:00	6.70	7.54	0.84	0.625	7236.43	13216.24	2.701	13218.94	7237.41	0.98
	17:00	6.71	7.52	0.81	0.610	7262.45	13286.65	2.635	13289.29	7263.41	0.96
22	07:00	6.70	7.48	0.78	0.589	7236.43	13216.24	2.544	13218.78	7237.36	0.93
	17:00	6.72	7.45	0.73	0.564	7288.47	13357.06	2.438	13359.50	7289.36	0.89
23	07:00	6.74	7.50	0.76	0.588	7340.52	13497.89	2.542	13500.43	7341.45	0.93
	17:00	6.76	7.53	0.77	0.600	7403.02	13646.53	2.593	13649.12	7404.22	1.20
24	07:00	6.79	7.55	0.76	0.603	7512.47	13881.2	2.604	13883.80	7513.66	1.19
	17:00	6.80	7.55	0.75	0.600	7548.95	13959.43	2.590	13962.02	7550.14	1.19
25	07:00	6.82	7.56	0.74	0.599	7621.91	14115.88	2.588	14118.47	7623.11	1.20
	17:00	6.83	7.55	0.72	0.589	7658.39	14194.1	2.546	14196.65	7659.56	1.17
26	07:00	6.84	7.53	0.69	0.573	7694.87	14272.33	2.477	14274.81	7696.02	1.15
	17:00	6.84	7.51	0.67	0.561	7694.87	14272.33	2.423	14274.75	7695.99	1.12
27	07:00	6.85	7.51	0.66	0.557	7731.36	14350.56	2.407	14352.97	7732.47	1.11
	17:00	6.85	7.47	0.62	0.532	7731.36	14350.56	2.298	14352.86	7732.42	1.06
28	07:00	6.85	7.44	0.59	0.513	7731.36	14350.56	2.216	14352.78	7732.38	1.02
	17:00	6.85	7.42	0.57	0.500	7731.36	14350.56	2.162	14352.72	7732.35	0.99
29	07:00	6.86	7.41	0.55	0.490	7767.84	14428.78	2.118	14430.90	7768.81	0.97
	17:00	6.87	7.40	0.53	0.480	7804.32	14507.01	2.073	14509.08	7805.27	0.95
30	07:00	6.89	7.39	0.50	0.465	7877.28	14663.46	2.011	14665.47	7878.21	0.93
	17:00	6.90	7.38	0.48	0.455	7913.76	14741.68	1.965	14743.65	7914.66	0.90
31	07:00							0.000	0.00	3.18	3.18
	17:00							0.000	0.00	3.18	3.18

Average Discharge (m³/s)

0.867

Average Area (ha)

1.572

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Table 43 (continued)
Inundation Impact (July 1996)

DAY	TIME	C/S	R/S	Head Diff.	Discharge through Fishpass	Area Submergd	Project Storage	Incremental Storage for Fishpass	Total Storage	Area Corresponding Total Storage	Area Affected
		(m PWD)	(m PWD)	meter	m ³ /s	(ha)	(ha - m)	(ha - m)	(ha - m)	(ha)	(ha)
1	07:00	7.06	7.43	0.37	0.416	8512.78	16049.93	1.798	16051.73	8513.55	0.77
	17:00	7.17	7.45	0.28	0.371	8942.14	17014.24	1.605	17015.84	8942.82	0.68
2	07:00	7.35	8.03	0.68	0.708	9703.42	18697.13	3.056	18700.19	9704.80	1.38
	17:00	7.49	8.28	0.79	0.827	10332.03	20071.32	3.571	20074.89	10333.64	1.61
3	07:00	7.61	8.51	0.90	0.943	10868.03	21372.33	4.073	21376.40	10869.67	1.64
	17:00	7.76	8.69	0.93	1.012	11545.62	23024.73	4.370	23029.10	11547.48	1.86
4	07:00	7.81	8.85	1.04	1.109	11808.4	23632.23	4.792	23637.02	11810.43	2.03
	17:00	7.89	8.92	1.03	1.128	12228.83	24604.23	4.873	24609.10	12230.90	2.07
5	07:00	7.99	8.98	0.99	1.130	12754.38	25819.23	4.882	25824.11	12756.45	2.07
	17:00	8.07	9.02	0.95	1.124	13140.88	26878.96	4.857	26883.82	13142.58	1.70
6	07:00	8.10	9.02	0.92	1.110	13284.00	27281.06	4.796	27285.86	13285.68	1.68
	17:00	8.11	9.02	0.91	1.105	13331.71	27415.09	4.775	27419.86	13333.38	1.67
7	07:00	8.13	9.03	0.90	1.103	13427.12	27683.16	4.767	27687.93	13428.79	1.67
	17:00	8.13	9.02	0.89	1.095	13427.12	27683.16	4.732	27687.89	13428.78	1.66
8	07:00	8.15	9.02	0.87	1.085	13522.54	27951.22	4.689	27955.91	13524.18	1.64
	17:00	8.15	9.02	0.87	1.085	13522.54	27951.22	4.689	27955.91	13524.18	1.64
9	07:00	8.15	9.01	0.86	1.077	13522.54	27951.22	4.654	27955.87	13524.17	1.63
	17:00	8.15	9.01	0.86	1.077	13522.54	27951.22	4.654	27955.87	13524.17	1.63
10	07:00	8.15	9.00	0.85	1.069	13522.54	27951.22	4.619	27955.84	13524.16	1.62
	17:00	8.15	9.00	0.85	1.069	13522.54	27951.22	4.619	27955.84	13524.16	1.62
11	07:00	8.15	9.02	0.87	1.085	13522.54	27951.22	4.689	27955.91	13524.18	1.64
	17:00	8.15	9.02	0.87	1.085	13522.54	27951.22	4.689	27955.91	13524.18	1.64
12	07:00	8.14	9.02	0.88	1.090	13474.83	27817.19	4.711	27821.90	13476.48	1.65
	17:00	8.13	9.01	0.88	1.087	13427.12	27683.16	4.698	27687.86	13428.77	1.65
13	07:00	8.12	9.00	0.88	1.084	13379.42	27549.12	4.684	27553.80	13381.06	1.64
	17:00	8.12	8.98	0.86	1.068	13379.42	27549.12	4.615	27553.73	13381.03	1.61
14	07:00	8.12	8.96	0.84	1.052	13379.42	27549.12	4.545	27553.66	13381.01	1.59
	17:00	8.11	8.96	0.85	1.057	13331.71	27415.09	4.567	27419.66	13333.31	1.60
15	07:00	8.16	8.96	0.80	1.031	13570.25	28085.25	4.455	28089.70	13571.81	1.56
	17:00	8.16	8.96	0.80	1.031	13570.25	28085.25	4.455	28089.70	13571.81	1.56
16	07:00	8.18	8.98	0.80	1.037	13665.66	28353.32	4.480	28357.80	13667.23	1.57
	17:00	8.19	8.98	0.79	1.032	13713.37	28487.35	4.457	28491.81	13714.93	1.56
17	07:00	8.22	8.95	0.73	0.990	13856.49	28889.45	4.276	28893.73	13857.99	1.50
	17:00	8.22	8.95	0.73	0.990	13856.49	28889.45	4.276	28893.73	13857.99	1.50
18	07:00	8.20	8.94	0.74	0.993	13761.07	28621.39	4.288	28625.68	13762.57	1.51
	17:00	8.19	8.94	0.75	0.998	13713.37	28487.35	4.312	28491.66	13714.88	1.51
19	07:00	8.20	8.93	0.73	0.984	13761.07	28621.39	4.252	28625.64	13762.57	1.50
	17:00	8.20	8.93	0.73	0.984	13761.07	28621.39	4.252	28625.64	13762.57	1.50
20	07:00	8.22	8.95	0.73	0.990	13856.49	28889.45	4.276	28893.73	13857.99	1.50
	17:00	8.20	8.95	0.75	1.001	13761.07	28621.39	4.325	28625.71	13762.6	1.53
21	07:00	8.23	8.95	0.72	0.984	13904.20	29023.48	4.252	29027.73	13905.69	1.49
	17:00	8.22	8.95	0.73	0.990	13856.49	28889.45	4.276	28893.73	13857.99	1.50
22	07:00	8.22	8.93	0.71	0.973	13856.49	28889.45	4.203	28893.65	13857.96	1.47
	17:00	8.22	8.93	0.71	0.973	13856.49	28889.45	4.203	28893.65	13857.96	1.47
23	07:00	8.22	8.92	0.70	0.964	13856.49	28889.45	4.166	28893.62	13857.95	1.46
	17:00	8.22	8.92	0.70	0.964	13856.49	28889.45	4.166	28893.62	13857.95	1.46
24	07:00	8.22	8.91	0.69	0.956	13856.49	28889.45	4.128	28893.58	13857.94	1.45
	17:00	8.22	8.91	0.69	0.956	13856.49	28889.45	4.128	28893.58	13857.94	1.45
25	07:00	8.22	8.91	0.69	0.956	13856.49	28889.45	4.128	28893.58	13857.94	1.45
	17:00	8.23	8.94	0.71	0.976	13904.20	29023.48	4.215	29027.69	13905.67	1.47
26	07:00	8.23	8.98	0.75	1.010	13904.20	29023.48	4.362	29027.84	13905.73	1.53
	17:00	8.22	8.94	0.72	0.981	13856.49	28889.45	4.240	28893.69	13857.98	1.49
27	07:00	8.22	8.88	0.66	0.930	13856.49	28889.45	4.016	28893.47	13857.9	1.41
	17:00	8.21	8.84	0.63	0.901	13808.78	28755.42	3.891	28759.31	13810.15	1.37
28	07:00	8.21	8.79	0.58	0.857	13808.78	28755.42	3.700	28759.12	13810.08	1.30
	17:00	8.21	8.76	0.55	0.830	13808.78	28755.42	3.584	28759.00	13810.04	1.26
29	07:00	8.21	8.73	0.52	0.802	13808.78	28755.42	3.466	28758.89	13810	1.22
	17:00	8.21	8.71	0.50	0.784	13808.78	28755.42	3.386	28758.81	13809.97	1.19
30	07:00	8.21	8.69	0.48	0.765	13808.78	28755.42	3.306	28758.73	13809.93	1.15
	17:00	8.21	8.71	0.50	0.784	13808.78	28755.42	3.386	28758.81	13809.97	1.19
31	07:00	8.23	8.78	0.55	0.835	13904.20	29023.48	3.605	29027.09	13905.46	1.26
	17:00	8.23	8.78	0.55	0.835	13904.20	29023.48	3.605	29027.09	13905.46	1.26

Average Discharge (m³/s) 0.973

Average Area (ha)

1.514

Table 43 (continued)
Inundation Impact (August 1996)

DAY	TIME	C/S	R/S	Head Diff.	Discharge through Fishpass	Area Submergd	Project Storage	Incremental Storage for Fishpass	Total Storage	Area Corresponding Total Storage	Area Affected
		(m PWD)	(m PWD)	meter	m ³ /s	(ha)	(ha-m)	(ha-m)	(ha-m)	(ha)	(ha)
1	07:00	8.23	8.78	0.55	0.835	13904.2	29023.48	3.605	29027.09	13905.46	1.26
	17:00	8.24	8.78	0.54	0.828	13951.9	29157.52	3.577	29161.10	13953.16	1.26
2	07:00	8.25	8.74	0.49	0.784	13999.61	29291.55	3.387	29294.94	14000.79	1.18
	17:00	8.26	8.73	0.47	0.768	14051.65	29438.05	3.316	29441.37	14052.81	1.16
3	07:00	8.27	8.72	0.45	0.751	14103.7	29584.55	3.243	29587.79	14104.83	1.13
	17:00	8.28	8.67	0.39	0.694	14155.74	29731.05	2.998	29734.05	14156.77	1.03
4	07:00	8.29	8.62	0.33	0.634	14207.79	29877.55	2.741	29880.29	14208.72	0.93
	17:00	8.33	8.62	0.29	0.599	14415.96	30463.56	2.588	30466.15	14416.84	0.88
5	07:00	8.38	8.62	0.24	0.551	14676.18	31196.07	2.380	31198.45	14676.97	0.79
	17:00	8.38	8.62	0.24	0.551	14676.18	31196.07	2.380	31198.45	14676.97	0.79
6	07:00	8.39	8.63	0.24	0.553	14728.23	31342.57	2.387	31344.96	14729.02	0.79
	17:00	8.38	8.62	0.24	0.551	14676.18	31196.07	2.380	31198.45	14676.97	0.79
7	07:00	8.38	8.60	0.22	0.527	14676.18	31196.07	2.276	31198.35	14676.93	0.75
	17:00	8.37	8.54	0.17	0.461	14624.14	31049.56	1.993	31051.55	14624.76	0.62
8	07:00	8.36	8.49	0.13	0.404	14572.09	30903.06	1.747	30904.81	14572.60	0.51
	17:00	8.36	8.46	0.10	0.359	14572.09	30903.06	1.550	30904.61	14572.50	0.41
9	07:00	8.35	8.42	0.07	0.307	14520.05	30756.56	1.326	30757.89	14520.32	0.27
	17:00	8.35	8.40	0.05	0.269	14520.05	30756.56	1.161	30757.72	14520.17	0.12
10	07:00	8.34	8.38	0.04	0.247	14468.01	30610.06	1.067	30611.13	14468.08	0.07
	17:00	8.32	8.35	0.03	0.223	14363.92	30317.06	0.964	30318.02	14363.98	0.06
11	07:00	8.31	8.30			14311.87	30170.56	0.000	30170.56	14311.87	
	17:00	8.31	8.33	0.02	0.198	14311.87	30170.56	0.854	30171.41	14311.92	0.05
12	07:00	8.31	8.35	0.04	0.245	14311.87	30170.56	1.056	30171.62	14311.95	0.08
	17:00	8.30	8.36	0.06	0.284	14259.83	30024.06	1.225	30025.28	14260.04	0.21
13	07:00	8.31	8.40	0.09	0.337	14311.87	30170.56	1.455	30172.01	14312.23	0.36
	17:00	8.31	8.42	0.11	0.368	14311.87	30170.56	1.591	30172.15	14312.31	0.44
14	07:00	8.31	8.46	0.15	0.426	14311.87	30170.56	1.839	30172.40	14312.43	0.56
	17:00	8.30	8.48	0.18	0.464	14259.83	30024.06	2.004	30026.06	14260.46	0.63
15	07:00	8.31	8.49	0.18	0.465	14311.87	30170.56	2.011	30172.57	14312.51	0.64
	17:00	8.31	8.50	0.19	0.478	14311.87	30170.56	2.066	30172.63	14312.53	0.66
16	07:00	8.32	8.52	0.20	0.492	14363.92	30317.06	2.126	30319.19	14364.6	0.68
	17:00	8.33	8.53	0.20	0.494	14415.96	30463.56	2.133	30465.69	14416.65	0.69
17	07:00	8.34	8.60	0.26	0.567	14468.01	30610.06	2.450	30612.51	14468.82	0.81
	17:00	8.41	8.65	0.24	0.556	14832.31	31635.57	2.402	31637.97	14833.11	0.80
18	07:00	8.44	8.70	0.26	0.585	14988.45	32075.07	2.528	32077.60	14989.29	0.84
	17:00	8.45	8.72	0.27	0.599	15040.49	32221.57	2.587	32224.16	15041.36	0.87
19	07:00	8.47	8.75	0.28	0.614	15144.58	32514.58	2.653	32517.23	15145.47	0.89
	17:00	8.47	8.78	0.31	0.648	15144.58	32514.58	2.801	32517.38	15145.53	0.95
20	07:00	8.48	8.79	0.31	0.650	15196.62	32661.08	2.809	32663.89	15197.58	0.96
	17:00	8.49	8.80	0.31	0.652	15248.67	32807.58	2.818	32810.40	15249.62	0.95
21	07:00	8.51	8.82	0.31	0.656	15359.13	33114.39	2.835	33117.22	15360.12	0.99
	17:00	8.51	8.84	0.33	0.679	15359.13	33114.39	2.932	33117.32	15360.16	1.03
22	07:00	8.52	8.87	0.35	0.703	15417.55	33274.7	3.036	33277.74	15418.62	1.07
	17:00	8.52	8.87	0.35	0.703	15417.55	33274.7	3.036	33277.74	15418.62	1.07
23	07:00	8.51	8.87	0.36	0.712	15359.13	33114.39	3.074	33117.46	15360.21	1.08
	17:00	8.50	8.86	0.36	0.710	15300.71	32954.08	3.065	32957.15	15301.79	1.08
24	07:00	8.49	8.87	0.38	0.729	15248.67	32807.58	3.149	32810.73	15249.75	1.08
	17:00	8.48	8.87	0.39	0.737	15196.62	32661.08	3.185	32664.27	15197.72	1.10
25	07:00	8.48	8.87	0.39	0.737	15196.62	32661.08	3.185	32664.27	15197.72	1.10
	17:00	8.47	8.85	0.38	0.725	15144.58	32514.58	3.130	32517.71	15145.66	1.08
26	07:00	8.46	8.85	0.39	0.733	15092.53	32368.08	3.166	32371.25	15093.63	1.10
	17:00	8.45	8.84	0.39	0.731	15040.49	32221.57	3.157	32224.73	15041.58	1.09
27	07:00	8.45	8.81	0.36	0.699	15040.49	32221.57	3.020	32224.59	15041.53	1.04
	17:00	8.43	8.78	0.35	0.684	14936.40	31928.57	2.956	31931.53	14937.41	1.01
28	07:00	8.43	8.77	0.34	0.673	14936.40	31928.57	2.909	31931.48	14937.4	1.00
	17:00	8.45	8.75	0.30	0.633	15040.49	32221.57	2.736	32224.31	15041.42	0.93
29	07:00	8.43	8.73	0.30	0.629	14936.40	31928.57	2.719	31931.29	14937.32	0.92
	17:00	8.46	8.74	0.28	0.612	15092.53	32368.08	2.645	32370.72	15093.42	0.89
30	07:00	8.48	8.73	0.25	0.580	15196.62	32661.08	2.508	32663.59	15197.45	0.83
	17:00	8.48	8.73	0.25	0.580	15196.62	32661.08	2.508	32663.59	15197.45	0.83
31	07:00	8.49	8.69	0.20	0.520	15248.67	32807.58	2.245	32809.82	15249.39	0.72
	17:00	8.48	8.70	0.22	0.544	15196.62	32661.08	2.348	32663.43	15197.39	0.77

Average Discharge (m³/s) 0.569

Average Area (ha)

0.798

Table 43 (continued)
Inundation Impact (September 1996)

DAY	TIME	C/S	R/S	Head Diff	Discharge through Fishpass	Area Submergd	Project Storage	Incremental Storage for Fishpass	Total Storage	Area Corresponding Total Storage	Area Affected
		(m PWD)	(m PWD)	meter	m ³ /s	(ha)	(ha - m)	(ha - m)	(ha - m)	(ha)	(ha)
1	07:00	8.48	8.66	0.18	0.492	15196.62	32661.08	2.123	32663.20	15197.29	0.67
	17:00	8.48	8.66	0.18	0.492	15196.62	32661.08	2.123	32663.20	15197.29	0.67
2	07:00	8.46	8.65	0.19	0.502	15092.53	32368.08	2.167	32370.25	15093.22	0.69
	17:00	8.46	8.65	0.19	0.502	15092.53	32368.08	2.167	32370.25	15093.22	0.69
3	07:00	8.44	8.64	0.20	0.512	14988.45	32075.07	2.210	32077.28	14989.16	0.71
	17:00	8.44	8.63	0.19	0.499	14988.45	32075.07	2.154	32077.22	14989.13	0.68
4	07:00	8.43	8.62	0.19	0.497	14936.4	31928.57	2.147	31930.72	14937.08	0.68
	17:00	8.43	8.60	0.17	0.470	14936.4	31928.57	2.032	31930.60	14937.03	0.63
5	07:00	8.43	8.59	0.16	0.457	14936.4	31928.57	1.973	31930.54	14937.01	0.61
	17:00	8.43	8.57	0.14	0.428	14936.40	31928.57	1.851	31930.42	14936.95	0.55
6	07:00	8.42	8.56	0.14	0.427	14884.36	31782.07	1.845	31783.91	14884.90	0.54
	17:00	8.42	8.56	0.14	0.427	14884.36	31782.07	1.845	31783.91	14884.90	0.54
7	07:00	8.45	8.57	0.12	0.401	15040.49	32221.57	1.734	32223.30	15040.98	0.49
	17:00	8.45	8.57	0.12	0.401	15040.49	32221.57	1.734	32223.30	15040.98	0.49
8	07:00	8.45	8.57	0.12	0.401	15040.49	32221.57	1.734	32223.30	15040.98	0.49
	17:00	8.45	8.57	0.12	0.401	15040.49	32221.57	1.734	32223.30	15040.98	0.49
9	07:00	8.44	8.51	0.07	0.316	14988.45	32075.07	1.366	32076.44	14988.73	0.28
	17:00	8.44	8.47	0.03	0.232	14988.45	32075.07	1.004	32076.07	14988.51	0.06
10	07:00	8.45	8.42			15040.49	32221.57	0.000	32221.57	15040.49	
	17:00	8.44	8.40			14988.45	32075.07	0.000	32075.07	14988.45	
11	07:00	8.44	8.36			14988.45	32075.07	0.000	32075.07	14988.45	
	17:00	8.43	8.31			14936.40	31928.57	0.000	31928.57	14936.40	
12	07:00	8.43	8.28			14936.40	31928.57	0.000	31928.57	14936.40	
	17:00	8.42	8.26			14884.36	31782.07	0.000	31782.07	14884.36	
13	07:00	8.41	8.20			14832.31	31635.57	0.000	31635.57	14832.31	
	17:00	8.41	8.16			14832.31	31635.57	0.000	31635.57	14832.31	
14	07:00	8.4	8.12			14780.27	31489.07	0.000	31489.07	14780.27	
	17:00	8.38	8.08			14676.18	31196.07	0.000	31196.07	14676.18	
15	07:00	8.37	8.04			14624.14	31049.56	0.000	31049.56	14624.14	
	17:00	8.36	8.00			14572.09	30903.06	0.000	30903.06	14572.09	
16	07:00	8.34	7.94			14468.01	30610.06	0.000	30610.06	14468.01	
	17:00	8.33	7.89			14415.96	30463.56	0.000	30463.56	14415.96	
17	07:00	8.32	7.84			14363.92	30317.06	0.000	30317.06	14363.92	
	17:00	8.3	7.80			14259.83	30024.06	0.000	30024.06	14259.83	
18	07:00	8.33	7.80			14415.96	30463.56	0.000	30463.56	14415.96	
	17:00	8.35	7.82			14520.05	30756.56	0.000	30756.56	14520.05	
19	07:00	8.36	7.83			14572.09	30903.06	0.000	30903.06	14572.09	
	17:00	8.35	7.80			14520.05	30756.56	0.000	30756.56	14520.05	
20	07:00	8.34	7.78			14468.01	30610.06	0.000	30610.06	14468.01	
	17:00	8.33	7.75			14415.96	30463.56	0.000	30463.56	14415.96	
21	07:00	8.36	7.78			14572.09	30903.06	0.000	30903.06	14572.09	
	17:00	8.36	7.85			14572.09	30903.06	0.000	30903.06	14572.09	
22	07:00	8.43	7.97			14936.40	31928.57	0.000	31928.57	14936.4	
	17:00	8.45	8.06			15040.49	32221.57	0.000	32221.57	15040.49	
23	07:00	8.46	8.08			15092.53	32368.08	0.000	32368.08	15092.54	
	17:00	8.48	8.08			15196.62	32661.08	0.000	32661.08	15196.62	
24	07:00	8.48	8.06			15196.62	32661.08	0.000	32661.08	15196.62	
	17:00	8.47	8.08			15144.58	32514.58	0.000	32514.58	15144.58	
25	07:00	8.47	8.03			15144.58	32514.58	0.000	32514.58	15144.58	
	17:00	8.46	8.01			15092.53	32368.08	0.000	32368.08	15092.54	
26	07:00	8.46	8.01			15092.53	32368.08	0.000	32368.08	15092.54	
	17:00	8.44	7.97			14988.45	32075.07	0.000	32075.07	14988.45	
27	07:00	8.43	7.96			14936.40	31928.57	0.000	31928.57	14936.4	
	17:00	8.43	7.96			14936.40	31928.57	0.000	31928.57	14936.4	
28	07:00	8.42	8.02			14884.36	31782.07	0.000	31782.07	14884.36	
	17:00	8.42	8.02			14884.36	31782.07	0.000	31782.07	14884.36	
29	07:00	8.40	7.97			14780.27	31489.07	0.000	31489.07	14780.27	
	17:00	8.39	7.95			14728.23	31342.57	0.000	31342.57	14728.23	
30	07:00	8.37	7.93			14624.14	31049.56	0.000	31049.56	14624.14	
	17:00	8.36	7.95			14572.09	30903.06	0.000	30903.06	14572.09	
31	07:00										
	17:00										

Table 44

WATER QUALITY

November 95 Date	Location	Habitat	Time (Hrs.)	Alkal (mg/l)	Ammon (mg/l)	DO (mg/l)	CO ₂ (mg/l)	Chl. (mg/l)	Hard (mg/l)	Nitrite (mg/l)	pH	Temp (°C) Air	Water
Nov 23 95	Kushiyara river at up 3-vent regulator	River	1227	49.0	0.3		8.2	2.3	27.0	nil	6.7		25.5
	Monu river at up of Manumukh	River	1349	54.0	0.3		11.0	2.5	48.0	nil	7.5		25.5
Nov 24 95	Patashingra beel	Beel	1000	14.0	0.2		5.4	1.5	12.0	nil	6.8		25.5
	Junction of Karadair and Mogra canal	Canal	1120	9.0	0.1		-	1.1	5.0	nil	6.8		26.1
	Junction of 6-vent regulator & fishers	Canal	1230	-	0.1		-	1.2	10.0	nil	6.7		26.1

Table 44 (contd.)

May 96													
Date	Location	Habitat	Time (Hrs.)	Alkal (mg/l)	Ammon (mg/l)	DO (mg/l)	CO2 (mg/l)	Chl. (mg/l)	Hard (mg/l)	Nitrite (mg/l)	pH	Temp (°C) Air	Water
May 06 96	Patasingra beel	Beel	1300	28.0	nil	6.2	5.2	3.5	32.0	nil	6.9		33.5
	Mogra canal	Canal	1145	29.0	nil	6.5	16.0	4.6	29.0	nil	7.2		32.0
	Akali canal	Canal	1030	32.0	nil	5.8	16.1	4.4	22.0	nil	7.1		30.0
	Karadair canal behind 3-vent Regulator	Canal	0830	33.0	nil	6.2	15.4	4.7	17.0	nil	7.1		29.0
May 07 96	Kushiyara River in front of 3-vent regulator	River	1030	59.0	nil	8.7	21.0	4.9	29.0	nil	6.9		31.0
	Manu River near Manumukh	River	1300	75.0	nil	6.5	22.0	5.1	25.0	nil	7.2		32.5

Table 44 (contd.)

September 96		Date	Location	Habitat	Time (Hrs.)	Alkal (mg/l)	Ammon (mg/l)	DO (mg/l)	CO ₂ (mg/l)	Chl. (mg/l)	Hard (mg/l)	Nitrite (mg/l)	pH	Temp (°C)	
														Air	Water
Sept 01 96	Patashingra beel			Beel	1030 hrs	6.00	0.02	8.70	4.00	2.10	15.00	0.03	7.1	30.5	30.0
Sept 08 96	Confluence of Koradair, Akali & Mogra canal			Canal	0900 hrs	5.80	0.02	7.60	4.20	2.20	12.00	0.03	7.0	29.4	28.8
Sept 26 96	Countryside of Fishpass			Canal	1020 hrs	8.00	0.05	4.00	9.60	1.30	3.00	0.02	6.6	34.4	30.0
Sept 28 96	Kushiyara River (in front of) 3 vent regulator			River	0910 hrs	19.00	0.10	4.80	8.00	1.20	10.00	0.03	6.9	31.1	30.0
	Monu River at Manumukh			River	1040 hrs	16.00	0.10	3.90	10.00	1.20	15.00	0.02	6.8	31.1	28.8

Table 44 (contd.)

WATER QUALITY

October 96

Date	Location	Habitat	Time (hrs)	Alkal. (mg/l)	Ammon (mg/l)	DO (mg/l)	CO ₂ (mg/l)	Chl (mg/l)	Hard. (mg/l)	Nitrite (mg/l)	Temp (°C)	
											Air	Water
Oct 23 96	Patashingra beel	Beel	0830	6.0	0.01	6.0	5.0	2.0	14.0	0.02	28.8	29.4
Oct 23 96	Confluence of Koradair, Akali & Mogra canal	Canal	1000	5.9	0.02	5.0	4.4	2.1	13.0	0.03	30.0	30.0
Oct 23 96	Koradair canal adjacent to fishpass	Canal	1120	5.8	0.02	5.8	4.8	1.4	4.0	0.02	36.6	36.1
Oct 13 96	Kushiyara River in front of 3-vent regulator	River	0820	21.0	0.09	5.0	7.0	1.2	8.0	0.02	29.4	29.4
Oct 13 96	Monu River at Monumukh	River	1040	18.0	0.08	4.4	9.0	1.4	13.0	0.02	31.1	30.0

Table 45 : Crop Area of Beels

Name of beel	Cropped area (ha)
Haowa	280
Hawagulaya	240
Singua	200
Kursha	160
Matikura	150
Baroury	100
Machhuakhali	80
Melaghar	80
Chatol	70
Majherbondh	66
Goali	64
Rukkua	40
Ulauly	24
Patasingra	18
Upargoali	12
Bhuterdibi	6
Total	1,590

Source: Survey of Beels

Table 46 : Yield of Boro Crops, 1996

Variety	Yield/ha (MT)
Ratashail	2.29
Poshushail	2.18
Koiyaboro	1.42
Garshishail	2.30
Boroshail	2.49
Kaliboro	1.24
Nimoria	1.63
Tupashail	2.33
Weighted average	1.90

Table 47 : Largest Land-Owners in the Beels

Name	Village	Beel	Land possessed (ha)	Beel area (ha)	Control of beel area (%)
Akol Hazi	Dhulijuri	Kursha	53	160	33
Abdul Mosabbir	Rokta	Kursha	24	160	15
Zami Ahmed	Berkuri	Hawa	24	240	10
Badsha Mia	Dhulijuri	Kursha	22	160	14
Bacchu Mia	Gargaon	Matikura	20	150	13
Aboni Das	Antehori	Melaghar	18	80	23
Lebu Mia	Rokta	Majherbondh	18	66	27
Abdul Gani	Gargaon	Ulauli	16	24	67
Shamsul Huq	Gargaon	Majherbondh	14	66	21
Kanu Member	Dhulijuri	Kursha	13	160	8
Total			222	720	31

Source: Survey of Beels

Table 48 : Project Population

Thana	Union	Social catchment				Population			Percentage	
		% of area	Number of village	Area (ha)	Number of household	Total	Male	Female	Area	Pop
Rajnagar	Rajnagar	100.00	28	2,381	3,339	20,010	10,118	9,892		
	Monurnagar	86.31	28	1,738	2,948	18,017	9,198	8,819		
	Uttarbhat	68.95	33	5,530	3,116	19,942	10,043	9,899		
	Panchgaon	100.00	33	2,906	2,952	18,847	9,490	9,357		
	Munshibazar	83.12	27	2,872	2,984	17,485	8,919	8,566		
	Fatehpur	100.00	27	4,626	3,404	21,295	10,896	10,399		
	Sub-total		176	20,054	18,743	115,596	58,664	56,932	76	73
Moulvibazar	Ekatuna	100.00	43	2,117	2,211	14,895	7,607	7,288		
	Chandnighat	48.29	19	1,228	2,049	11,697	6,116	5,581		
	Akhailkura	100.00	38	2,913	2,638	16,182	8,172	8,010		
	Monumukh	*	1	*	68	365	177	188		
	Sub-total		101	6,258	6,966	43,139	22,072	21,067	24	27
Total			277	26,311	25,709	158,735	80,736	77,999	100	100

* Monumukh village is included in Chandpur *mouza* which is part of Akhailkura union, and the area thereof has been shown in Akhailkura.

Source: 1991 Population Census, BBS

Table 49 : Population Growth

Census year	Project population	Annual growth rate (%)	
		Project area	Bangladesh
1901	25,206		
1911	27,802	0.99	0.94
1921	34,753	2.26	0.60
1931	60,122	5.63	0.74
1941	69,020	1.39	1.70
1951	74,680	0.79	0.50
1961	82,633	0.98	2.26
1974	118,216	2.82	2.48
1981	142,322	2.69	2.35
1991	158,735	1.10	2.17
1995	169,930	1.72	1.77
1901-1991		2.07	1.51
1974-1991		1.75	2.25

Source: BBS

Table 50 : Villages Covered by the Reconnaissance Survey

Thana	Union	Village	Households
Rajnagar	Fatehpur	Betahunja	500
		Antehori	219
		Zahidpur	210
		Mohammadpur	268
		Charkarpar	72
		Rashidpur	29
		Hamidpur	142
		Mujaffarpur	82
		Kashimpur	71
		Berkuri	235
		Shahpur	308
		Abdullahpur	39
		Sonapur	60
	Rajnagar	Uttar Gargaon	347
		Dakshin Gargaon	253
	Pachgaon	Amirpur	238
		Rokta	118
		Kubja	66
		Khalidar	35
	Mansurnagar	Banarai	288
		Jaua	36
		Bisonkirti	136
Moulvibazar	Akhailkura	Chandpur	49
		Kadipur	145
	Monumukh	Monumukh Sumarai	115
	Ekatuna	Karimullahpur	51
Total			4,112

Source: Village Reconnaissance Survey

Table 51: Source of Drinking Water

Source	% of households	
	Survey villages	Bangladesh
Tap	0	4
Tubewell	19	76
Well	1	9
Pond	55	8
River/canal	25	3
Total	100	100

Table 52 : Toilet Facility

Type	% of households	
	Survey villages	Bangladesh
Sanitary	8	13
Other	71	53
No	21	34
Total	100	100

Table 53: Ethnic Distribution of Households

Community	Caste	Household	
		Number	Percentage
Muslim	Maimol	1,964	47.8
	Bangal	1,067	25.9
	Abadi	288	7.0
	Sub-total	3,319	80.7
Hindu	Das	376	9.1
	Namasudra	259	6.3
	Nath	60	1.5
	Barman	40	1.0
	Brahmin	21	0.5
	Ghosh	20	0.5
	Boidya	17	0.4
	Sub-total	793	19.3
Total		4,112	100.0

Source: Village Reconnaissance Survey

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Table 54 : Occupational Distribution of Households

Occupation	Household*	
	Number	Percentage
Agriculture	2,093	50.9
Fishing	1,675	40.7
Fish trade	1,064	25.9
Farm labour	643	15.6
Londoni	179	4.4
Services	54	1.3
Trading (non-fish)	46	1.1
Lessee	40	1.0
Others	65	1.6
Total	4,112	100.0

* Multiple responses have been recorded
Source: Village Reconnaissance Survey

Table 55 : Fishers Survey Coverage

Union	Village	Number of fishers surveyed	
		Full-time	Seasonal
Pachgaon	Amirpur	17	27
	Rokta	14	34
	Khaldar	11	10
Fatehpur	Betahunja	15	3
Rajnagar	Gargaon	8	7
Monsumnagar	Banarai	2	34
	Bisonkirti		1
Total		67	135

Table 56 : Occupational Pattern of Male Population

Main occupation	Full-time fisher		Seasonal fisher	
	Number	%	Number	%
Fishing	88	66	47	17.7
Farming	16	12	141	53.0
Trading	20	15	29	10.9
Londoni	4	3	10	3.8
Farm labour	3	2	37	13.9
Others	2	2	2	0.8
Total	133	100	266	100.0
Total households	67		135	
Total population	401		769	
Average household size	6.0		5.7	
Civilian labour force	151		322	
Employment rate (%)	88		83	

Source: Fishers Survey

Table 57: Distribution of Fishers by Cultivable Holding

Stratum	Full-time fisher		Seasonal fisher	
	Number	%	Number	%
Landless	40	60	59	44
Small farmer	24	36	53	39
Medium farmer	2	3	18	13
Large farmer	1	1	5	4
Total	67	100	135	100

Source: Fishers Survey

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Table 58: Ownership of Fishing Gear and Boat among Full-Time Fishers

Gear	Ownership		Percentage	
	Individual	Joint	Individual	Joint
Footpine jal	4	28	6	42
Hook	32		48	
Pai jal	8	4	12	6
Fanda jal	1		1	
Ural jal	16		24	
Rek jal	7	7	10	10
Bel jal	1	1	1	1
Kapri jal		9		13
Baro jal	1		1	
Boat	26		39	
Total	67	67	100	100

Source: Fishers Survey

Table 59: Ownership of Fishing Gear and Boat among Seasonal Fishers

Gear	Ownership		Percentage	
	Individual	Joint	Individual	Joint
Footpine jal		6		4
Hook	49	10	36	7
Pai jal	1		1	
Fanda jal	29	3	21	2
Kapri jal		14		10
Boro jal	5	4	4	3
Chai	12		9	
Chhoto jal	12		9	
Afa jal	3		2	
Boat	69	6	51	4
Total	135	135	100	100

Source: Fishers Survey

Table 60 : Membership in Cooperatives

Membership	Membership in traditional fishers' cooperatives (male)		Membership in NGO- sponsored groups (female)	
	Number	%	Number	%
Member	14	21	16	24
Not member	53	79	51	76
Total	67	100	67	100

Table 61: Information on Fishpass

Source	Full-time fishers		Seasonal fishers	
	No.	%	No.	%
Gossip	20	41	15	16
Fishers	16	33	58	62
Seen	7	14	3	3
NERP staff	5	10	17	18
Lessee	1	2		
Total responses	49	100	93	100

Source: Fishers Survey

Table 62 : Statistics on Women's Groups

Village	Sponsoring agency	Number of group members	Activities
Gargaon	BRAC	90	grocery, fish trading
Bisonkirti	GB	30	poultry, net making,, cow rearing, goat rearing, dry fish trading, small trading
	BRAC	40	Poultry, vegetable cultivation, net making, dry fish trading, rice trading, cow rearing, goat rearing
Khaldar	BRAC	25	Poultry, cow and goat rearing, net making, rice trading, pan-supari trading
Kubja	BRAC	20	rice trading, muri making
Shahpur	GB	40	
Abdullahpur	GB	10	
Chanpur	Unnayan Sahayak Sangstha	54	dry fish, poultry, muri making
Hamidpur	GB	40	fish trading and agriculture
Rokta	BRAC	30	rice trading, net making, cow rearing, poultry, dry fish trading
Banarai	BRAC	75	rice trading, net making, dry fish trading,, cow and goat rearing, poultry
	ASA	35	rice trading, net making, dry fish trading,, cow and goat rearing, poultry
Jaua	GB	9 (included in Bisonkirti groups)	Small trade, poultry, net making, dry fish trading, cow rearing
Poshchim Berkuri	GB	35	rice trading
Kadipur	BRAC	70	poultry, muri making, fish drying
Charkarpar	GB	10 (included in Jahidpur groups)	rice trading
Jahidpur	GB	25	poultry
Betahunza	GB	30	rice trading, vegetables selling

Table 63: Period of Fishing in 1994-95 Dry Season

Fishing period (day)	Fisher		Days worked		Wage earned (Tk)		
	Number	%	Total	Average per fisher	Total	Seasonal average per fisher	Average per day
1-30	2	4	37	19	2,539	1,270	69
31-60	32	63	1,859	50	104,701	3,272	66
61-90	13	25	981	75	56,598	4,354	58
91+	4	8	576	144	30,340	7,585	53
Total	51	100	3,138	62	194,178	3,807	61

Table 64 : Fishing Location in 1994-95 Dry Season

Number of working site (s)	Fisher	
	Number	%
1	15	29
2	34	67
3+	2	4
Total	51	100

Source Fishers Survey

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Table 65: Fishing Location in 1995 Monsoon Season

Number of fishing site (s)	Full-time fisher		Seasonal fisher		Total	
	Number	%	Number	%	Number	%
1	17	29	2	2	19	10
2	15	26	15	12	30	17
3+	26	45	106	86	132	73
Total	58	100	123	100	181	100

Source: Fishers Survey

Table 66: Statistics on Haor Fishing, 1995

Strata	Average daily per fisher				Consumption per capita per day (gram)
	Catch (kg)	Sale (kg)	Sale as % of catch	Cash income (Tk)	
Landless	3.4	3.0	89	90	74
Small	3.6	3.2	88	97	64
Medium	4.9	4.3	88	125	90
Large	3.8	3.3	87	100	71
Average	3.6	3.2	88	96	71

Source: Fishers Survey

Table 67: Statistics on Haor Fishing, 1996

Strata	Average daily per fisher				Consumption per capita per day (gram)
	Catch (kg)	Sale (kg)	Sale as % of catch	Cash income (Tk)	
Landless	3.5	3.1	88	121	76
Small	3.7	3.3	88	129	71
Medium	4.9	4.2	87	175	92
Large	4.2	3.8	90	172	62
Average	3.7	3.3	88	130	75

Table 68 : Fish Consumption Based on Weekly Reference Period

Strata	Per capita daily consumption (gram)	
	1995-96 dry season	1996 monsoon season
Landless	59	99
Small	35	81
medium	42	89
Large	142	106
Average	52	91

Source: Fishers Survey

Table 69 : Fish Consumption by Species (%)

Species	1995-96 dry season	1996 monsoon season
Puti	18.8	23.3
Taki	12.6	13.8
Mola	11.2	10.5
Icha	11.1	9.3
Ilish	0.4	8.4
Chanda	6.7	6.5
Chapila		6.5
Shol	4.3	4.4
Bheda		4.1
Shing	13.2	2.9
Chela		2.7
Koi		2.2
Tengra	1.8	1.6
Foli		1.6
Gojar		0.8
Rui	12.6	0.3
Magur	0.5	0.3
Boal		0.3
Nola		0.2
Karfu	1.0	0.1
Baim	2.6	0.1
Khoilsha		0.1
Gojya	0.7	
Baush	0.7	
Kaikka	0.7	
Baila	0.7	
Total	100.0	100.0

Source: Fishers Survey

Table 70 : Income from Fishing

Season	Average daily cash income/wage (tk)		Increase (%)
	1995	1996	
Dry season*	61	82	34
Monsoon season	96	130	35

* Dry season corresponds to 1994-95 and 1995-96

Source: Fishers Survey

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Table 71 : Fish Production of Kawadighi Haor

Pre-project Scenario : Year 1992-93

Fish Species	Production (mt)	Market Prices (Tk/mt)	Economic Prices (Tk/mt)	Financial Value (m.tk)	Economic Value (m.tk)	Financial Margin(m.tk)	Economic Margin(m.tk)
Carp	8.75	63,976	55,659	0.56	0.49	0.42	0.37
Catfish & other large	46.99	51,181	44,528	2.41	2.09	1.66	1.45
Golda Chingri	0.00			0.00	0.00	0.00	0.00
Small fishes	281.06	25,591	22,264	7.19	6.26	2.77	2.41
Total	336.80			10.16	8.84	4.85	4.22

Pre-project Scenario : Year 1994-95

Fish Species	Production (mt)	Market Prices (Tk/mt)	Economic Prices (Tk/mt)	Financial Value (m.tk)	Economic Value (m.tk)	Financial Margin(m.tk)	Economic Margin(m.tk)
Carp	26.09	64,356	55,990	1.68	1.46	1.18	1.02
Catfish & other large	73.37	53,630	46,658	3.93	3.42	2.52	2.19
Golda Chingri	0.00			0.00	0.00	0.00	0.00
Small fishes	501.83	26,815	23,329	13.46	11.71	3.80	3.30
Total	601.29			19.07	16.59	7.50	6.52

Pre-project Scenario : Year Average of 1992-93 & 1994-95

Fish Species	Production (mt)	Market Prices (Tk/mt)	Economic Prices (Tk/mt)	Financial Value (m.tk)	Economic Value (m.tk)	Financial Margin(m.tk)	Economic Margin(m.tk)
Carp	17.42	64,261	55,907	1.12	0.97	0.80	0.70
Catfish & other large	60.18	52,674	45,827	3.17	2.76	2.09	1.82
Golda Chingri	0.00			0.00	0.00		
Small fishes	391.45	26,376	22,947	10.32	8.98	3.28	2.85
Total	469.05			14.61	12.71	6.17	5.37

Post-project Scenario : Year 1995-96

Fish Species	Production (mt)	Market Prices (Tk/mt)	Economic Prices (Tk/mt)	Financial Value (m.tk)	Economic Value (m.tk)	Financial Benefit(m.tk)	Economic Benefit(m.tk)
Carp	65.70	68,000	59,160	4.47	3.89	3.07	2.68
Catfish & other large	93.85	55,000	47,850	5.16	4.49	3.17	2.76
Golda Chingri	2.50	150,000	130,500	0.38	0.33	0.32	0.28
Small fishes	526.14	30,000	26,100	15.78	13.73	4.63	4.03
Total	688.19			25.79	22.44	11.20	9.74

Incremental Production & Benefit

Fish Species	Production (mt)					Financial Benefit(m.tk)	Economic Benefit(m.tk)
Carp	48.28					2.28	1.98
Catfish & other large	33.67					1.08	0.94
Golda Chingri	2.50					0.32	0.28
Small fishes	134.70					1.35	1.17
Total	219.15					5.02	4.37

Table 72 : Cost – Benefit Stream

FPP Year	Cost			Benefit		Net Benefit (m.tk)
	Capital Cost (m.tk)	Development Cost (m.tk)	O & M Cost (m.tk)	Incremental Fish Prod. (MT)	Gross Benefit (m.tk)	
1	6.69					-6.69
2		0.35				-0.35
3			0.13	219.15	4.37	4.24
4			0.13	219.15	4.37	4.24
5			0.13	219.15	4.37	4.24
6			0.13	219.15	4.37	4.24
7			0.13	219.15	4.37	4.24
8			0.13	219.15	4.37	4.24
9			0.13	219.15	4.37	4.24
10			0.13	219.15	4.37	4.24
11			0.13	219.15	4.37	4.24
12			0.13	219.15	4.37	4.24
13			0.13	219.15	4.37	4.24
14			0.13	219.15	4.37	4.24
15			0.13	219.15	4.37	4.24
16			0.13	219.15	4.37	4.24
17			0.13	219.15	4.37	4.24
18			0.13	219.15	4.37	4.24
19			0.13	219.15	4.37	4.24
20			0.13	219.15	4.37	4.24
21			0.13	219.15	4.37	4.24
22			0.13	219.15	4.37	4.24
23			0.13	219.15	4.37	4.24
24			0.13	219.15	4.37	4.24
25			0.13	219.15	4.37	4.24
26			0.13	219.15	4.37	4.24
27			0.13	219.15	4.37	4.24
28			0.13	219.15	4.37	4.24
29			0.13	219.15	4.37	4.24
30			0.13	219.15	4.37	4.24
					NPV	20.72
					IRR	42.80%

Standard Conversion Factor	0.87	Financial Price	Economic Price
Initial Capital Cost (m.tk)		7.69	6.69
Development Capital Cost (m.tk)		0.40	0.35
O & M Cost:% of Capital Cos	2		
O & M Cost (m.tk)		0.15	0.13
Discount Rate (per cent)	12		
Life of the Project (years)	30		

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Table 73: Participants in Training on Fish Processing

Village	No. of participants
Monumukh	5
Hamidpur	5
Chanpur	5
Gargaon	4
Zahidpur	4
East Berkuri	4
Antehori	3
Rashidpur	3
Rakta	2
Amirpur	2
Betahunja	2
Poshchimbhag	2
Bisonkirti	2
West Berkuri	2
Noagaon	1
Mohammadpur	1
Kashimpur	1
Khaldar	1
Total	49

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LIST OF FIGURES

Figure 1

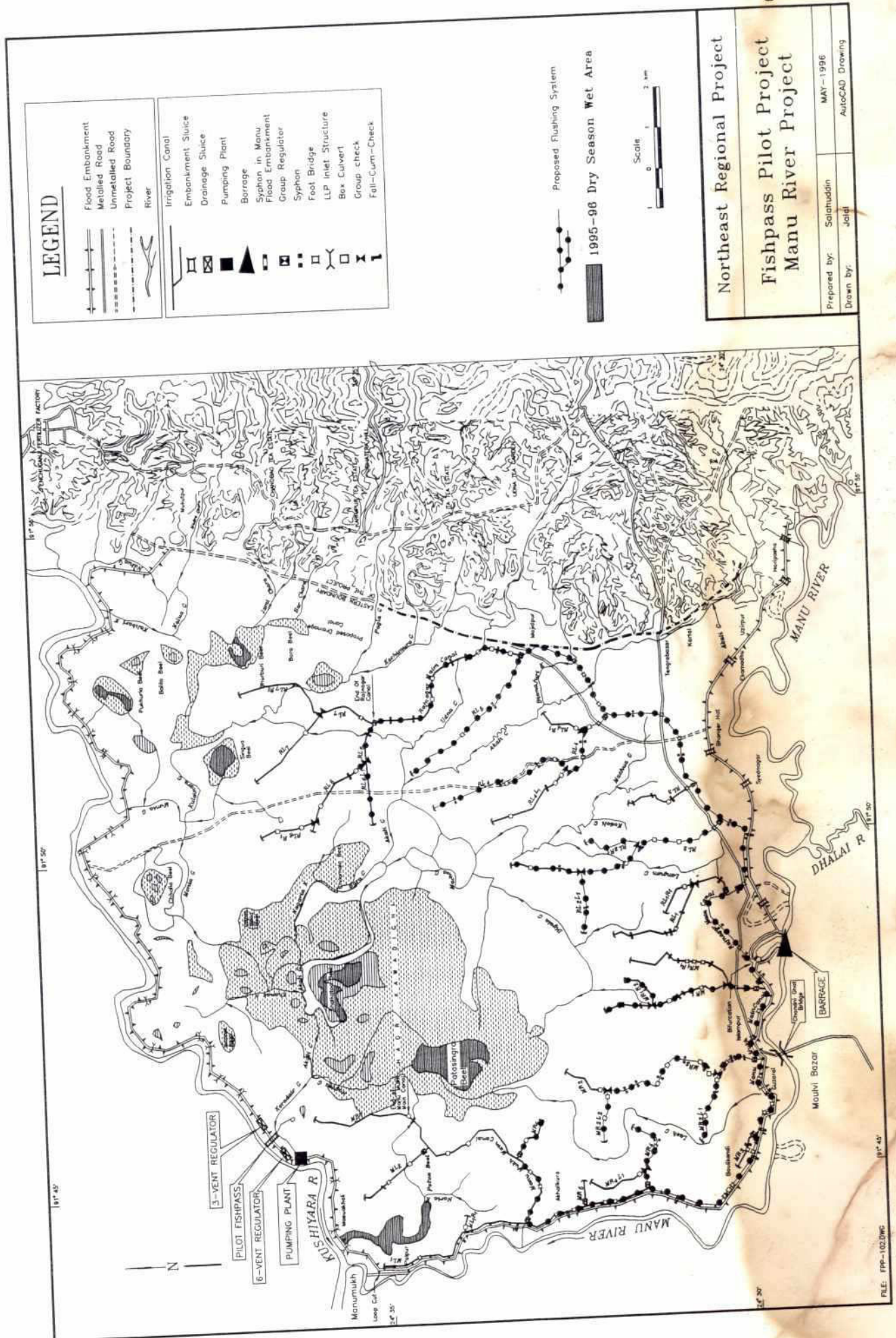
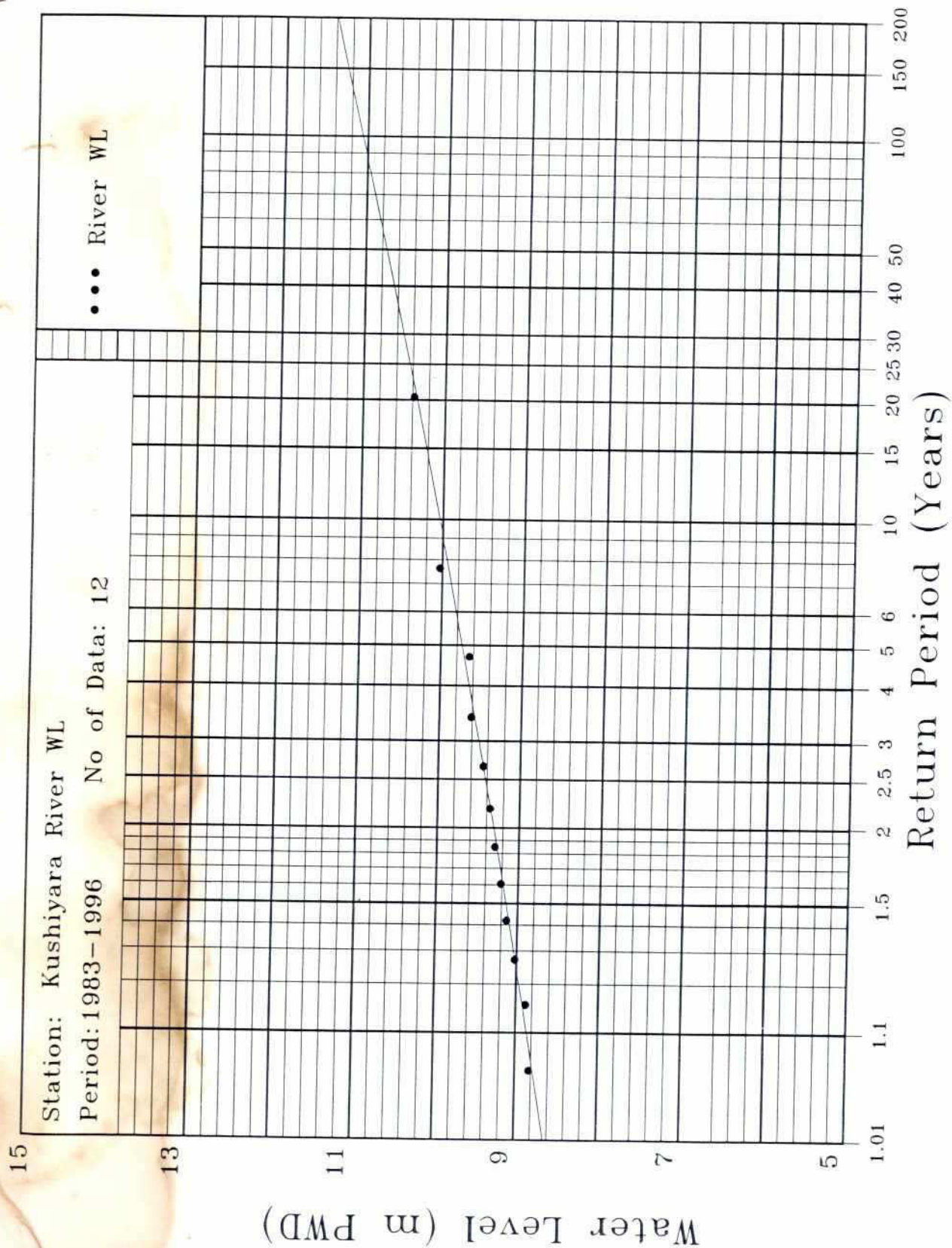


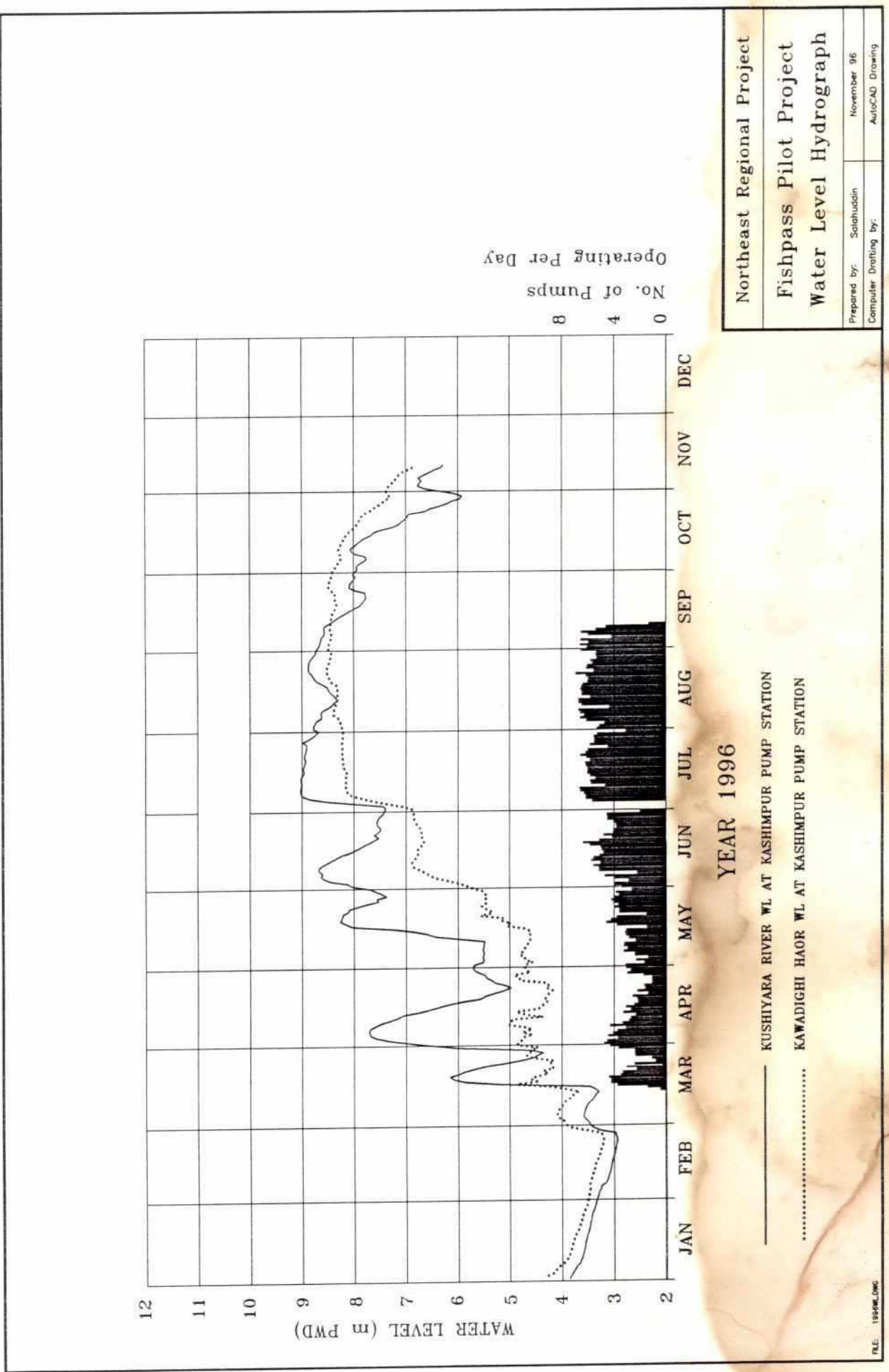
Figure 2

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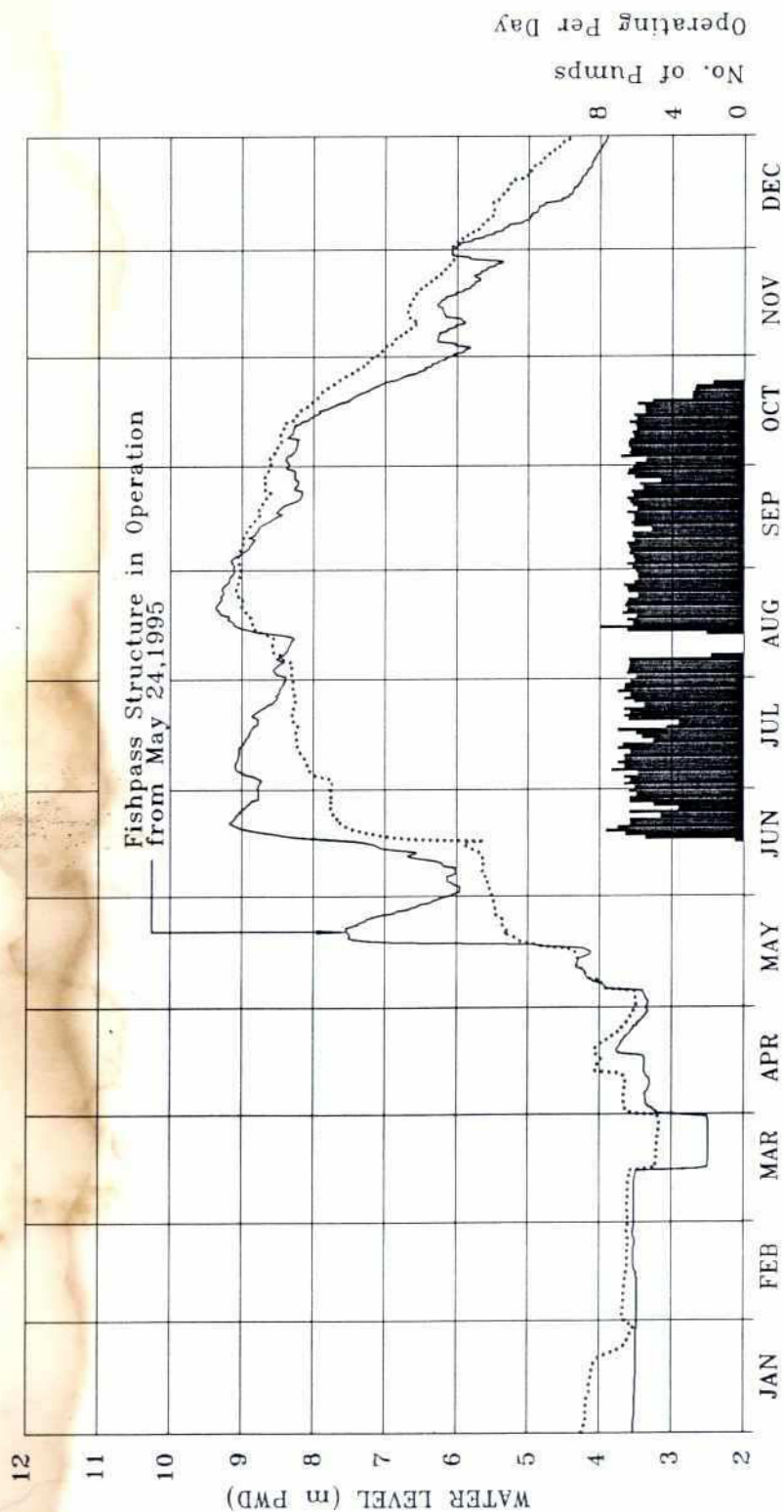
Figure 3



Northeast Regional Project	
Fishpass Pilot Project	
Water Level Hydrograph	
Prepared by: Salsuddin	November 96
Computer Drafting by:	AutoCAD Drawing

Figure 4

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YEAR 1995

— KUSHIYARA RIVER WL AT KASHIMPUR PUMP STATION

..... KAWADIGHI HAOR WL AT KASHIMPUR PUMP STATION

Northeast Regional Project

Fishpass Pilot Project

Water Level Hydrograph

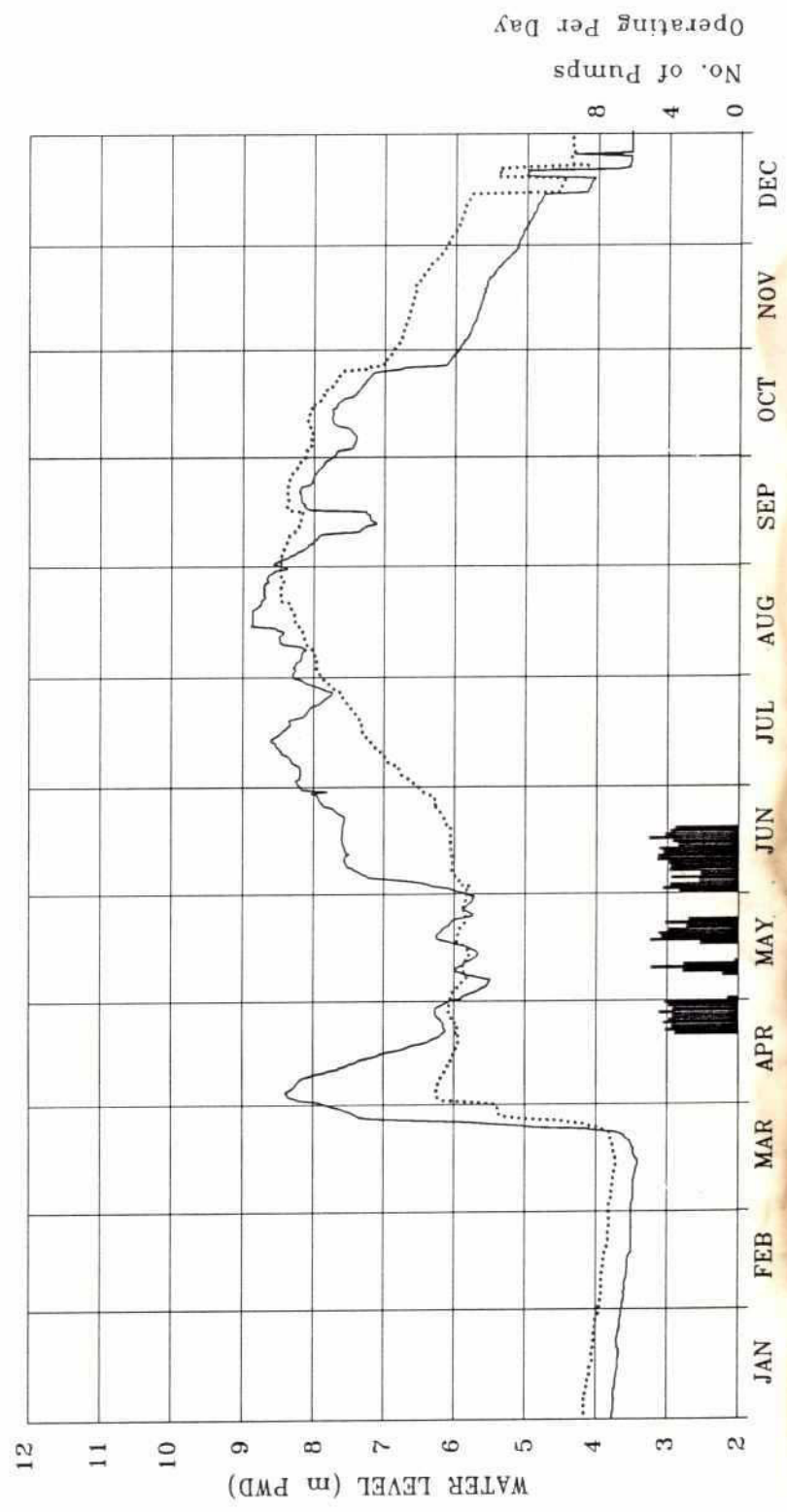
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Computer Drafting by: AutoCAD Drawing

FILE: 1995LW6

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Figure 5



— KUSHIYARA RIVER WL AT KASHIMPUR PUMP STATION
 KAWADIGHI HAOR WL AT KASHIMPUR PUMP STATION

Northeast Regional Project
 Fishpass Pilot Project
 Water Level Hydrograph

Prepared by: Salihuddin
 Computer Drafting by: AutoCAD
 Nov. 1995
 Drawing

Figure 6

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YEAR 1993

— KUSHIYARA RIVER WL AT KASHIMPUR PUMP STATION
 KAWADIGHI HAOR WL AT KASHIMPUR PUMP STATION

Northeast Regional Project

Fishpass Pilot project
 water Level Hydrograph

Prepared by: Salahuddin
 Computer Drafting by:

FILE: 190310WG

AutoCAD Drawing

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Figure 7

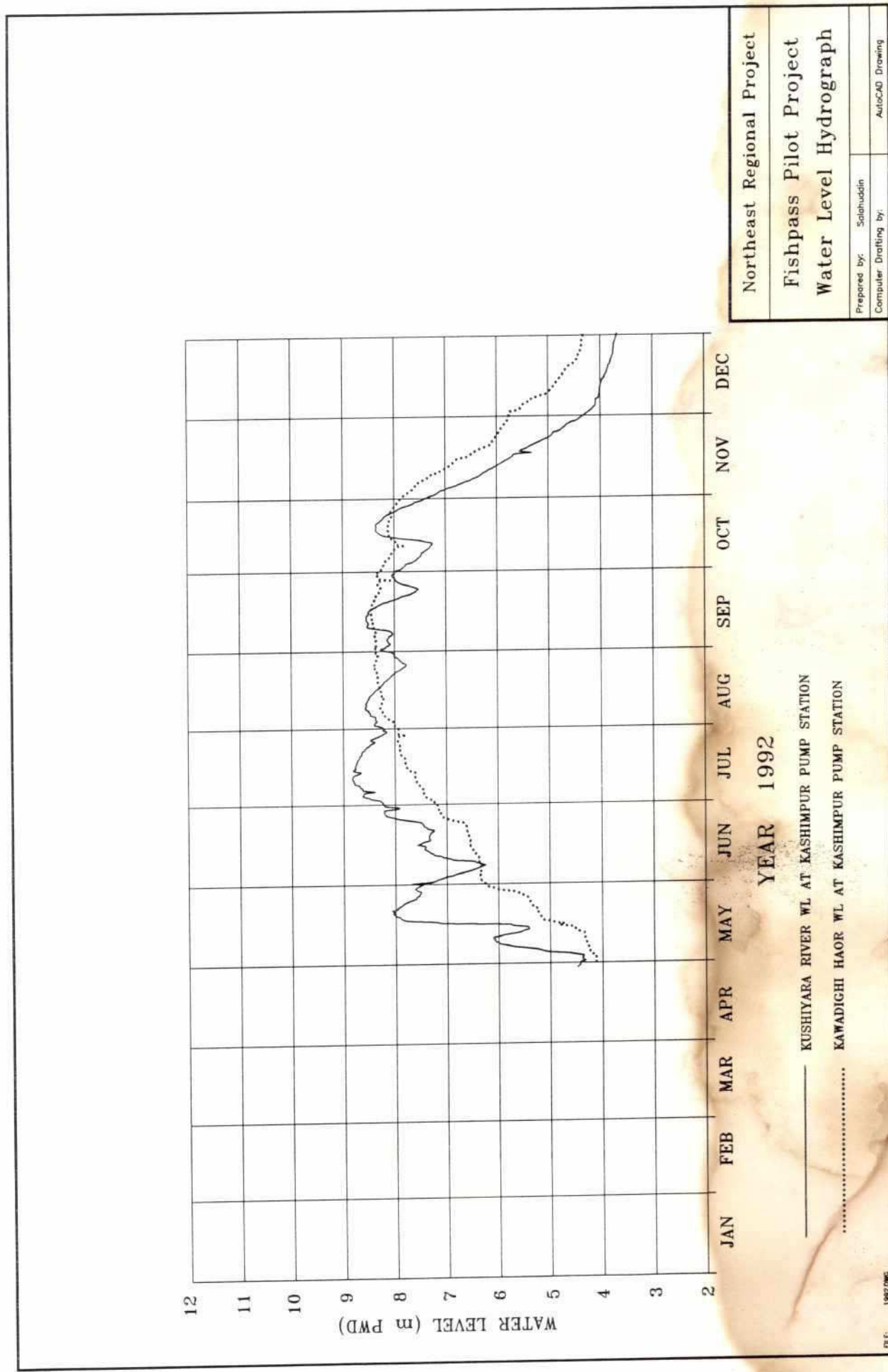
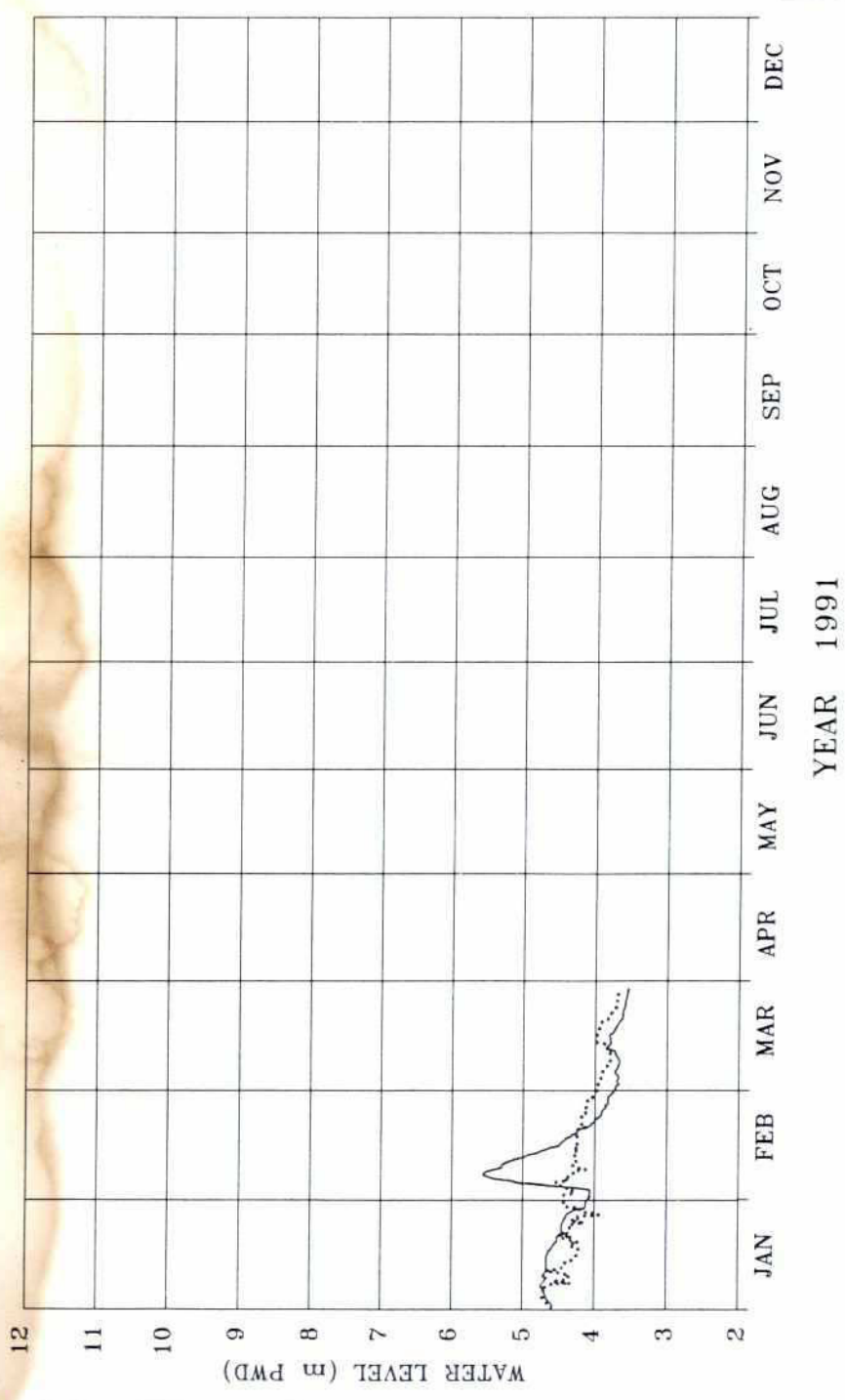


Figure 8

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— KUSHIYARA RIVER WL AT KASHIMPUR PUMP STATION
..... KAWADIGCHI HAOR WL AT KASHIMPUR PUMP STATION

Northeast Regional Project	
Fishpass Pilot Project	
Water Level Hydrograph	
Prepared by: salahuddin	
Computer Drafting by:	AutoCAD Drawing

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Figure 9

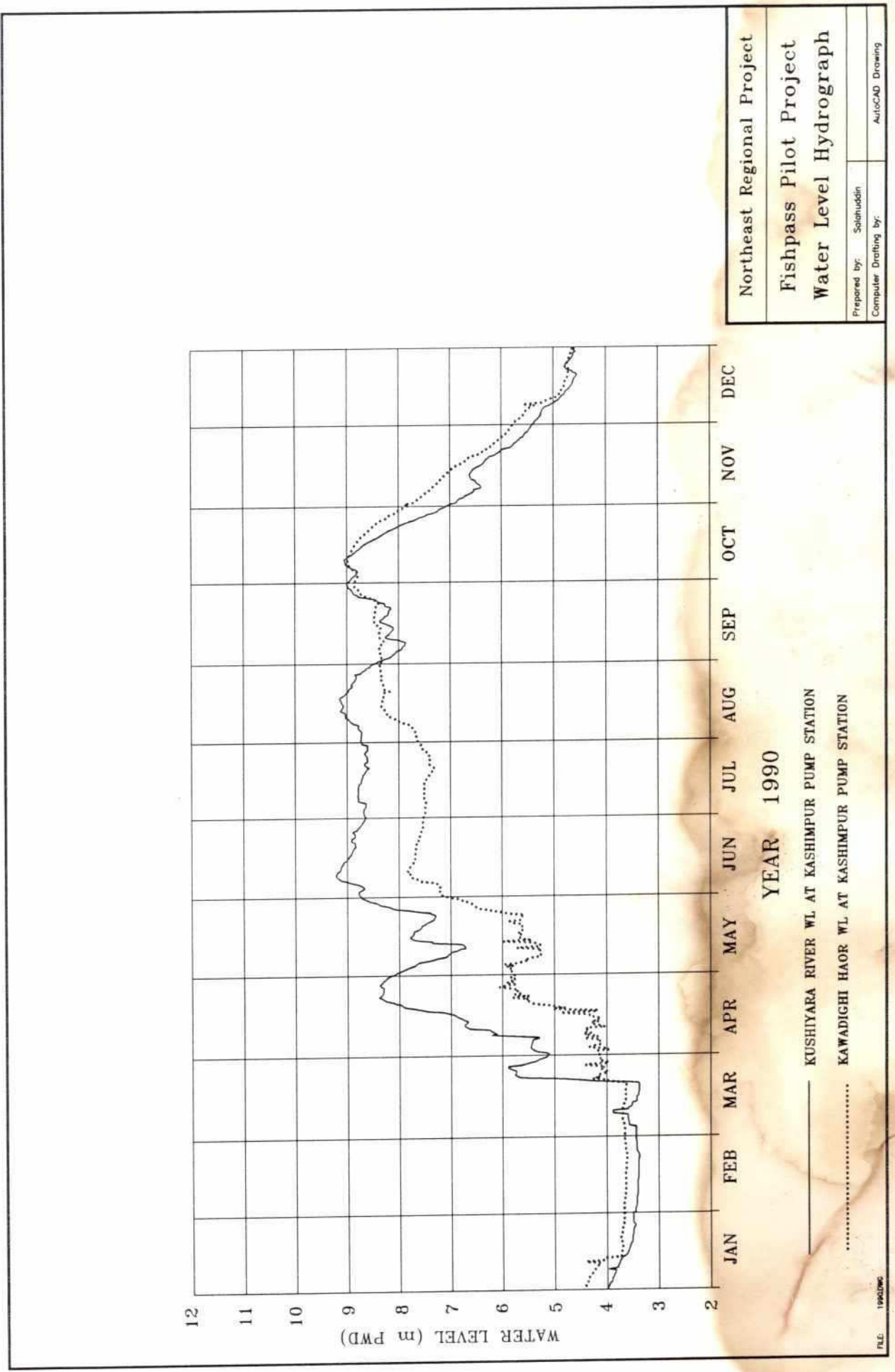
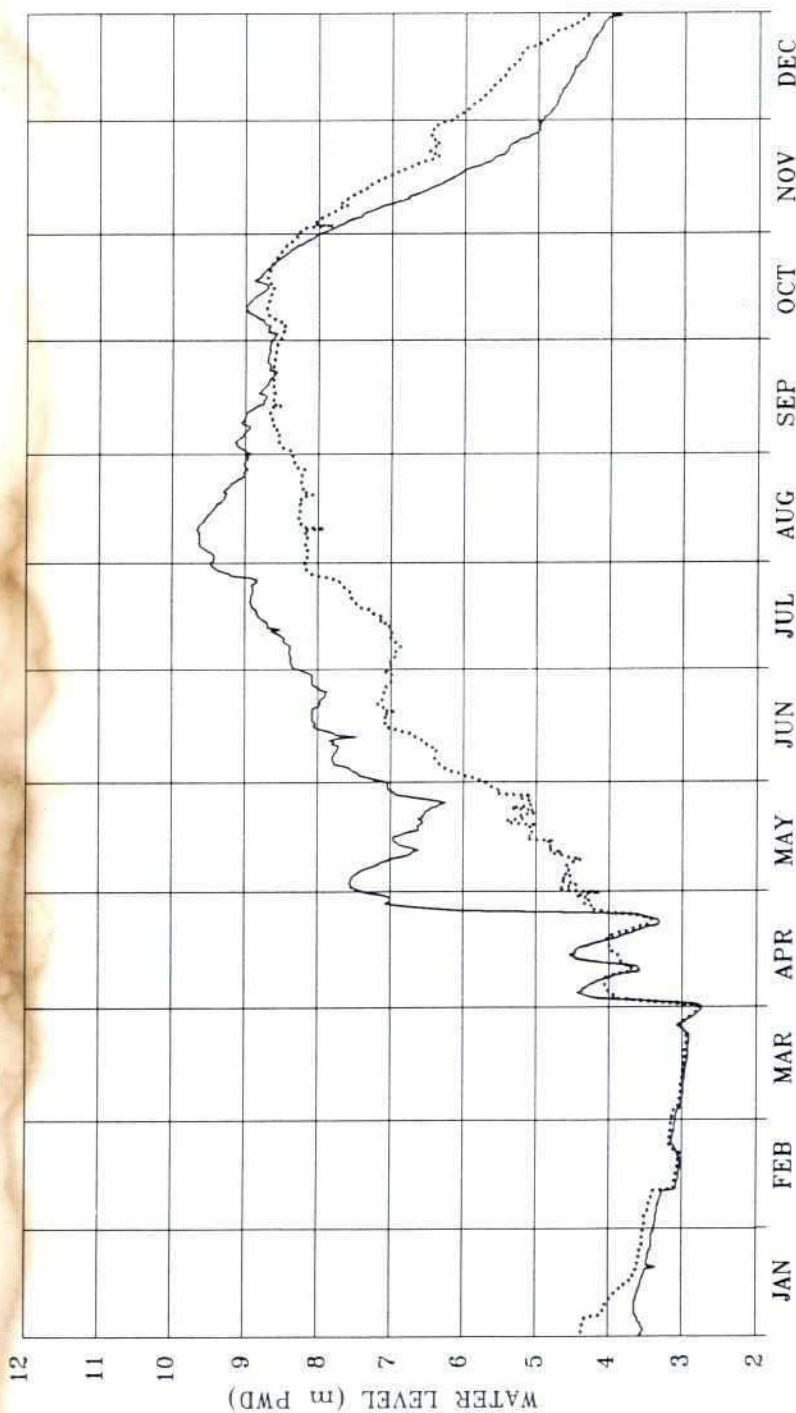


Figure 10

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YEAR 1989

— KUSHIYARA RIVER WL AT KASHIMPUR PUMP STATION

..... KAWADIGHI HAOR WL AT KASHIMPUR PUMP STATION

Northeast Regional Project

Fishpass Pilot Project

Water Level Hydrograph

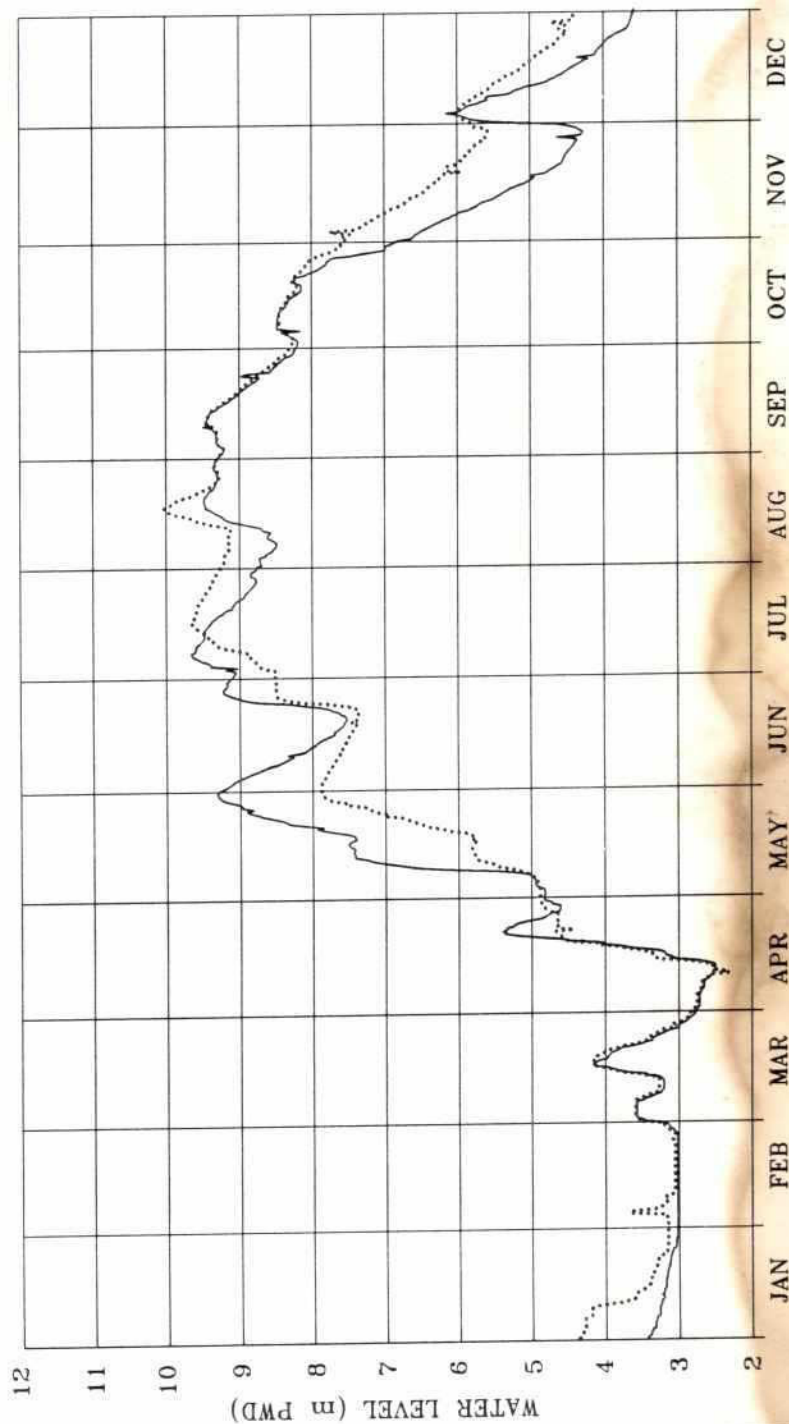
Prepared by: Solanuddin

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AutoCAD Drawing

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Figure 11



YEAR 1988

— KUSHIYARA RIVER WL AT KASHIMPUR PUMP STATION
 KAWADIGHI HAOR WL AT KASHIMPUR PUMP STATION

Northeast Regional Project

Fishpass Pilot Project
 Water Level Hydrograph

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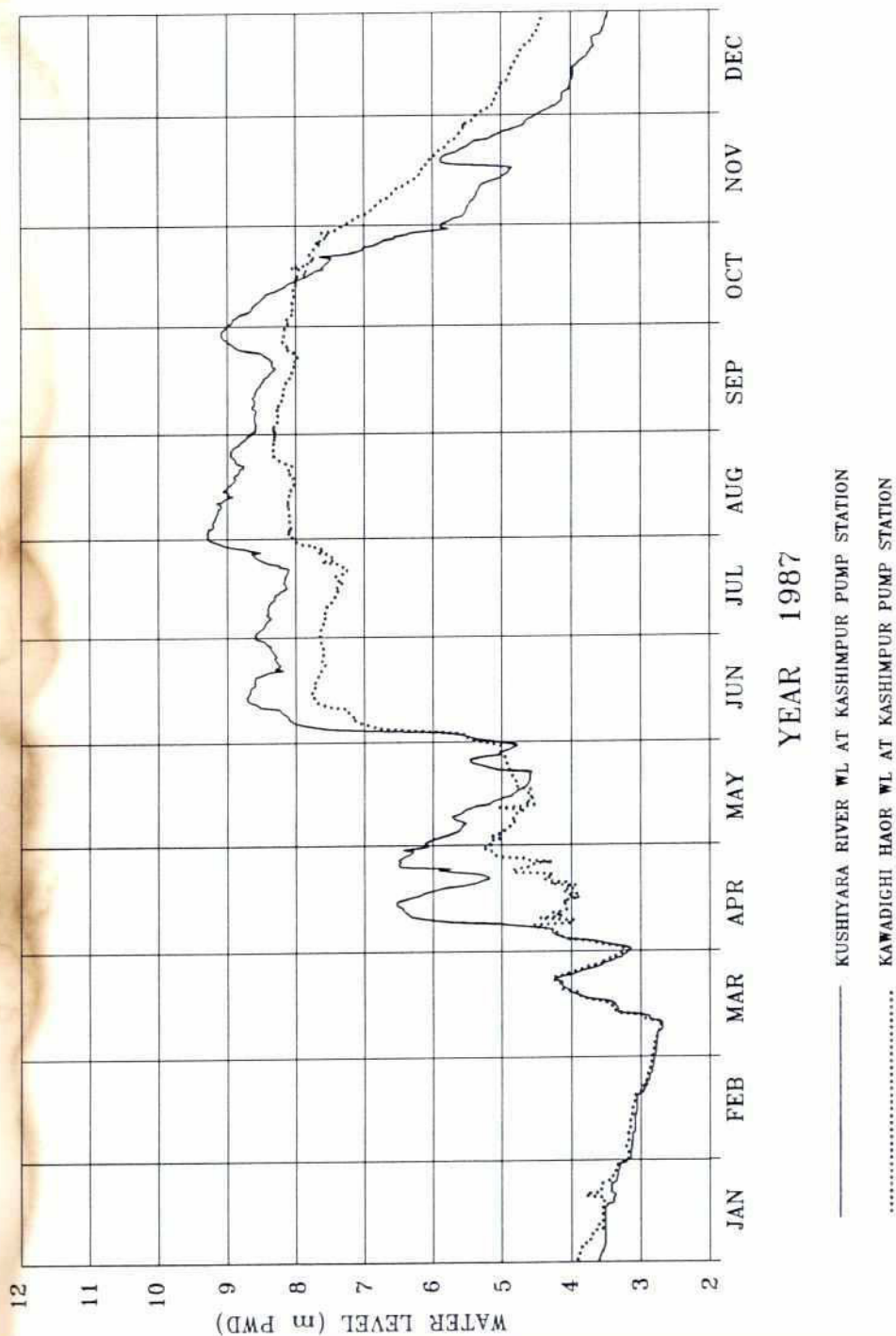
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Figure 12

22a



Northeast Regional Project

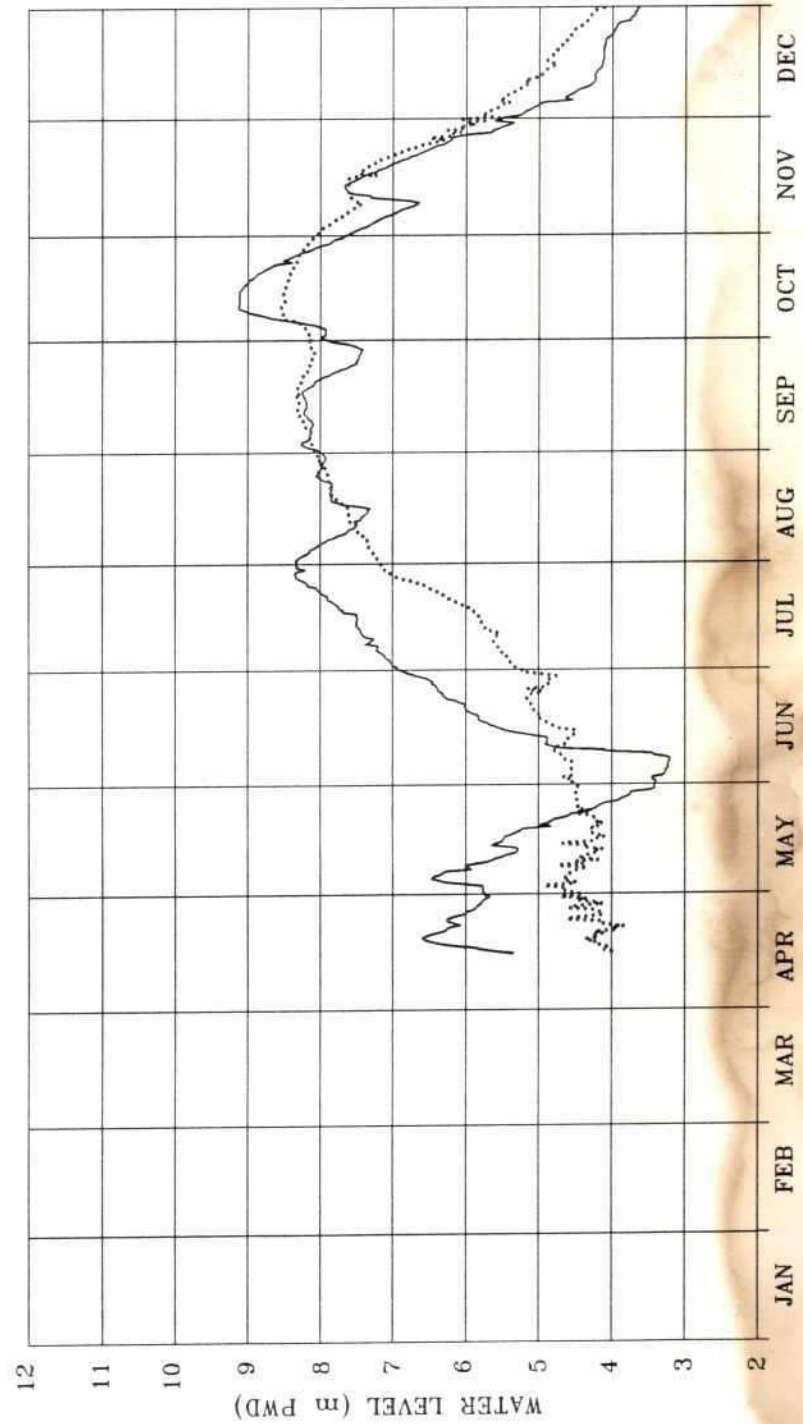
Fishpass Pilot Project
 Water Level Hydrograph

Prepared by: Salahuddin
 Computer Drafting by:

AutoCAD Drawing

FILE: DWG

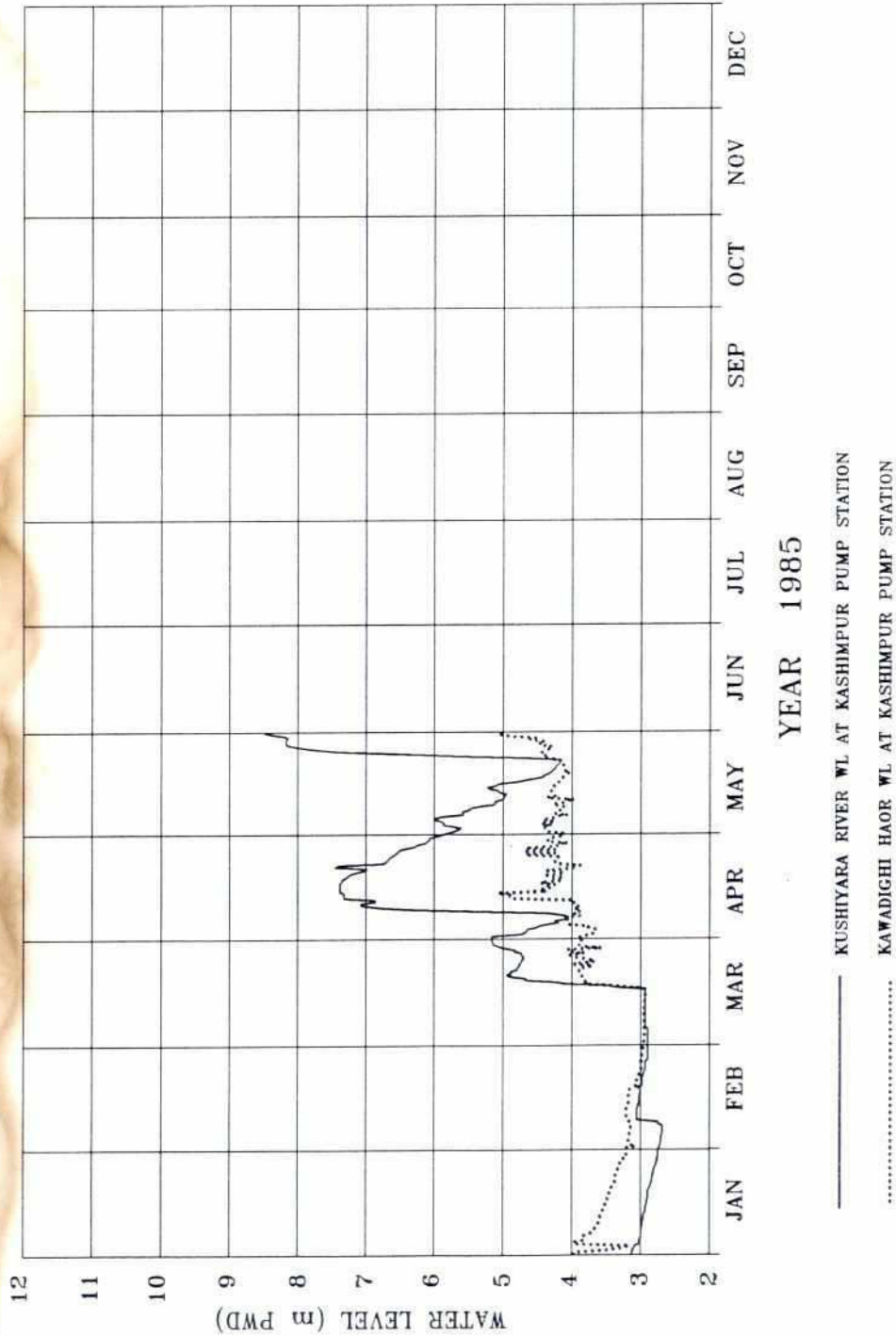
Figure 13



Northeast Regional Project
Fishpass Pilot Project
Water Level Hydrograph
Prepared by: solohuddin
Computer Drafting by: AutoCAD Drawing

Figure 14

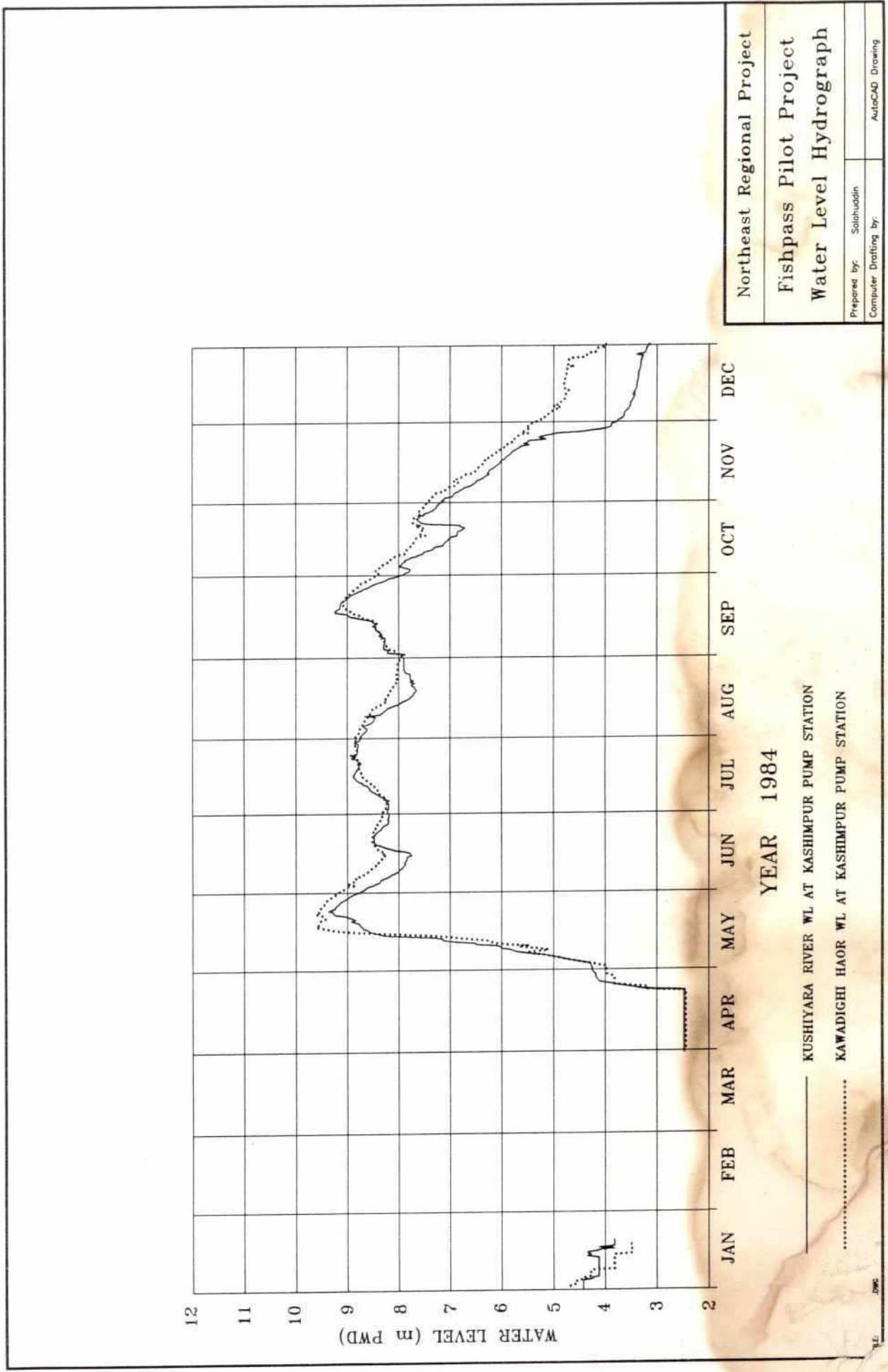
228



Northeast Regional Project	
Fishpass Pilot Project	
Water Level Hydrograph	
Prepared by: Salahuddin	AutocAD Drawing
Computer Drafting by:	

208

Figure 15



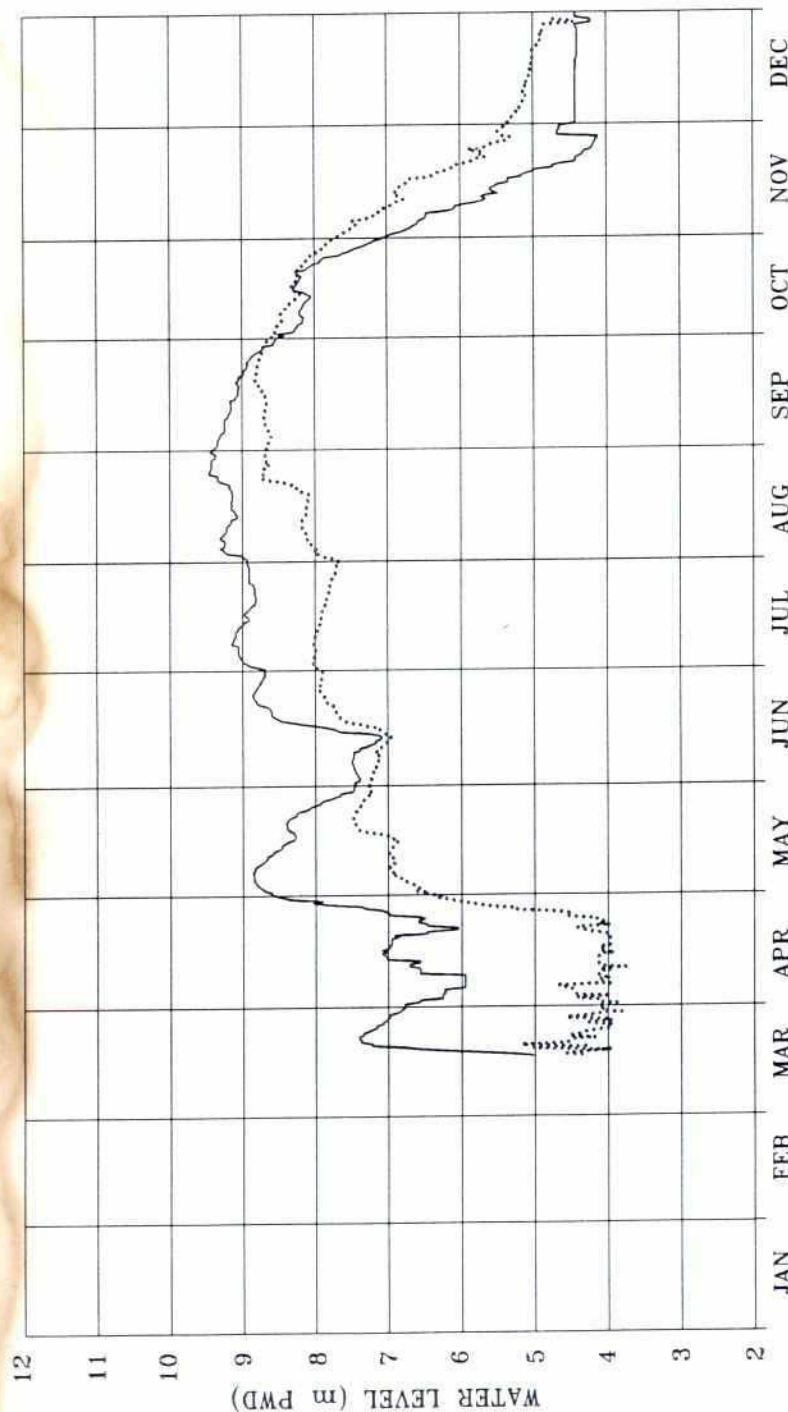
Northeast Regional Project

Fishpass Pilot Project
 Water Level Hydrograph

Prepared by: Salihuddin
 Computer Drafting by: AutoCAD Drawing

Figure 16

223



YEAR 1983

— KUSHIYARA RIVER WL AT KASHIMPUR PUMP STATION

..... KAWADIGHI HAOR WL AT KASHIMPUR PUMP STATION

Northeast Regional Project

Fishpass Pilot Project

Water Level Hydrograph

Prepared by: Salahuddin

Computer Drafting by:

AutoCAD Drawing

FILE: DWG

220

Figure 17

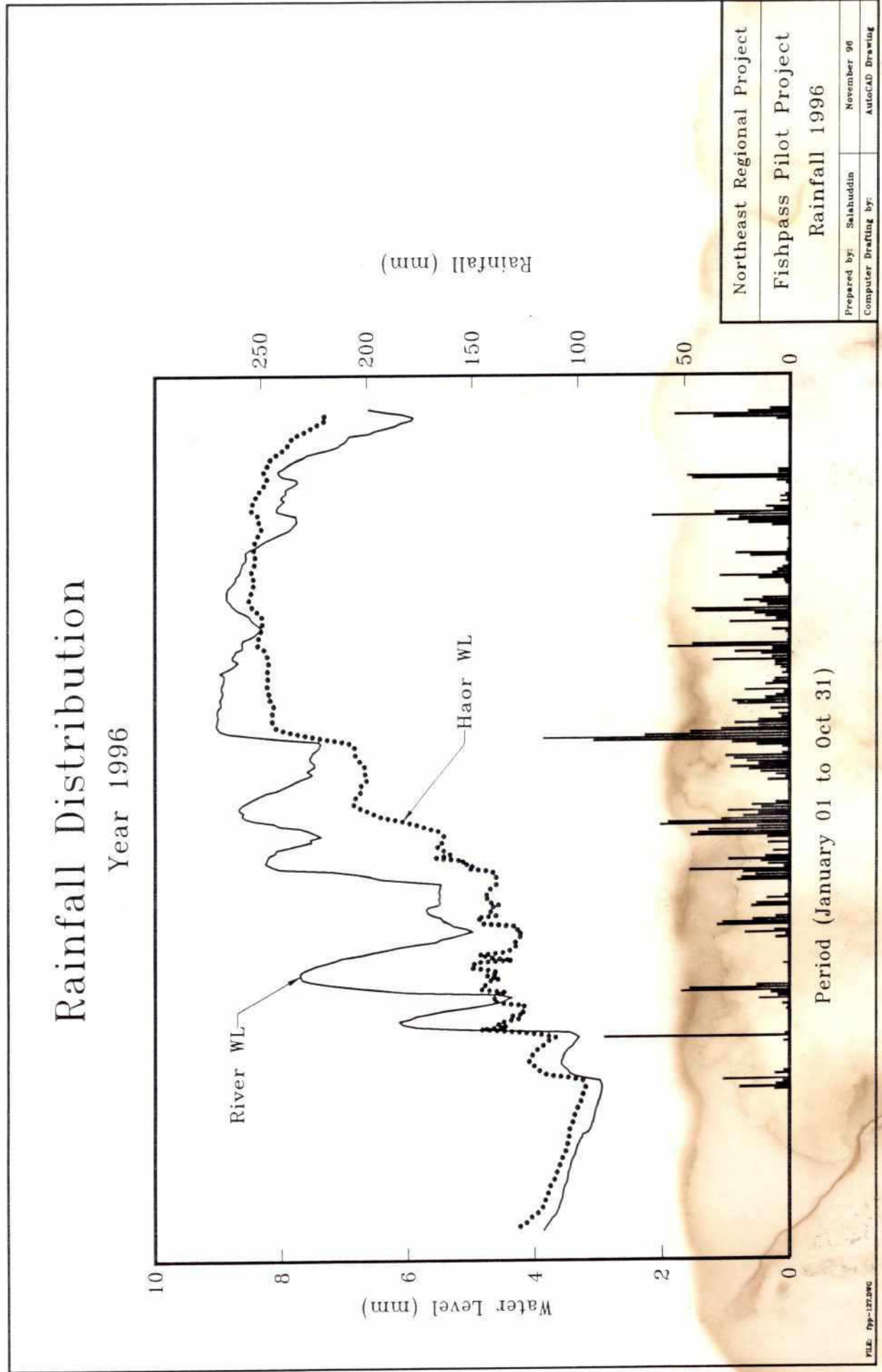
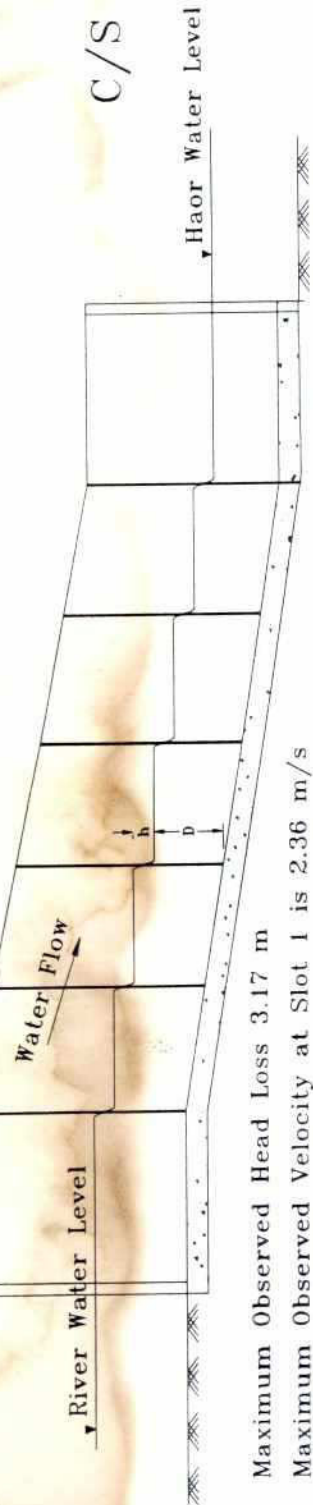


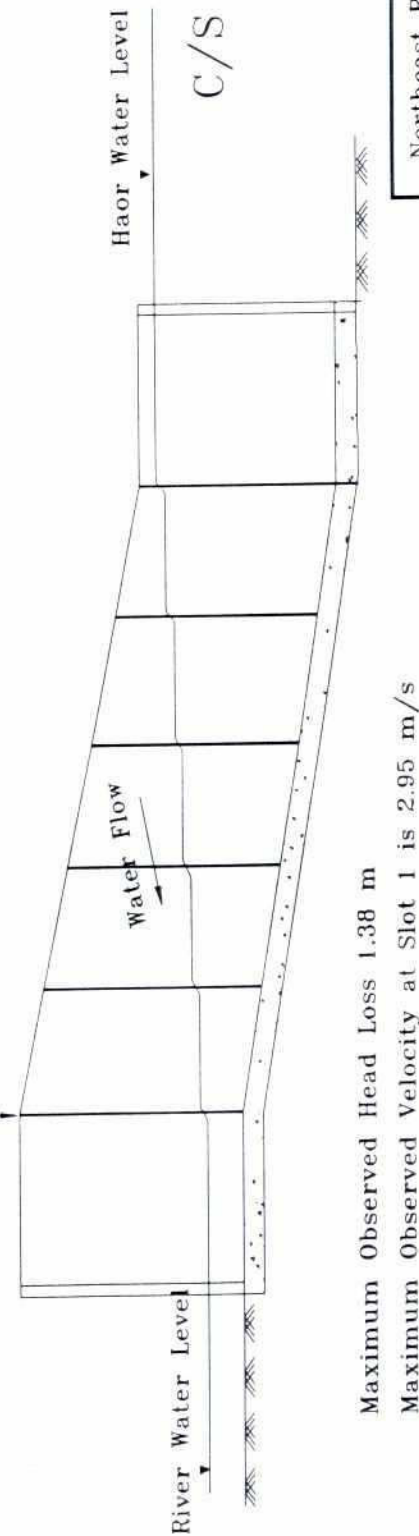
Figure 18

R/S

Direction of Water Flow : River to Haor
Periods : May 11,96 to Sep 09,96



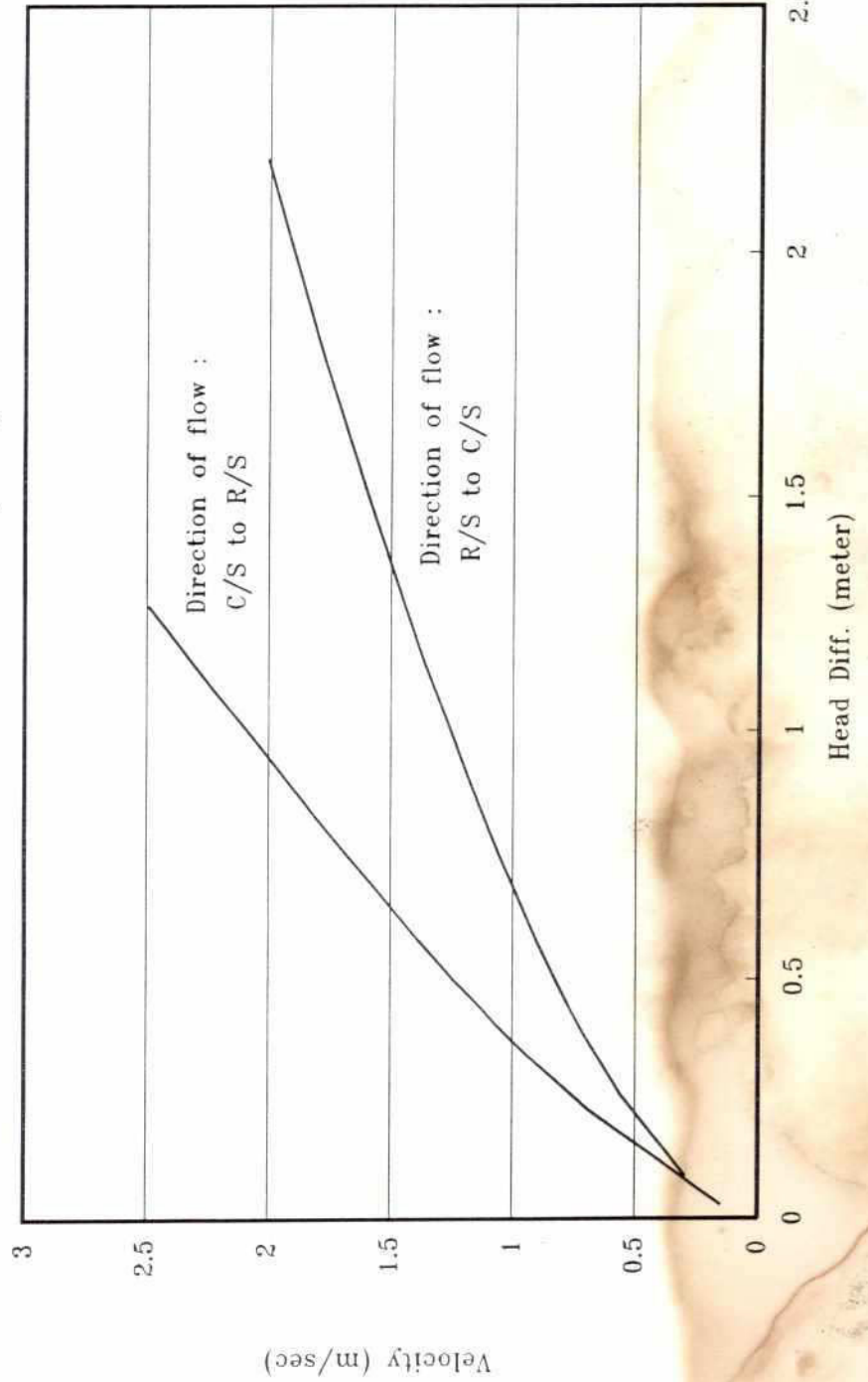
Direction of Water Flow : Haor to River
Period : September 09,96 to November 15,96



Northeast Regional Project	
Fishpass Pilot Project	
Schematic Flow Diagram	
Prepared by: Salahuddin	Nov. 1996
Computer Drafting by:	AutoCAD Drawing

Velocity Measurement

Variation of Head (meter)



Northeast Regional Project

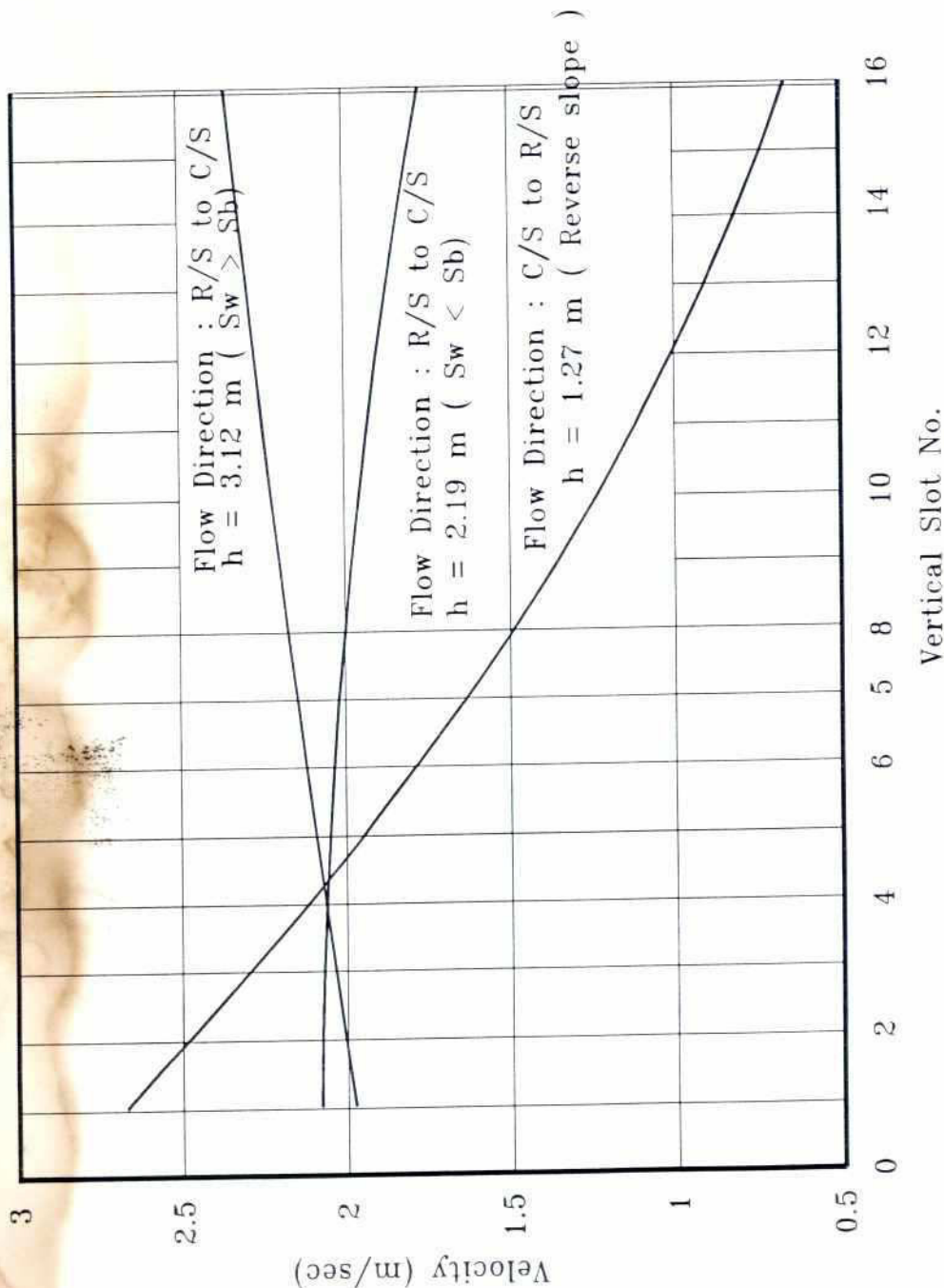
Fishpass Pilot Project
Velocity Vs. Head Diff.

Prepared by: Salahuddin
Computer Drafting by: November 96
AutoCAD Drawing

Figure 19 a

Velocity Measurement

Variation in Vertical Slots



Northeast Regional Project

Fishpass Pilot Project
Velocity at Vertical Slots

Prepared by: Salehuddin

November 96

Computer Drafting by:

AutoCAD Drawing

Figure 20

WATER LEVELS AND VELOCITY

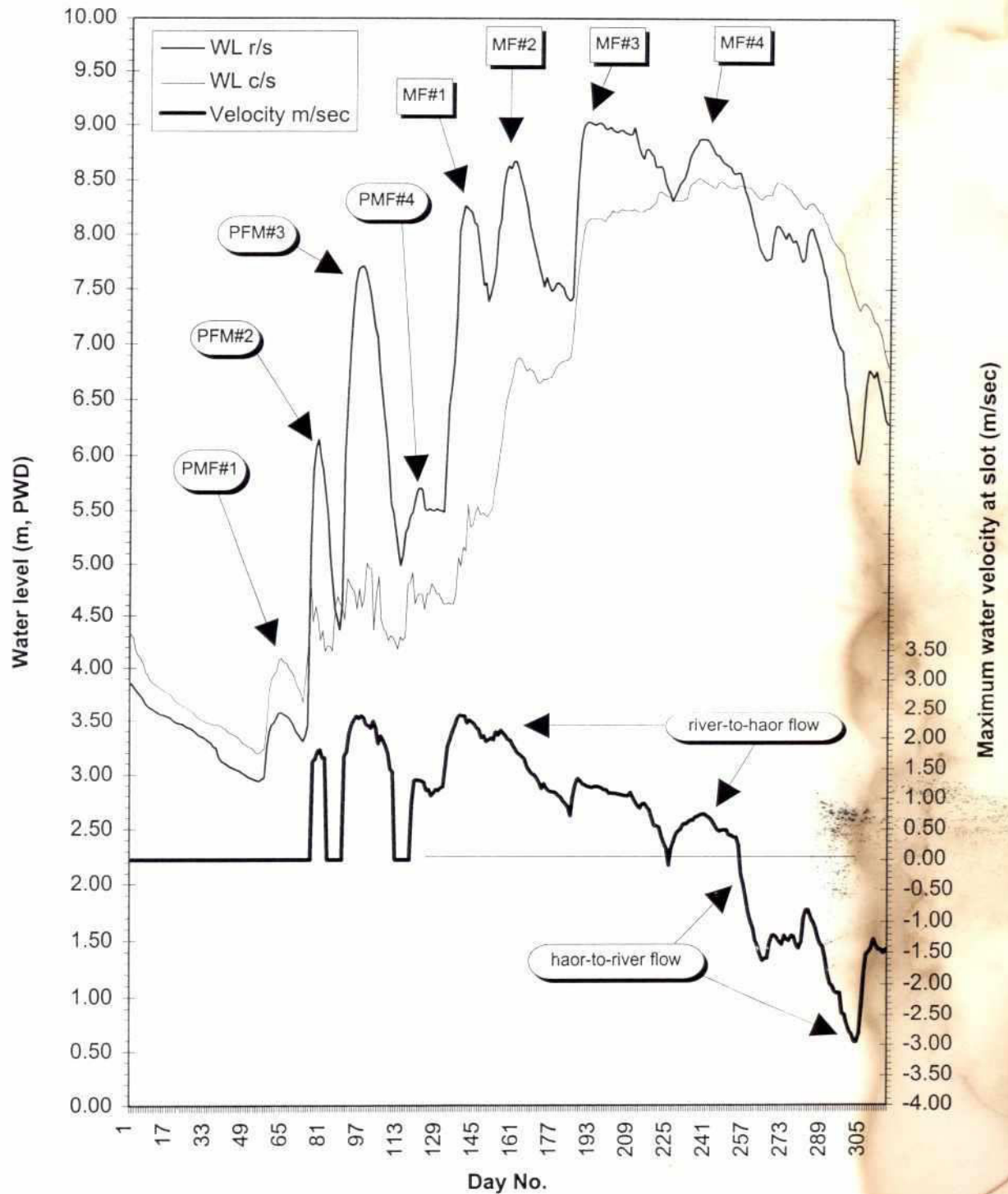
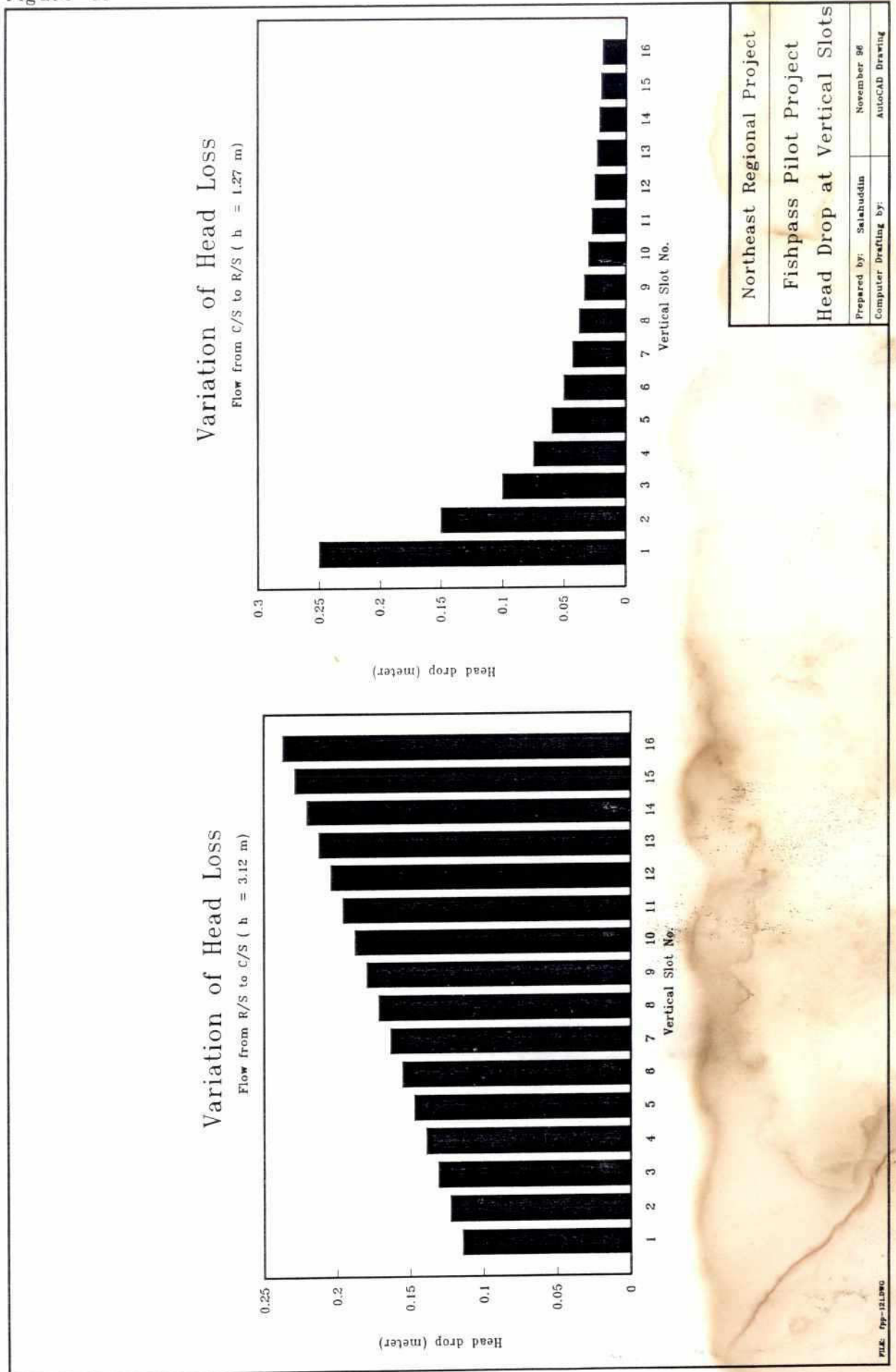
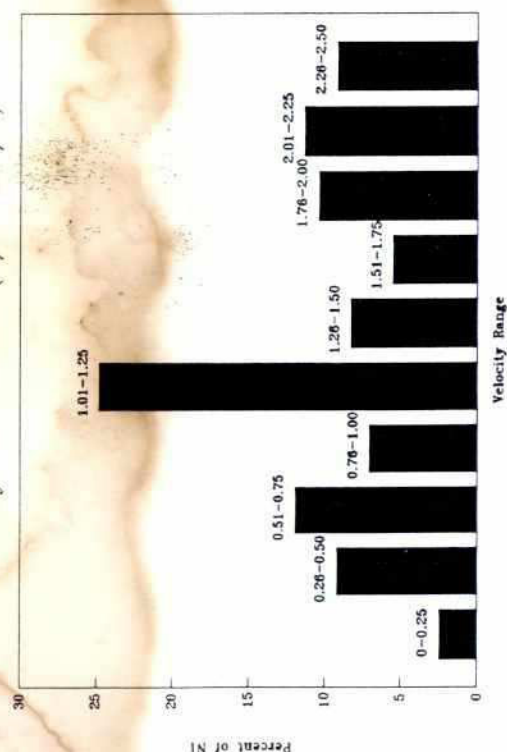


Figure 21

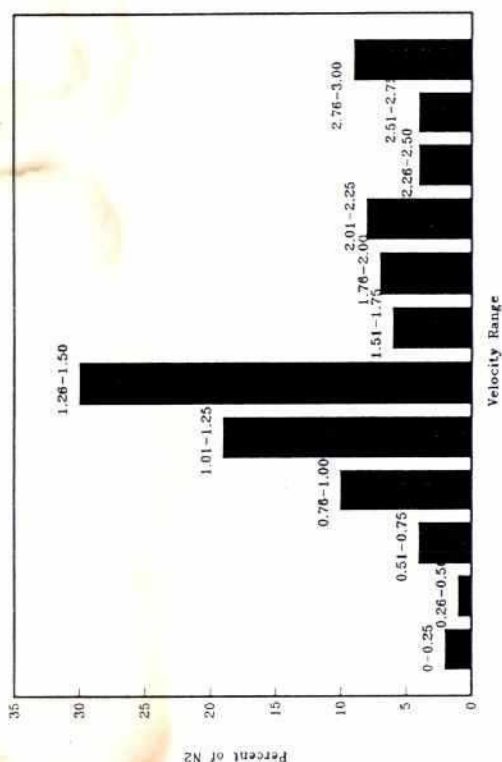


229

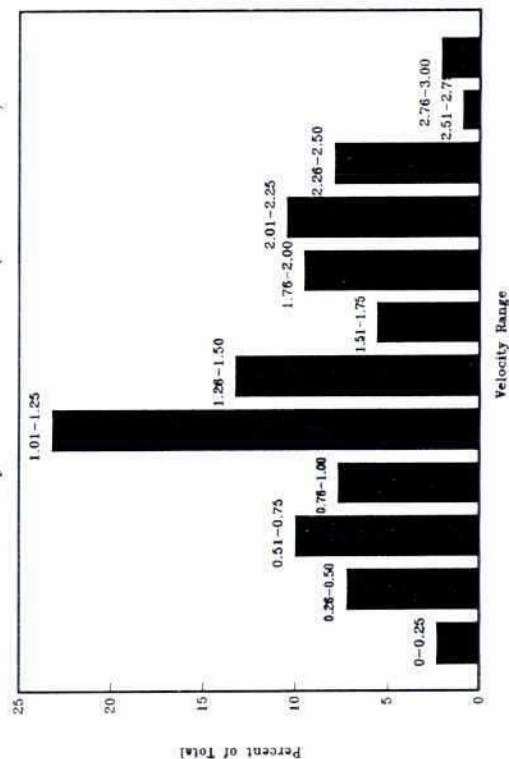
Velocity Distribution (R/S to C/S)



Velocity Distribution (C/S to R/S)



Velocity Distribution (Total 1996)

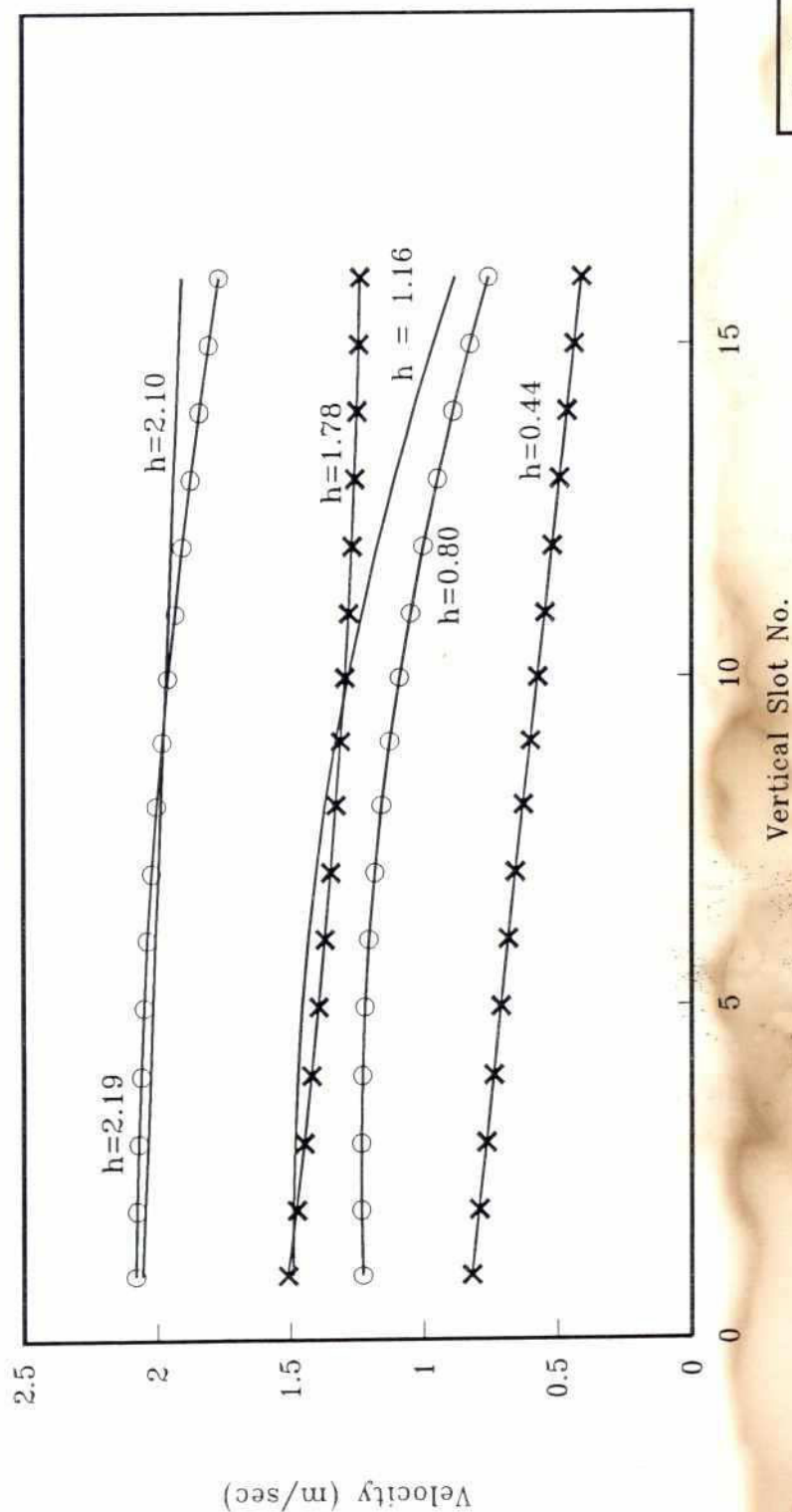


Northeast Regional Project	
Fishpass Pilot Project	
Velocity Distribution (1996)	
Prepared by: Salahuddin	November 96
Computer Drafting by:	AutoCAD Drawing

Figure 23

Velocity Variation

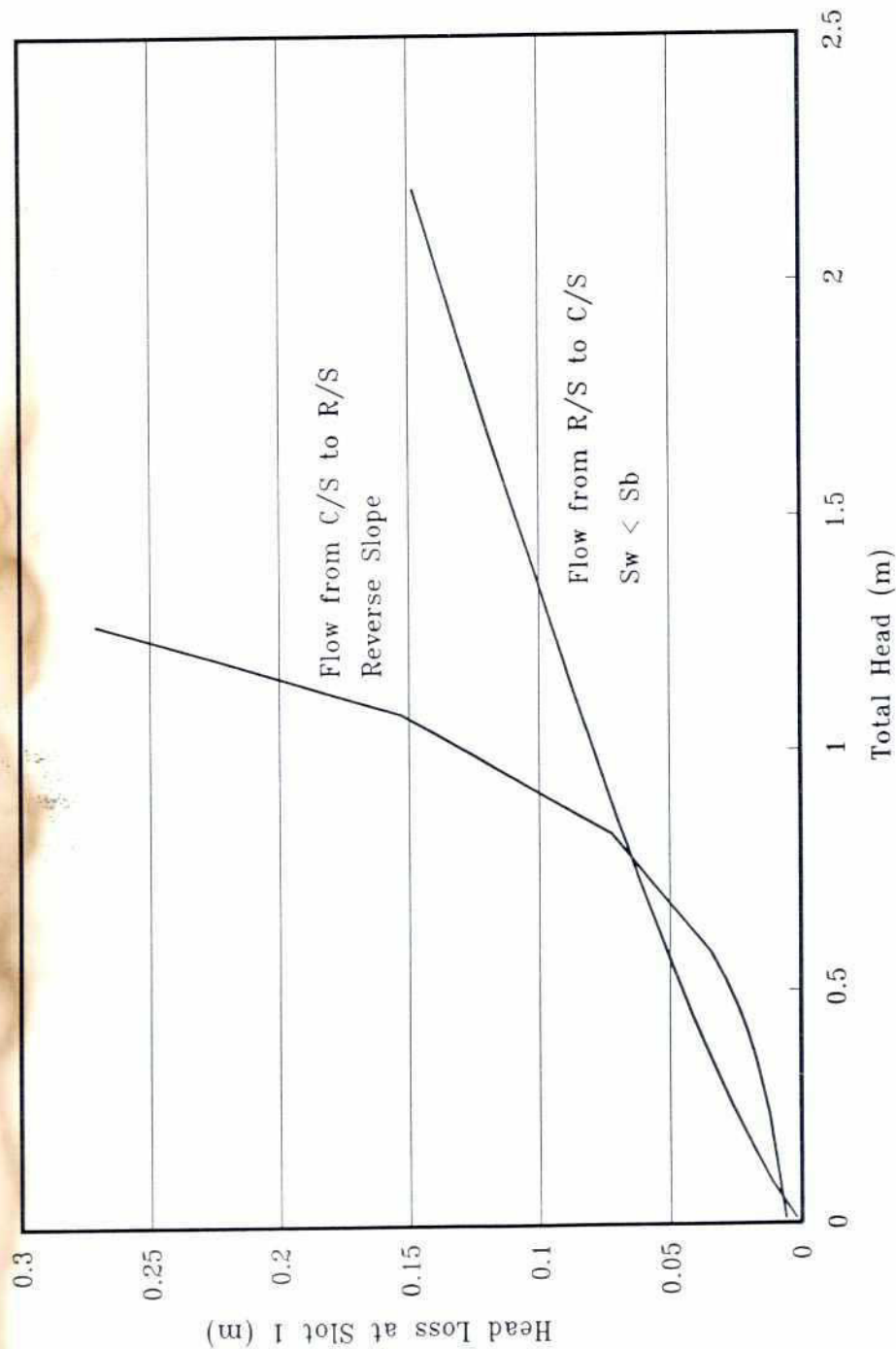
h - Head Difference across Structure (meter)



Northeast Regional Project	
Fishpass Pilot Project	
Velocities at Different h	
Prepared by: Salahuddin	November 1996
Computer Drafting by:	AutoCAD Drawing

Variation in Head Loss

Total Head vs. Head Loss at Slot 1



FILE: FPP-120.DWG

Northeast Regional Project

Fishpass Pilot Project

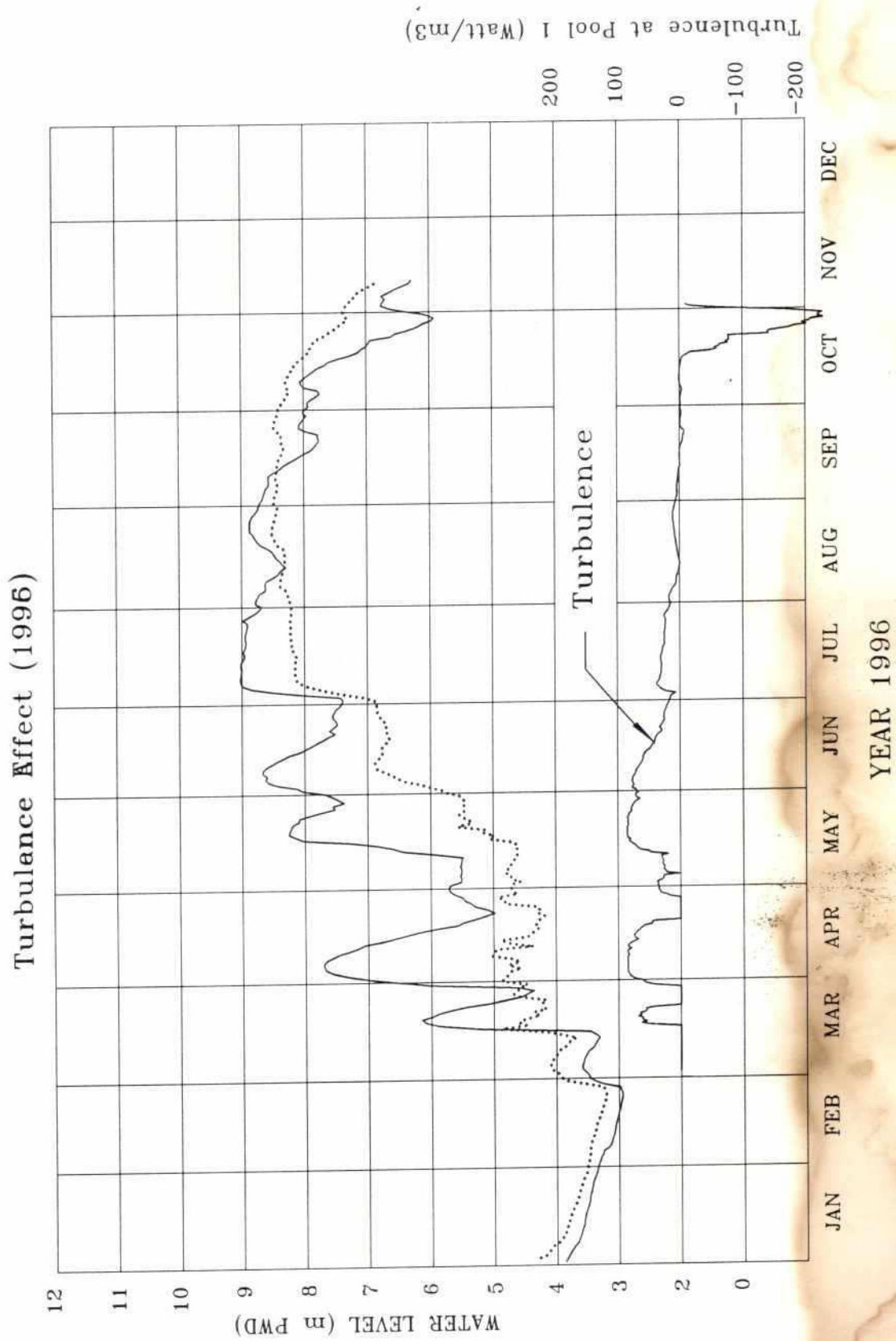
Variation in Head Loss

Prepared by: Salahuddin November 06

Computer Drafting by: AutoCAD Drawing

Figure 24

Figure 25



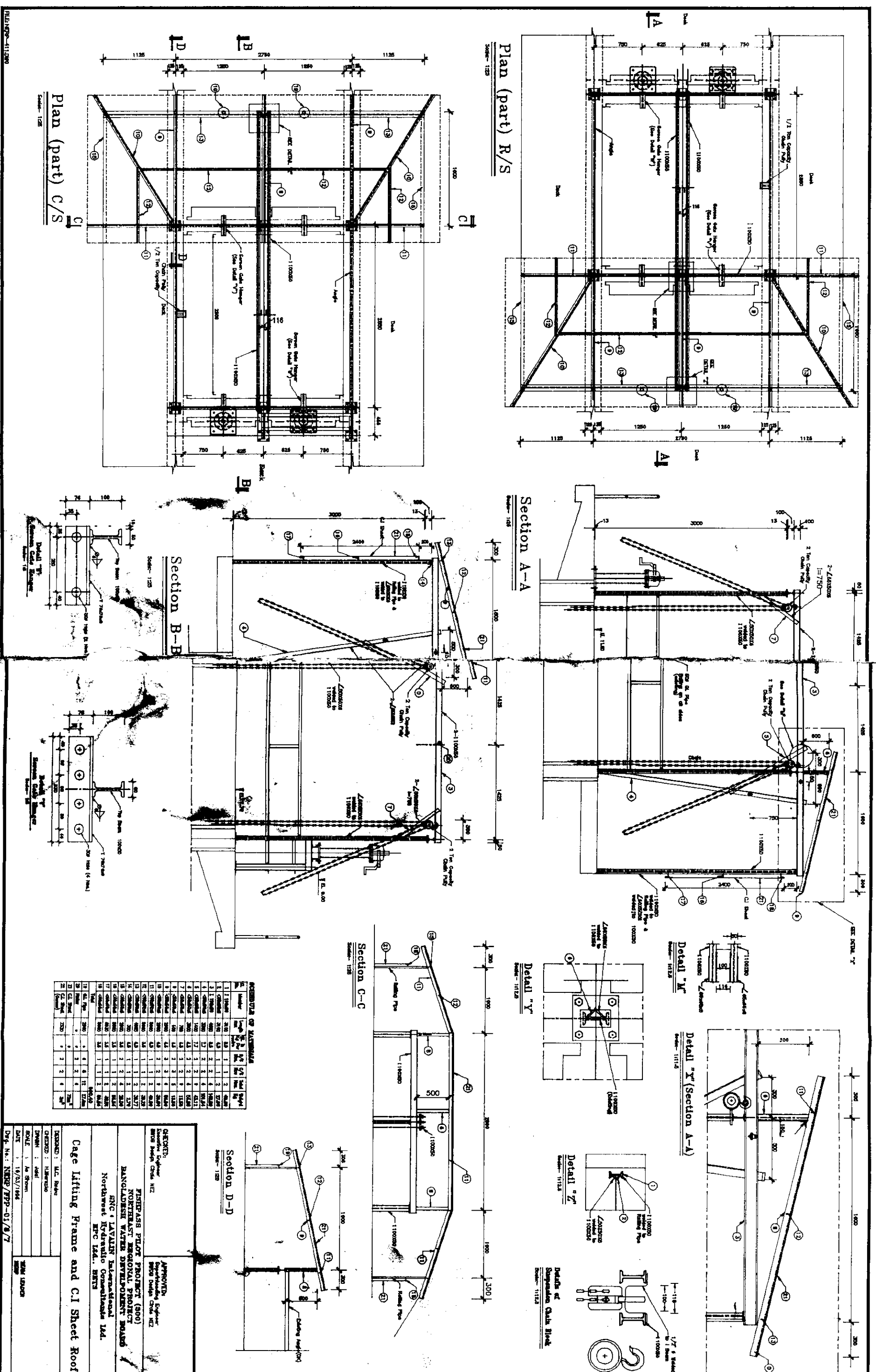
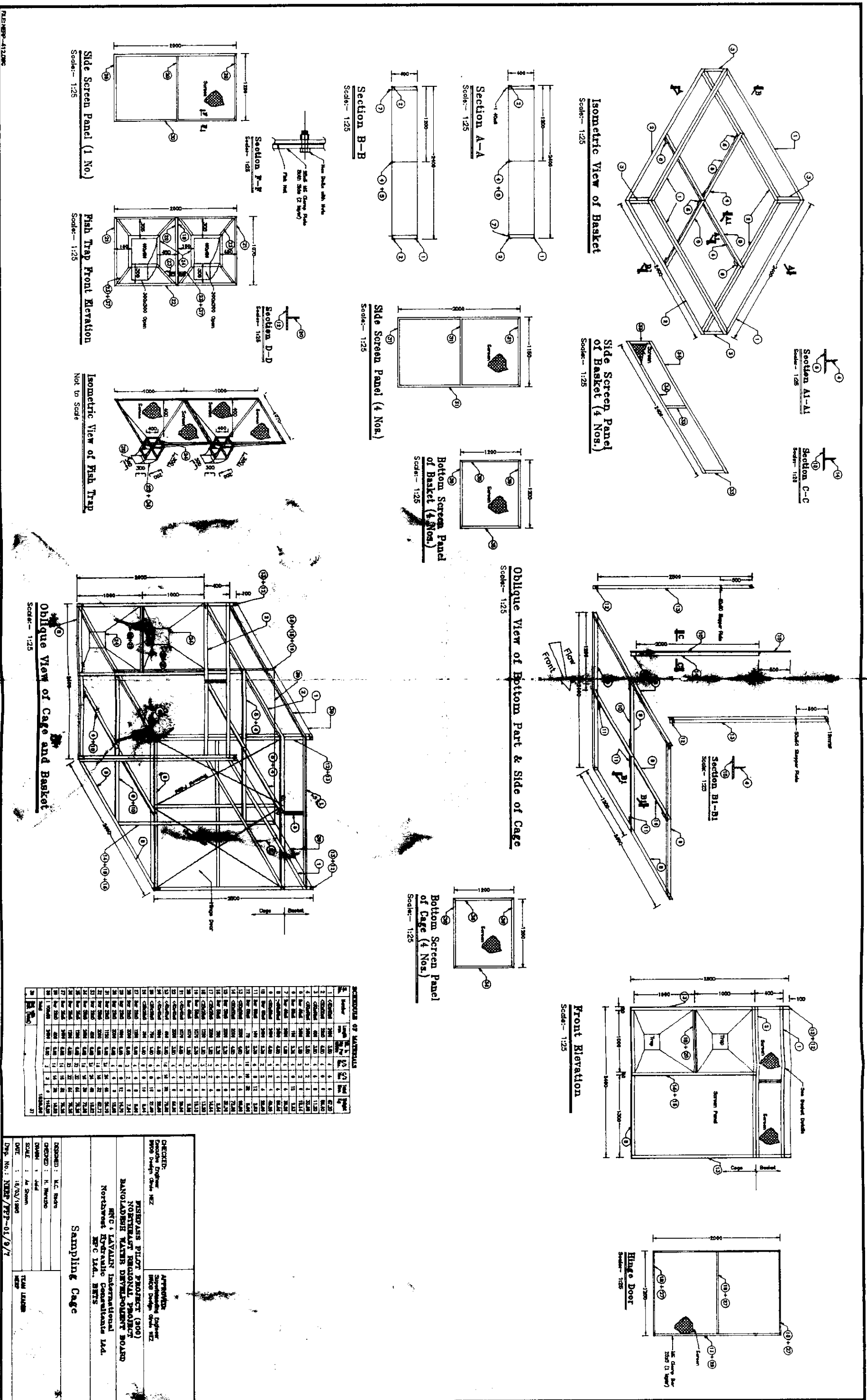
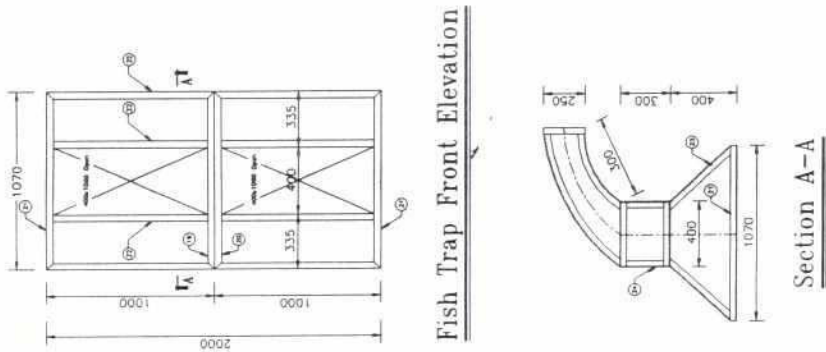


Figure 26

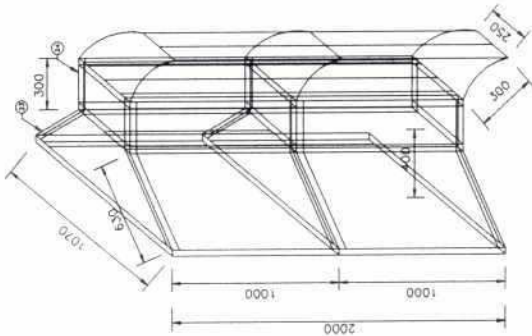


202



Fish Trap Front Elevation

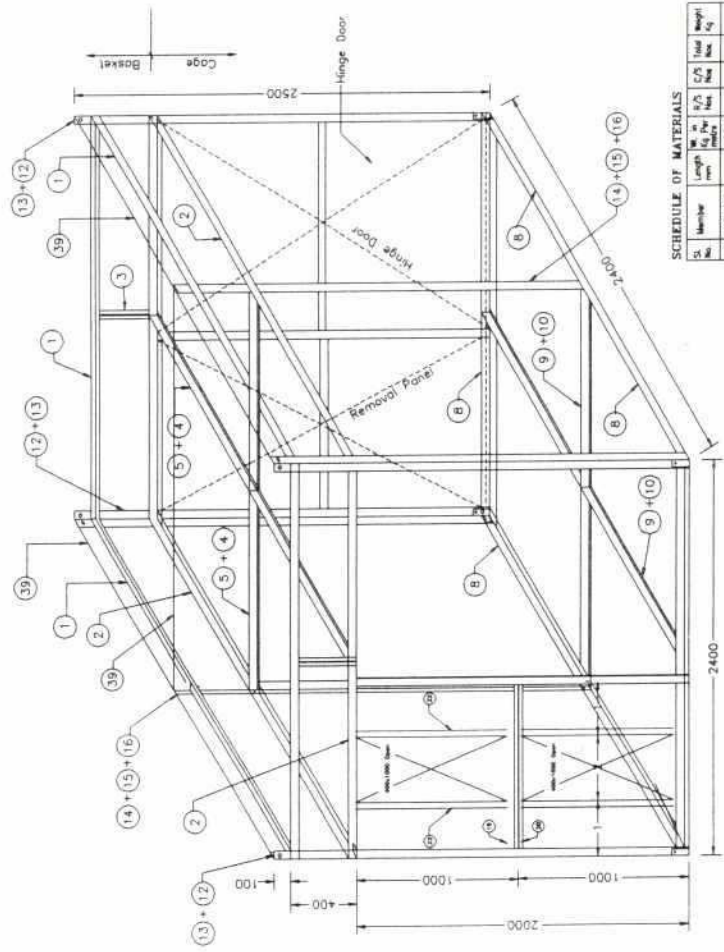
Section A-A



Isometric View of Fish Trap

Not to Scale

SCHEDULE OF MATERIALS									
Sl. No.	Material	Length (mm)	Wt. in Kg Per Meter	R/S	Net	G/S	Net	Total	Weight in Kg
21	<40x40x6	1550	3.50						
22	<40x40x6	350	3.50						
23	<40x40x6	350	3.50						
24	<40x40x6	350	3.50						
25	<40x40x6	180	1.80						
26	<40x40x6	180	1.80						
27	Bar 25x5	0.95	0.95						
28	Bar 25x5	0.95	0.95						
29	Bar 25x5	0.95	0.95						
30	Bar 25x5	0.95	0.95						
31	Bar 25x5	0.95	0.95						
32	Bar 25x5	0.95	0.95						
33	Bar 25x5	0.95	0.95						
34	Bar 25x5	0.95	0.95						
35	Bar 25x5	0.95	0.95						
36	Bar 25x5	0.95	0.95						
37	Bar 25x5	0.95	0.95						
38	Bar 25x5	0.95	0.95						
39	100x50	8.00	8.00						
39	Total								



Oblique View of Cage and Basket

SCHEDULE OF MATERIALS									
Sl. No.	Material	Length (mm)	Wt. in Kg Per Meter	R/S	Net	G/S	Net	Total	Weight in Kg
1	<40x40x6	450	4.50						
2	<40x40x6	350	3.50						
3	<40x40x6	350	3.50						
4	<40x40x6	350	3.50						
5	Bar 40x6	1.80	1.80						
6	Bar 50x8	2.30	2.30						
7	Bar 40x6	1.80	1.80						
8	<40x40x6	450	4.50						
9	<40x40x6	450	4.50						
10	Bar 50x8	2.30	2.30						
11	Bar 50x8	2.30	2.30						
12	Bar 50x8	2.30	2.30						
13	<40x40x6	450	4.50						
14	<40x40x6	450	4.50						
15	Bar 50x8	2.30	2.30						
16	Bar 50x8	2.30	2.30						
17	<40x40x6	1.80	1.80						
18	<40x40x6	1.80	1.80						
19	Bar 50x8	2.30	2.30						
20	Bar 40x6	1.80	1.80						

266

Figure 28

NUMBER OF SPECIES ABLE TO NEGOTIATE FISHPASS
as a function of water velocity at slot

Countercurrent Swimming Mode, except indicated bar

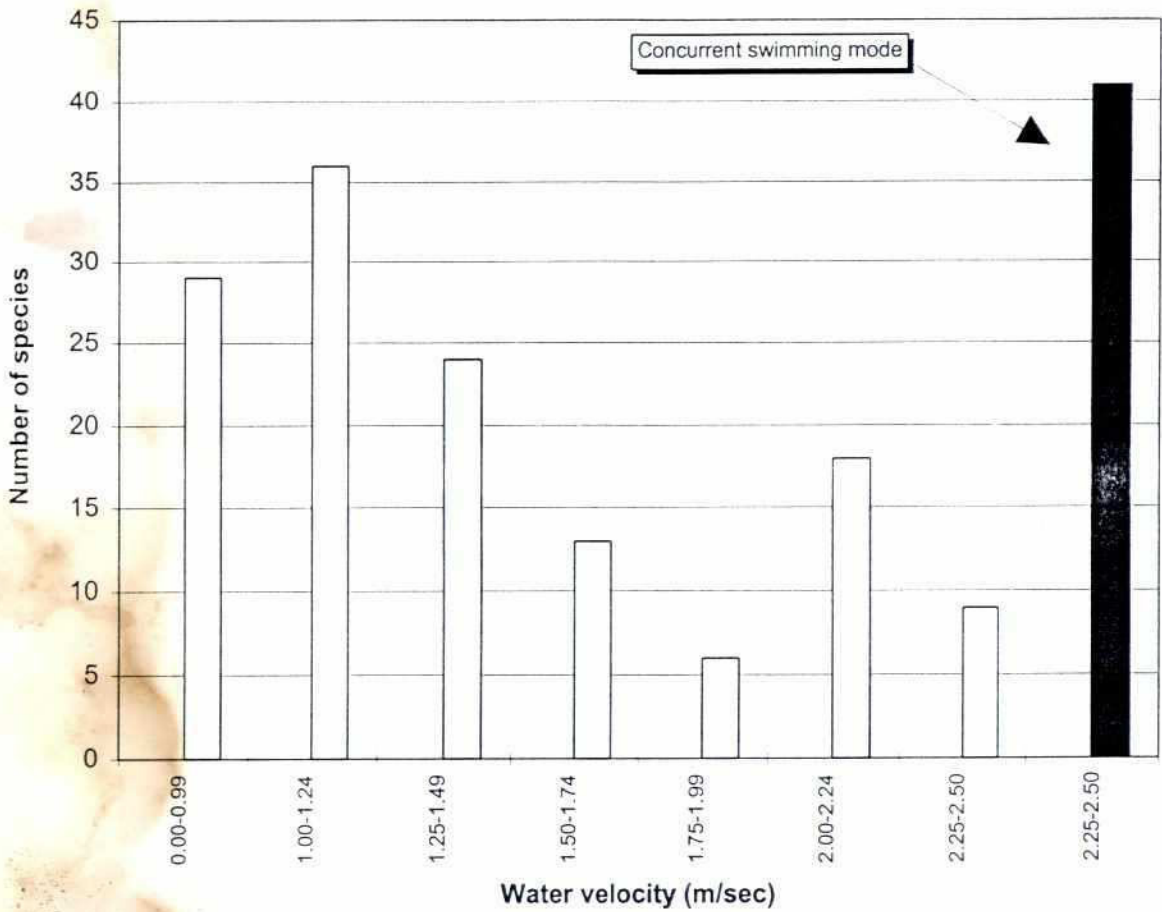
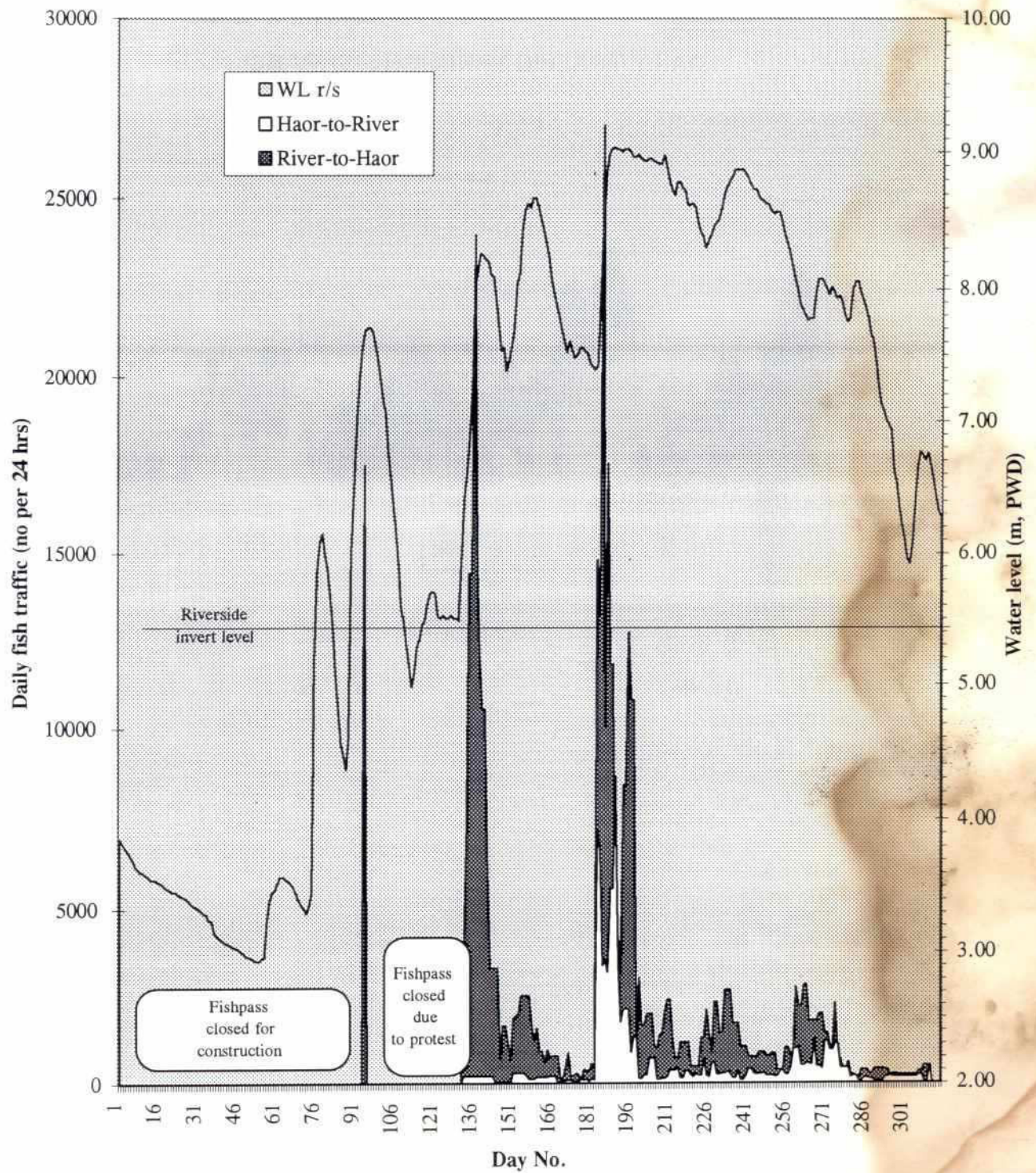


Figure 29

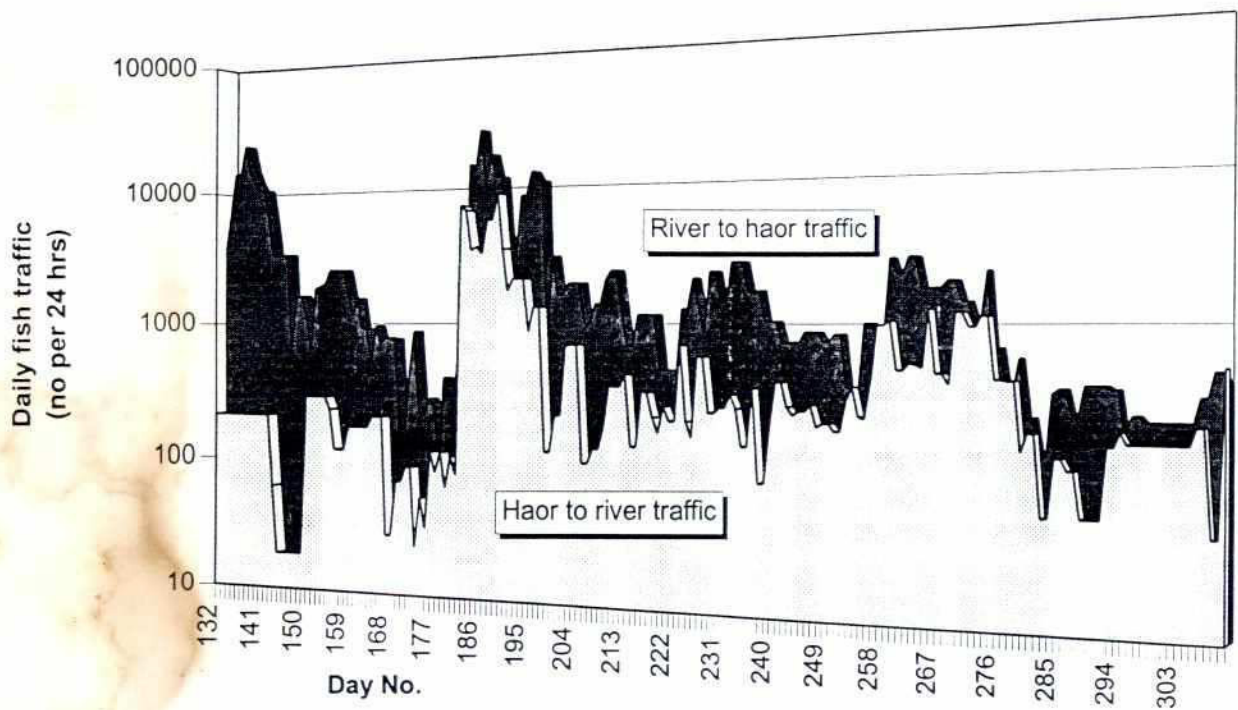
COMPARISON OF DAILY FISH TRAFFIC WITH RIVERSIDE WATER LEVEL



209

Figure 30

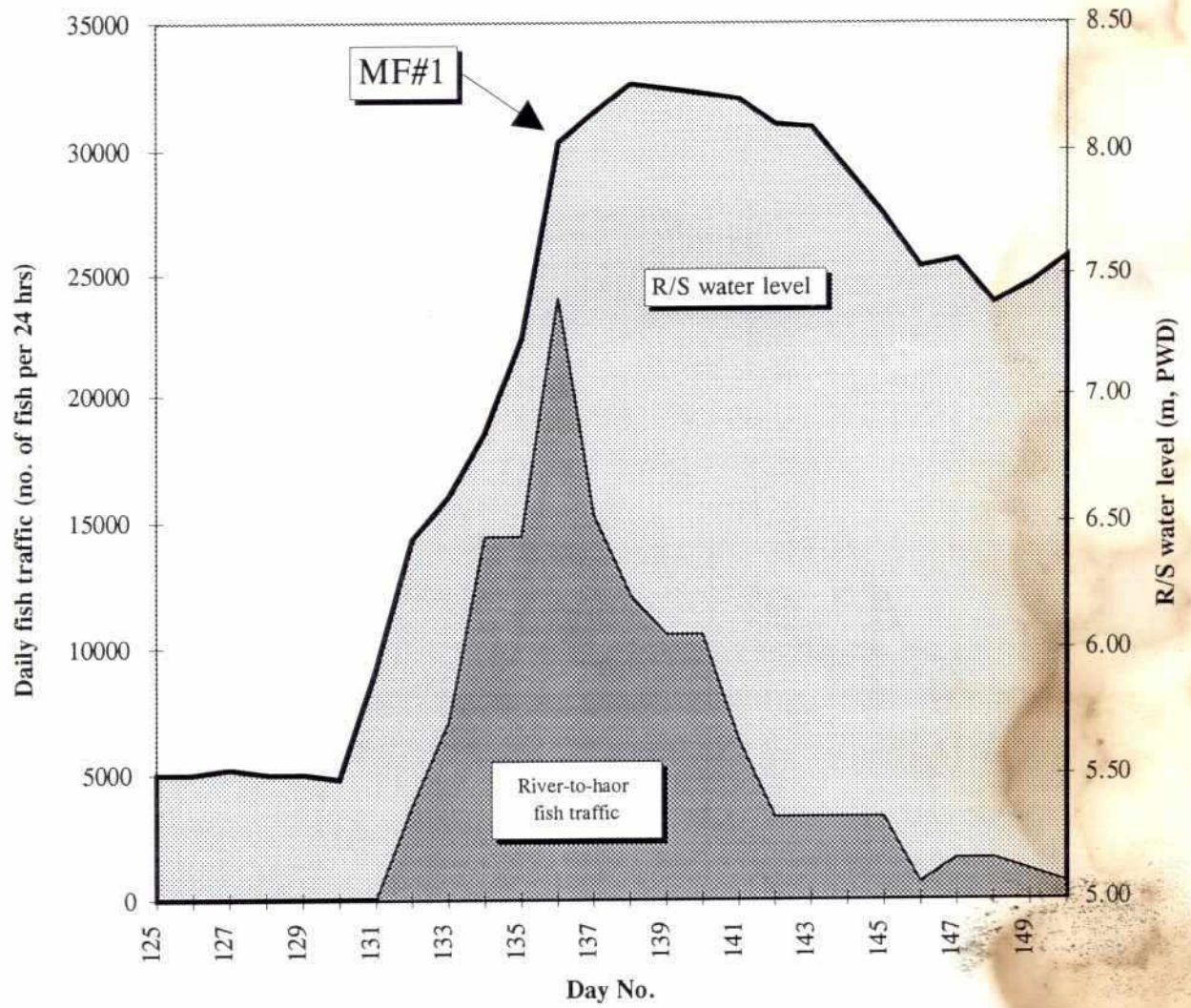
DAILY TRAFFIC THROUGH FISHPASS



200

Figure 31

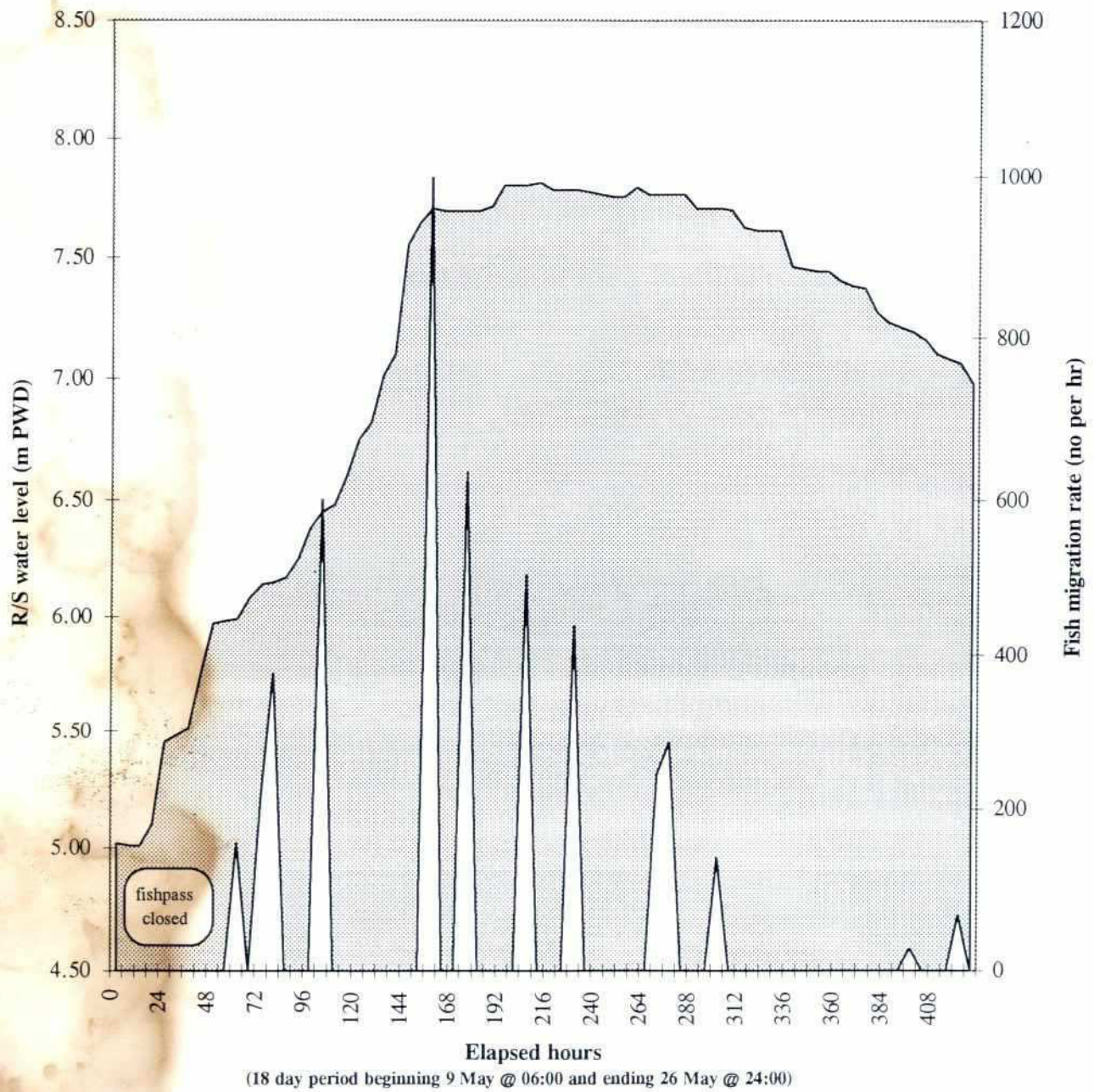
DAILY FISH TRAFFIC DURING MONSOON FLOOD #1



269

Figure 32

MONSOON FLOOD No. 1
Direction of migration: river to haor



267

Figure 33

DAILY FISH TRAFFIC DURING MONSOON FLOOD #3

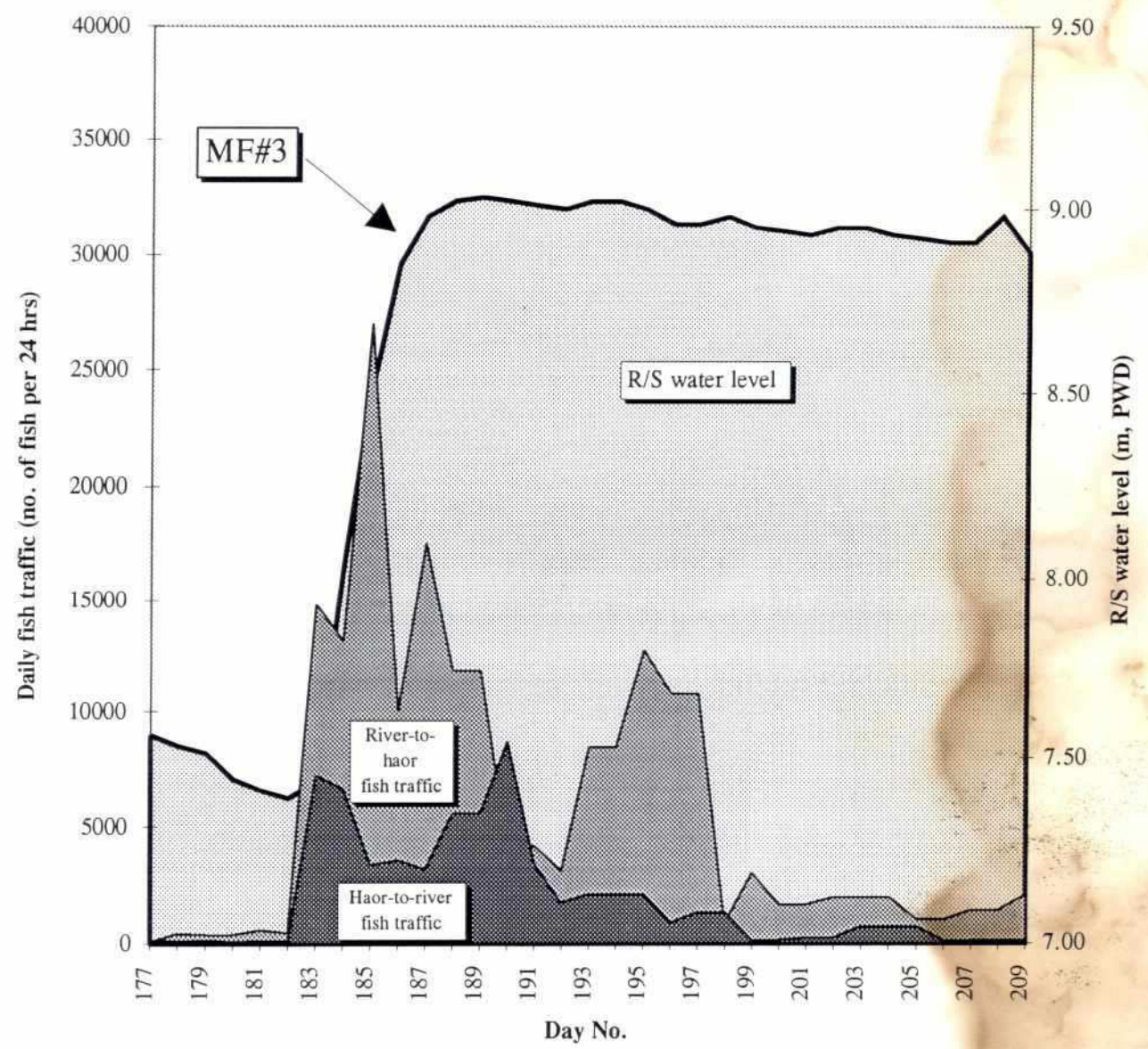


Figure 34

MONSOON FLOOD No. 3
Direction of migration: river to haor

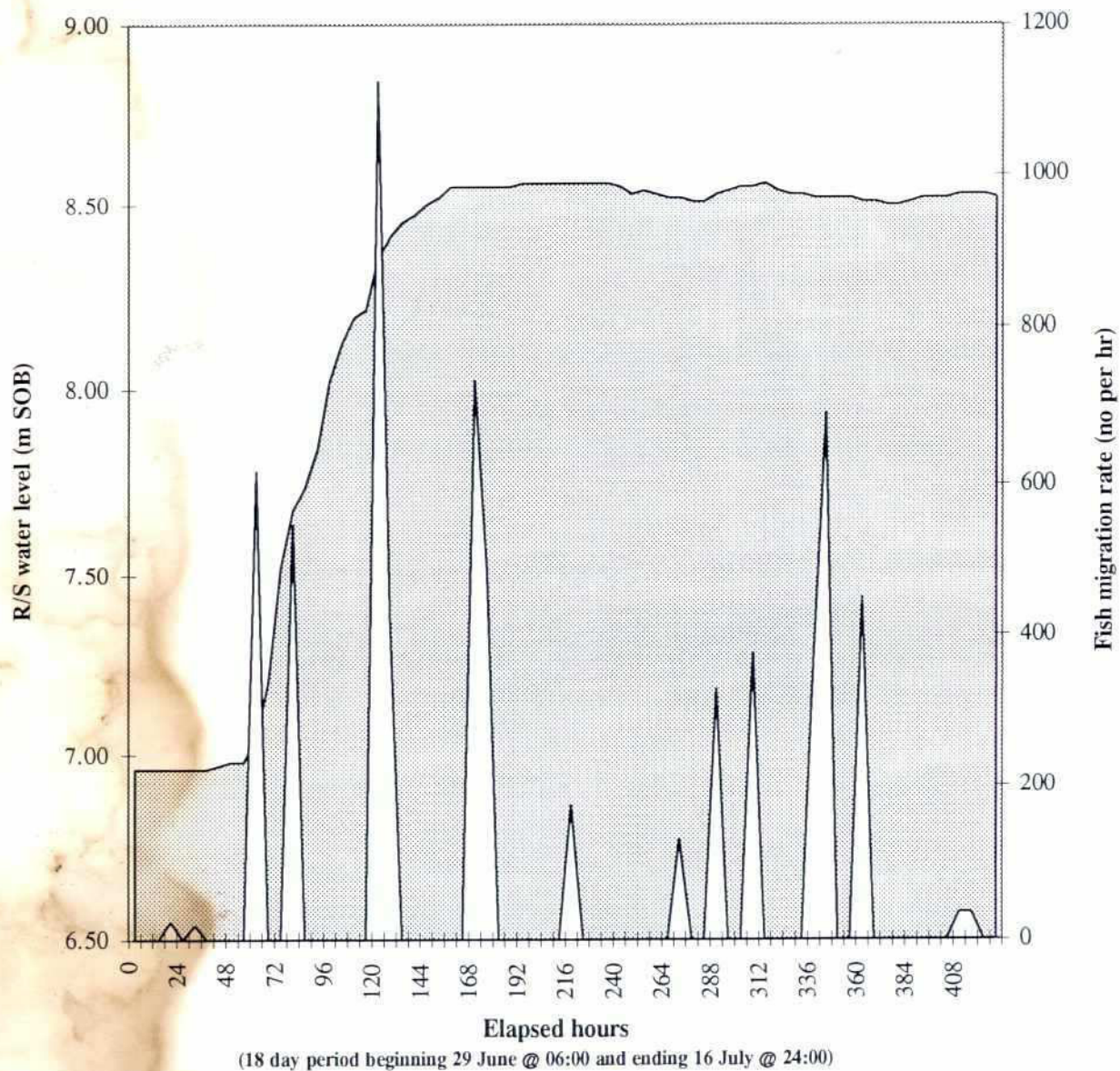
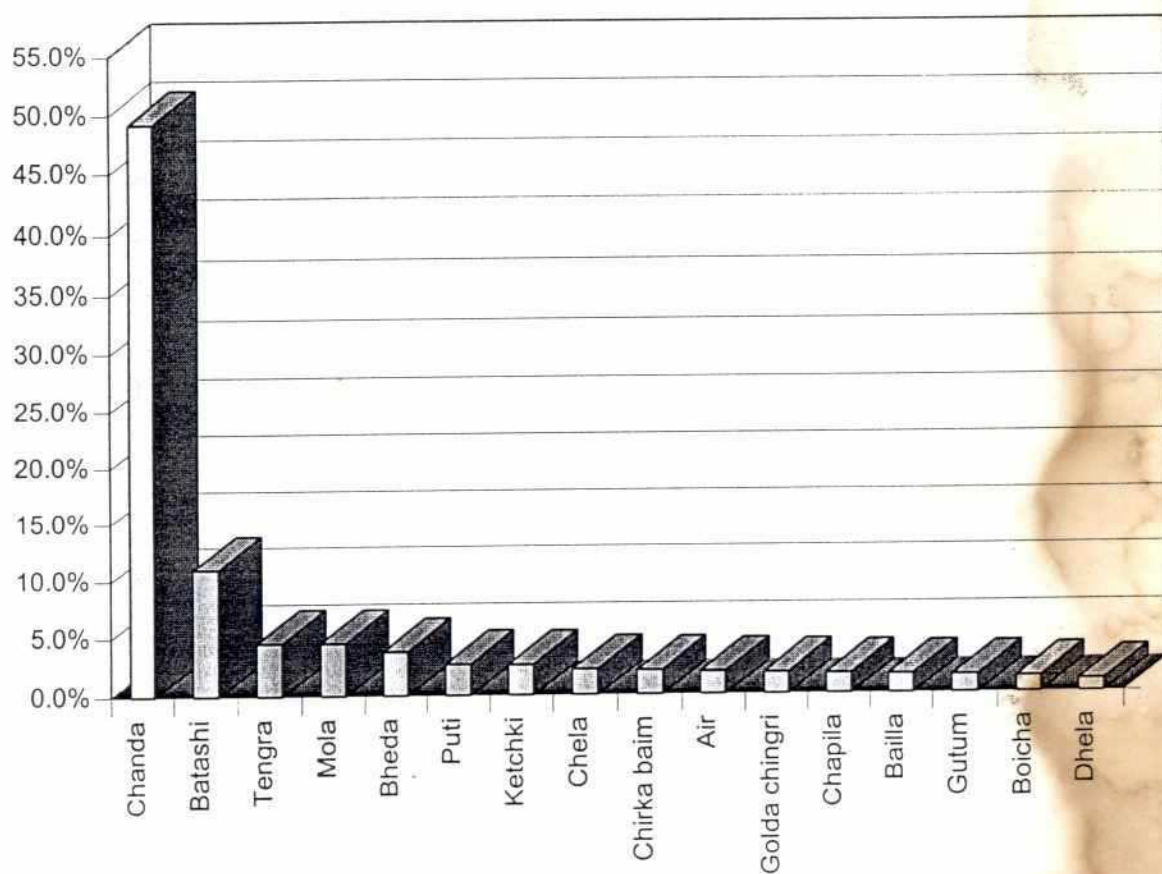


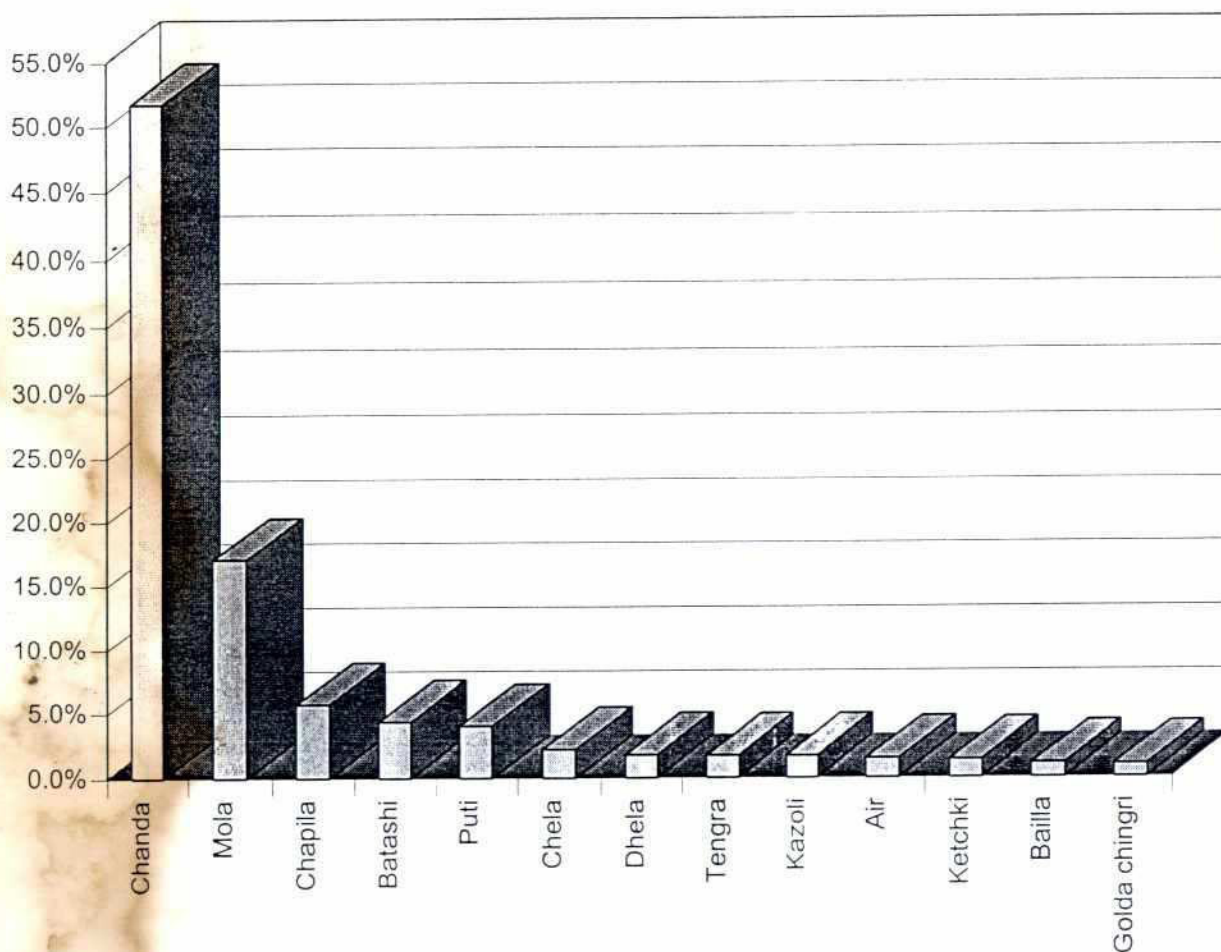
Figure 35

**SPECIES COMPOSITION OF FISH TRAFFICE
DURING MONSOON FLOOD No. 1**
Direction of migration: river to haor
Period: 9 May to 26 May 1996



282
Figure 36

**SPECIES COMPOSITION OF FISH TRAFFIC
DURING MONSOON FLOOD No. 3**
Direction of migration: river to haor
Period: 29 June to 16 July 1996



282

Figure 37

MONSOON FLOOD No. 3
Direction of migration: haor to river

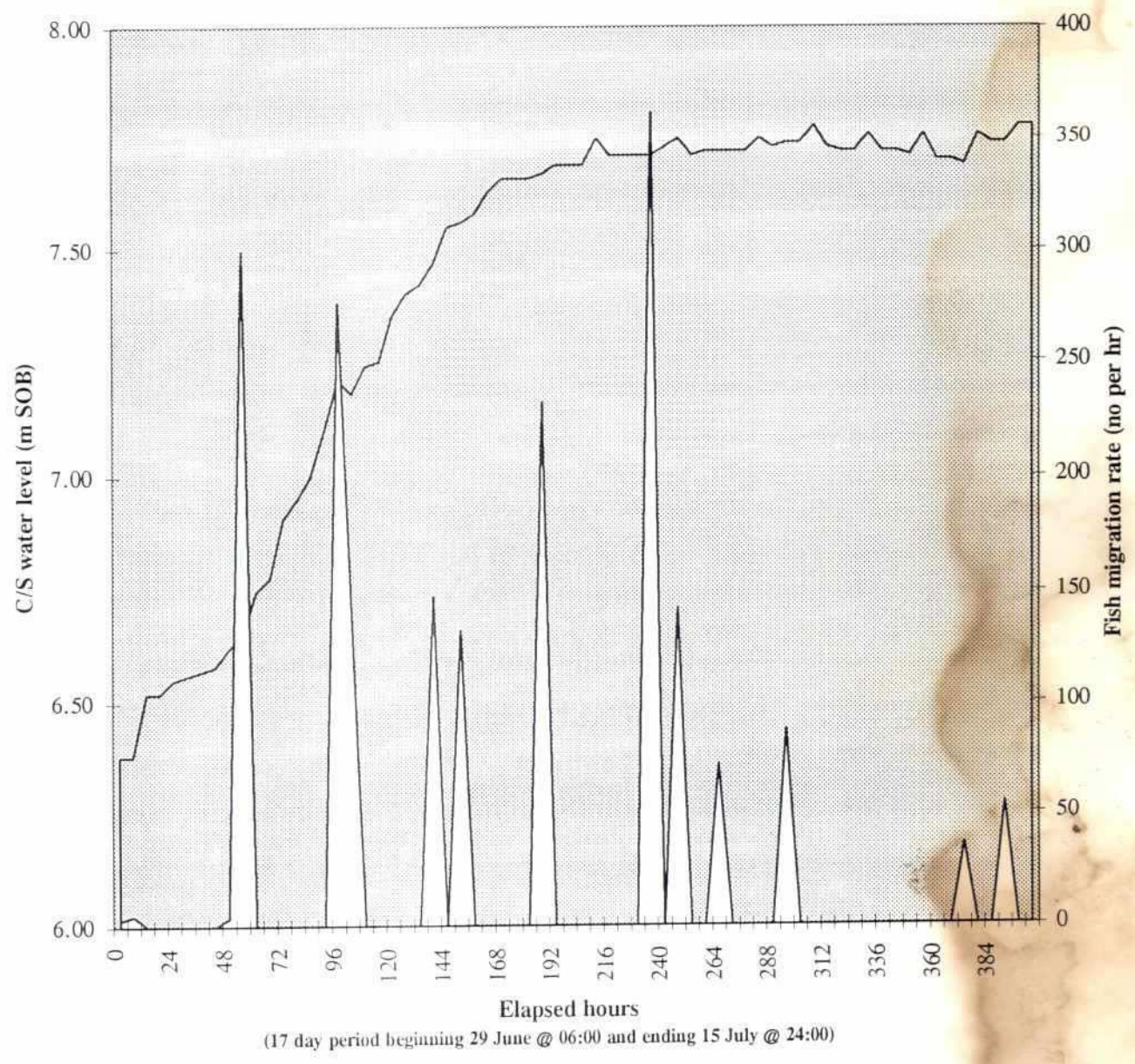


Figure 38

**SPECIES COMPOSITION OF FISH TRAFFIC
DURING MONSOON FLOOD No. 3**
Direction of migration: haor to river
Period: 29 June to 15 July 1996

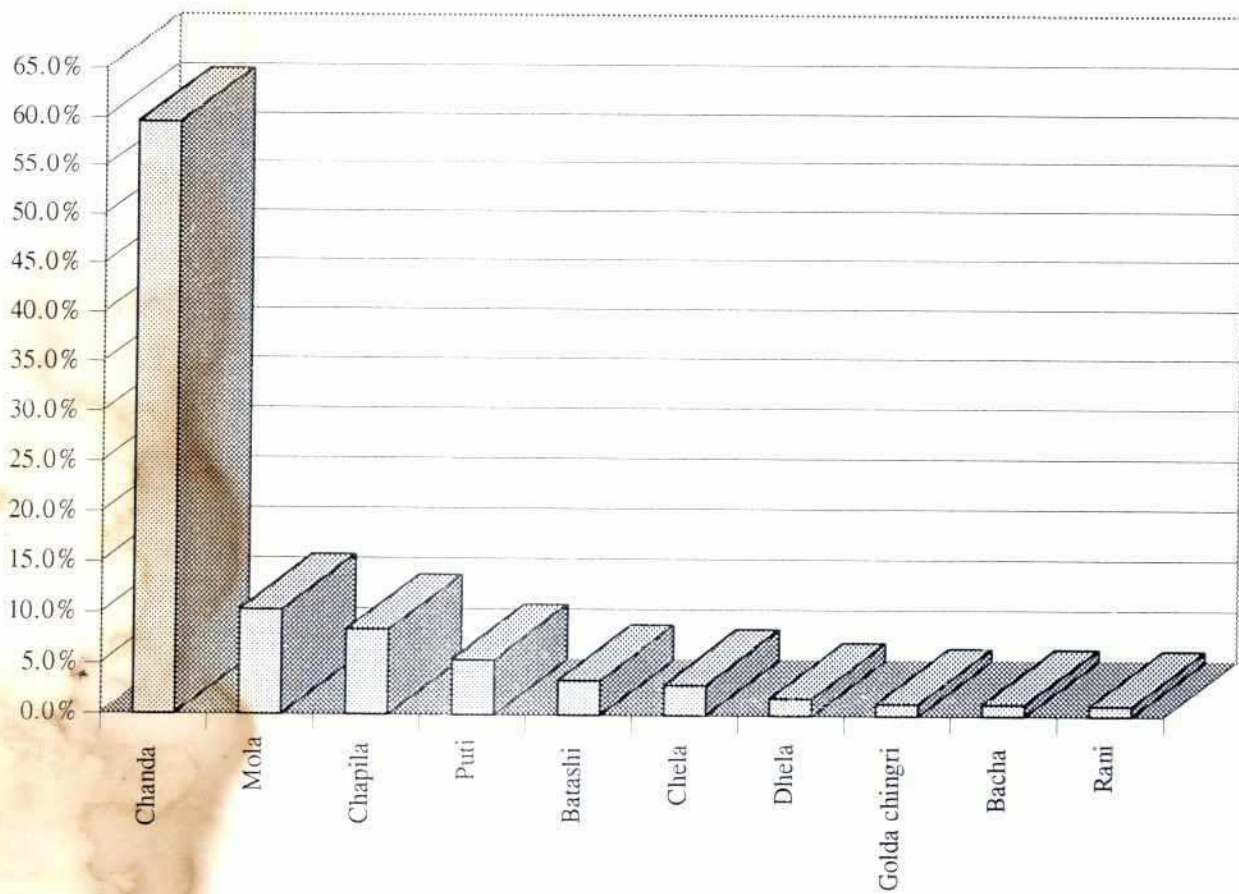
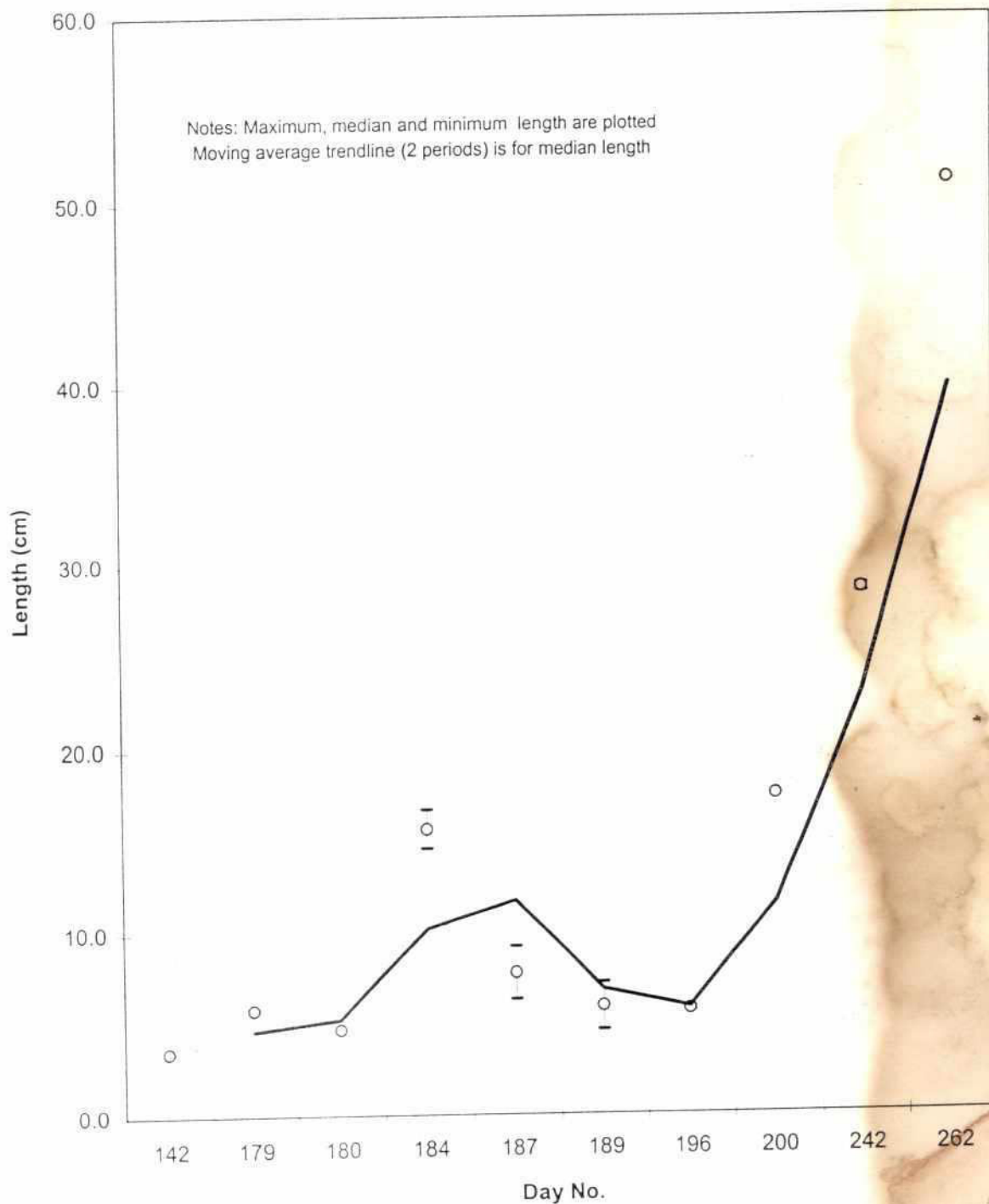


Figure 39

CHANGE IN BODY LENGTH OVER TIME OF FISH SAMPLED IN FISHPASS

RUI - River to Haor Migration

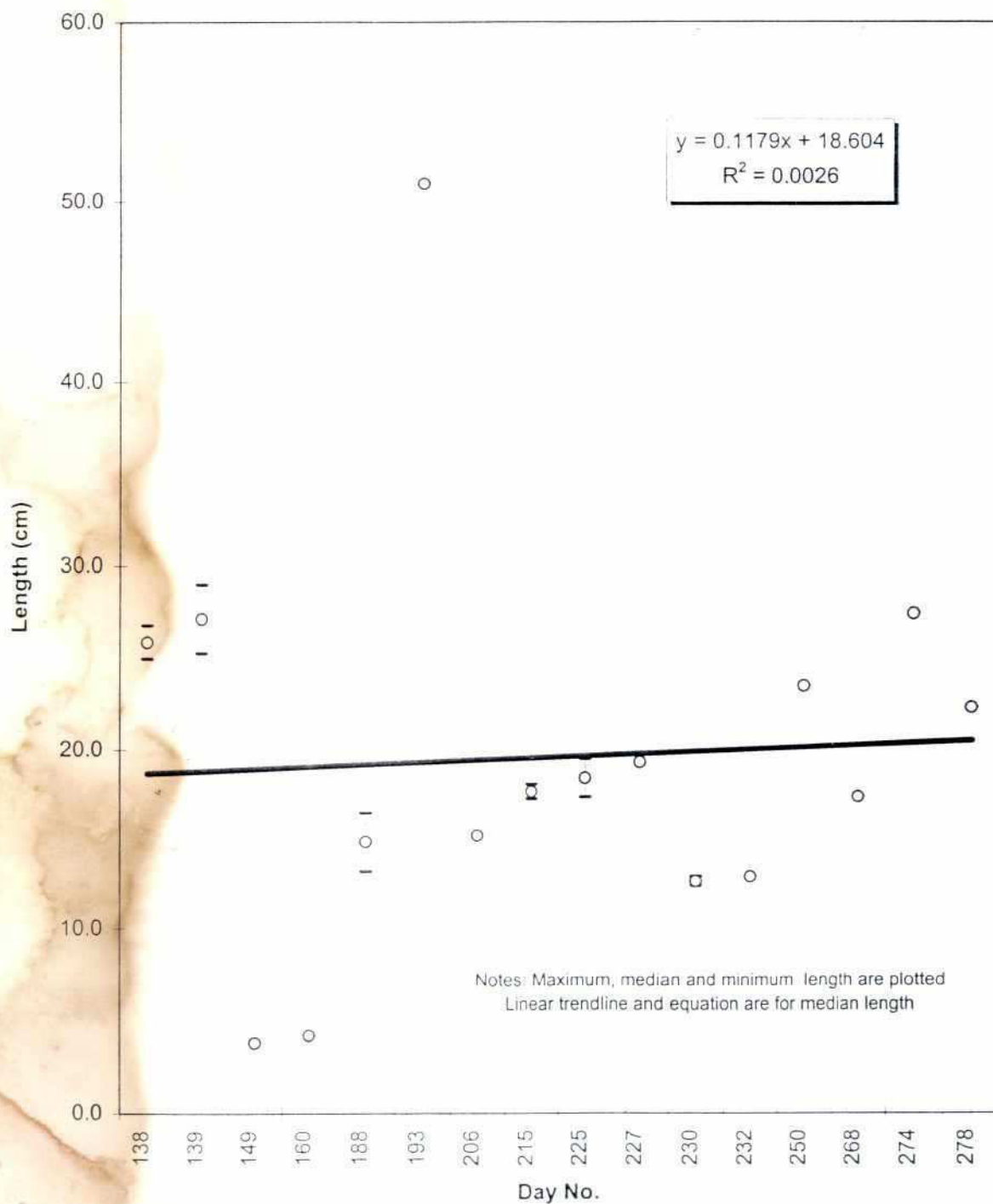


280

Figure 40

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

KALIBAUSH - River to Haor Migration

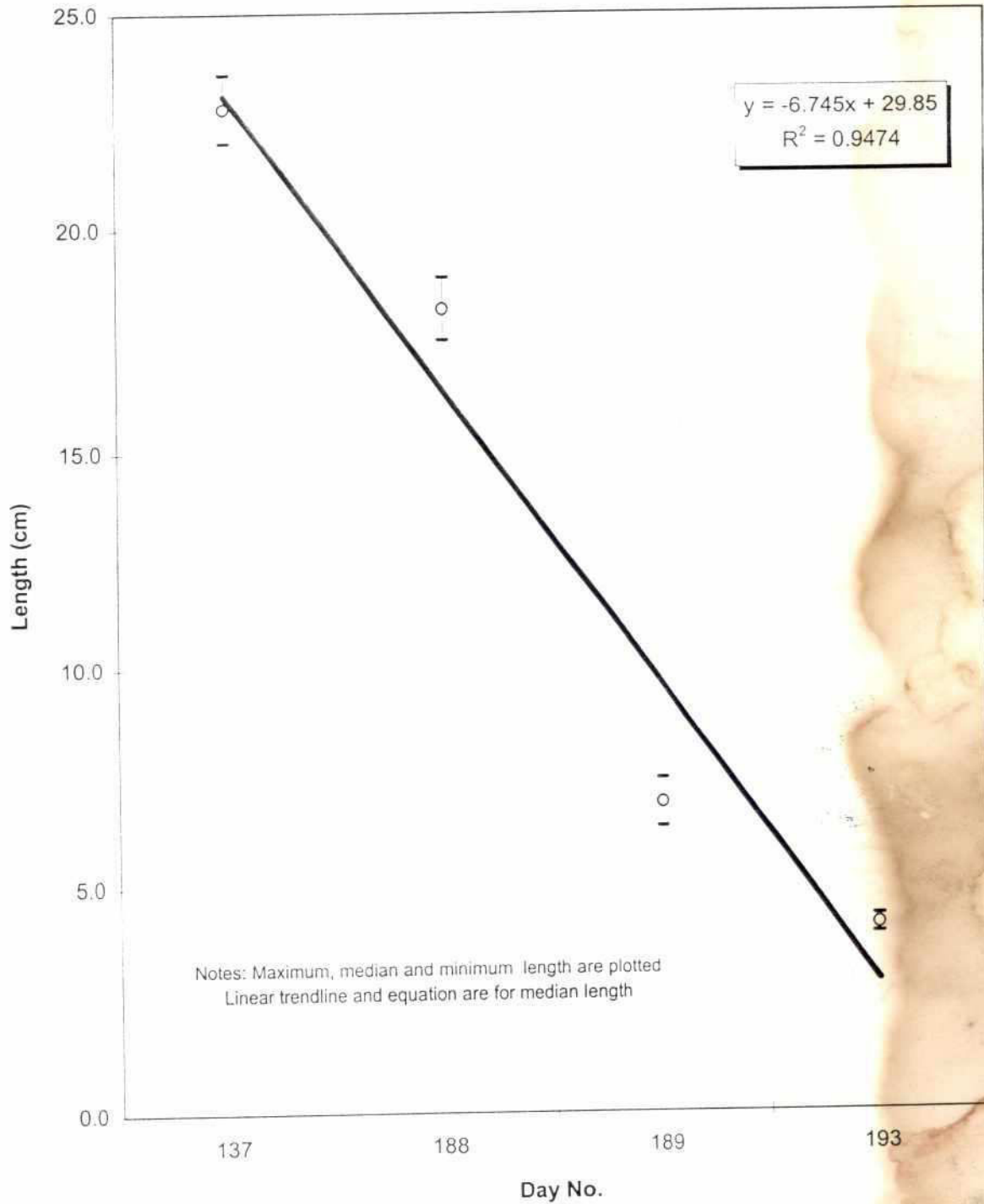


284

Figure 41

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

GONIA - River to Haor Migration

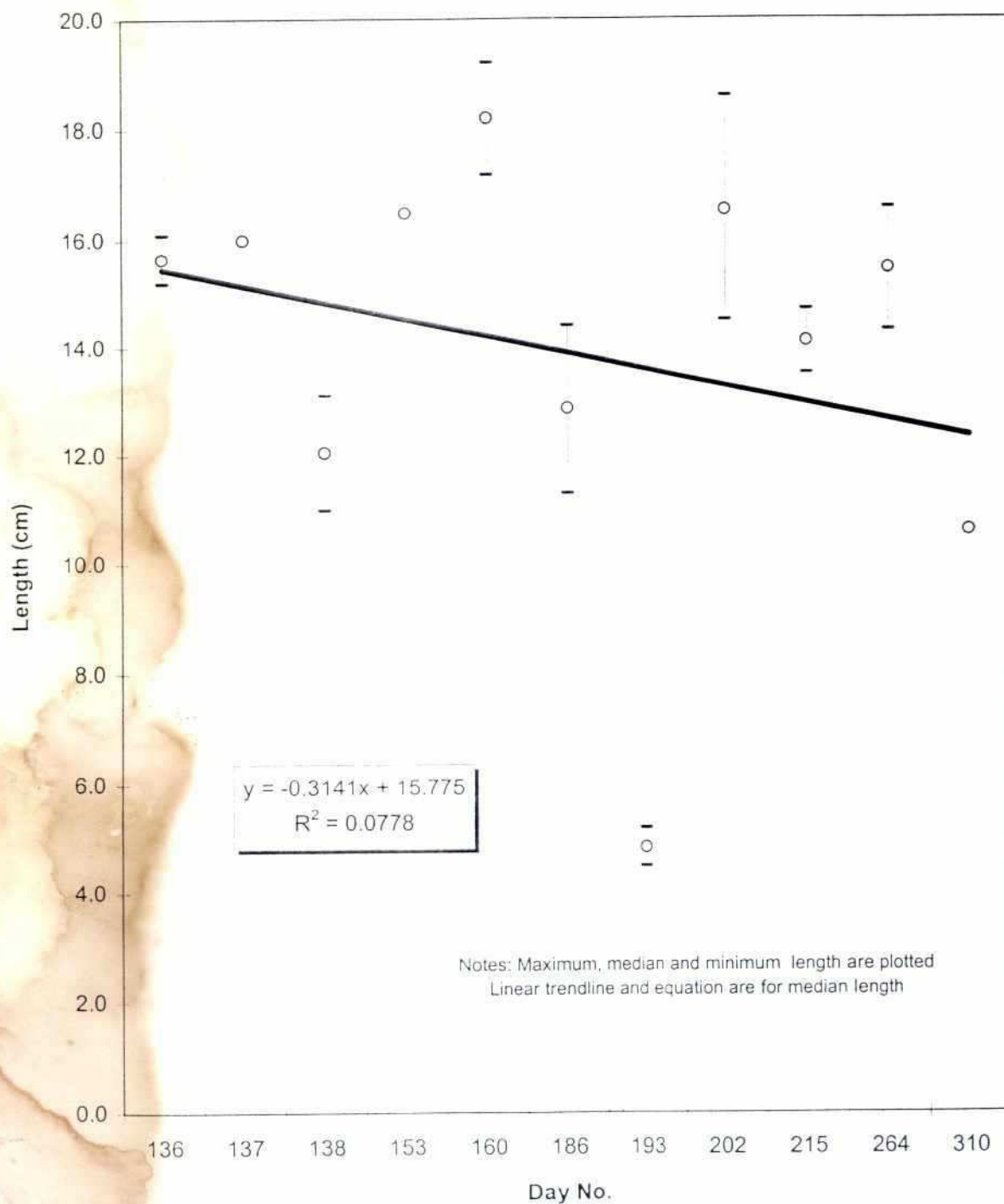


289

Figure 42

CHANGE IN BODY LENGTH OVER TIME OF FISH SAMPLED IN FISHPASS

LACHU - River to Haor Migration

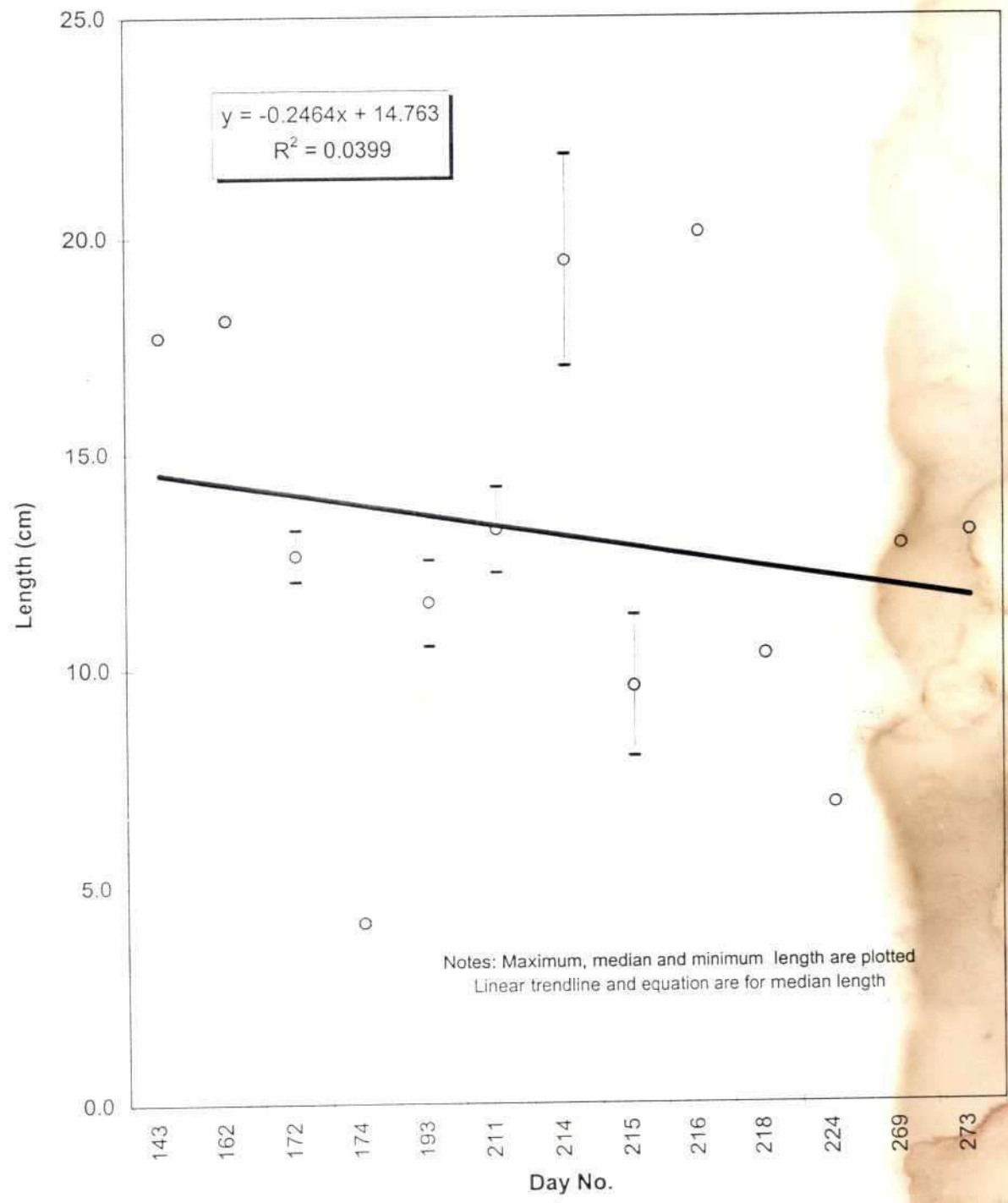


287

Figure 43

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

LACHU - Haor to River Migration

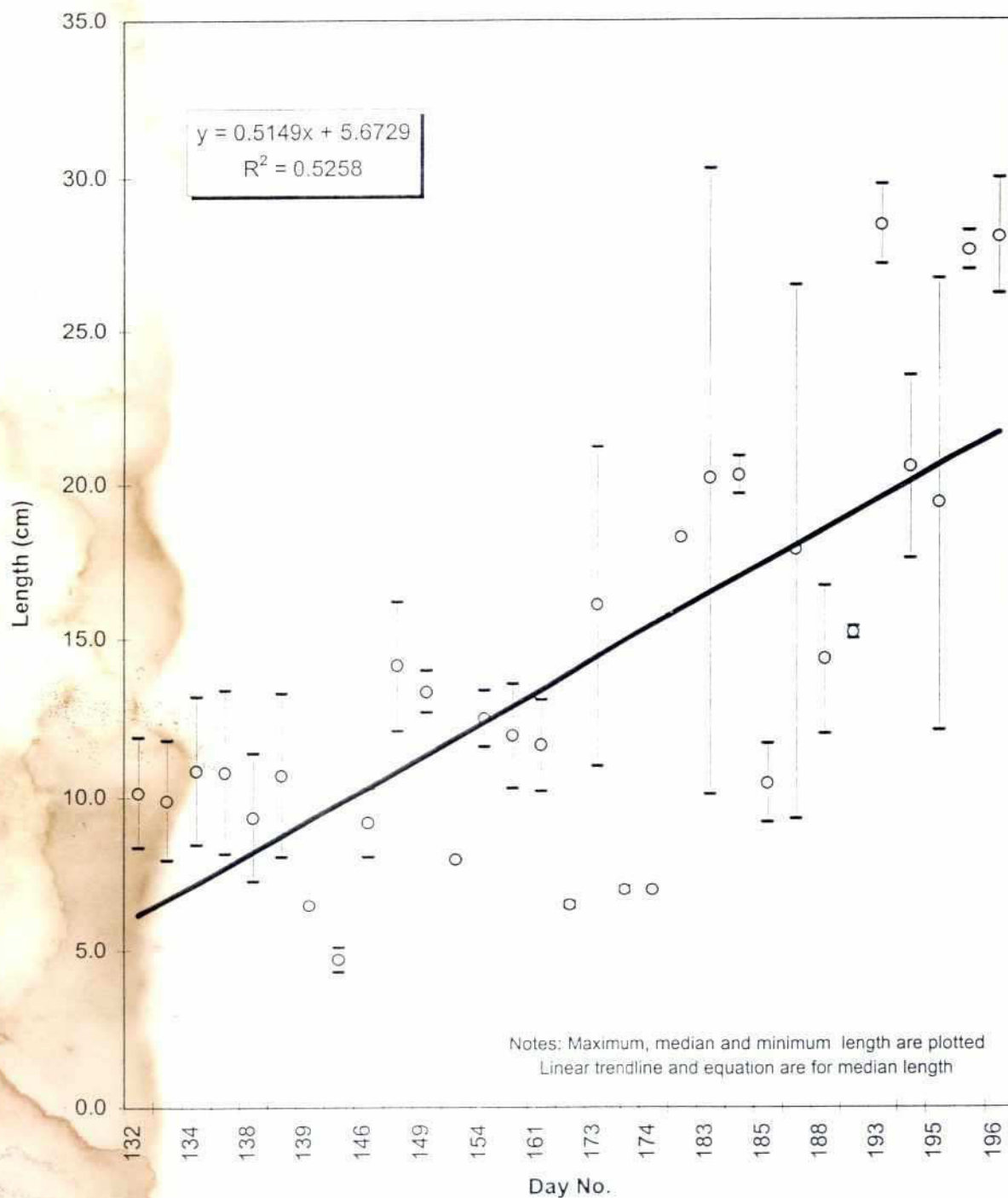


182

Figure 44

CHANGE IN BODY LENGTH OVER TIME OF FISH SAMPLED IN FISHPASS

AIR - River to Haor Migration

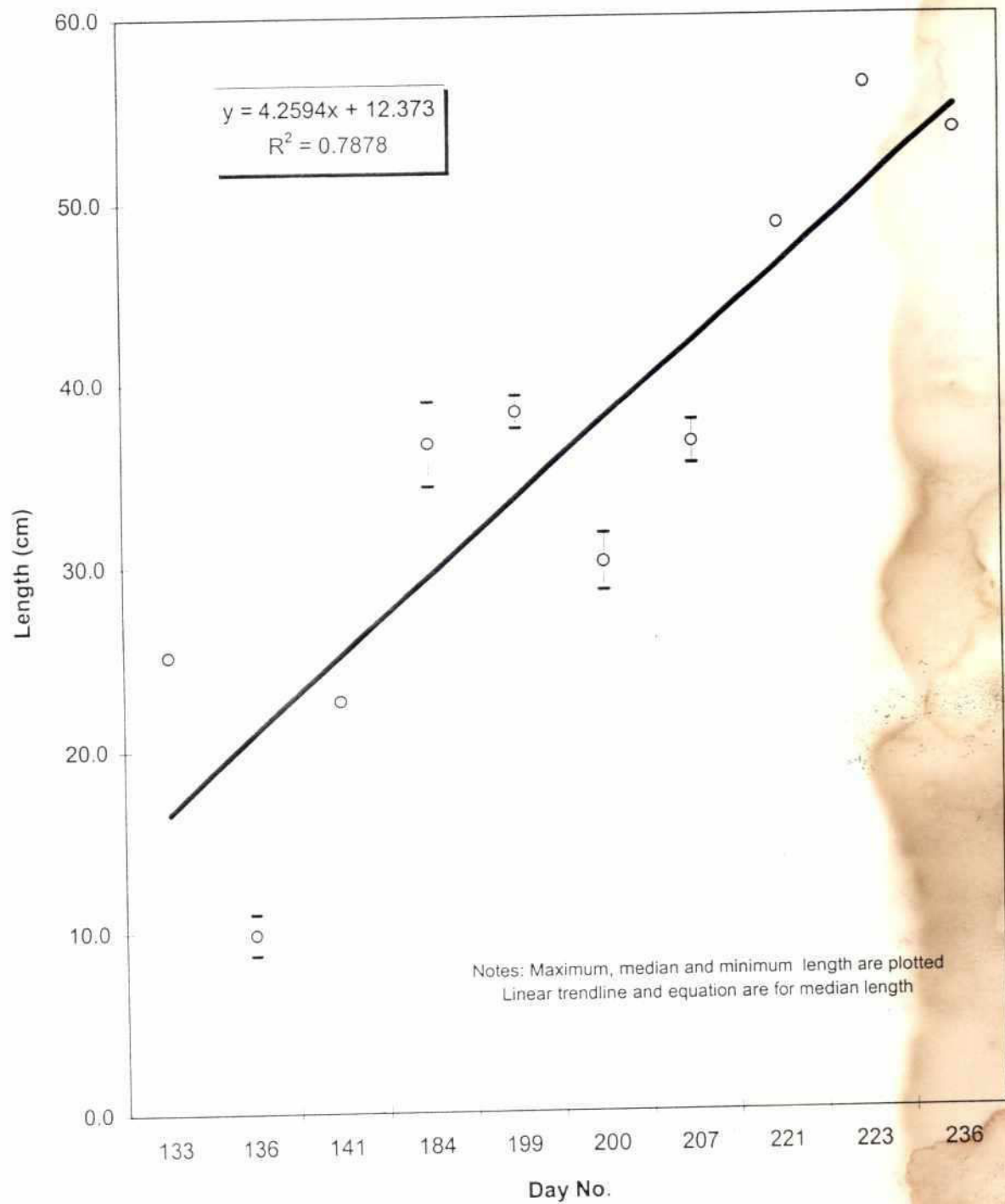


200

Figure 45

CHANGE IN BODY LENGTH OVER TIME OF FISH SAMPLED IN FISHPASS

BOAL - River to Haor Migration

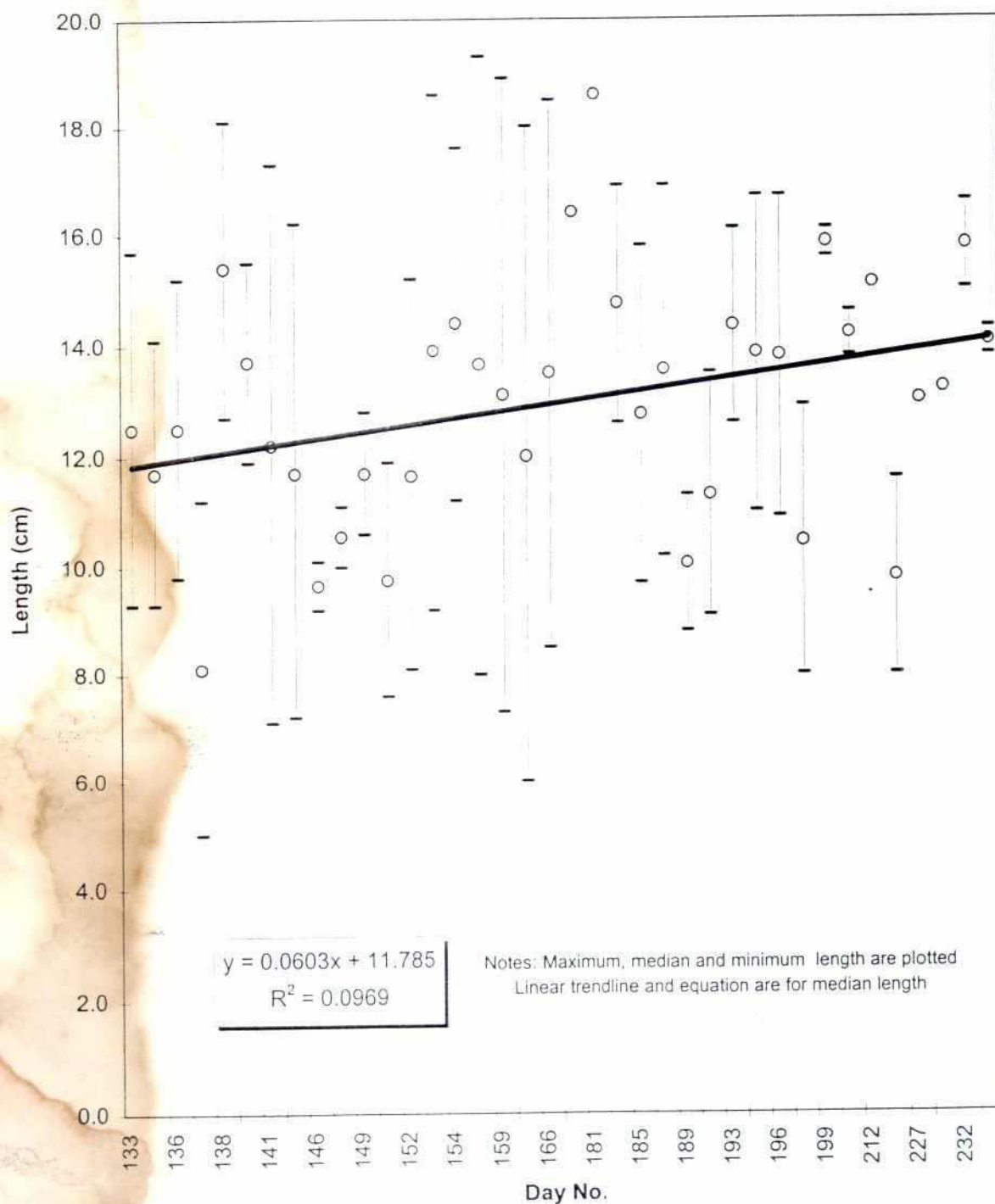


242

Figure 46

CHANGE IN BODY LENGTH OVER TIME OF FISH SAMPLED IN FISHPASS

GOLDA CHINGRI - River to Haor Migration

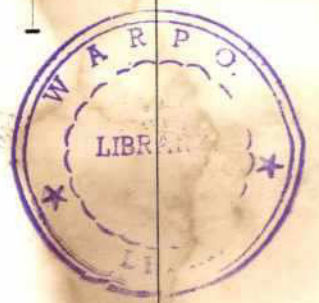
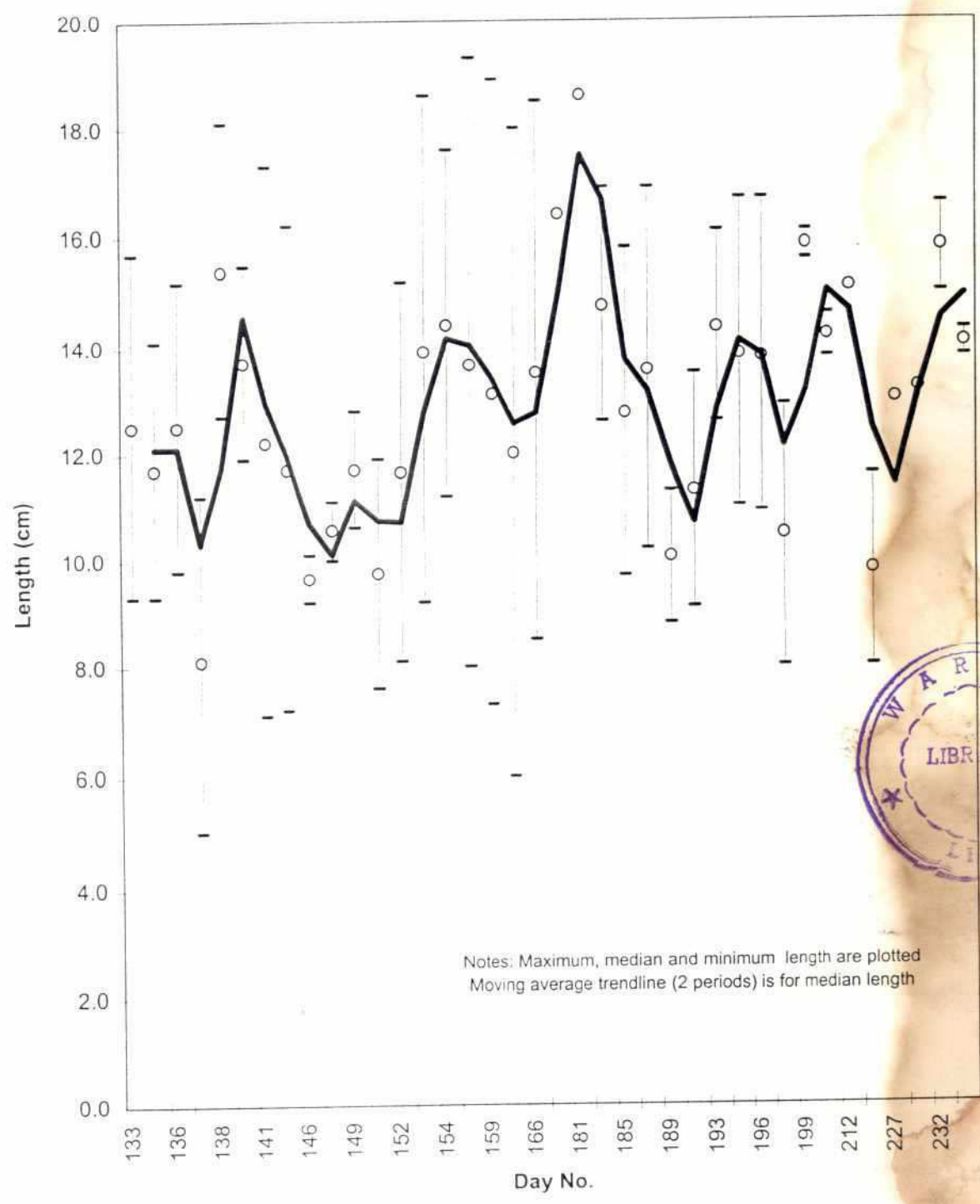


252

Figure 47

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

GOLDA CHINGRI - River to Haor Migration

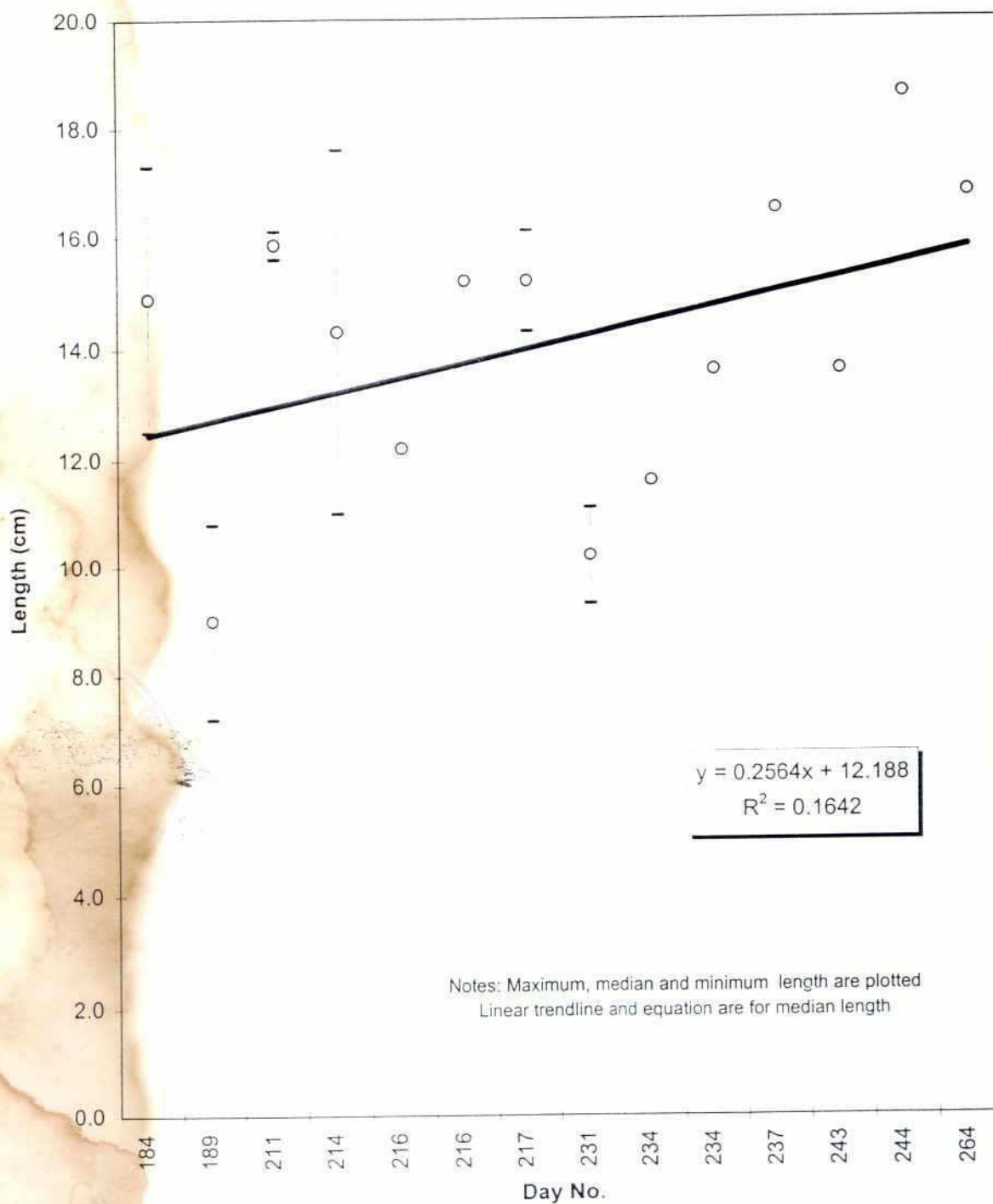


246

Figure 48

CHANGE IN BODY LENGTH OVER TIME OF FISH SAMPLED IN FISHPASS

GOLDA CHINGRI - Haor to River Migration

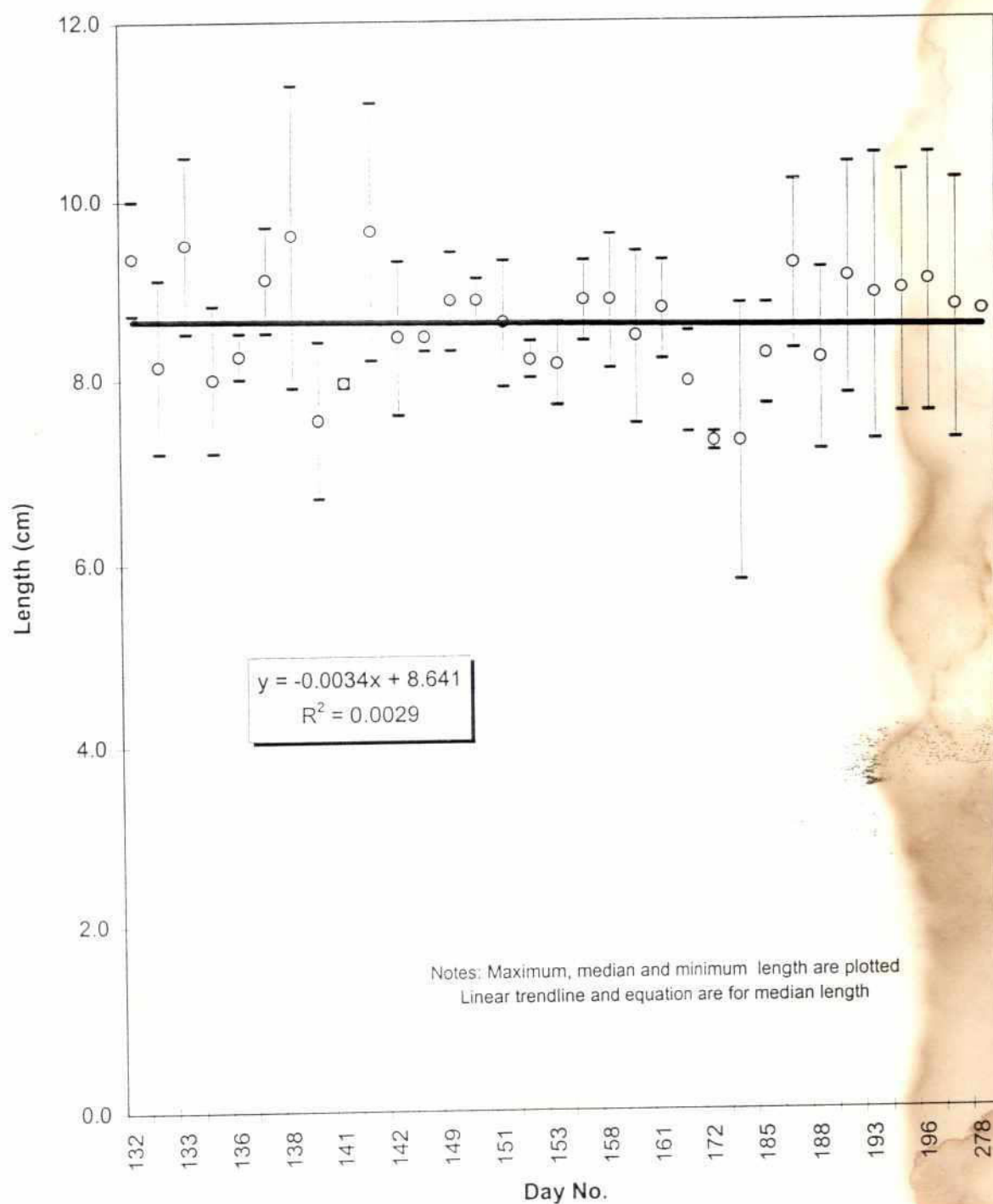


208

Figure 49

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

BATASHI - River to Haor Migration

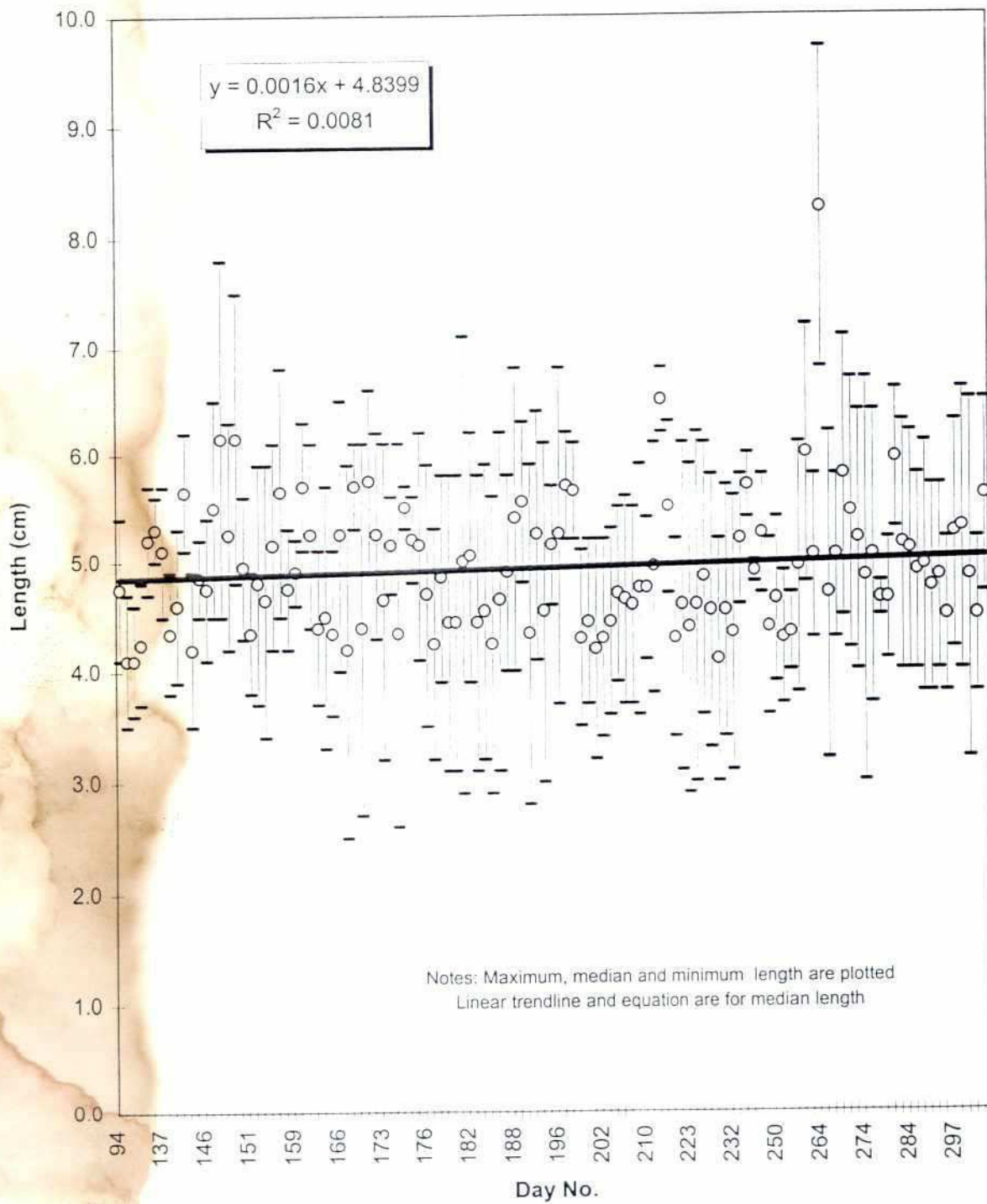


200

Figure 50

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

CHANDA - River to Haor Migration

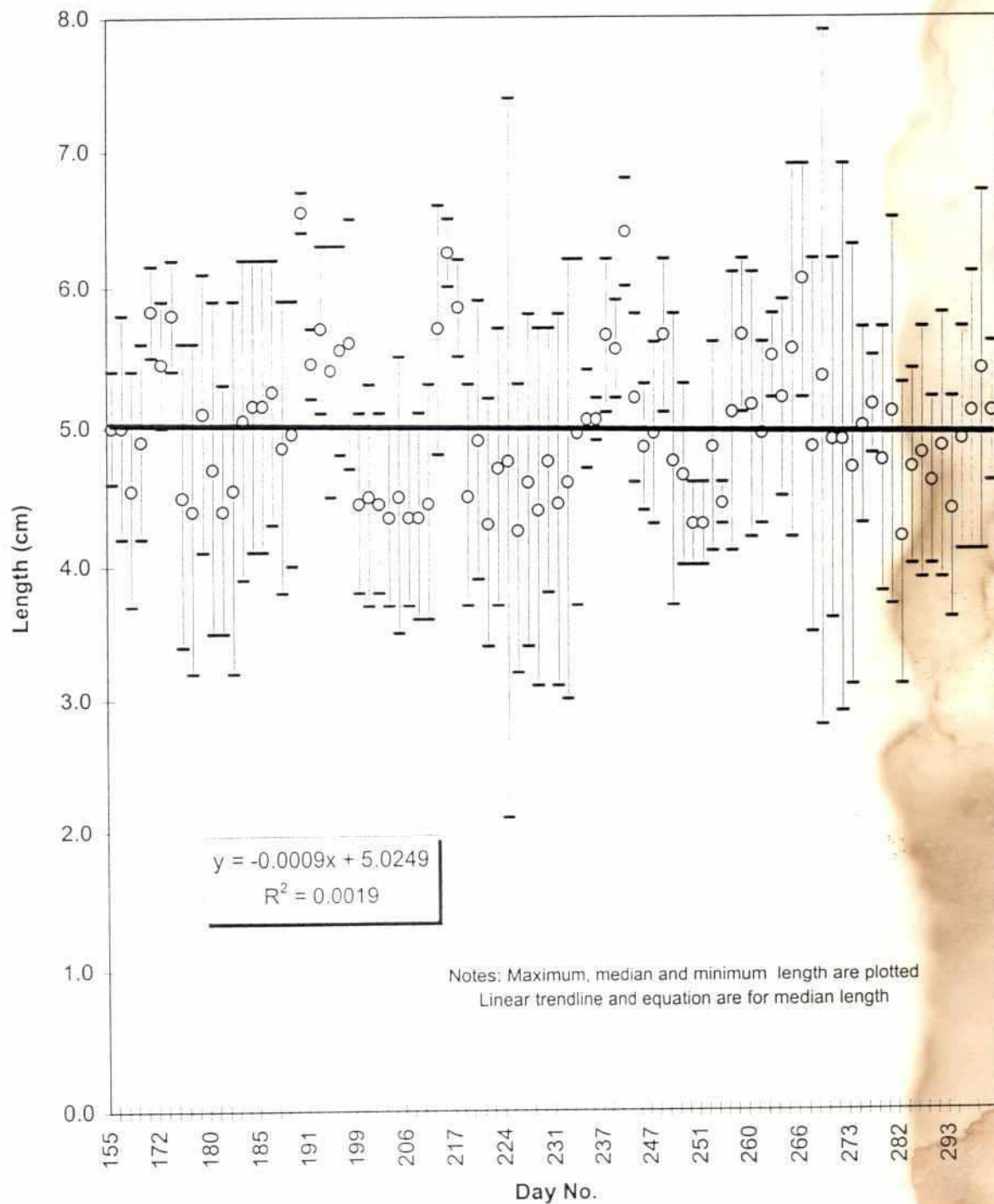


240

Figure 51

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

CHANDA - Haor to River Migration



209
Figure 52

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

CHAPILA - River to Haor Migration

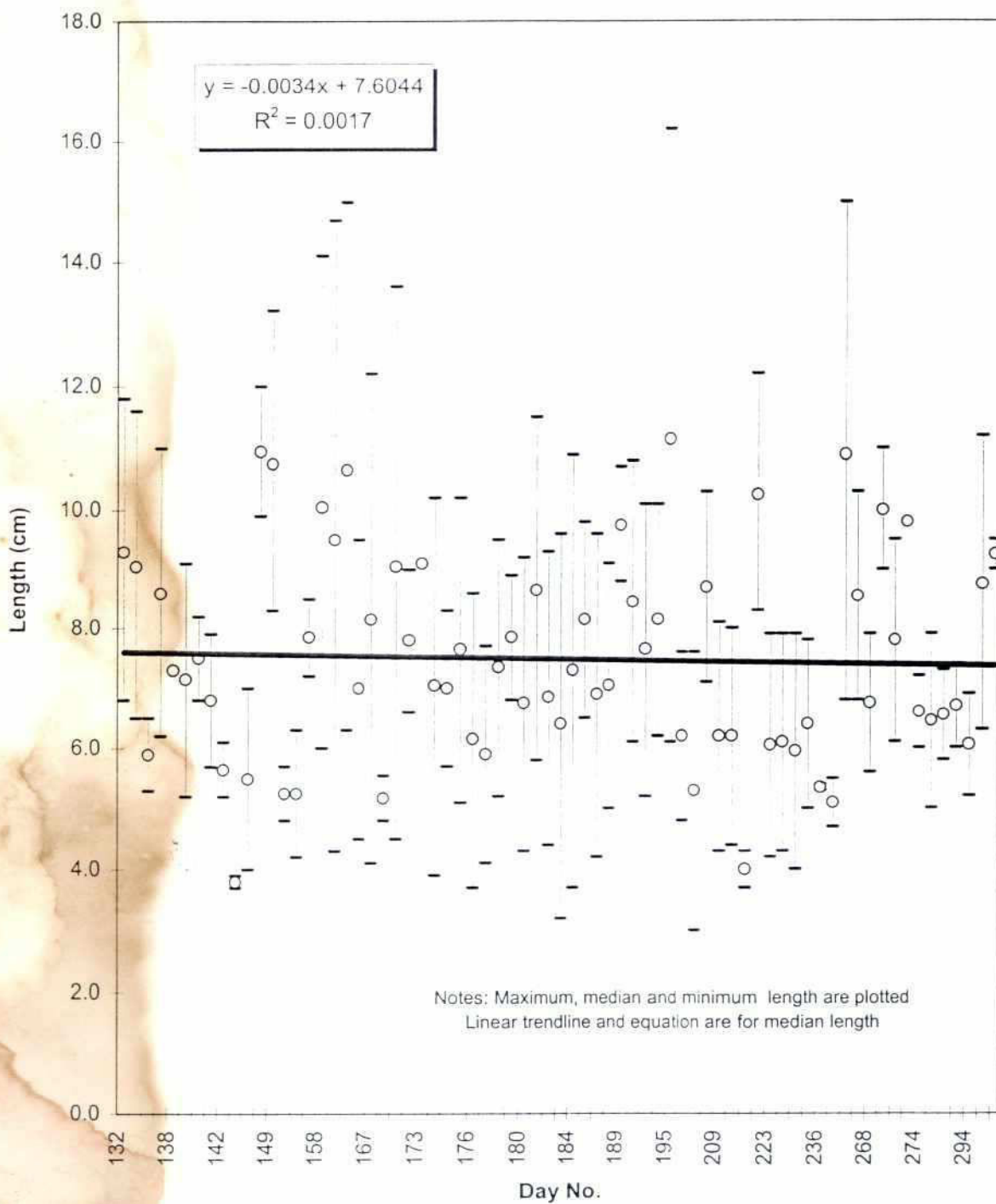


Figure 53

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

CHAPILA - Haor to River Migration

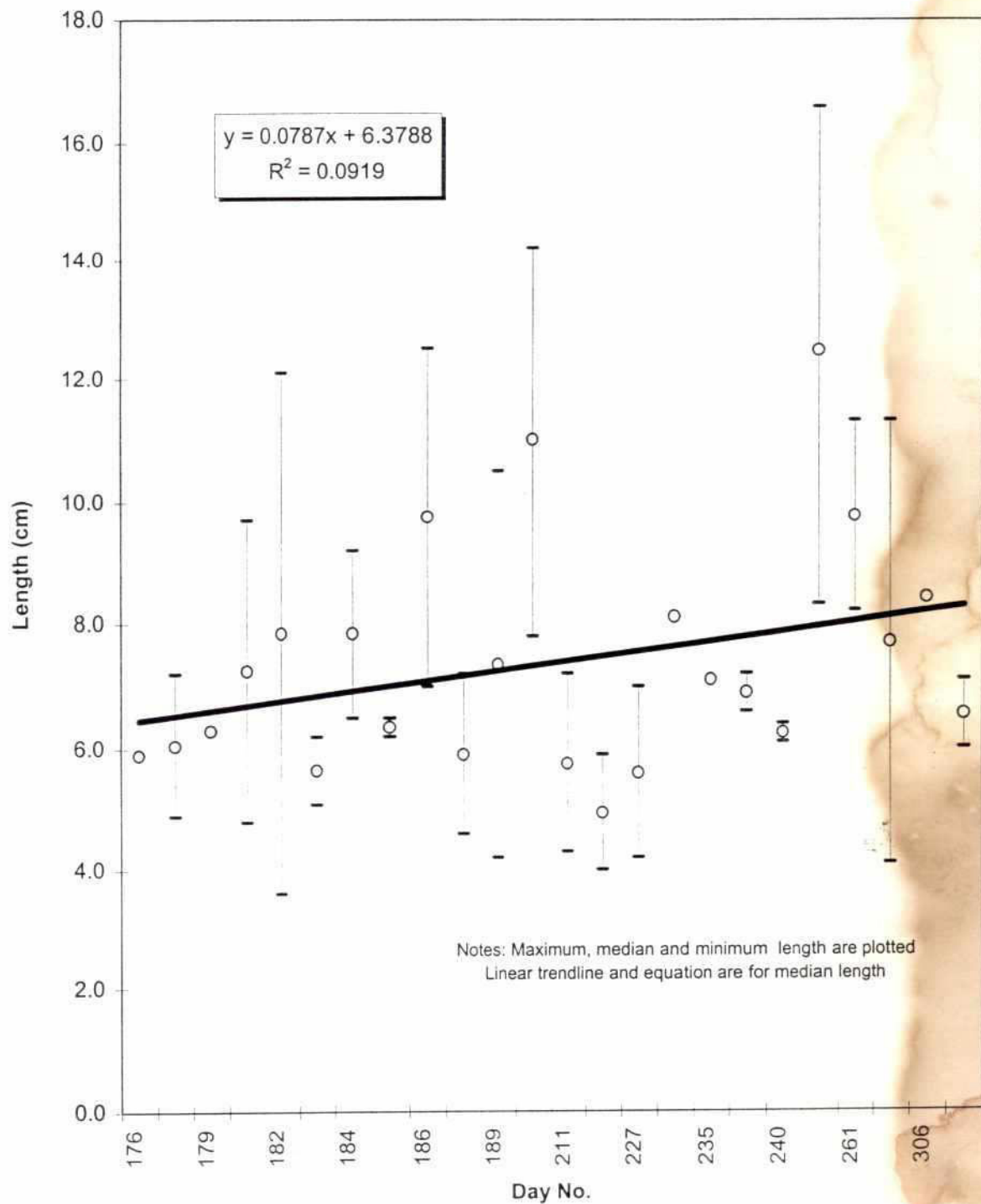
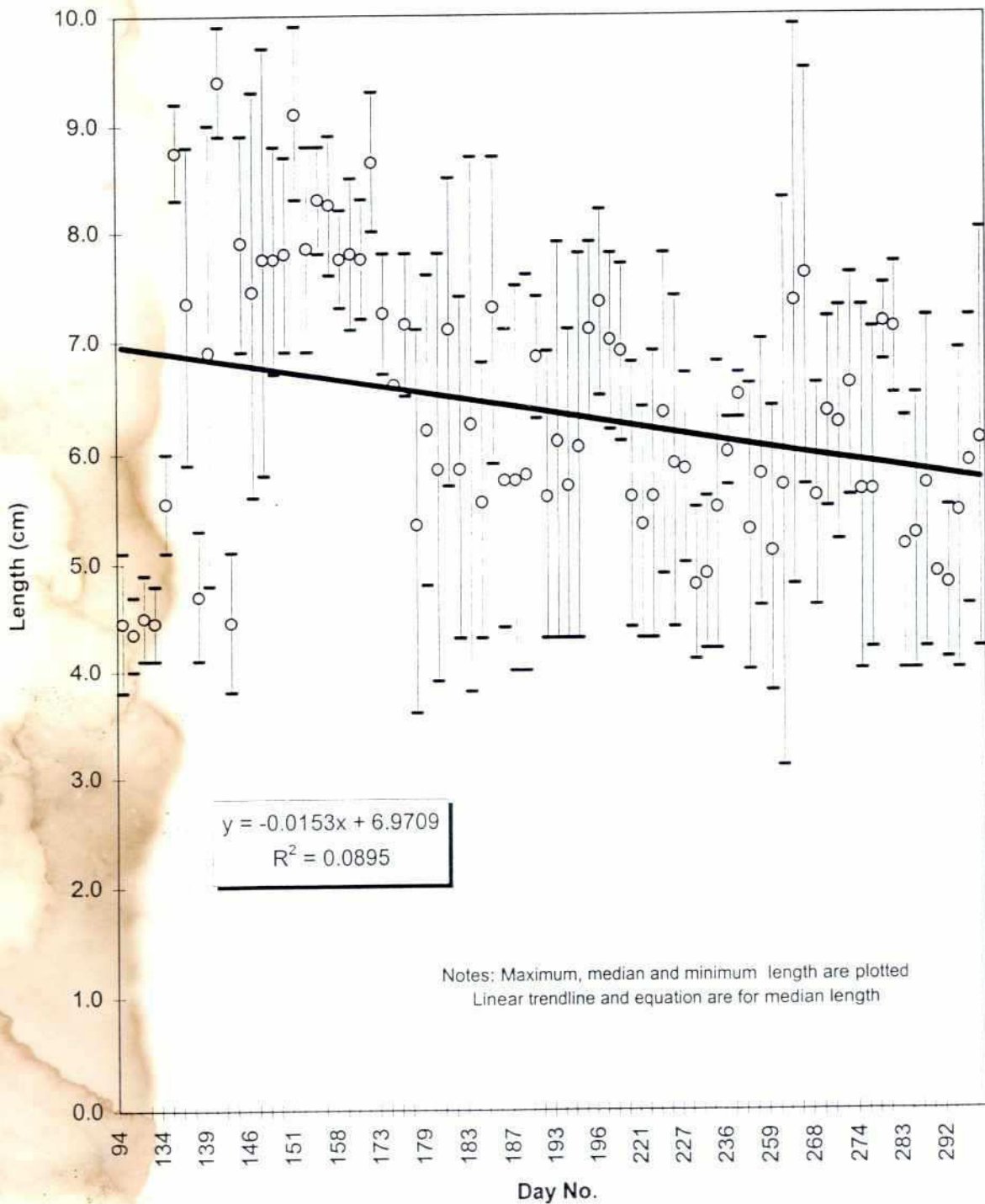


Figure 54

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

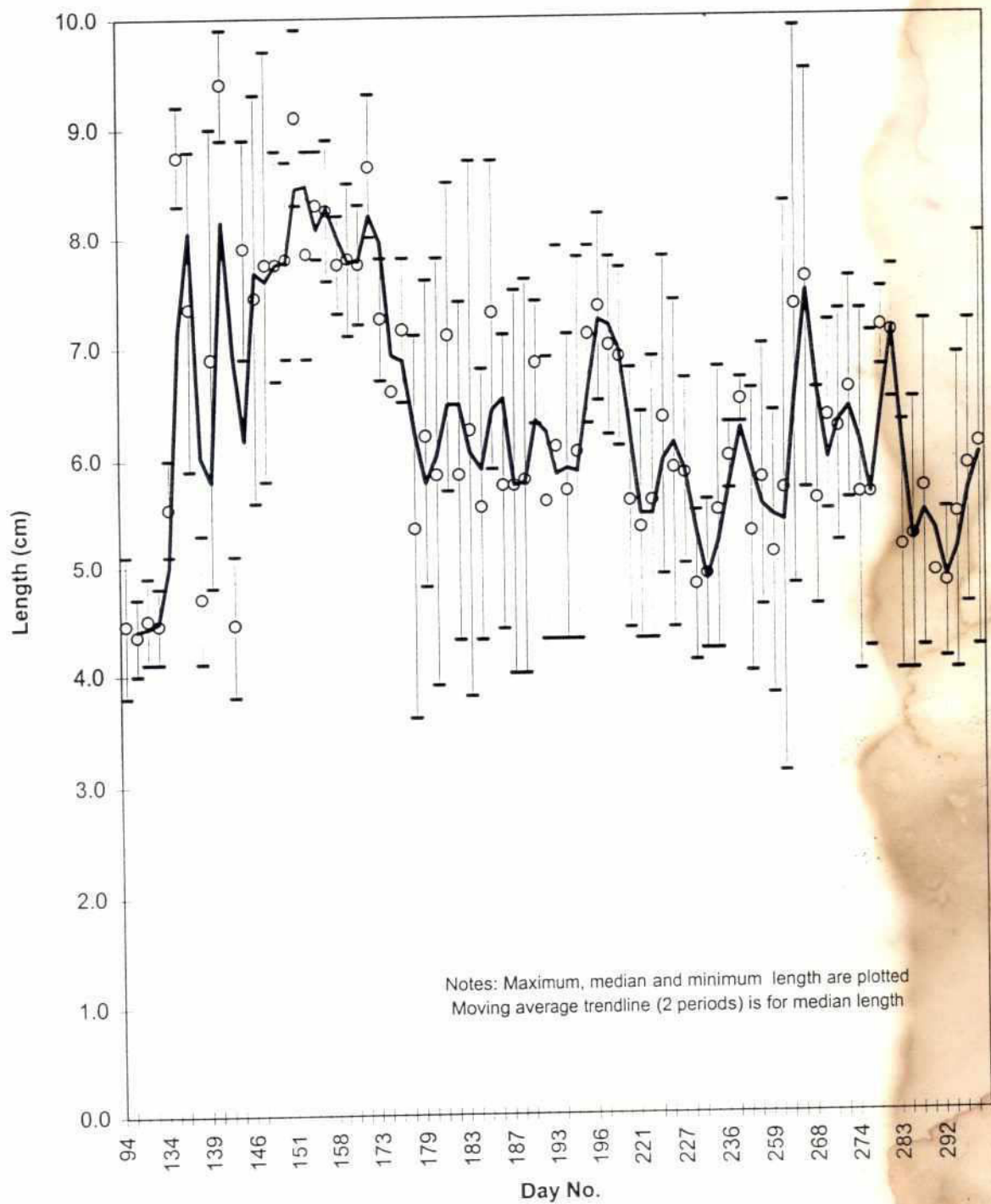
MOLA - River to Haor Migration



238
Figure 55

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

MOLA - River to Haor Migration

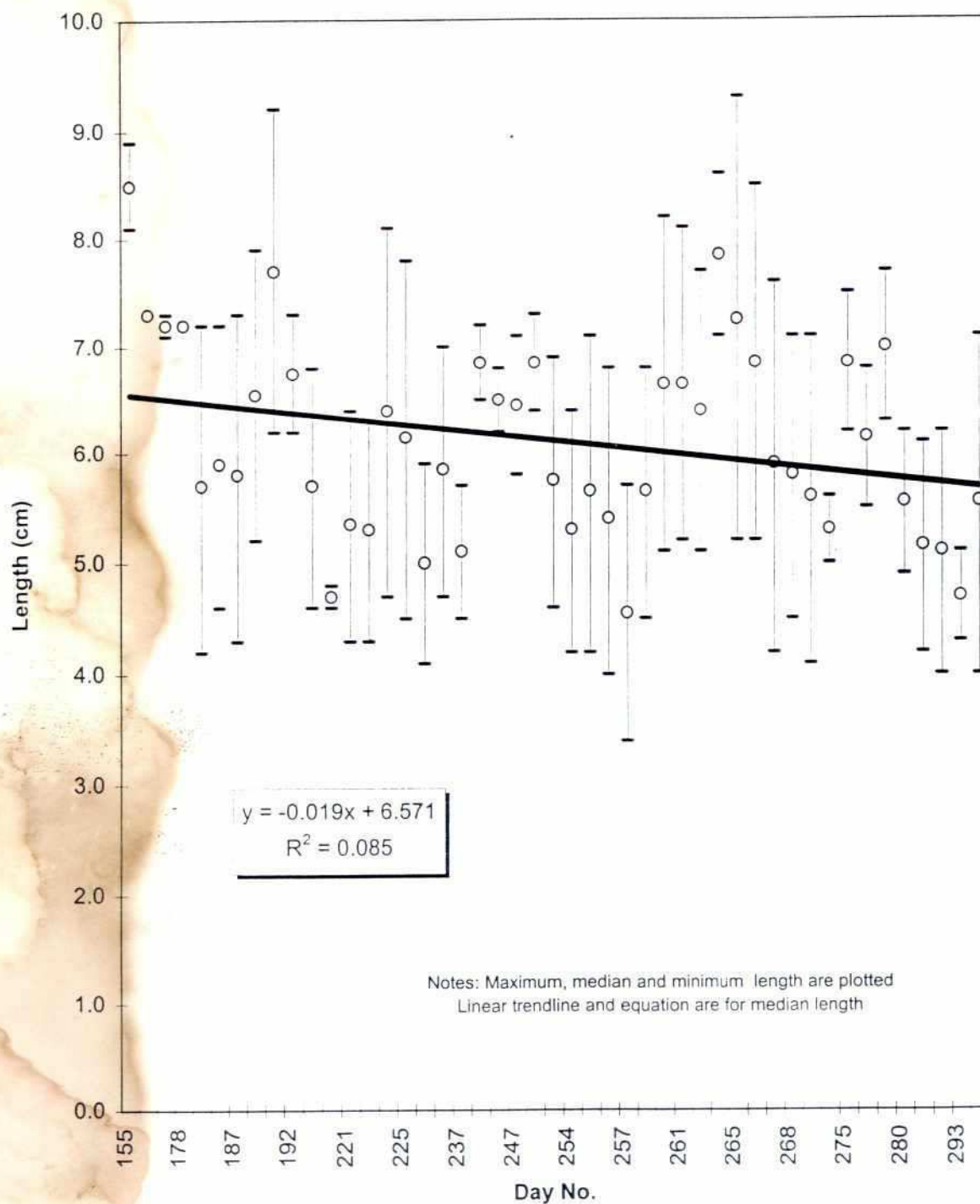


222

Figure 56

CHANGE IN BODY LENGTH OVER TIME OF FISH SAMPLED IN FISHPASS

MOLA - Haor to River Migration

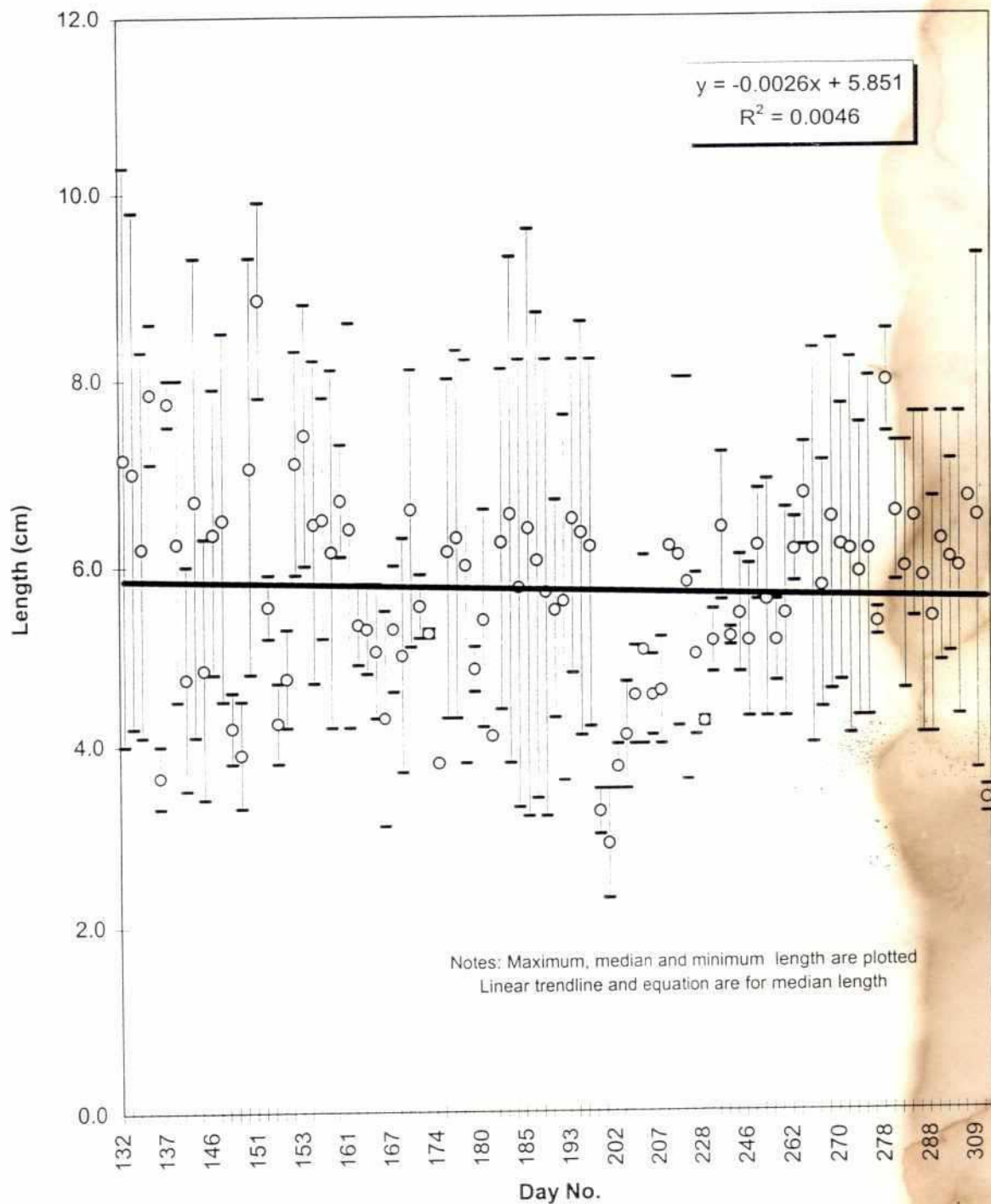


২৫২

Figure 57

CHANGE IN BODY LENGTH OVER TIME OF FISH SAMPLED IN FISHPASS

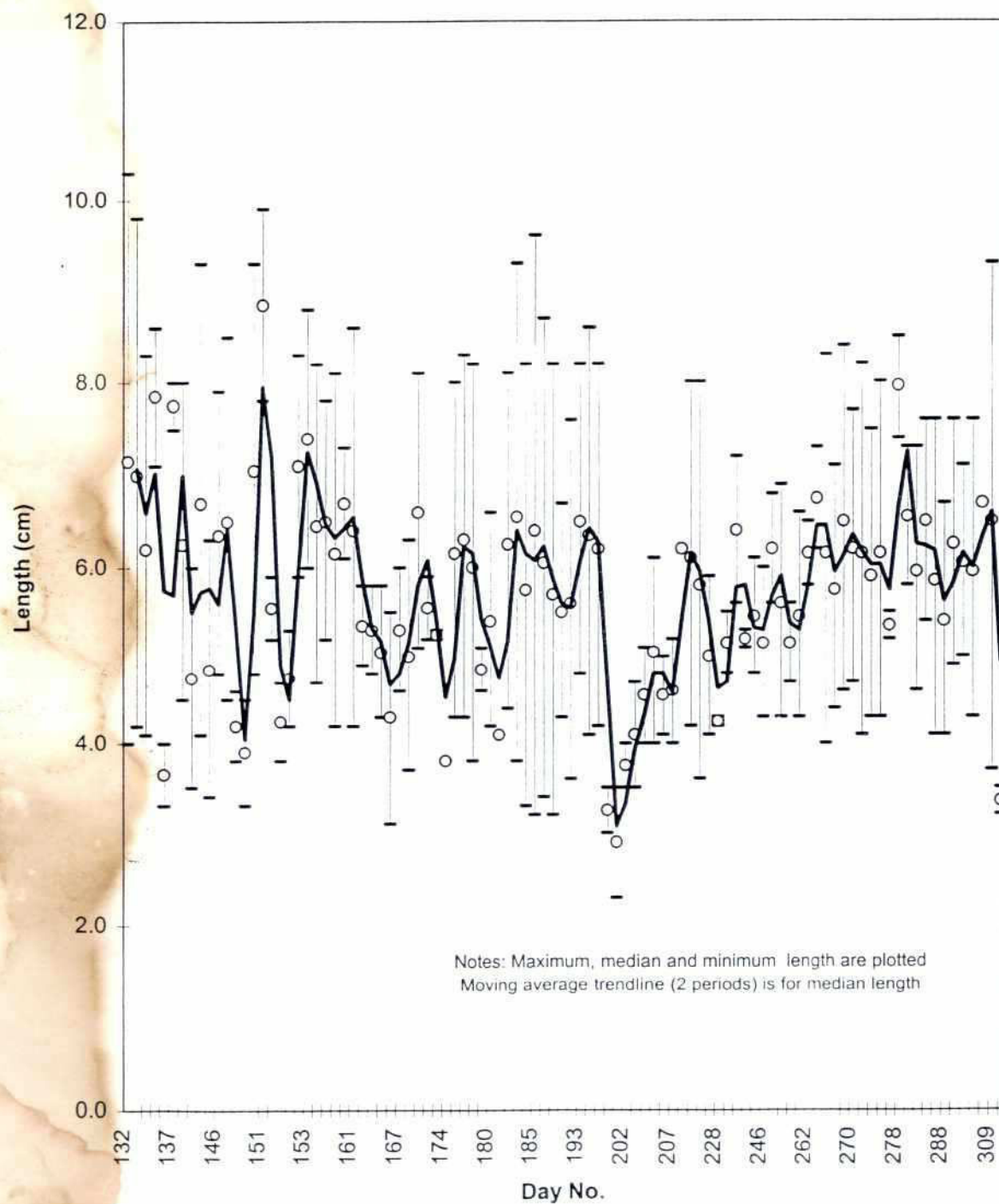
PUTI - River to Haor Migration



230
Figure 58

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

PUTI - River to Haor Migration

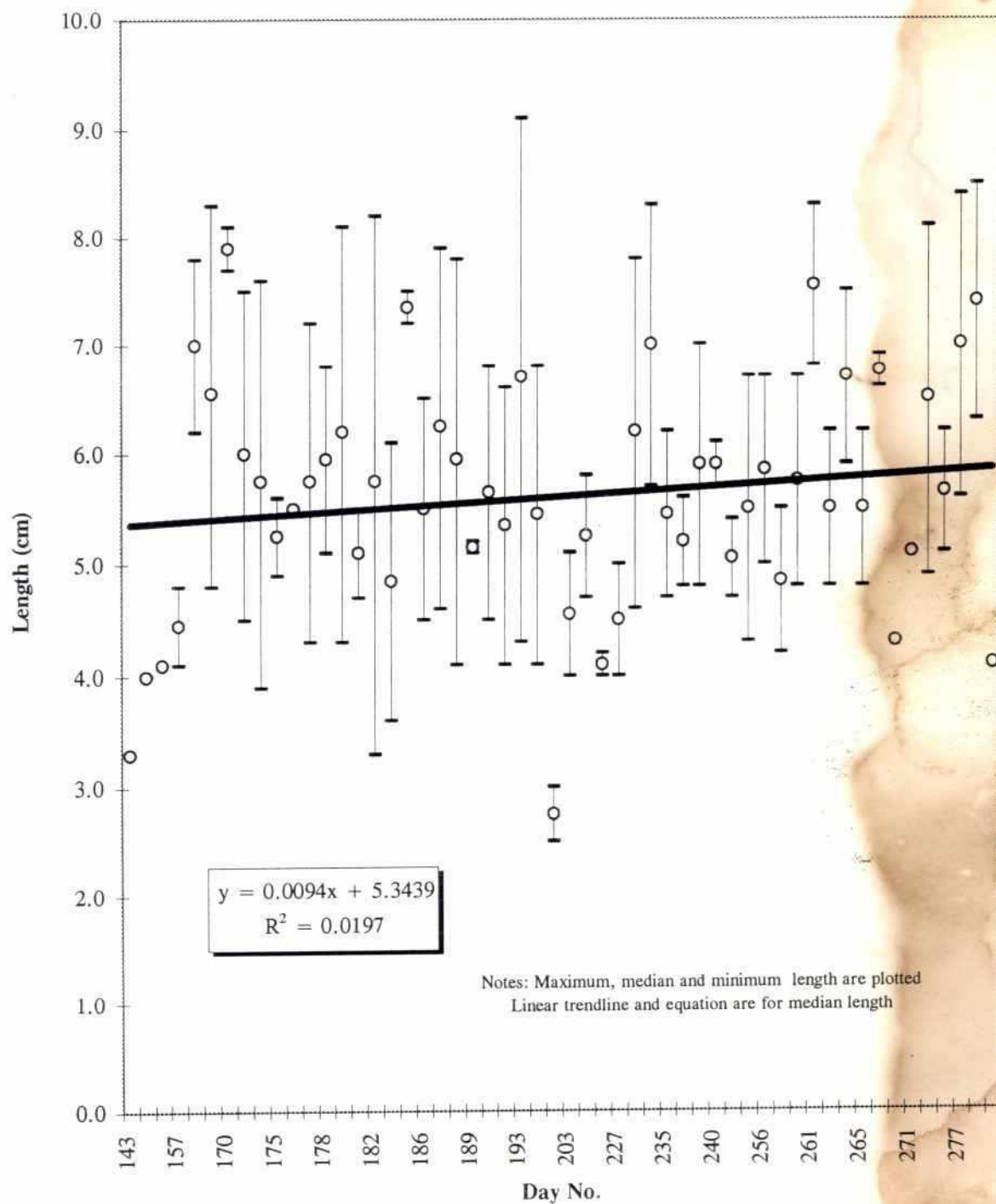


238

Figure 59

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

PUTI - Haor to River Migration

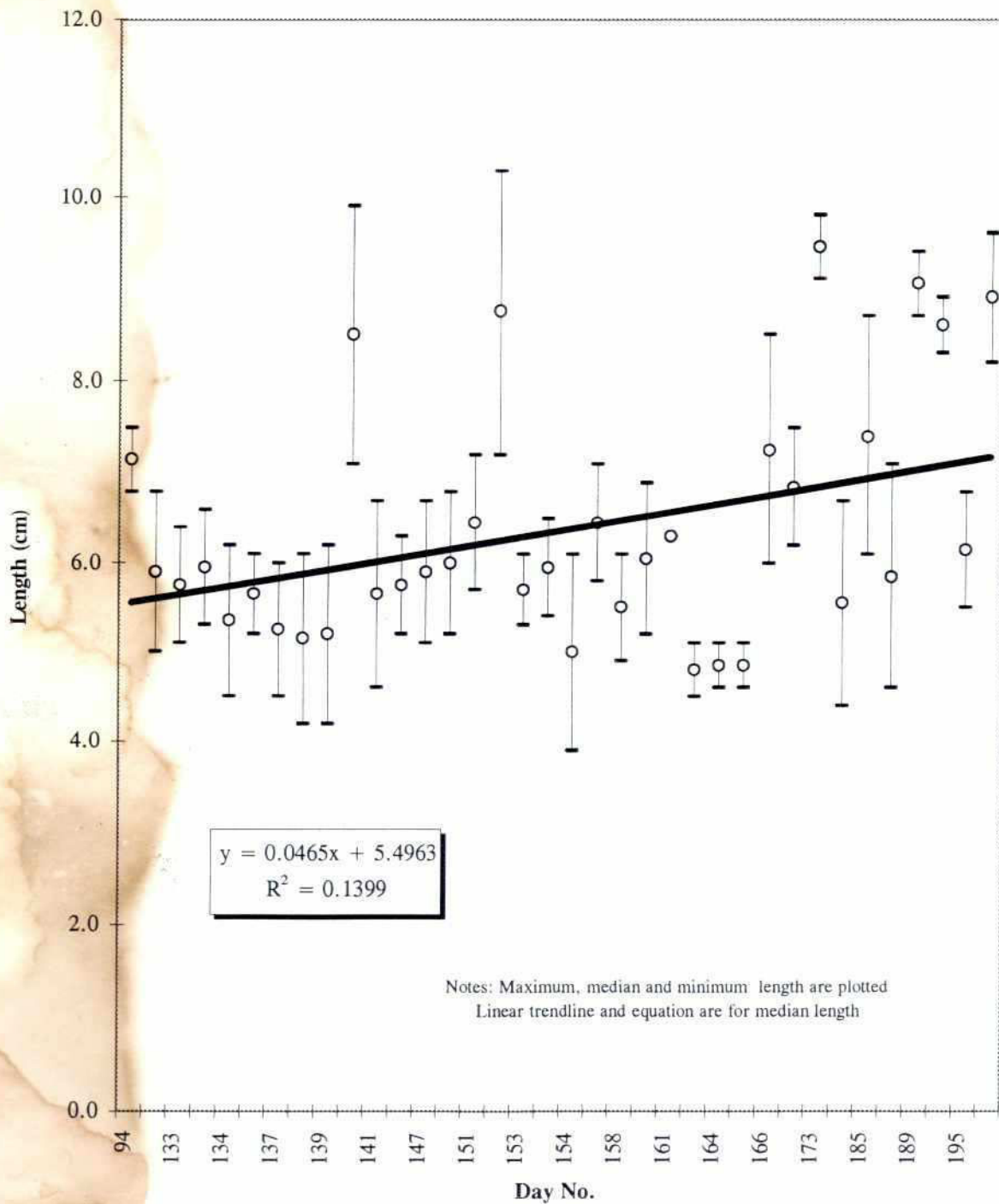


27/11

Figure 60

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

TENGRA - River to Haor Migration

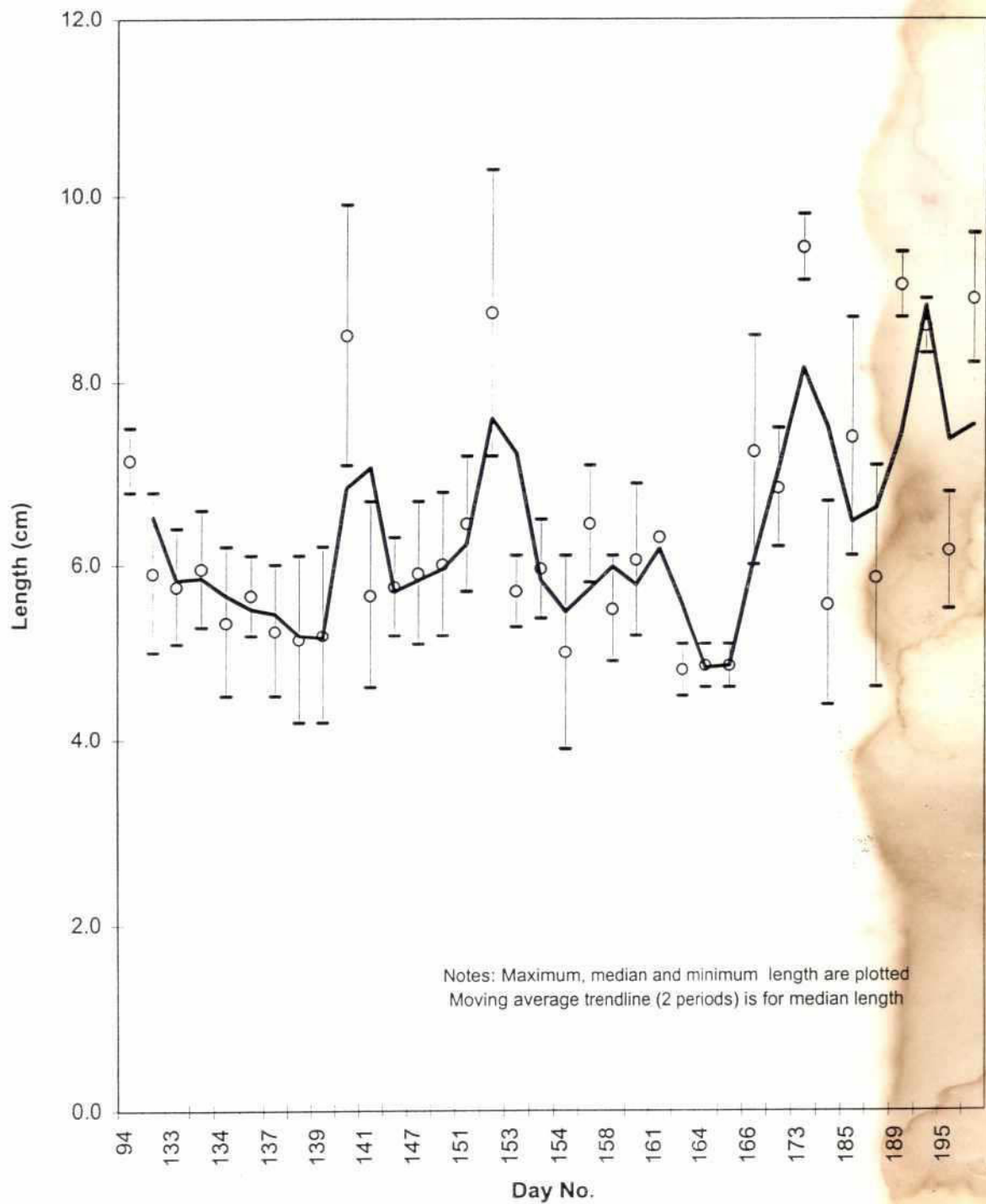


203

Figure 61

CHANGE IN BODY LENGTH OVER TIME OF FISH SAMPLED IN FISHPASS

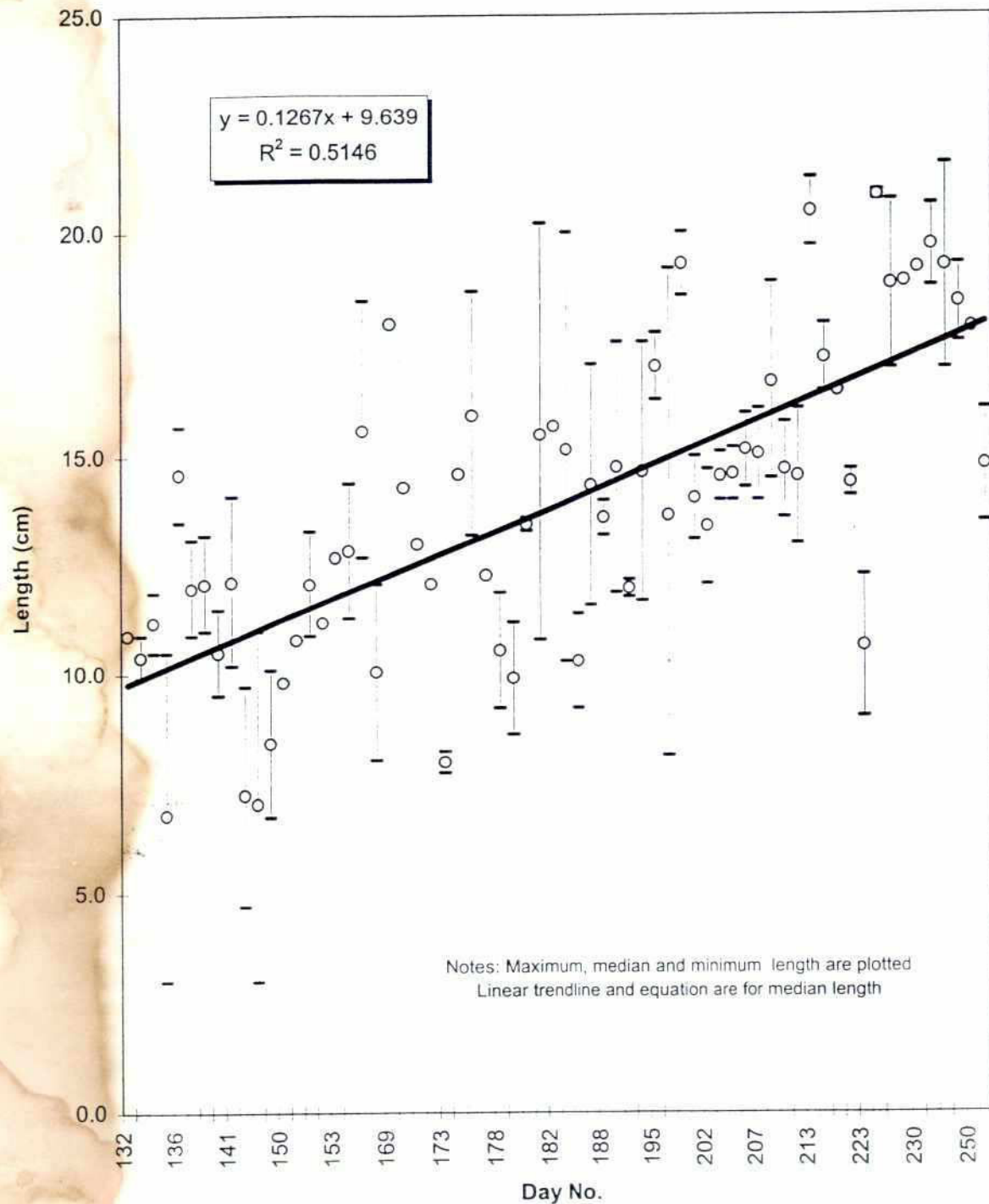
TENGRA - River to Haor Migration



29

Figure 62

CHANGE IN BODY LENGTH OVER TIME OF FISH SAMPLED IN FISHPASS BACHA - River to Haor Migration



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Figure 63

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

BACHA - Haor to River Migration

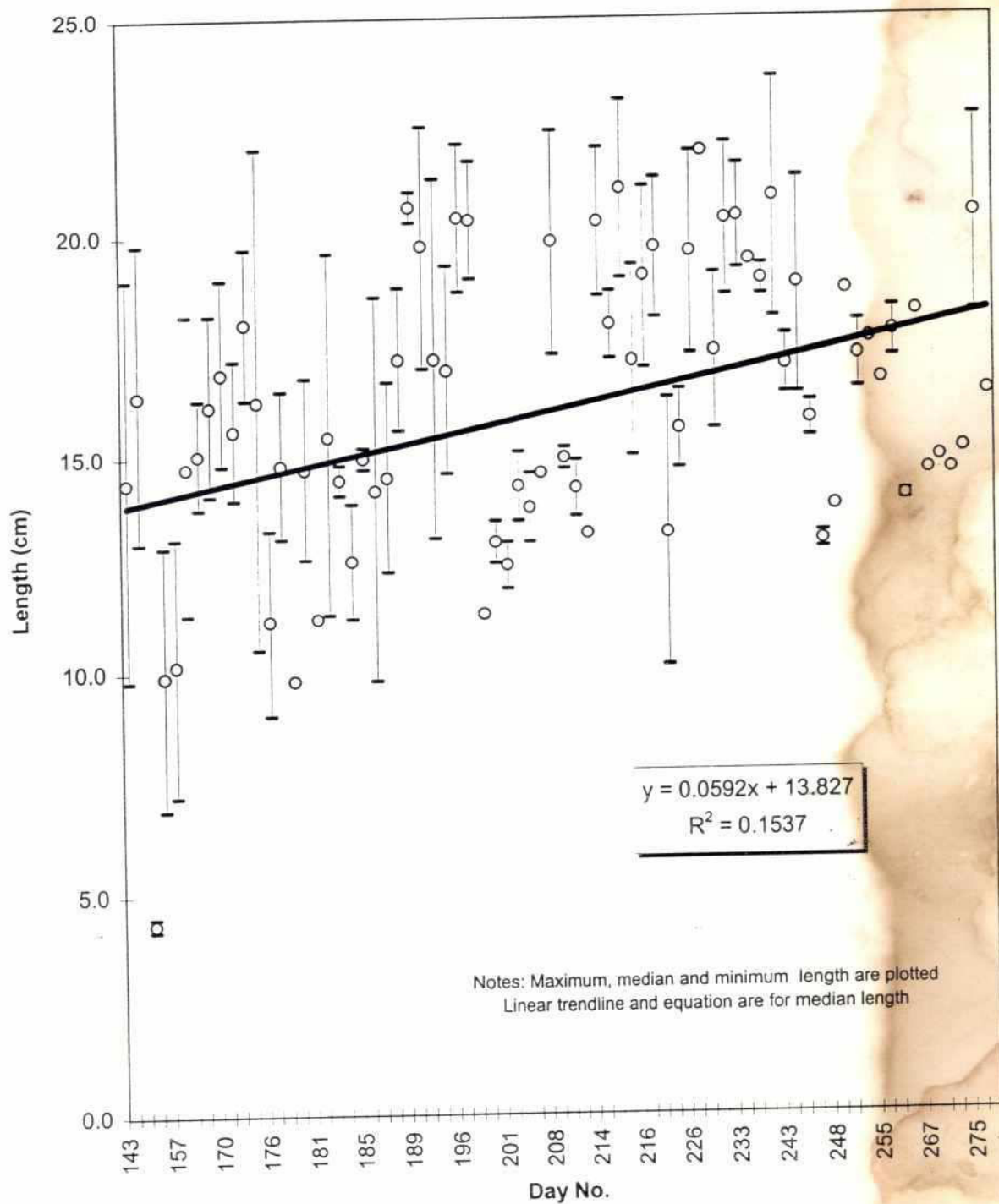
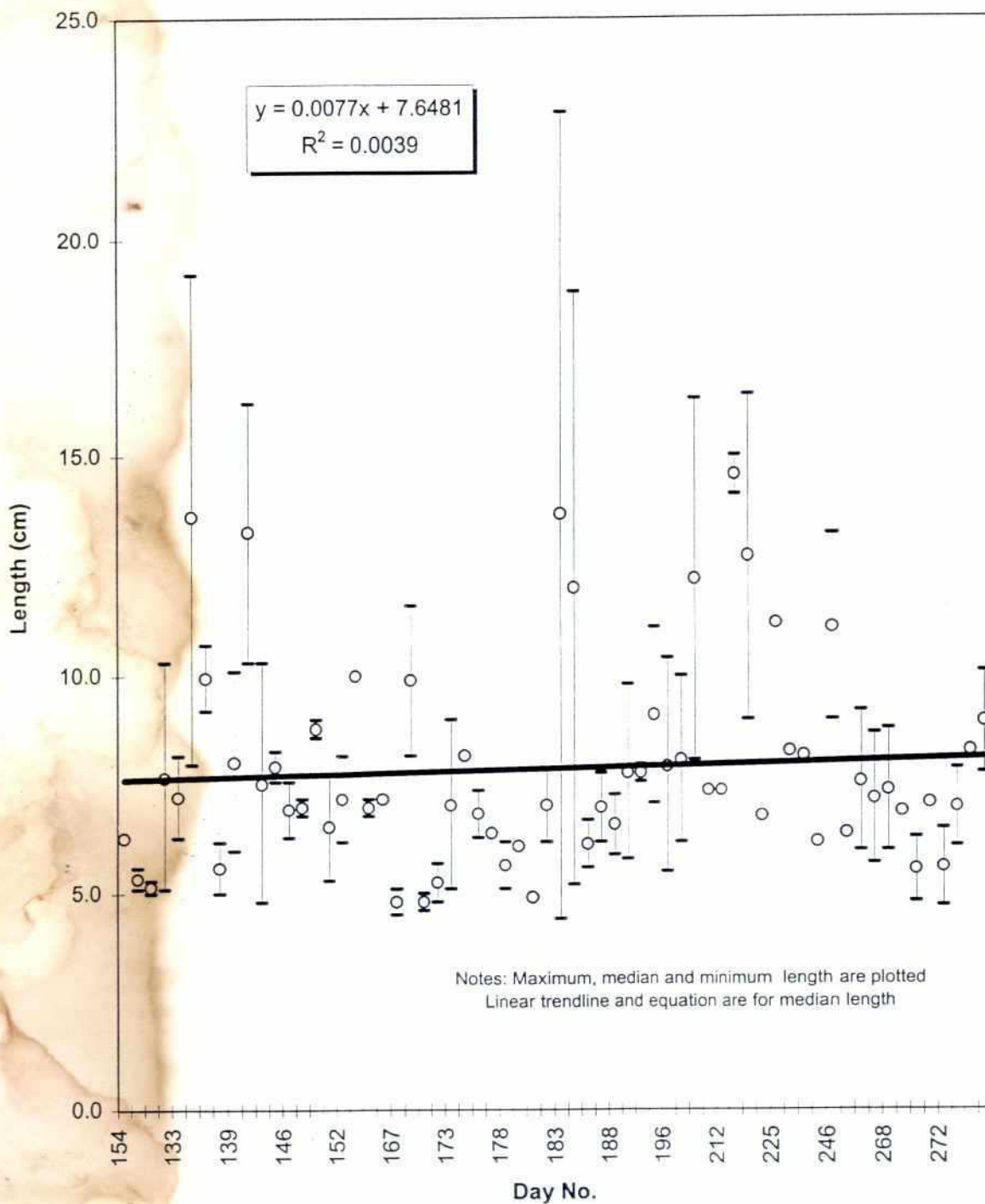


Figure 64

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

BAILLA - River to Haor Migration

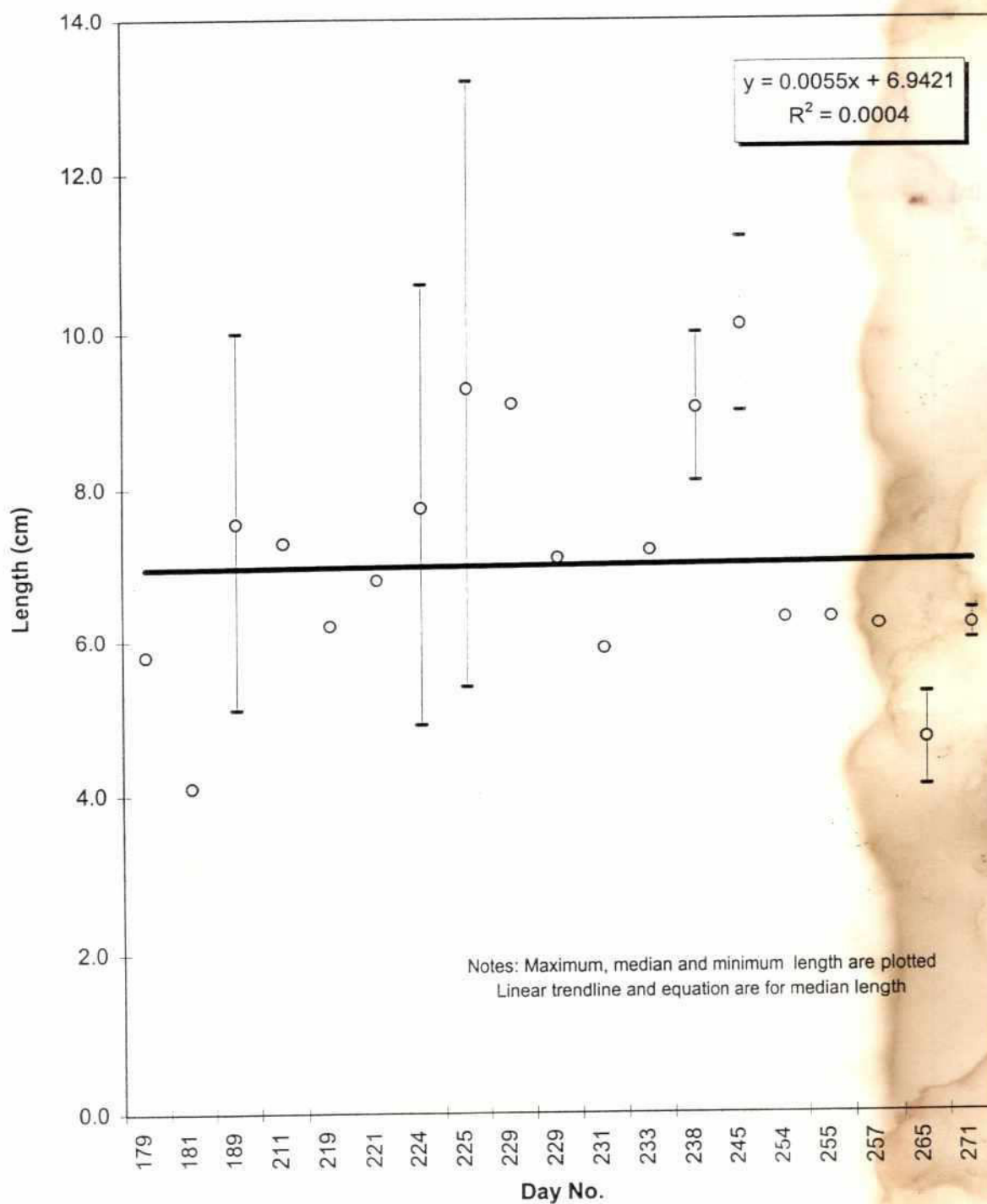


290

Figure 65

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

BAILLA - Haor to River Migration

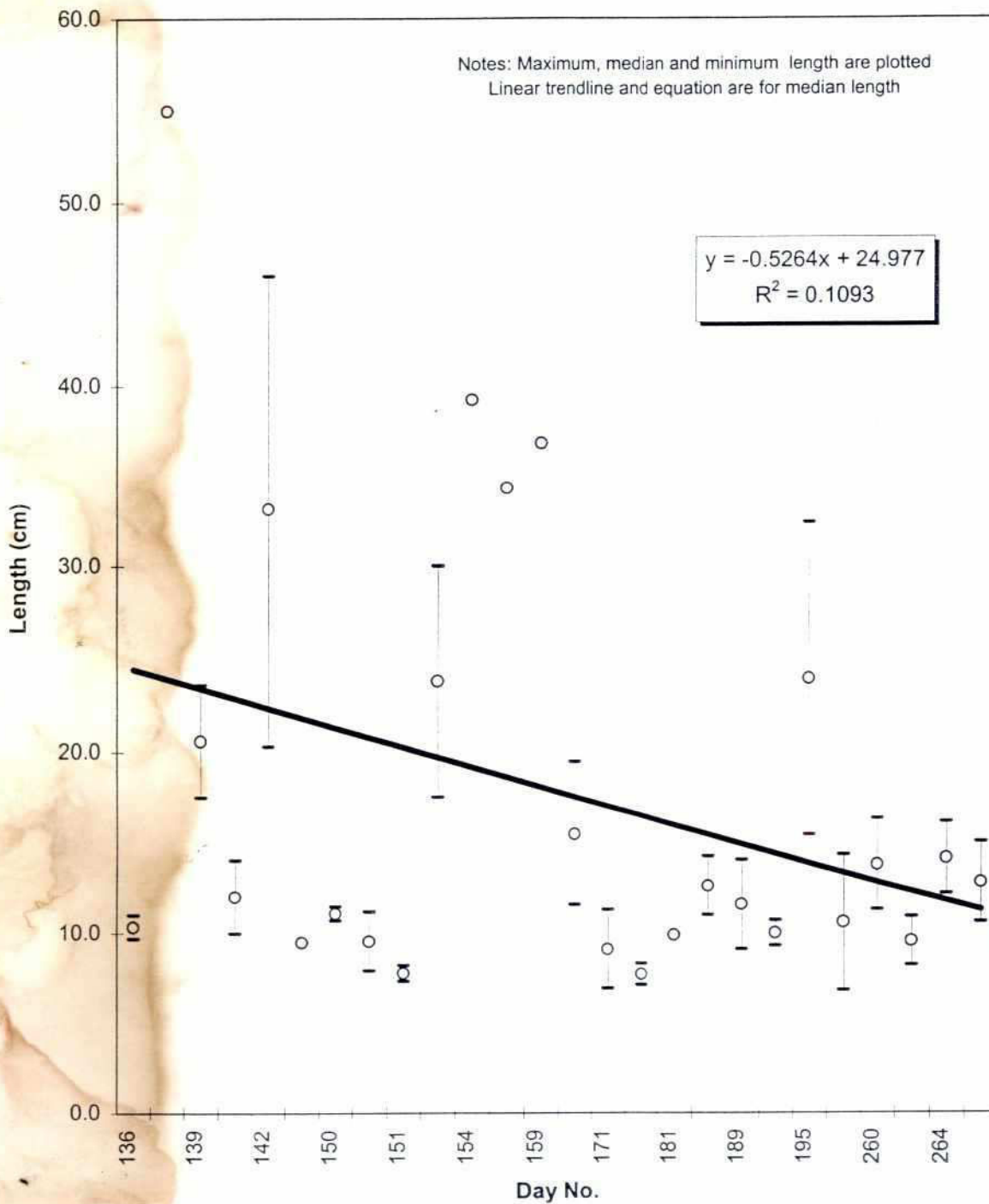


297

Figure 66

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

BAIM - River to Haor Migration

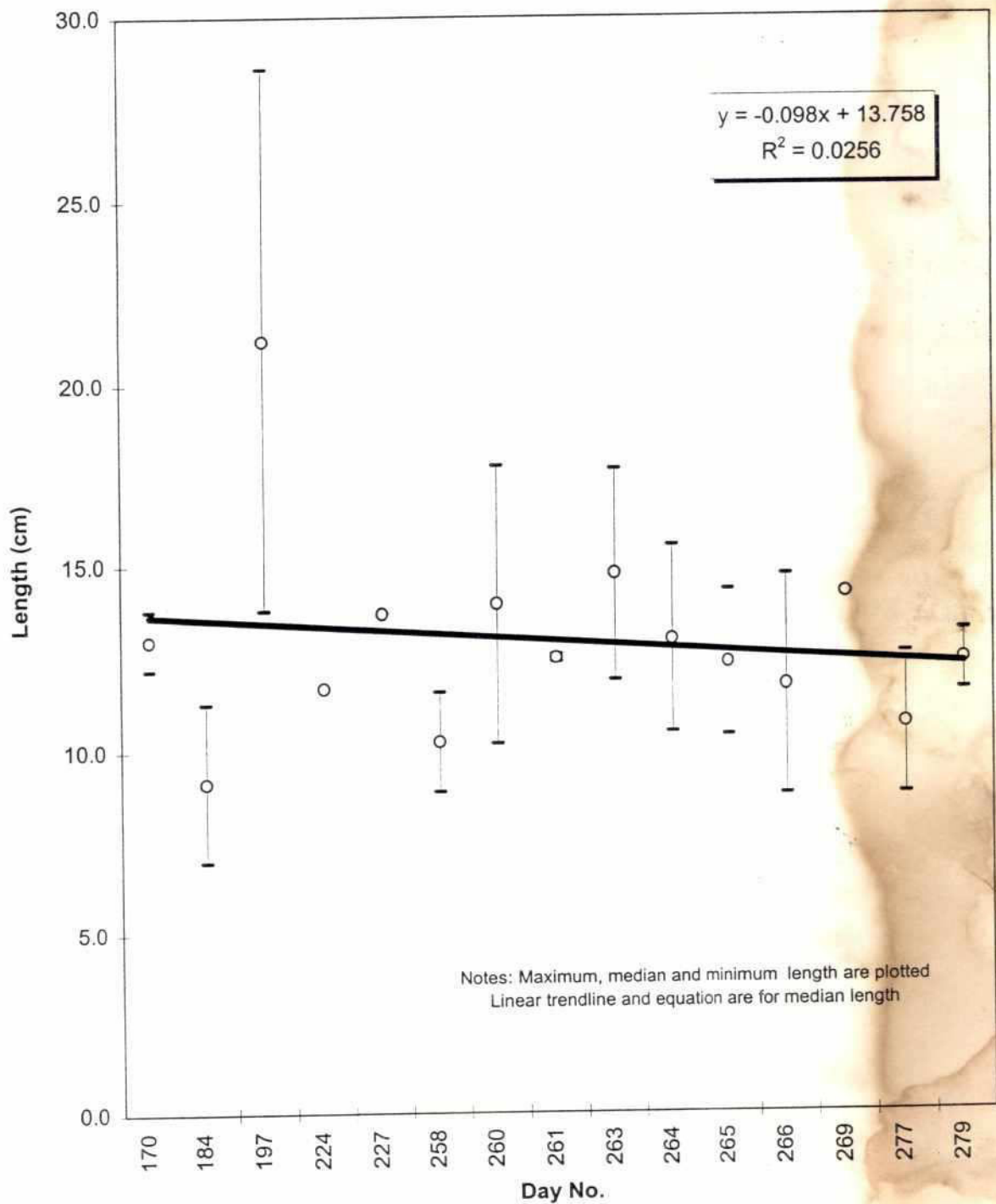


292

Figure 67

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

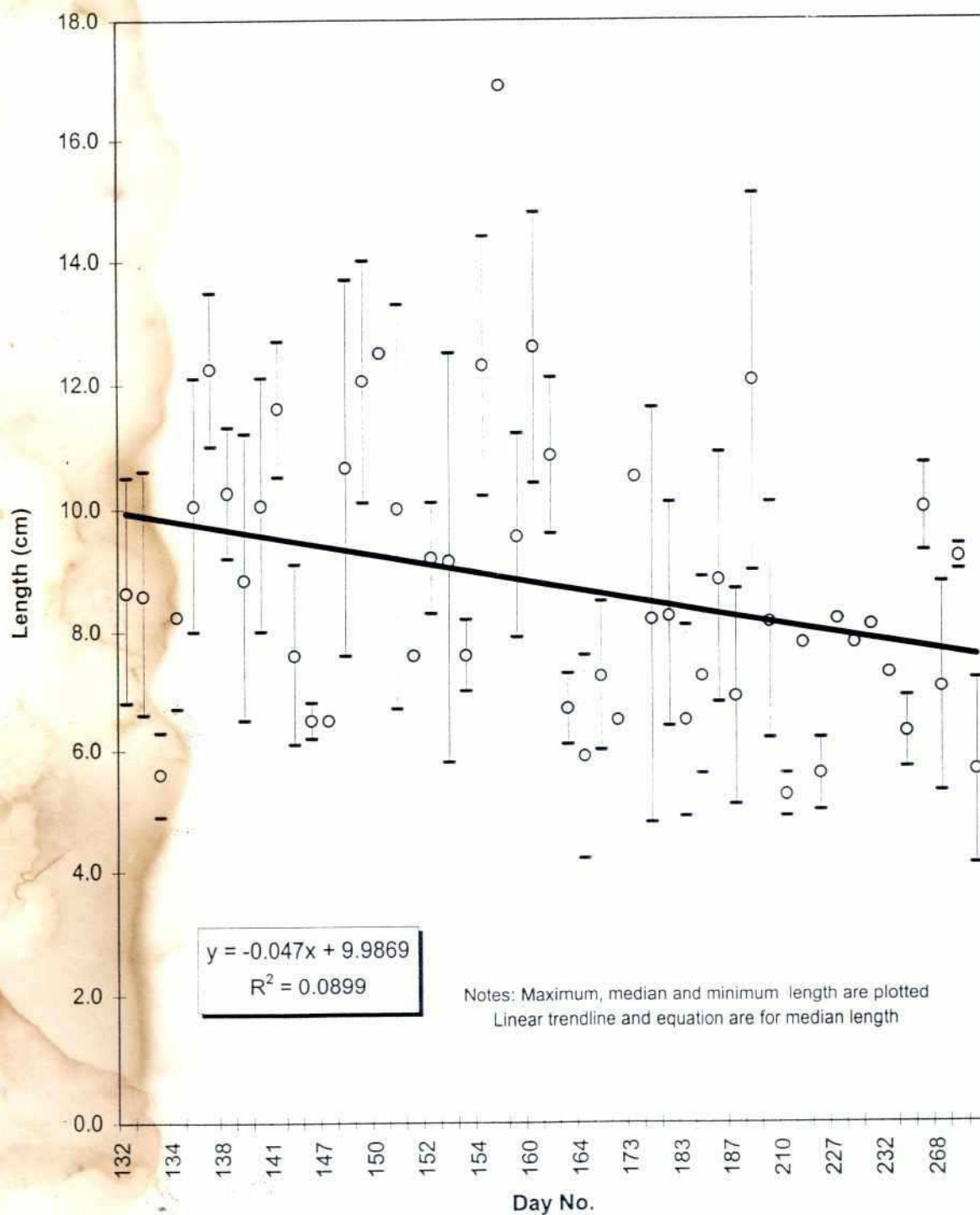
BAIM - Haor to River Migration



296
Figure 68

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

BHEDA - River to Haor Migration



298

Figure 69

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

BOICHA - River to Haor Migration

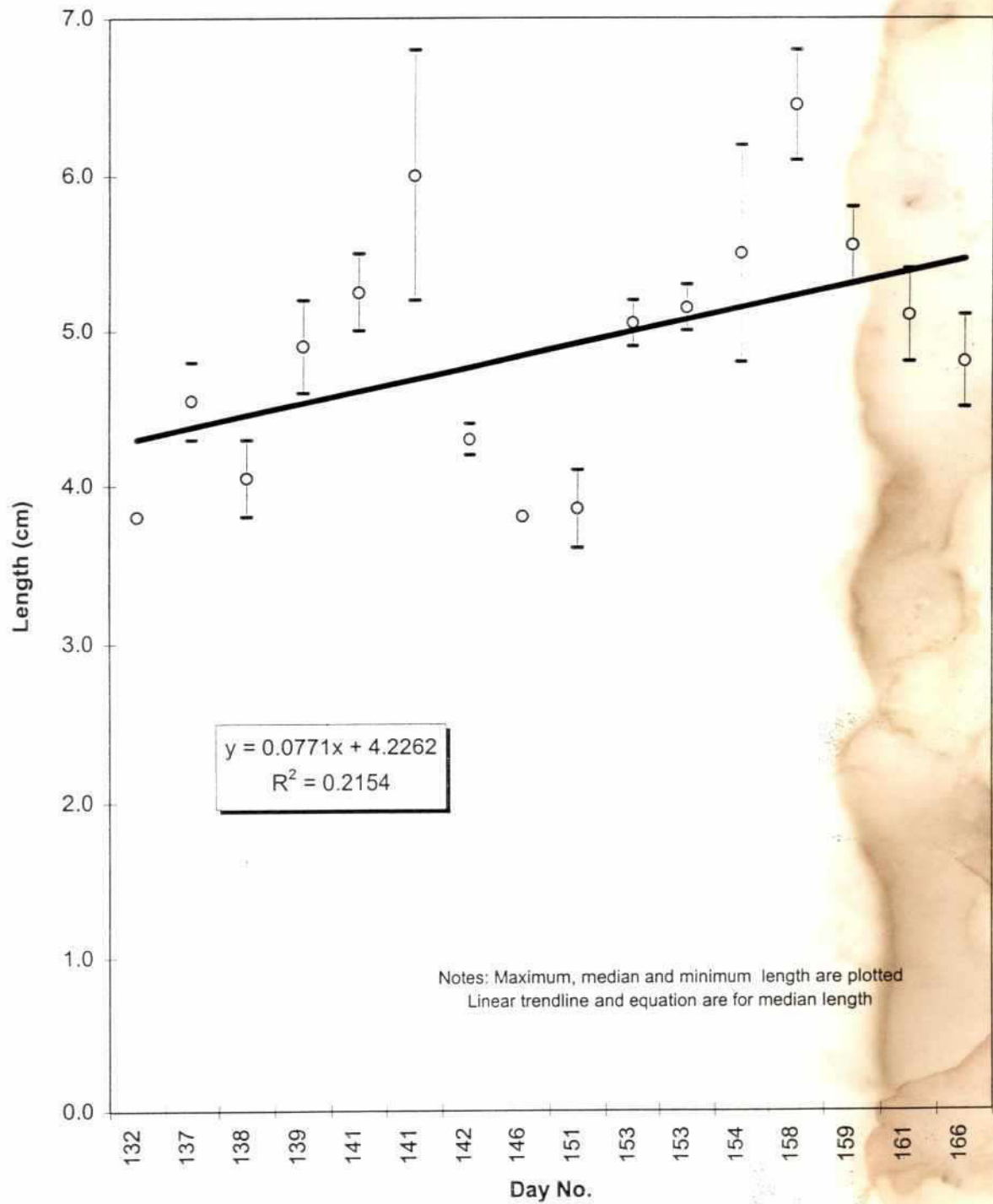
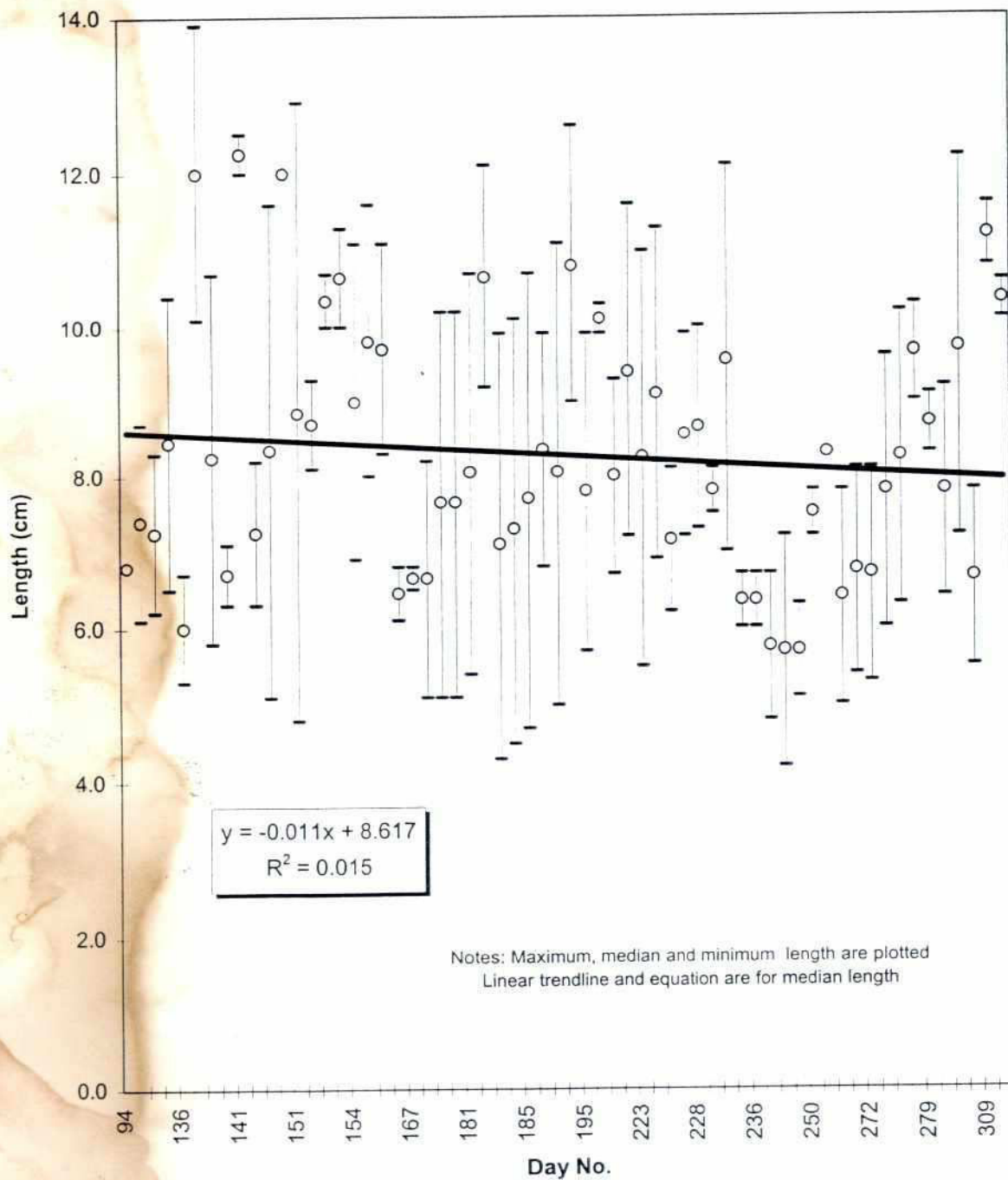


Figure 70

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

CHELA - River to Haor Migration

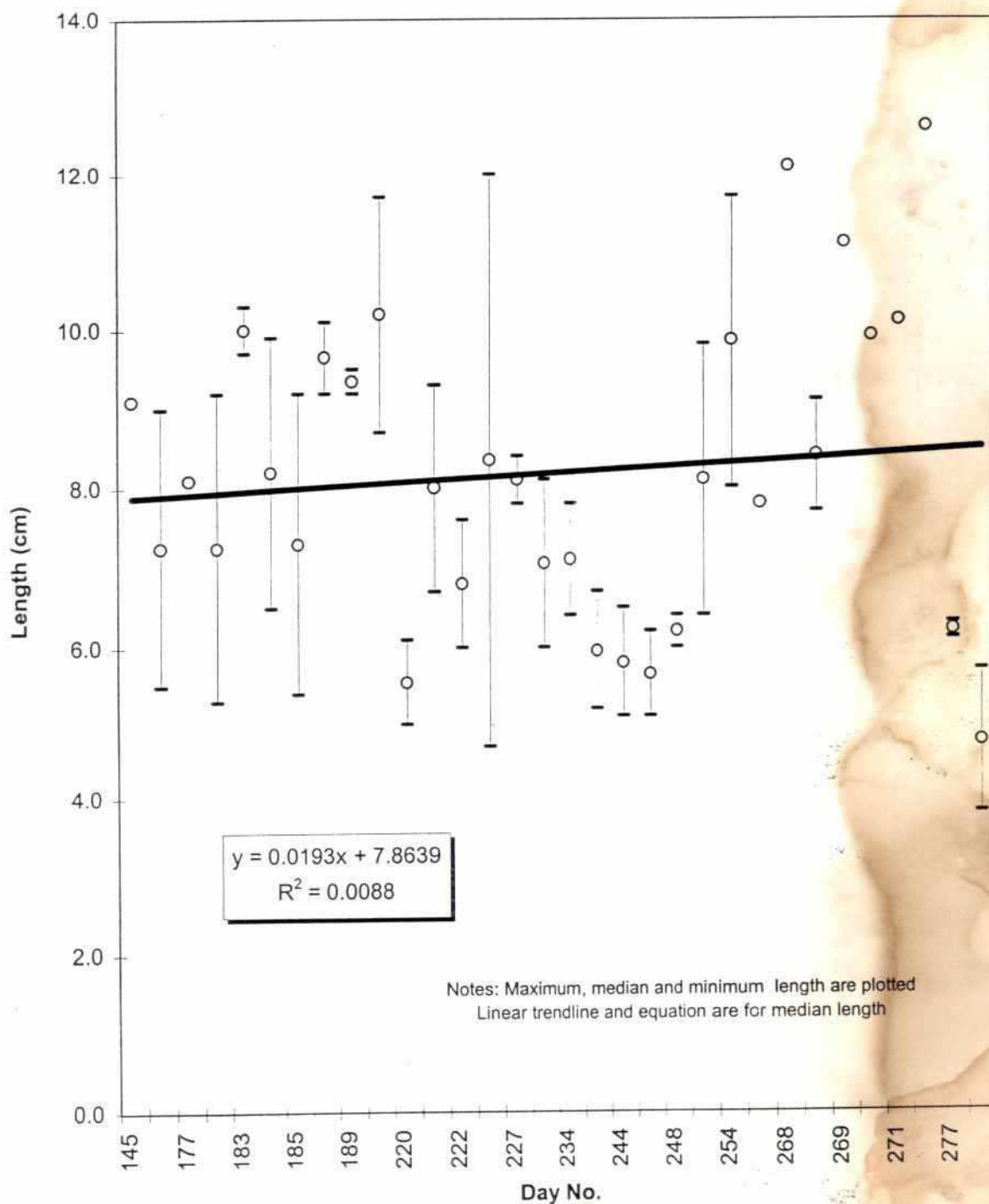


293

Figure 71

CHANGE IN BODY LENGTH OVER TIME OF FISH SAMPLED IN FISHPASS

CHELA - Haor to River Migration

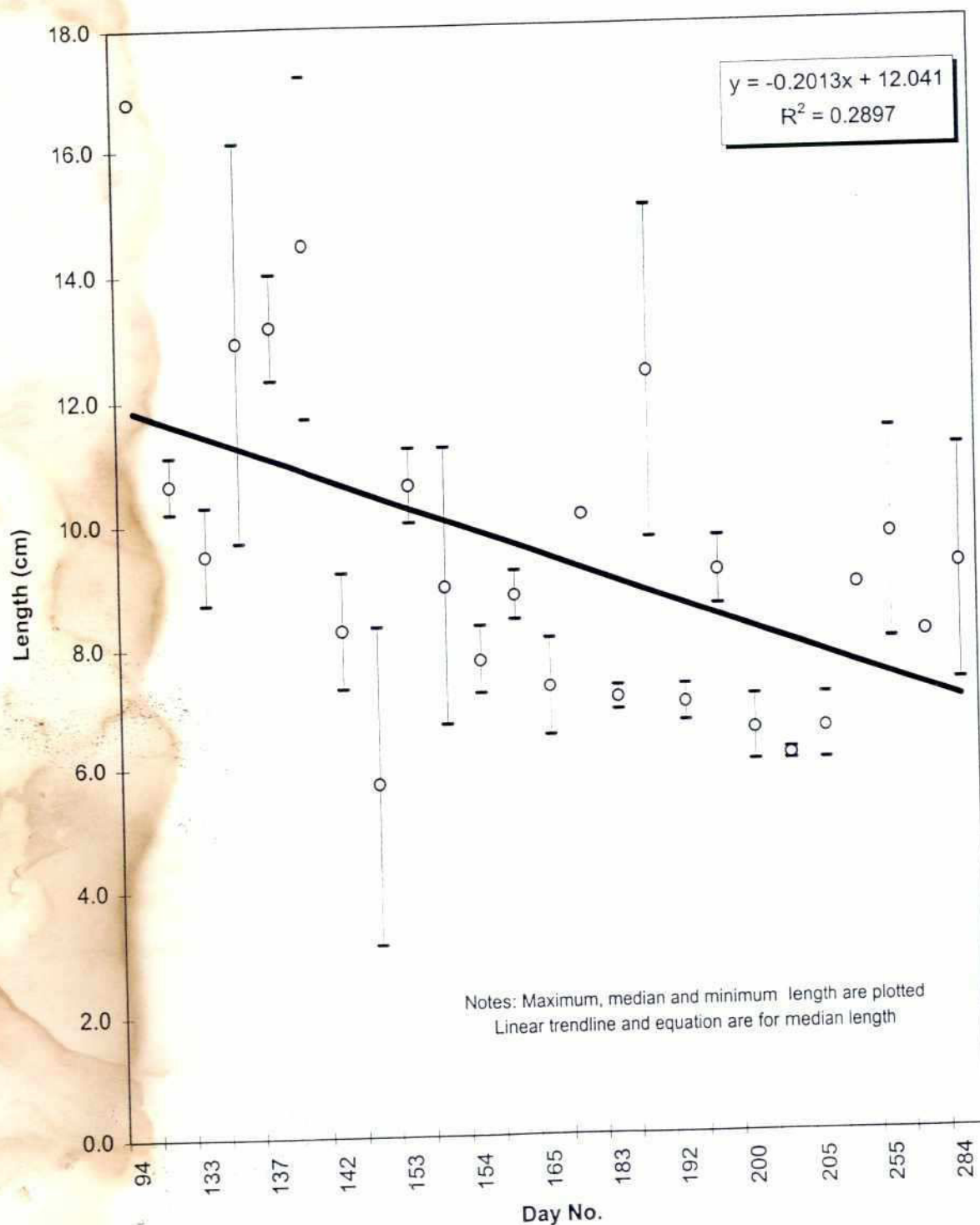


299

Figure 72

CHANGE IN BODY LENGTH OVER TIME OF FISH SAMPLED IN FISHPASS

CHIRKA BAIM - River to Haor Migration

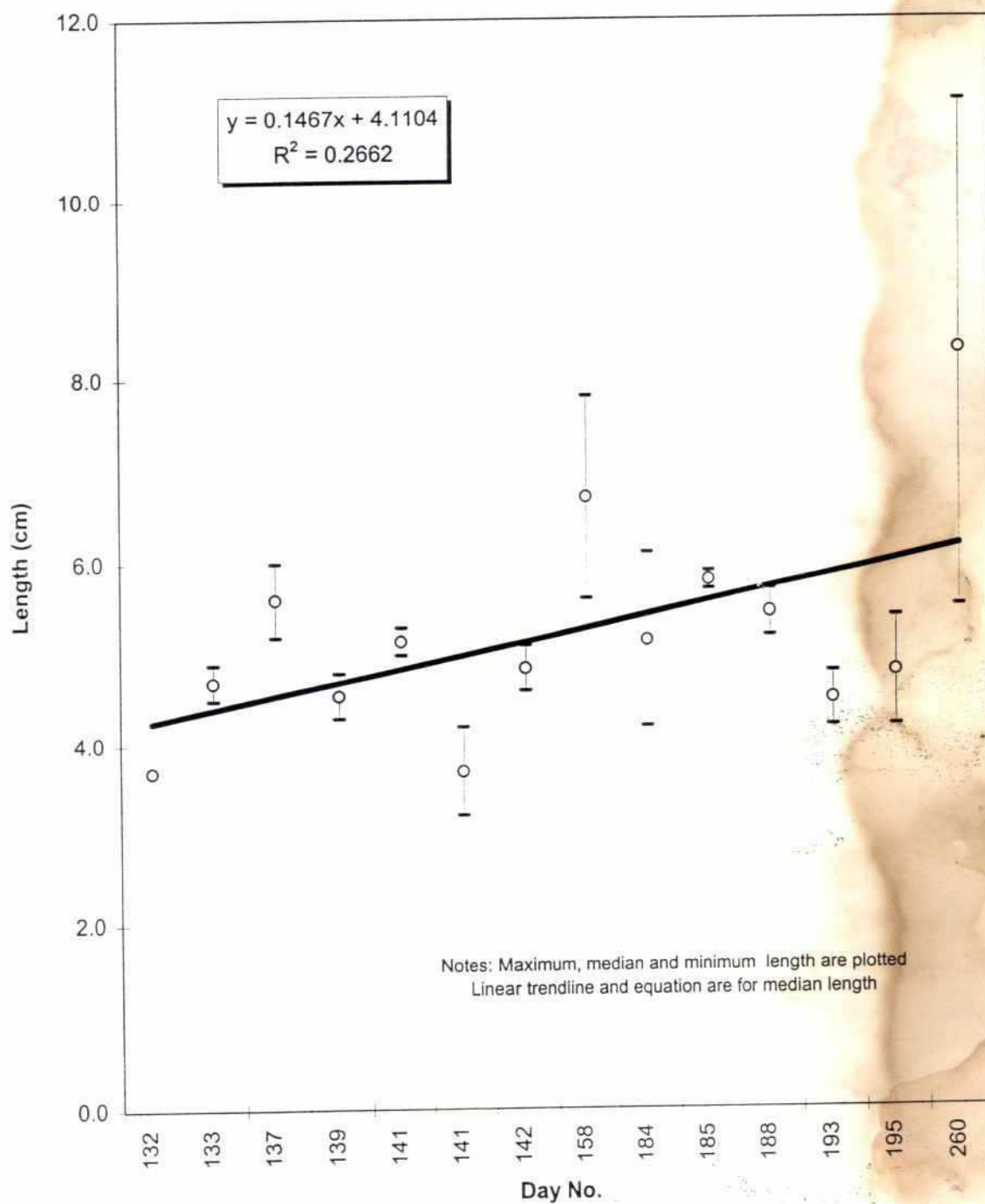


295

Figure 73

CHANGE IN BODY LENGTH OVER TIME OF FISH SAMPLED IN FISHPASS

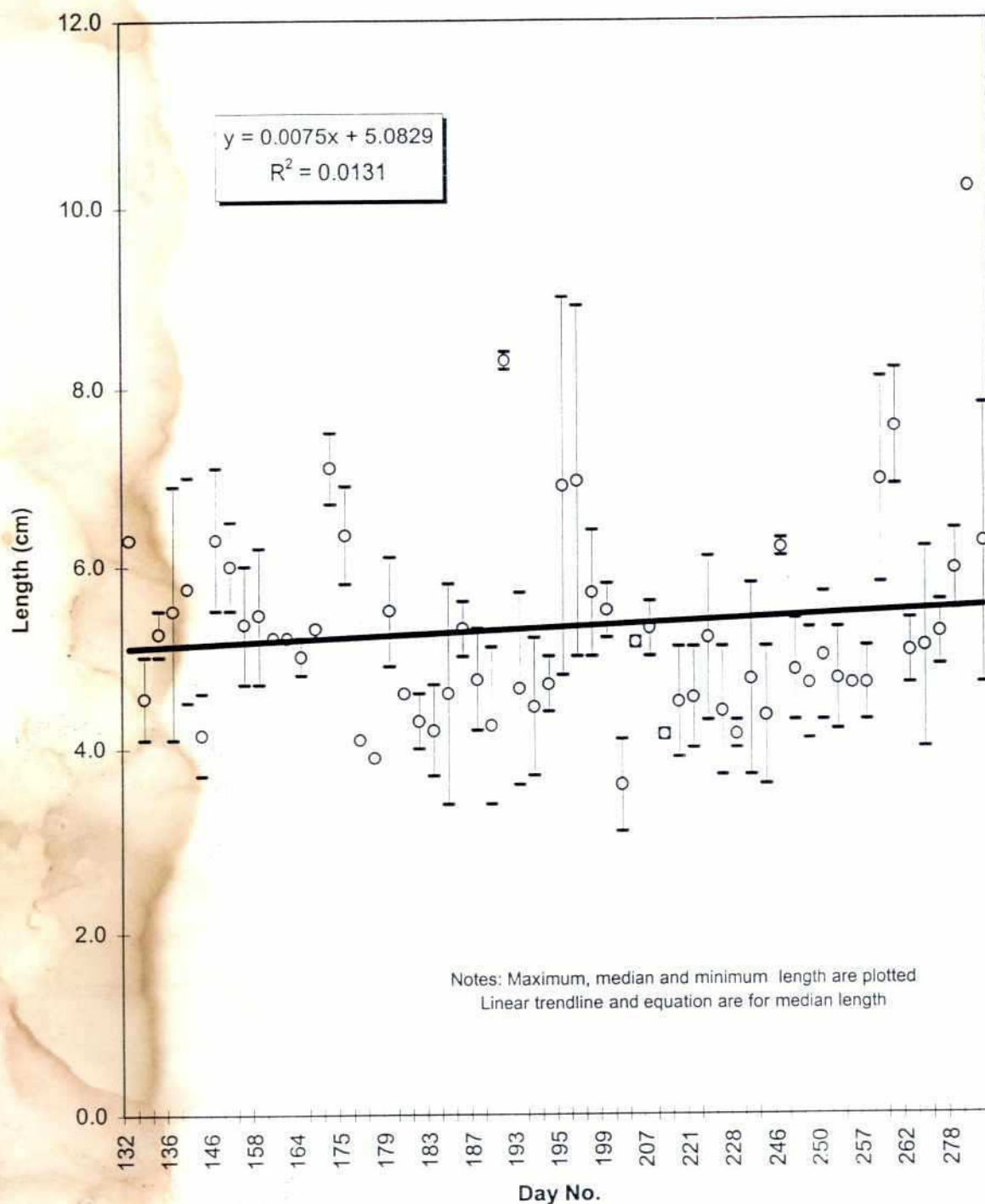
DARKINA - River to Haor Migration



292
Figure 74

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

DHELA - River to Haor Migration

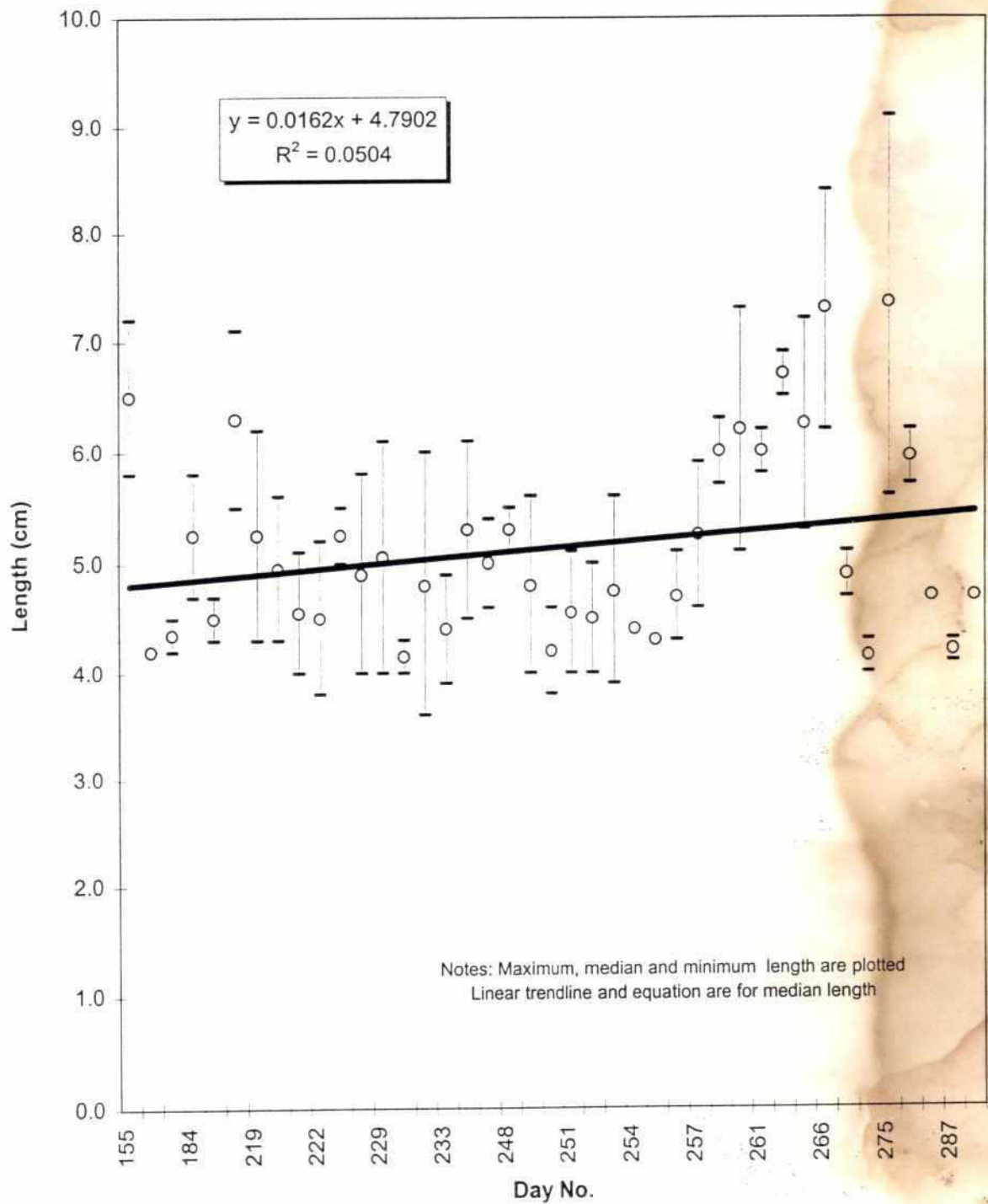


270

Figure 75

CHANGE IN BODY LENGTH OVER TIME OF FISH SAMPLED IN FISHPASS

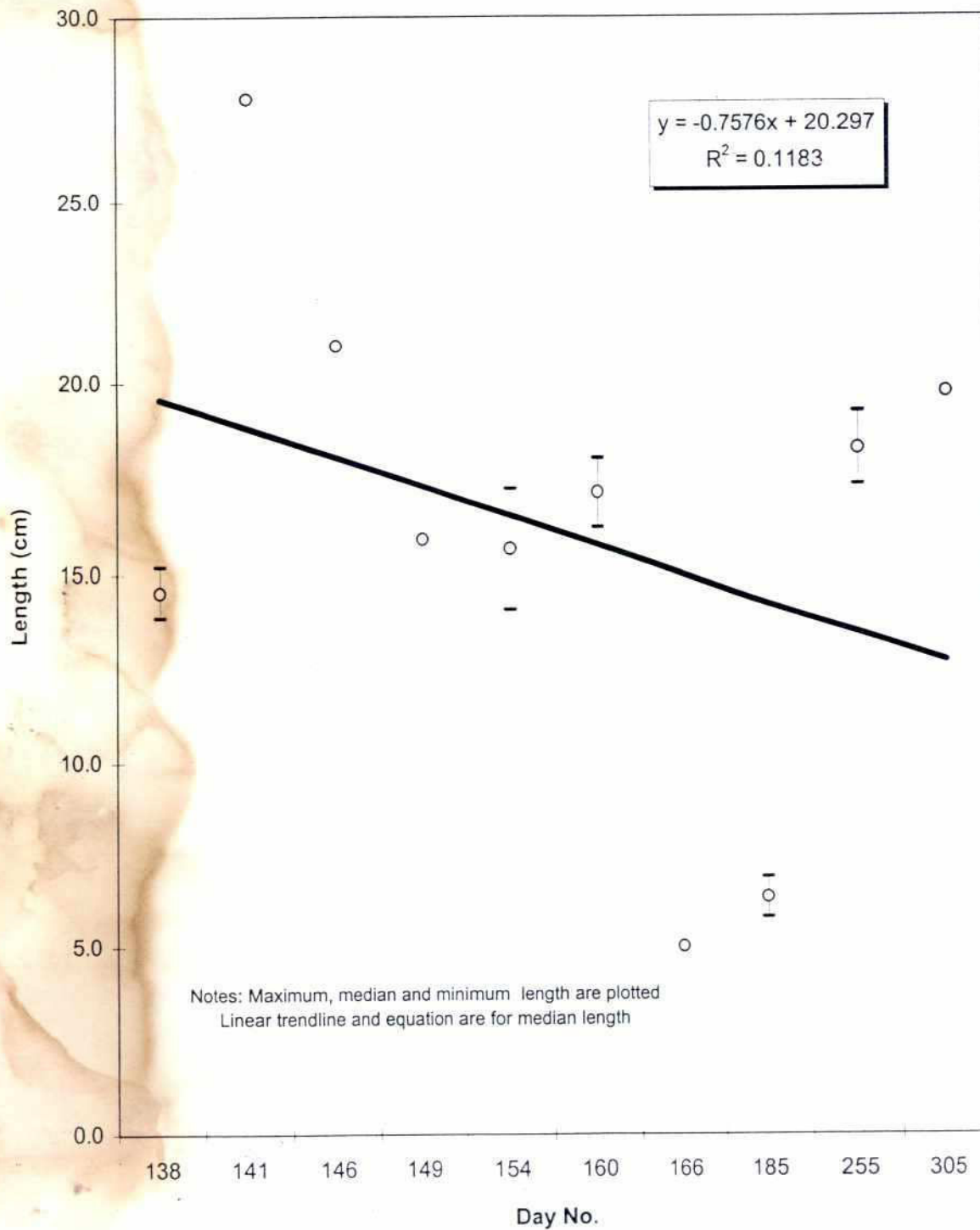
DHELA - Haor to River Migration



242
Figure 76

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

FOLI - River to Haor Migration

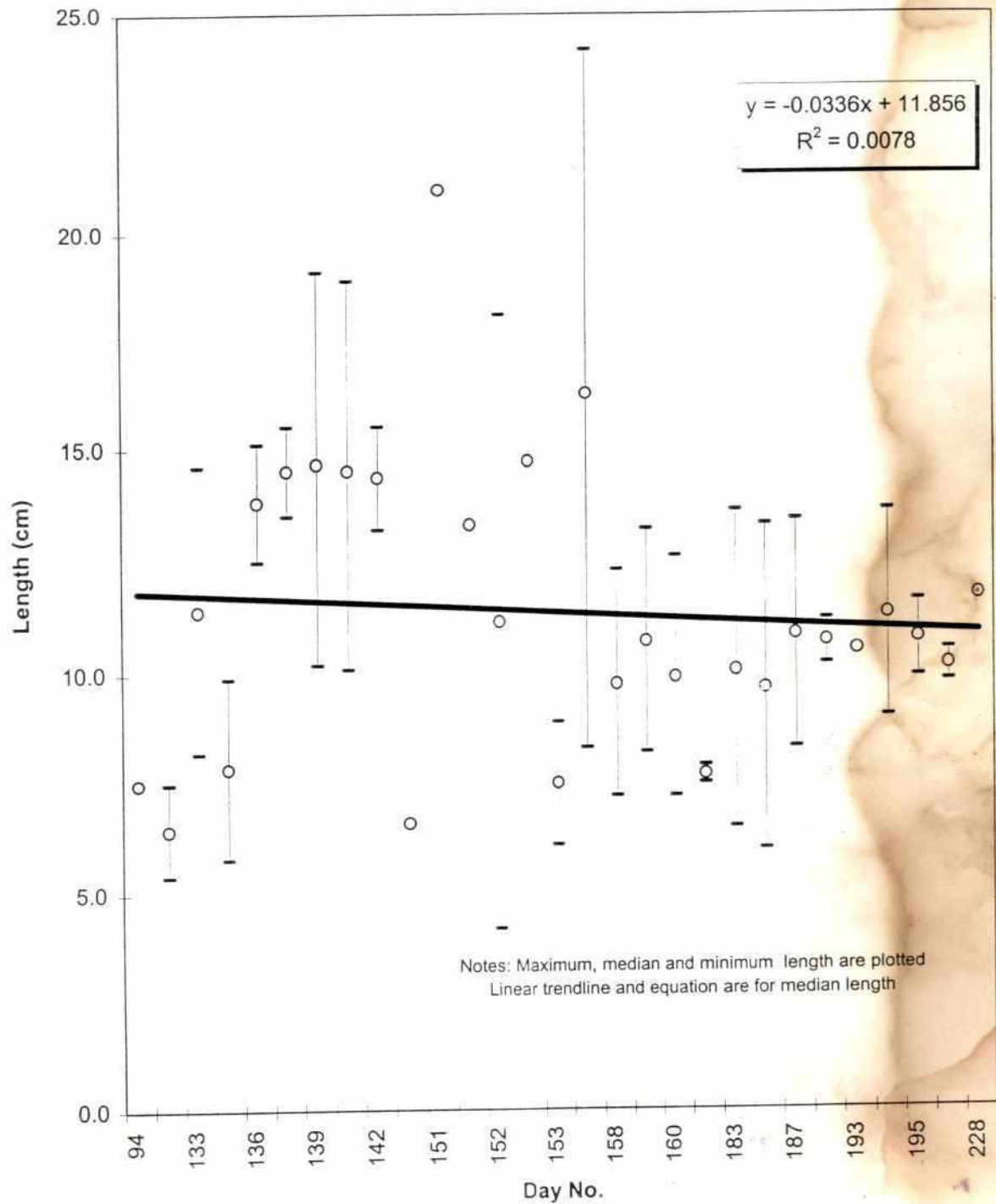


282

Figure 77

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

GULSHA - River to Haor Migration



216
Figure 78

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

GULSHA - River to Haor Migration

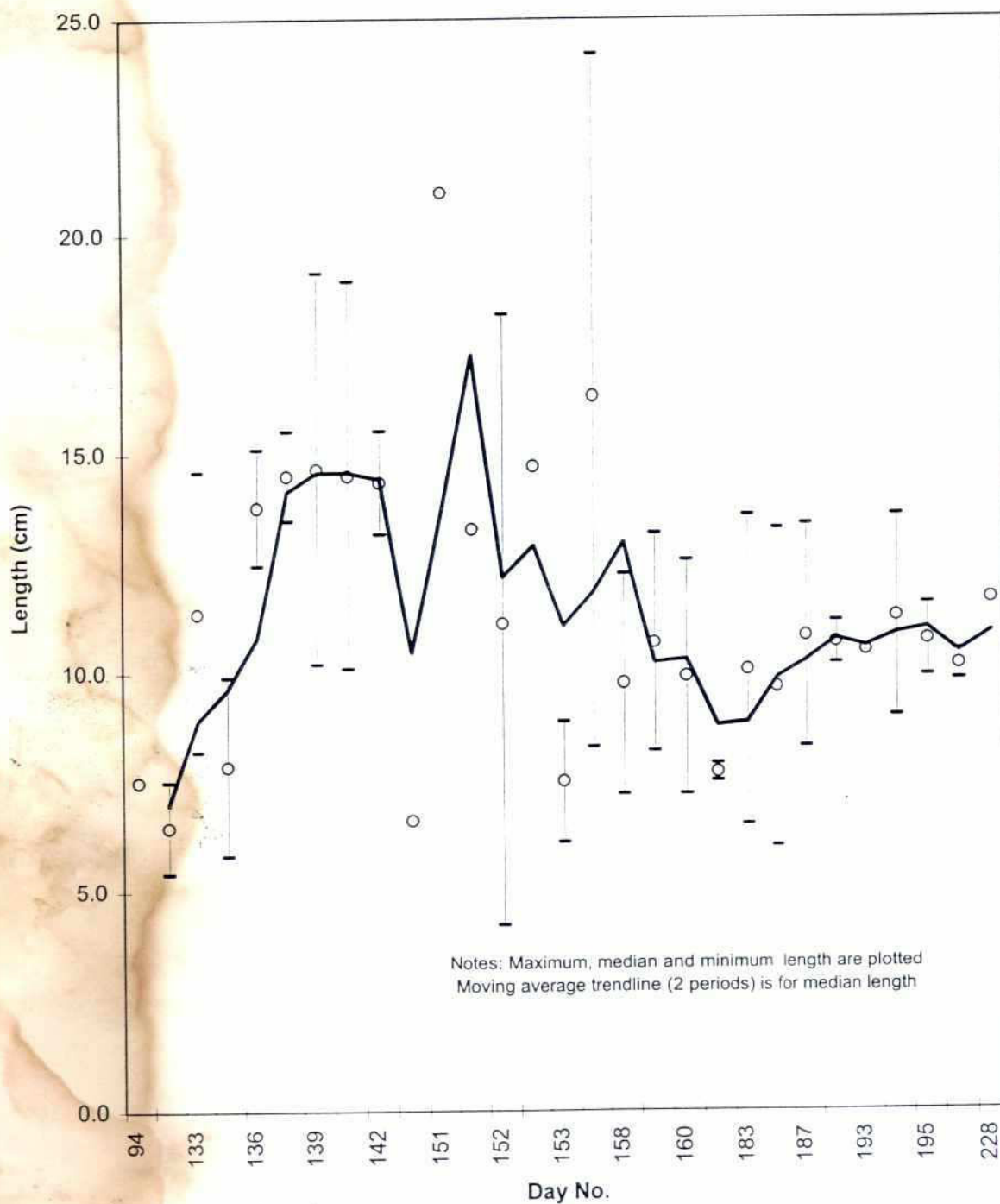


Figure 79

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

GUTUM - River to Haor Migration

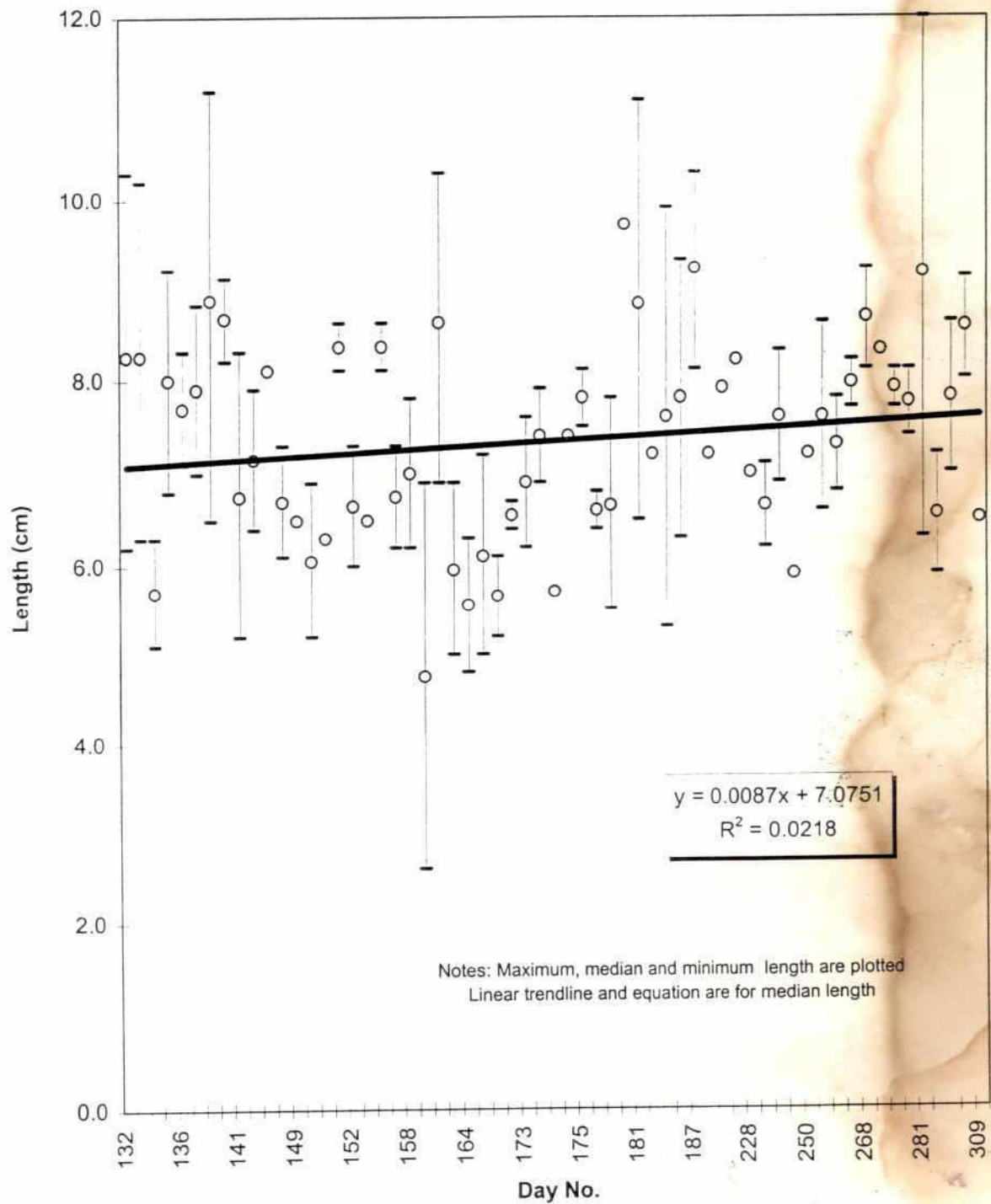
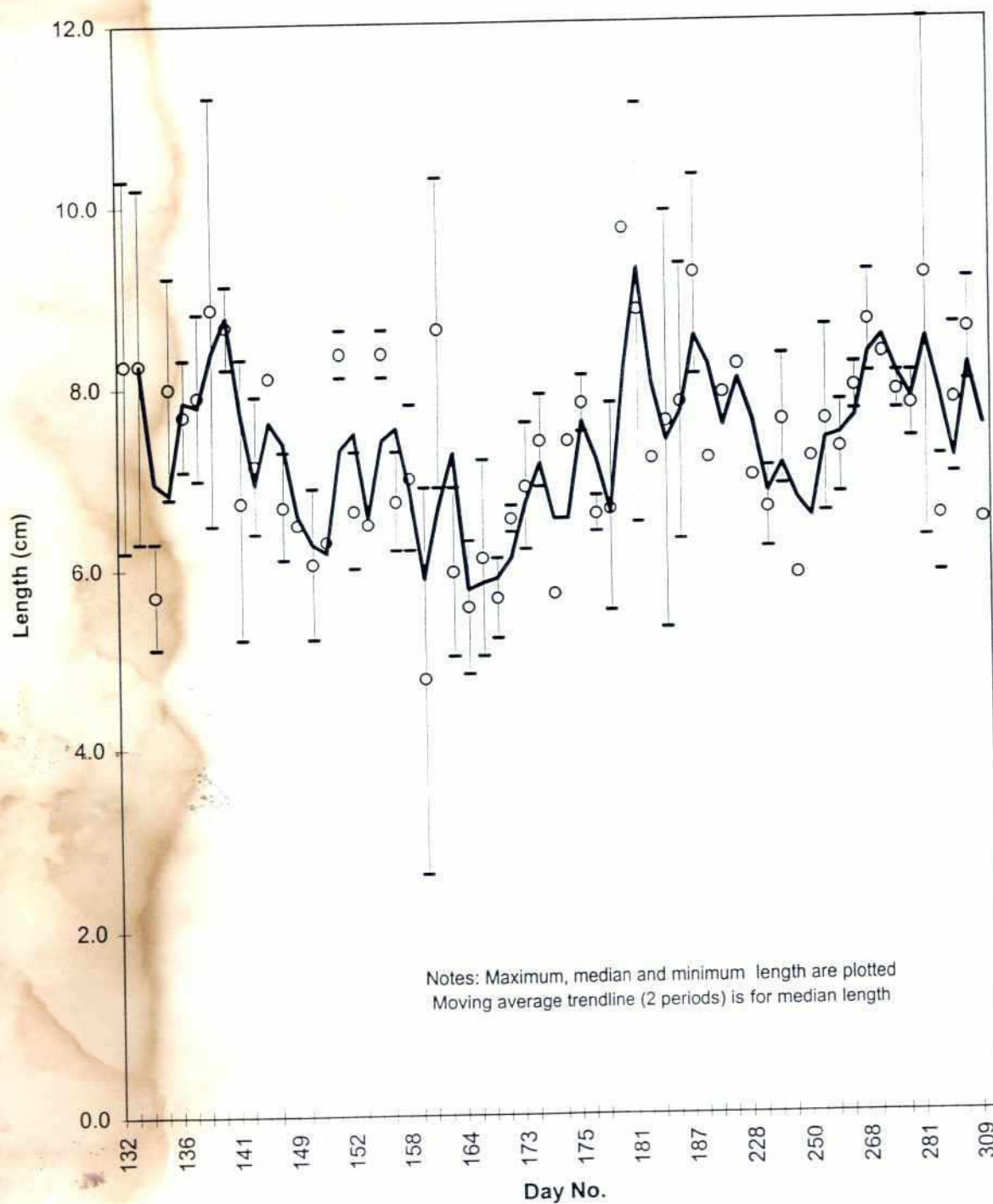


Figure 80

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

GUTUM - River to Haor Migration

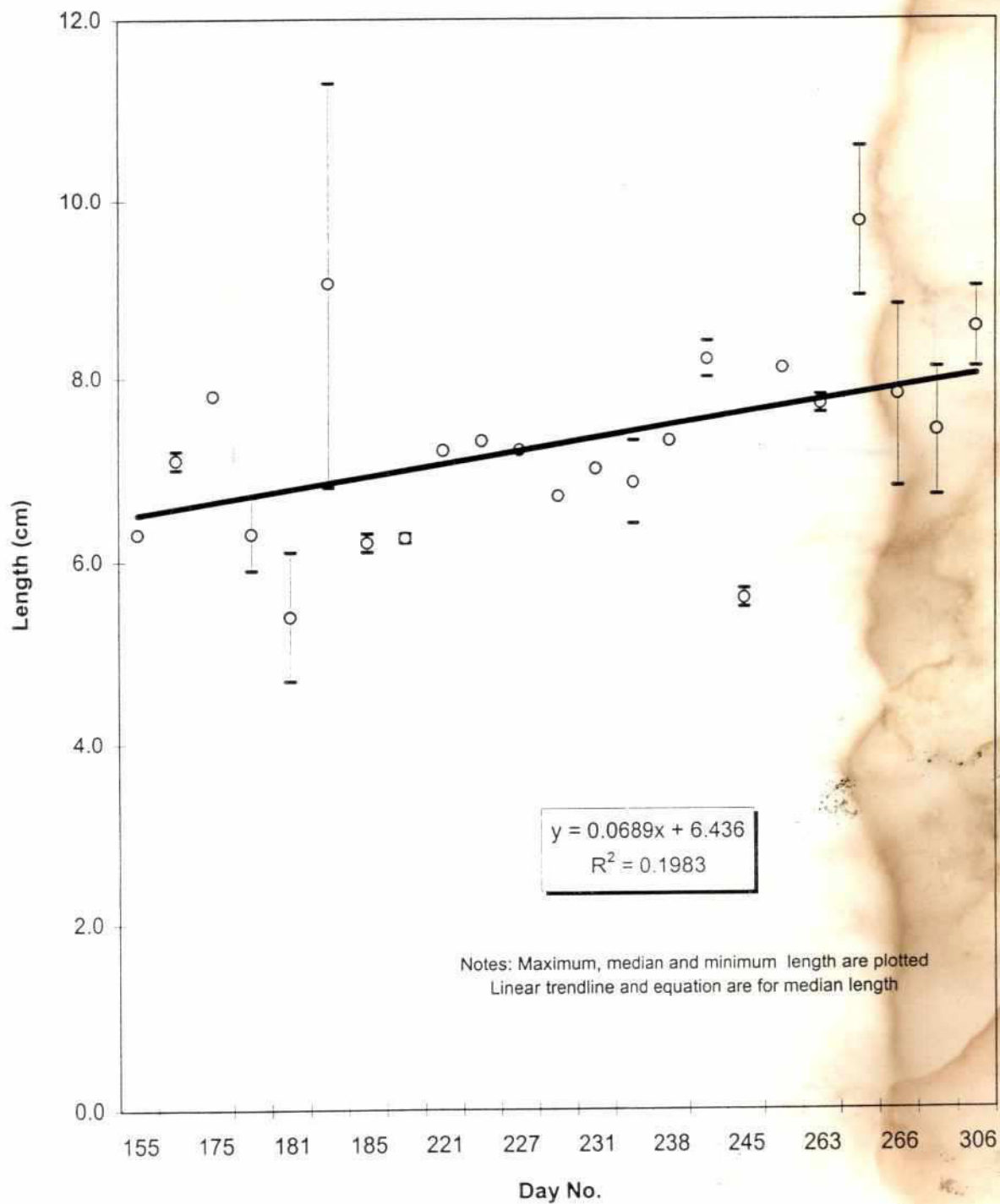


28-3

Figure 81

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

GUTUM - Haor to River Migration

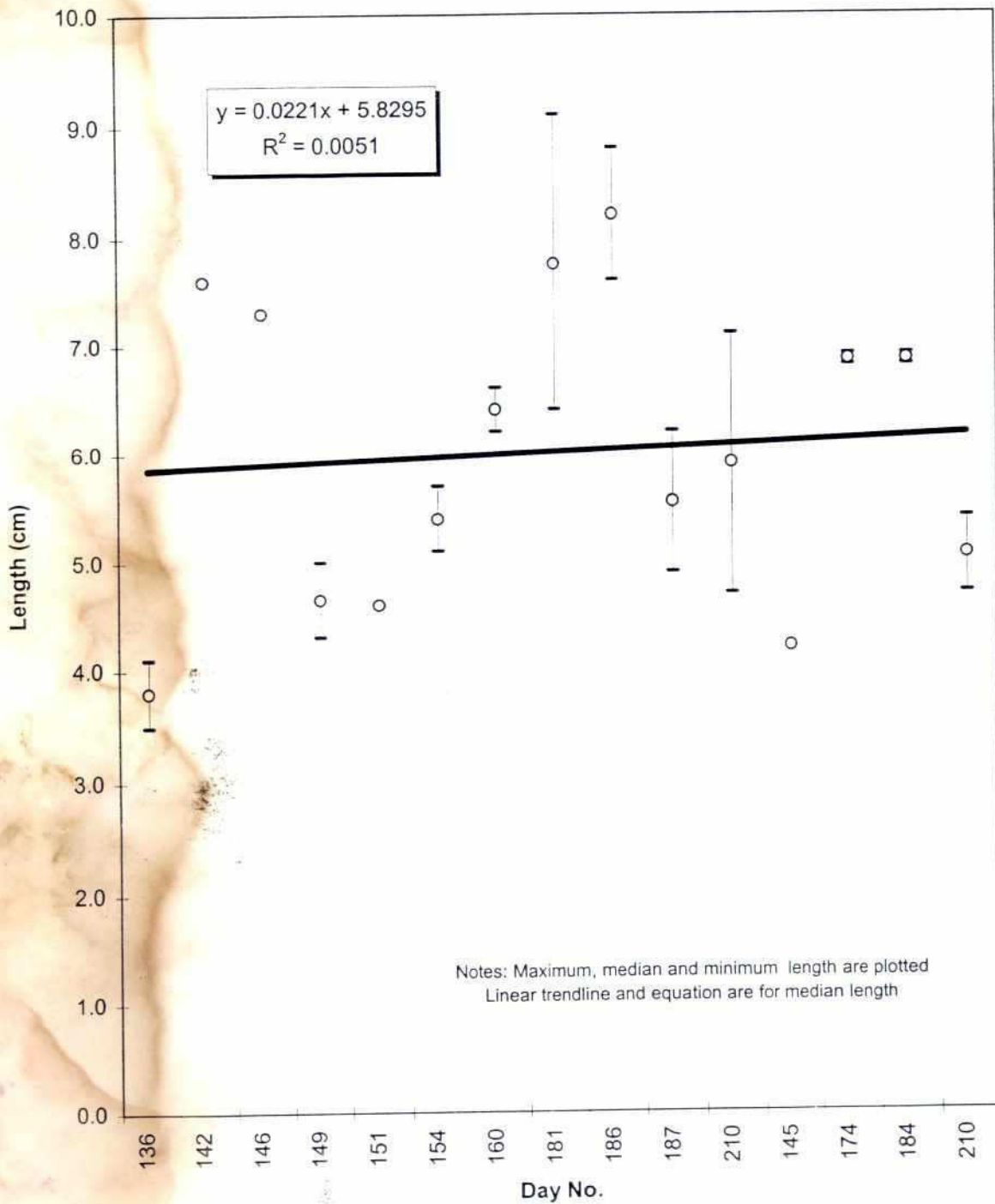


269

Figure 82

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

JAINZZA - River to Haor Migration

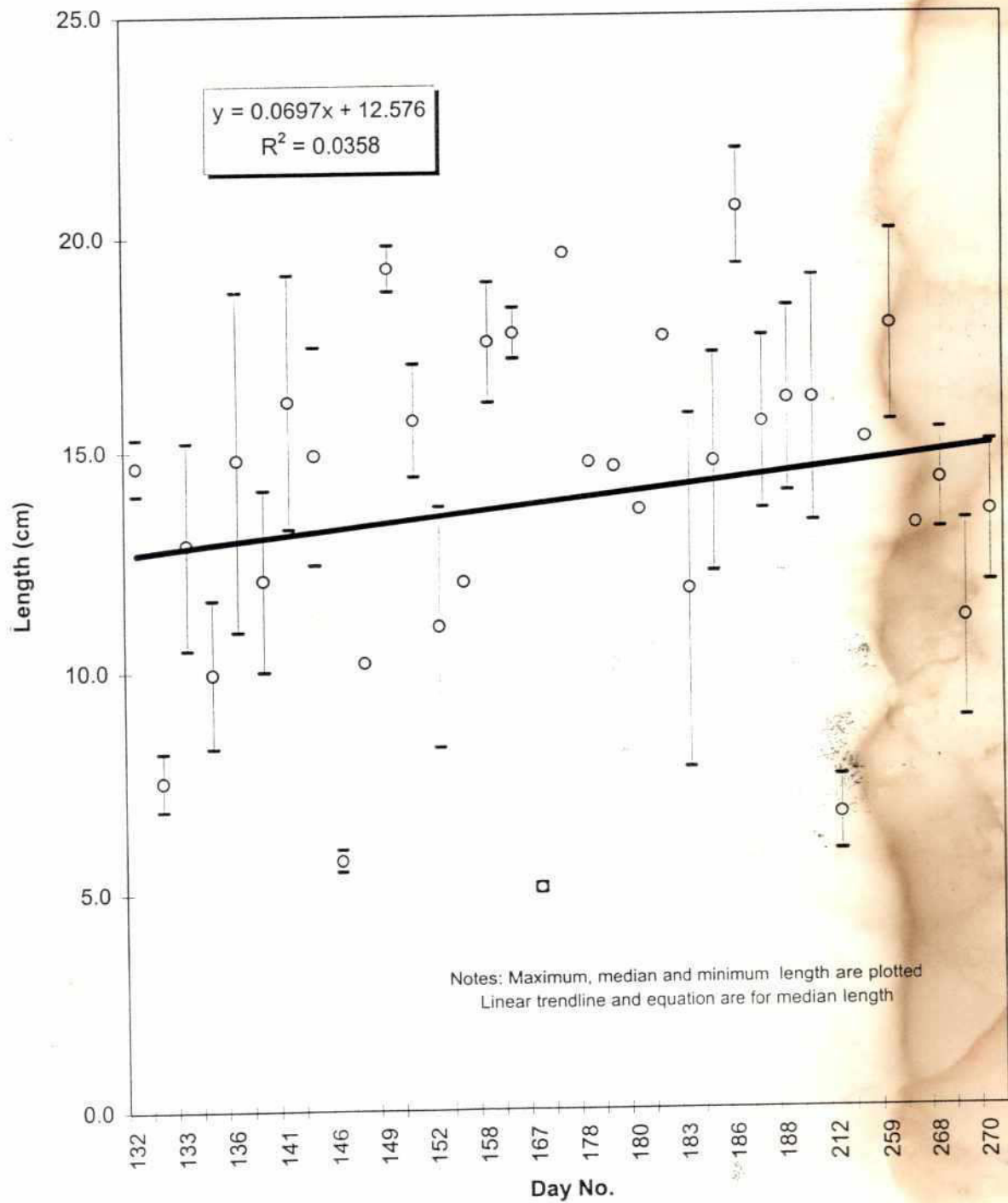


256

Figure 83

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

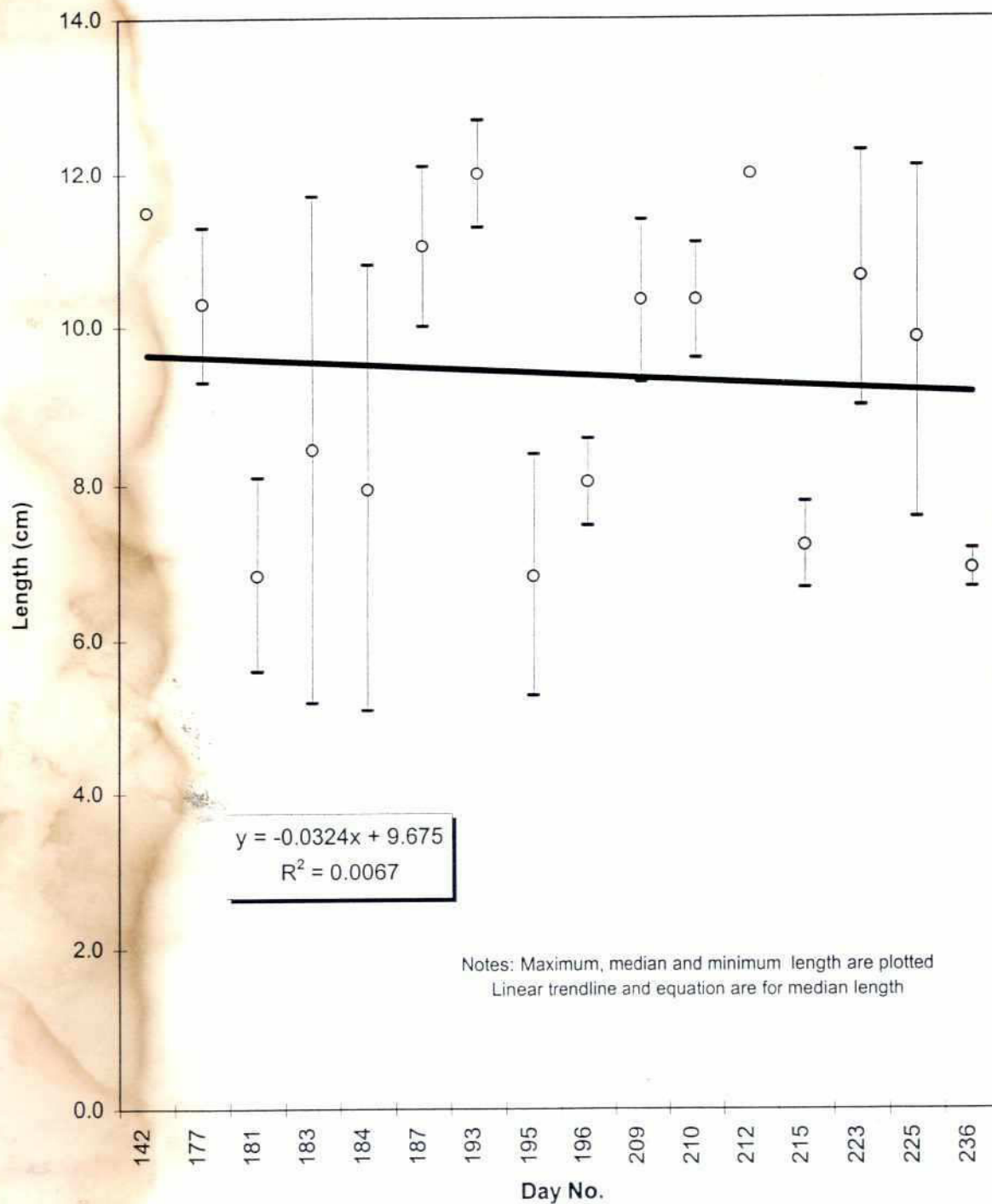
KAIKKA - River to Haor Migration



2/5
Figure 84

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

KAZOLI - River to Haor Migration

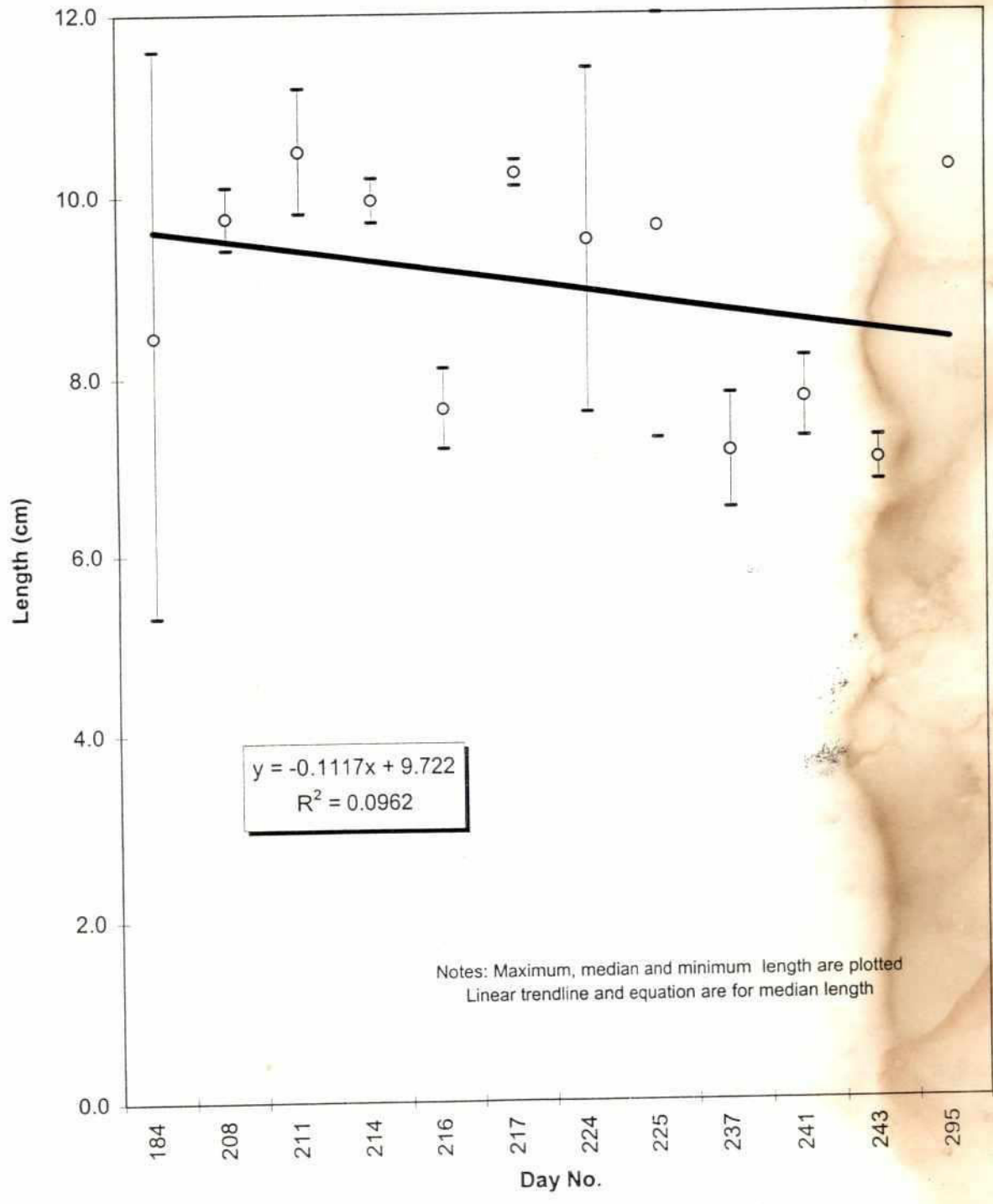


200

Figure 85

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

KAZOLI - Haor to River Migration

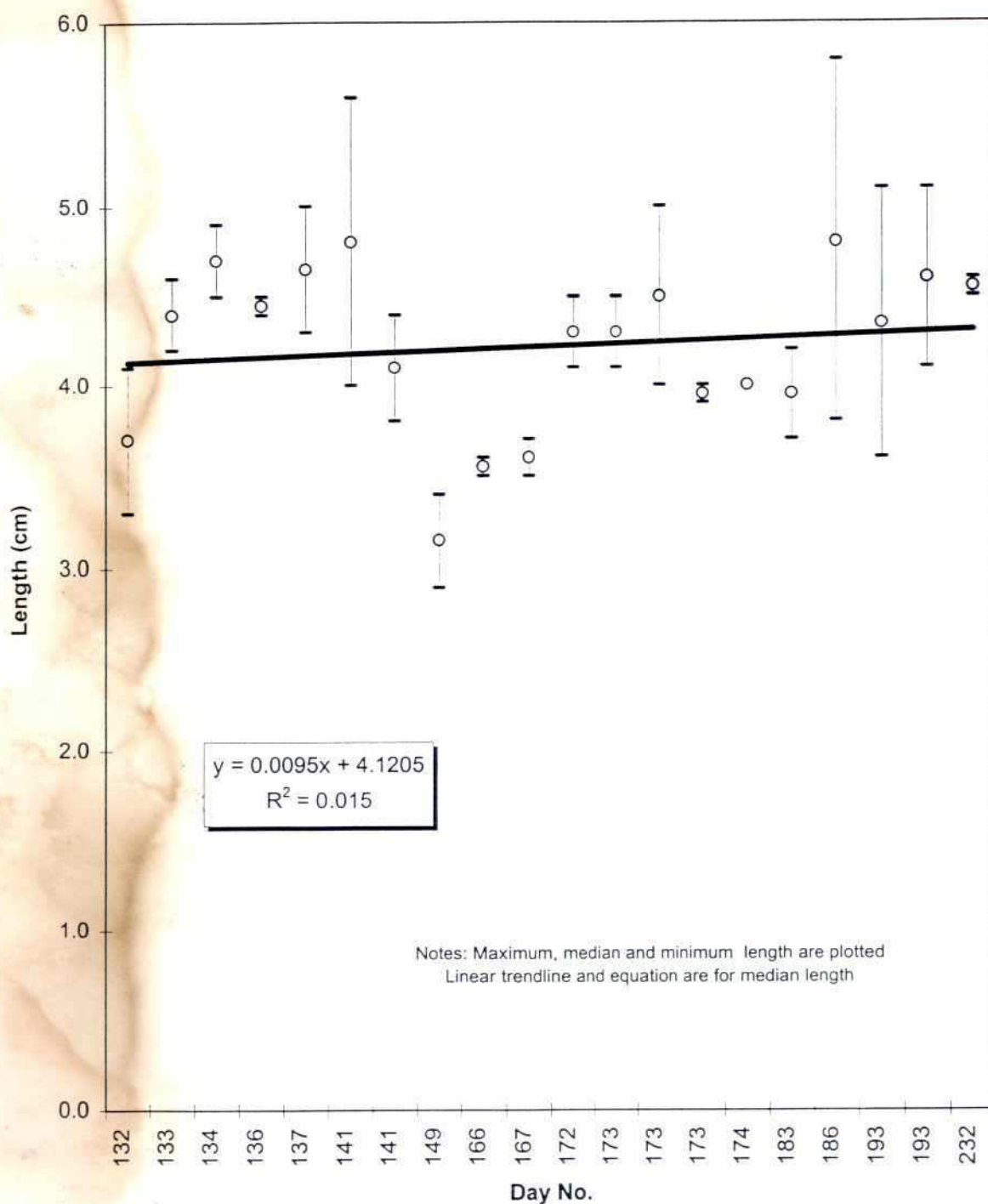


232

Figure 86

CHANGE IN BODY LENGTH OVER TIME OF FISH SAMPLED IN FISHPASS

KETCHKI - River to Haor Migration

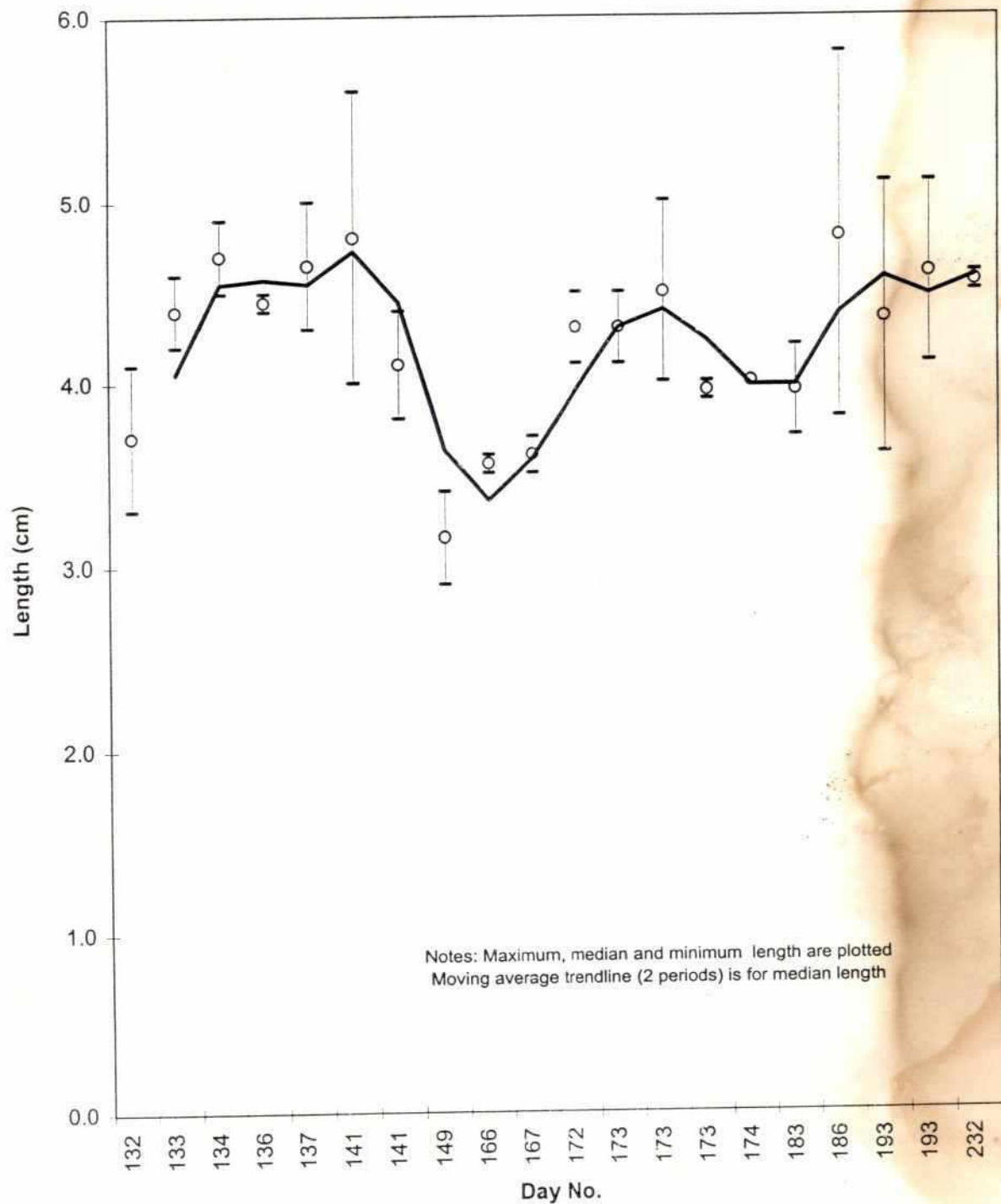


222

Figure 87

CHANGE IN BODY LENGTH OVER TIME OF FISH SAMPLED IN FISHPASS

KETCHKI - River to Haor Migration

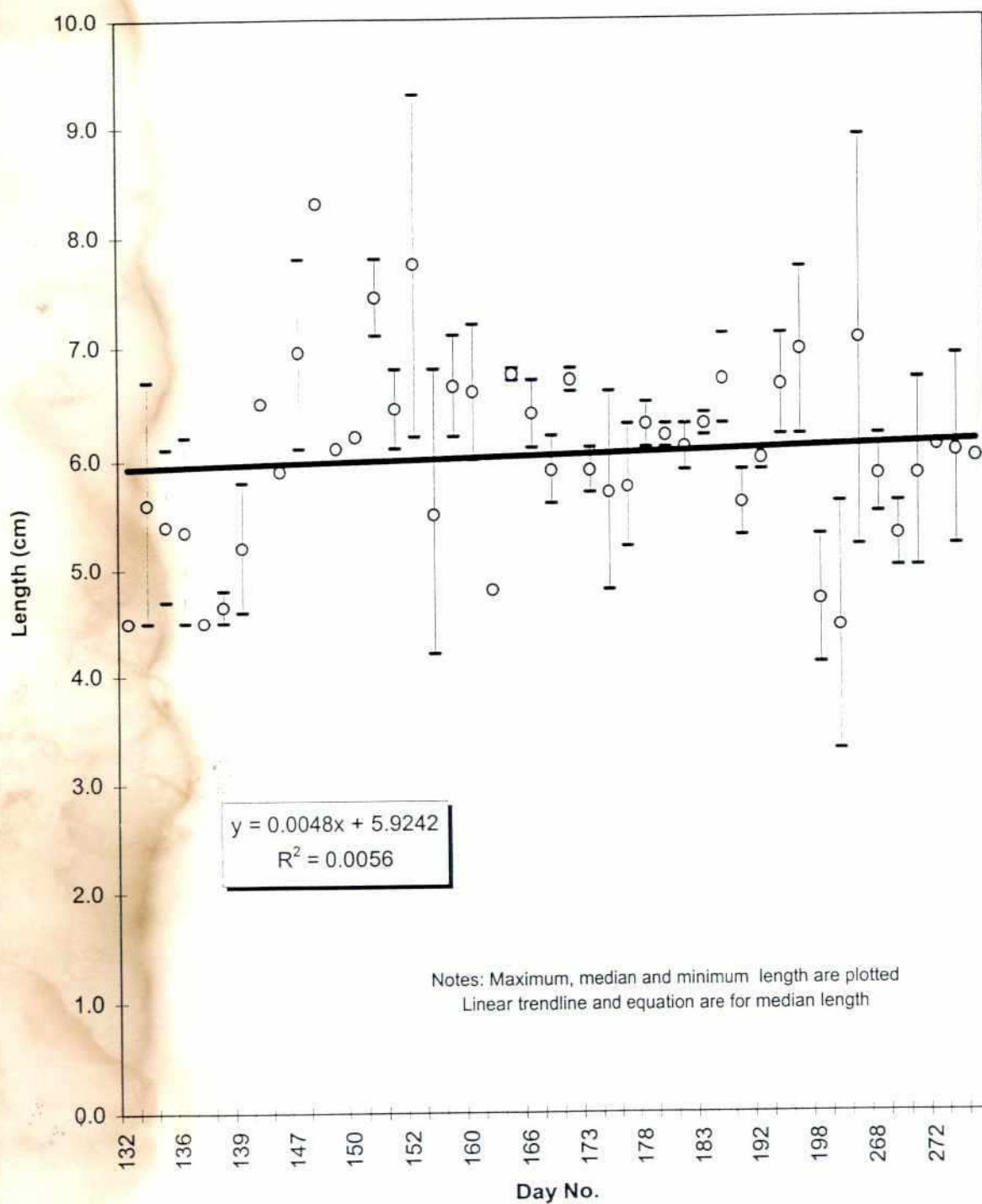


236

Figure 88

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

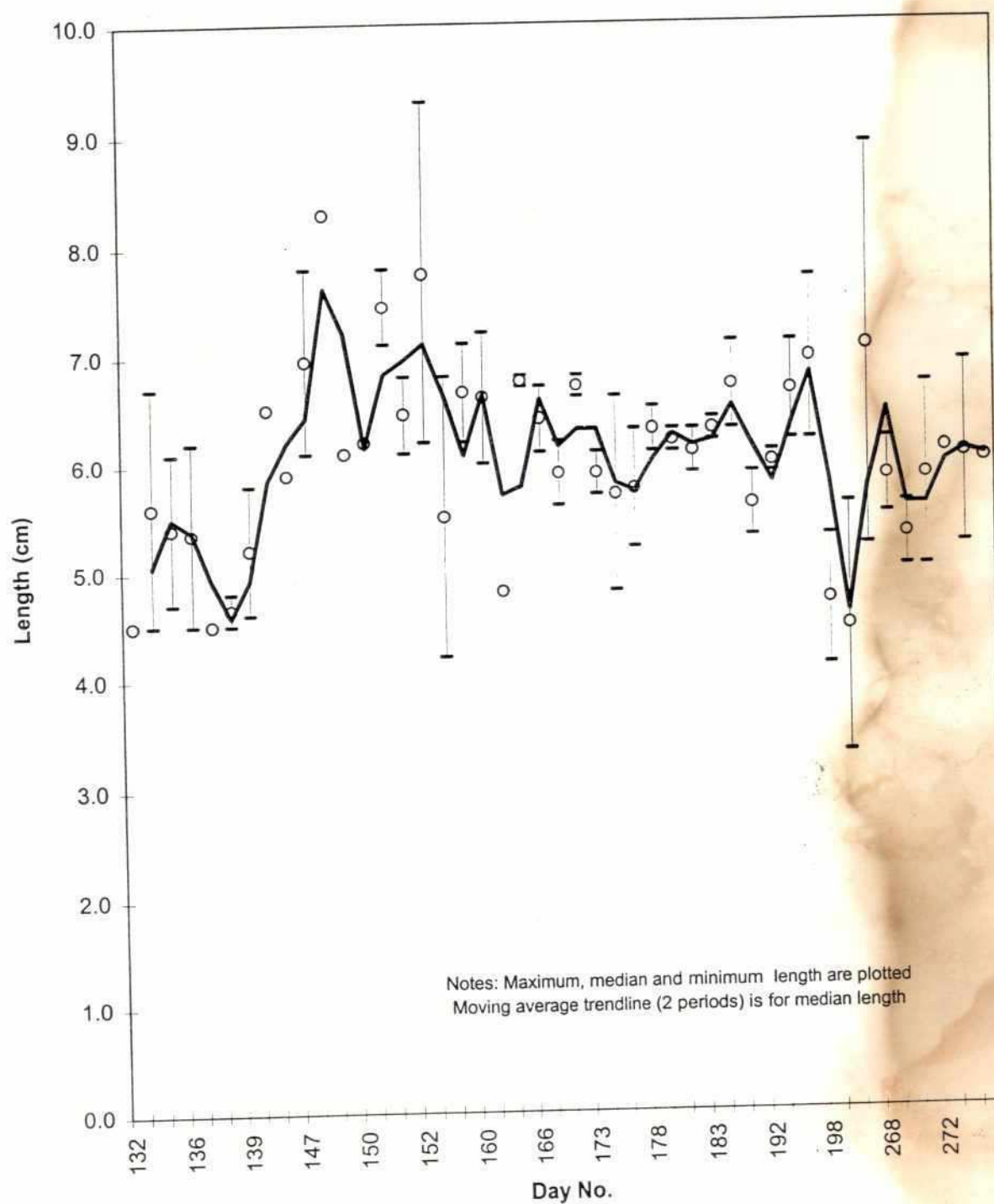
POTKA - River to Haor Migration



228

Figure 89

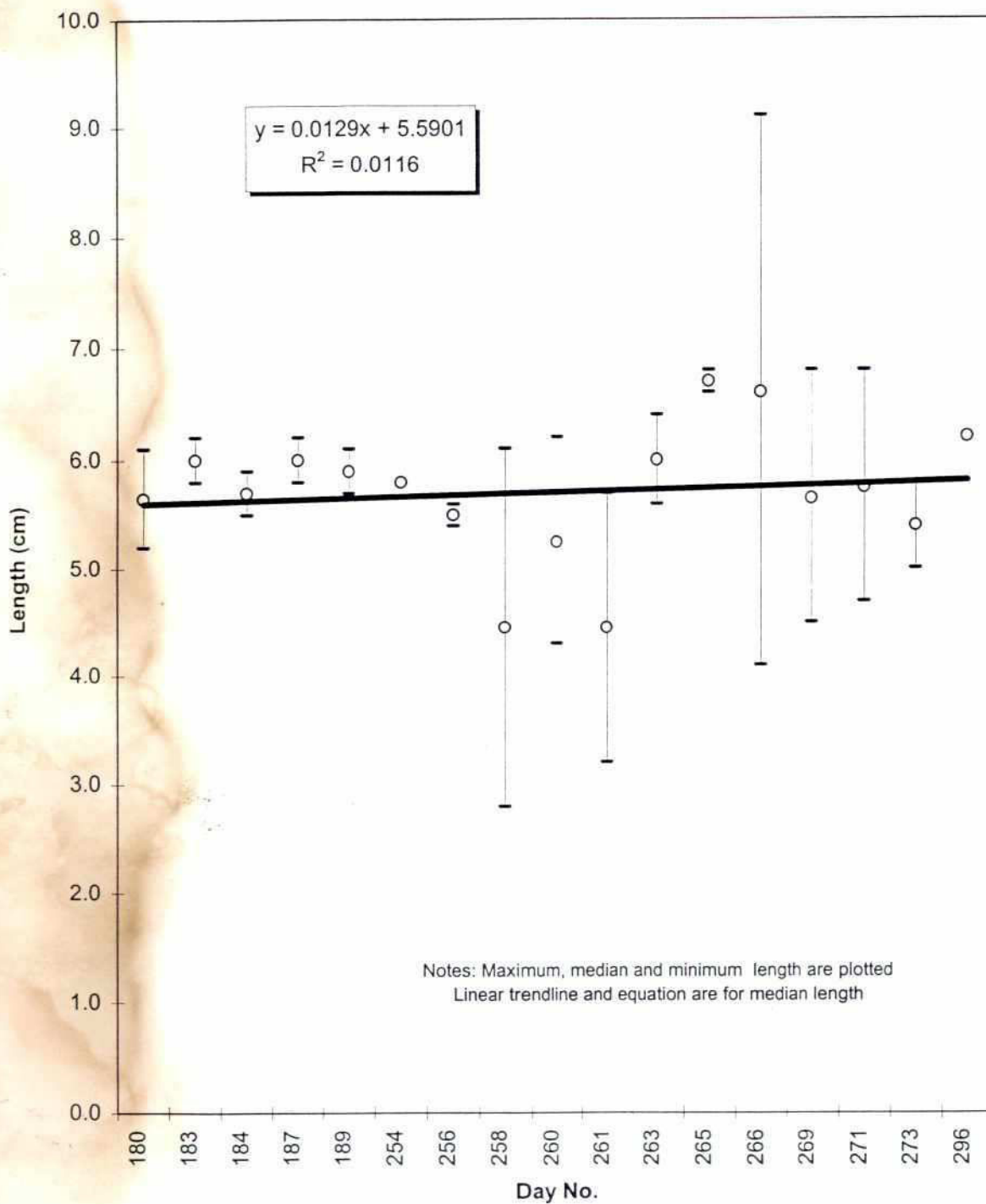
CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS
POTKA - River to Haor Migration



22a
Figure 90

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

POTKA - Haor to River Migration

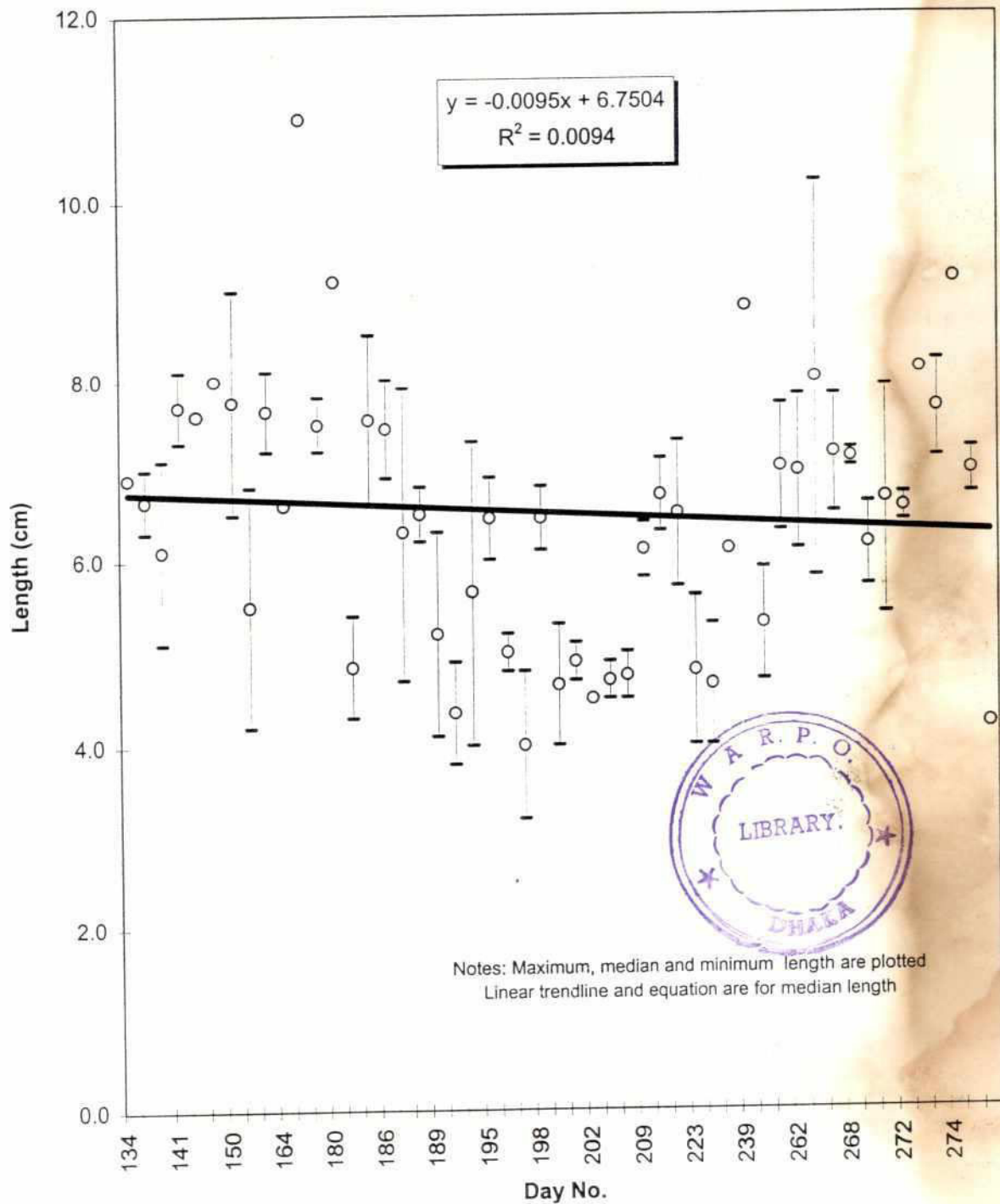


209

Figure 91

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

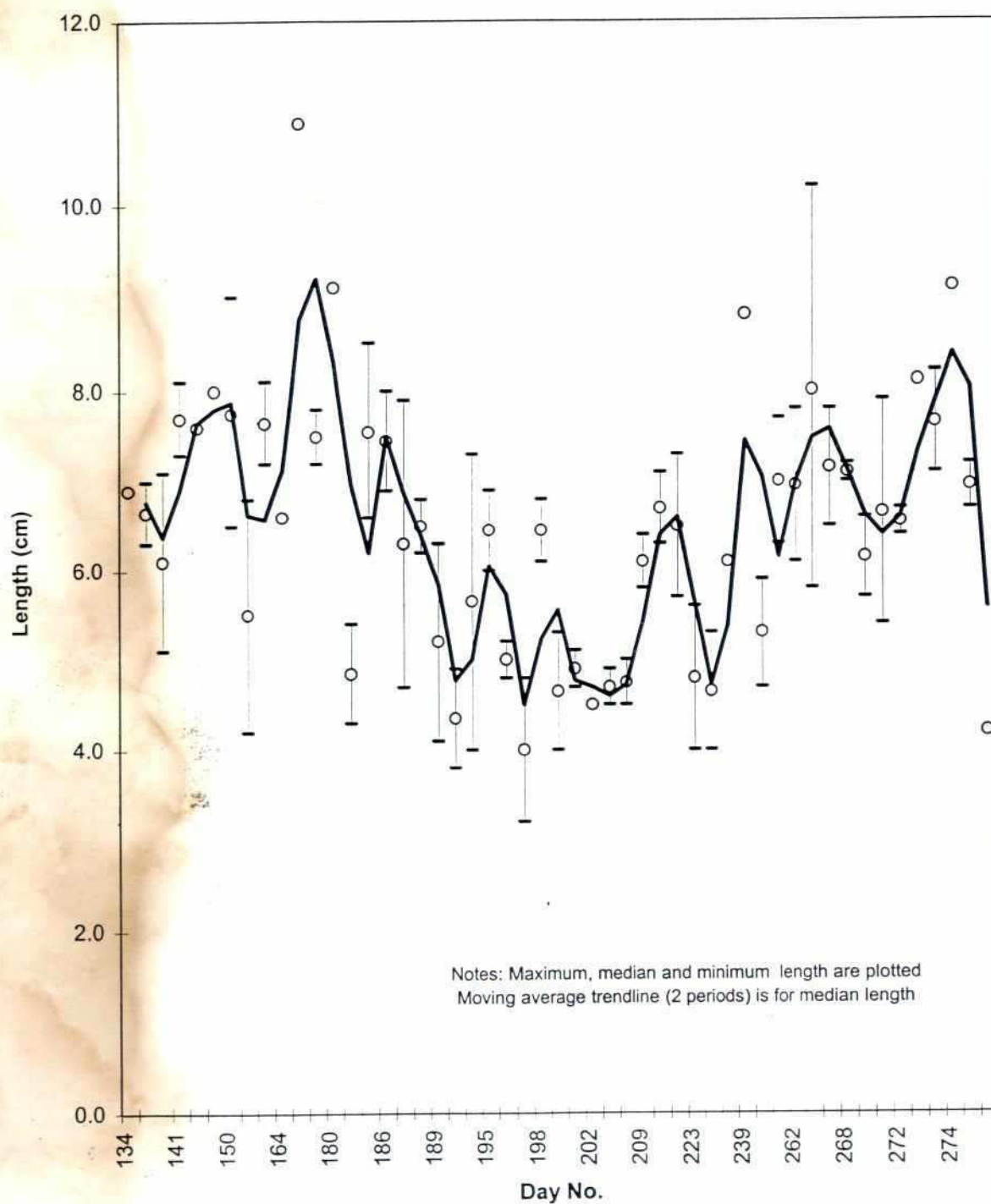
RANI - River to Haor Migration



229
Figure 92

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

RANI - River to Haor Migration



208
Figure 93

CHANGE IN BODY LENGTH OVER TIME OF FISH SAMPLED IN FISHPASS

RANI - Haor to River Migration

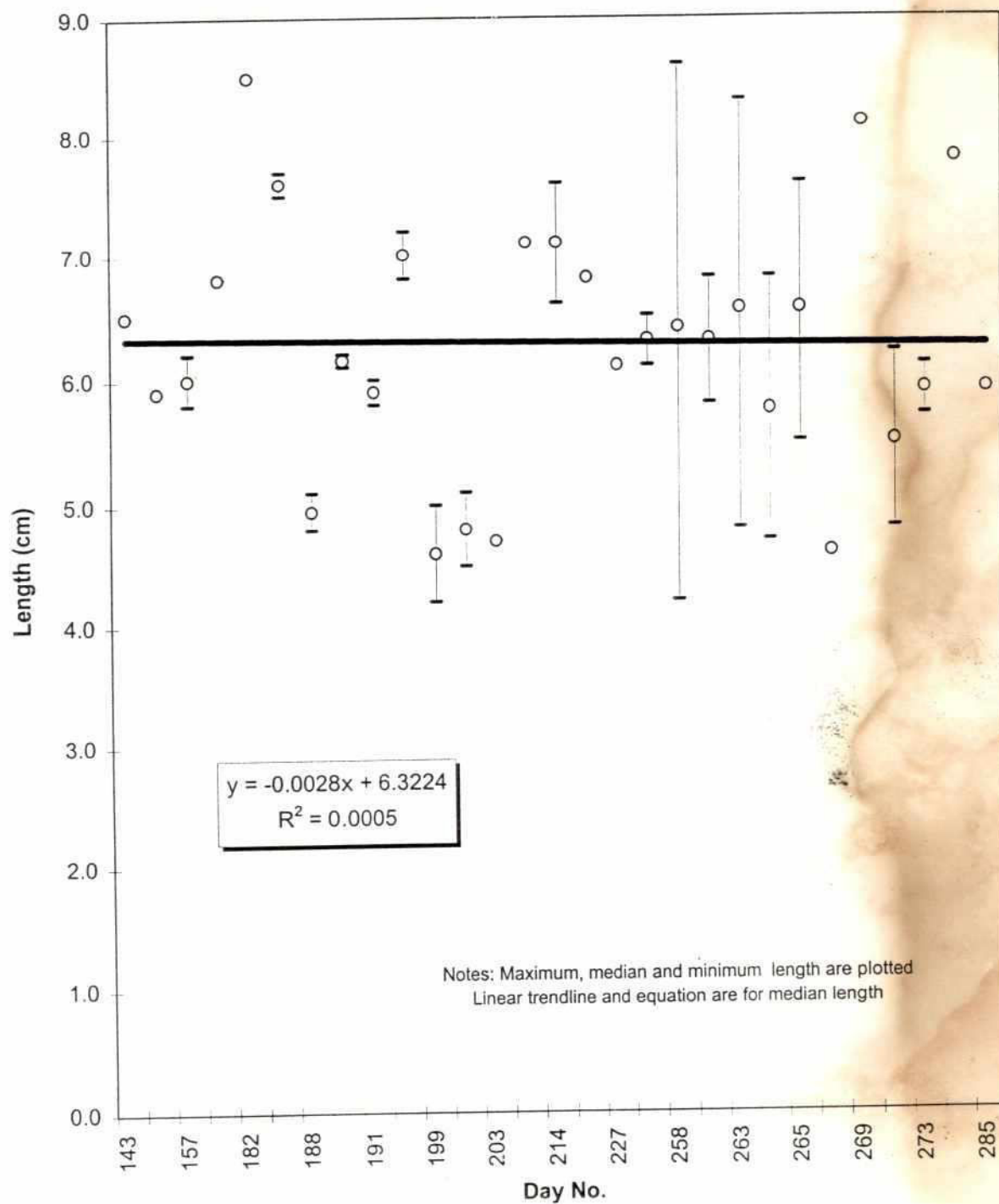


Figure 94

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

SHING - River to Haor Migration

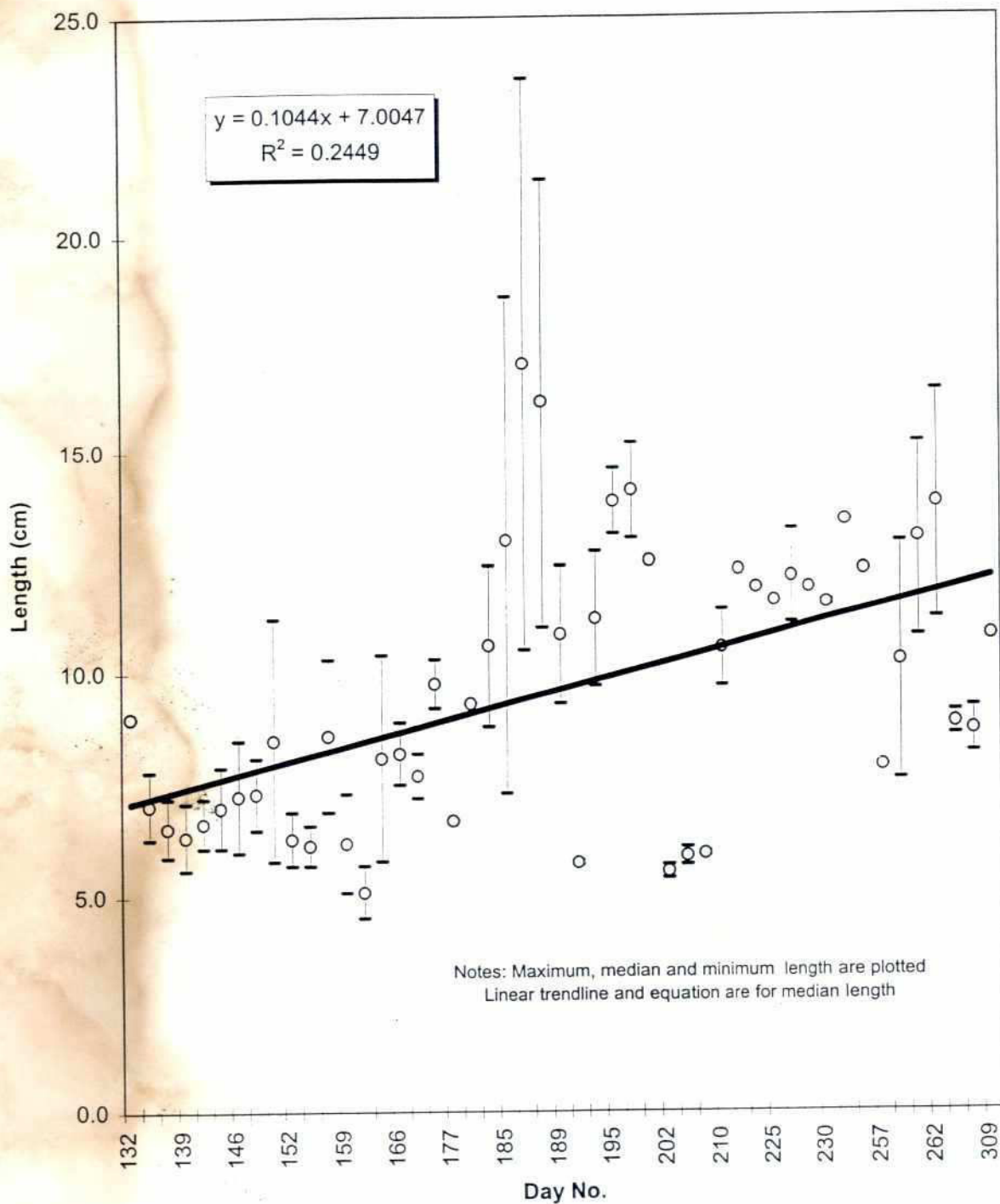


Figure 95

CHANGE IN BODY LENGTH OVER TIME OF FISH SAMPLED IN FISHPASS

SHING - River to Haor Migration

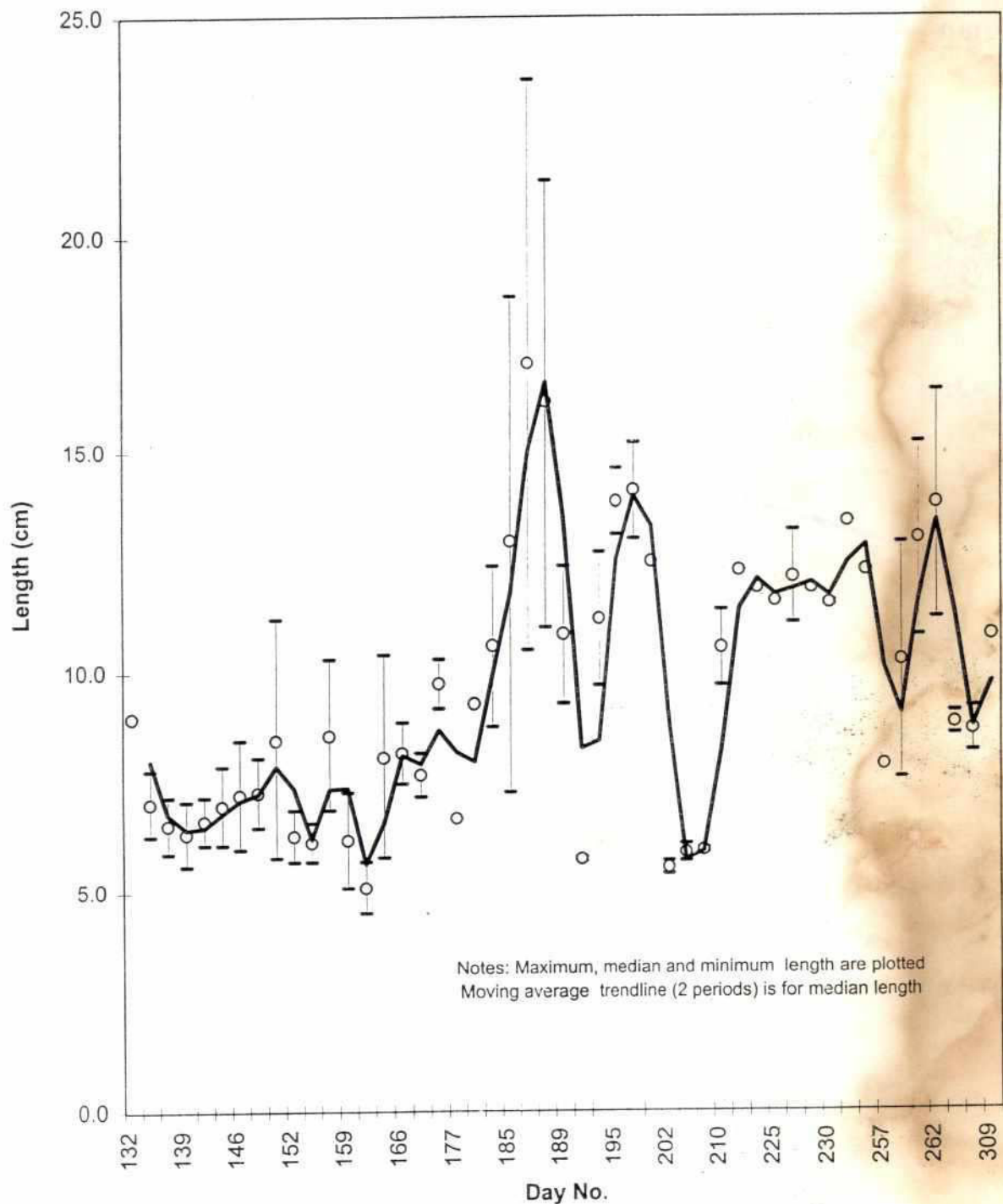
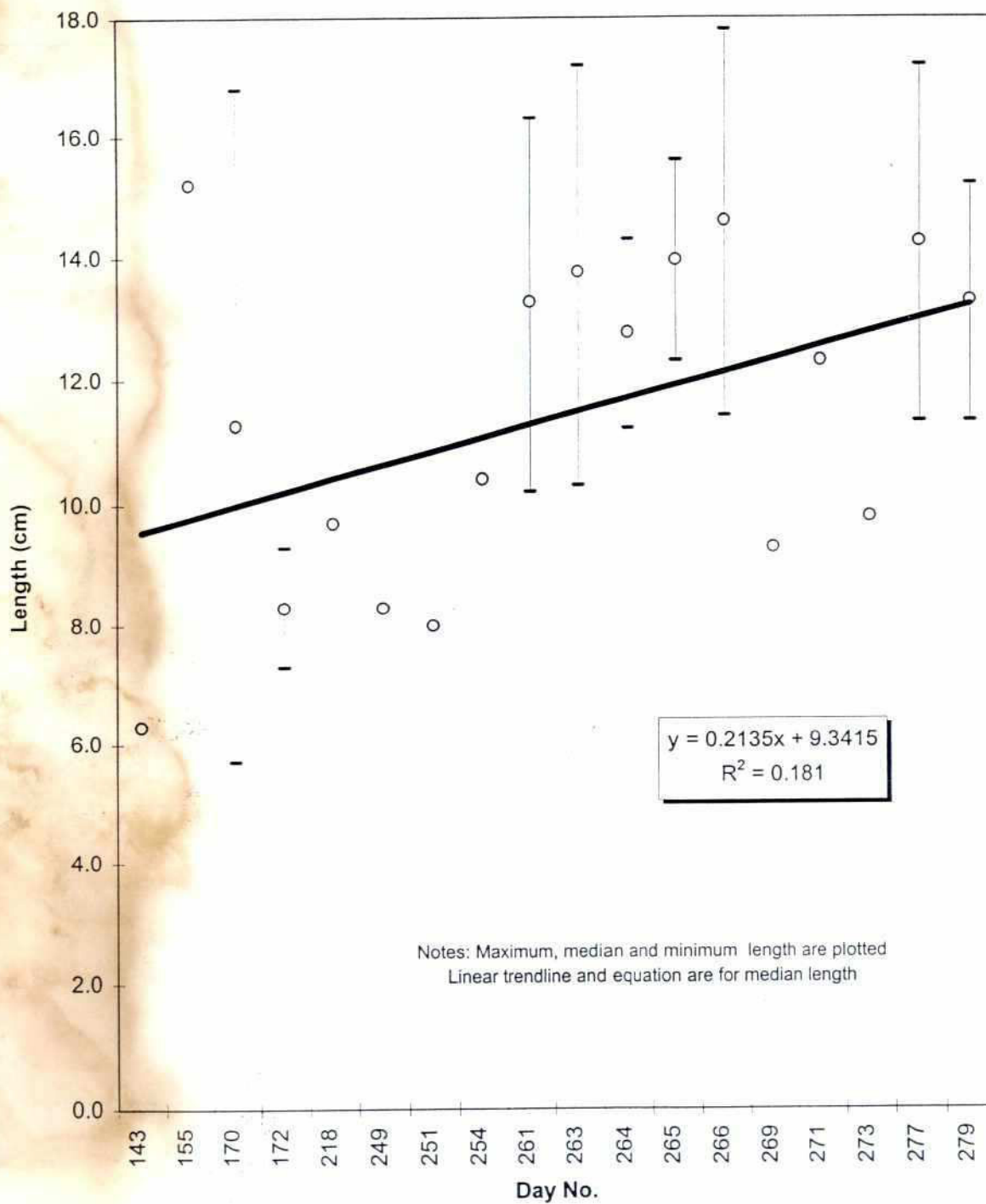


Figure 96

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

SHING - Haor to River Migration

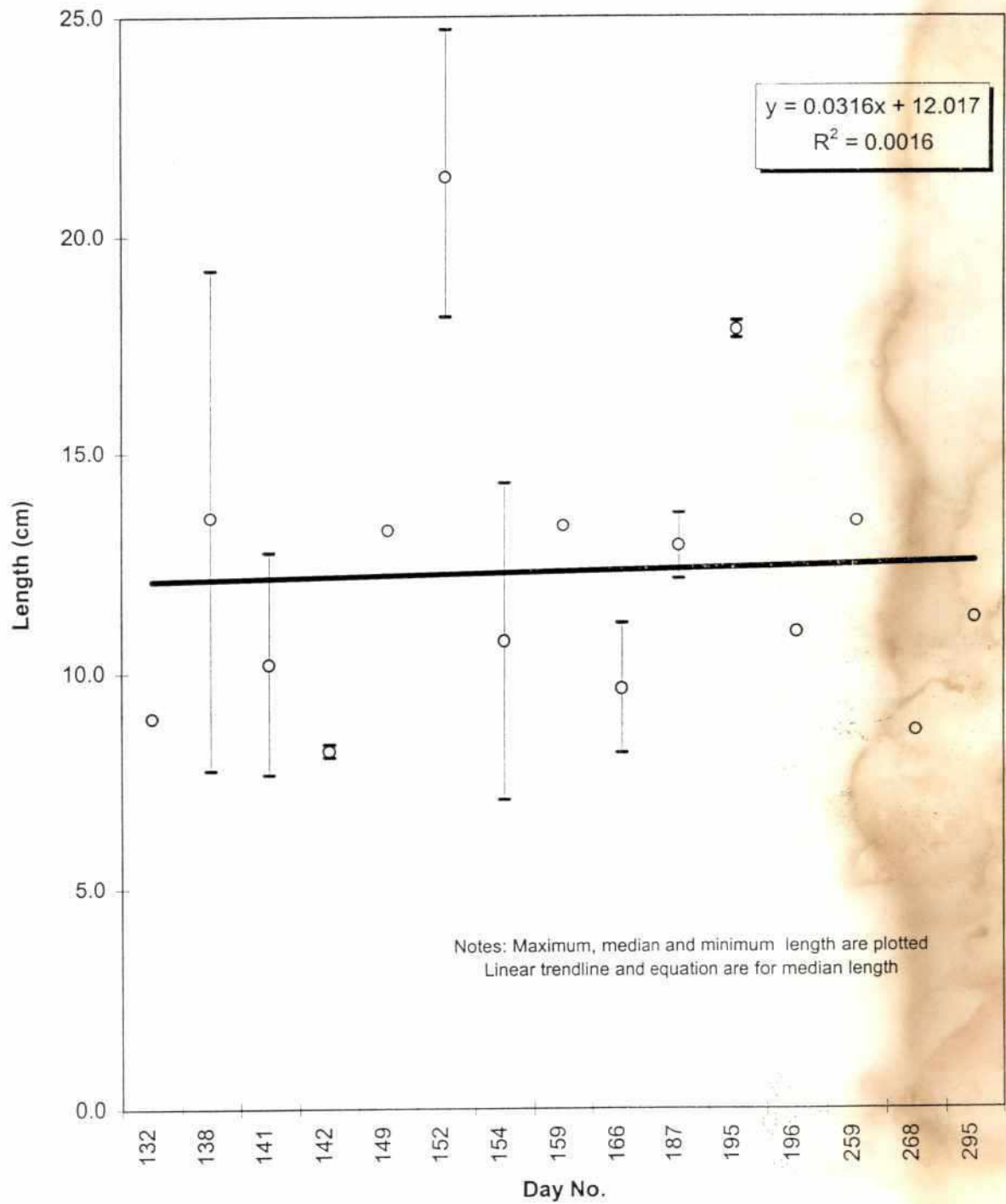


602

Figure 97

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

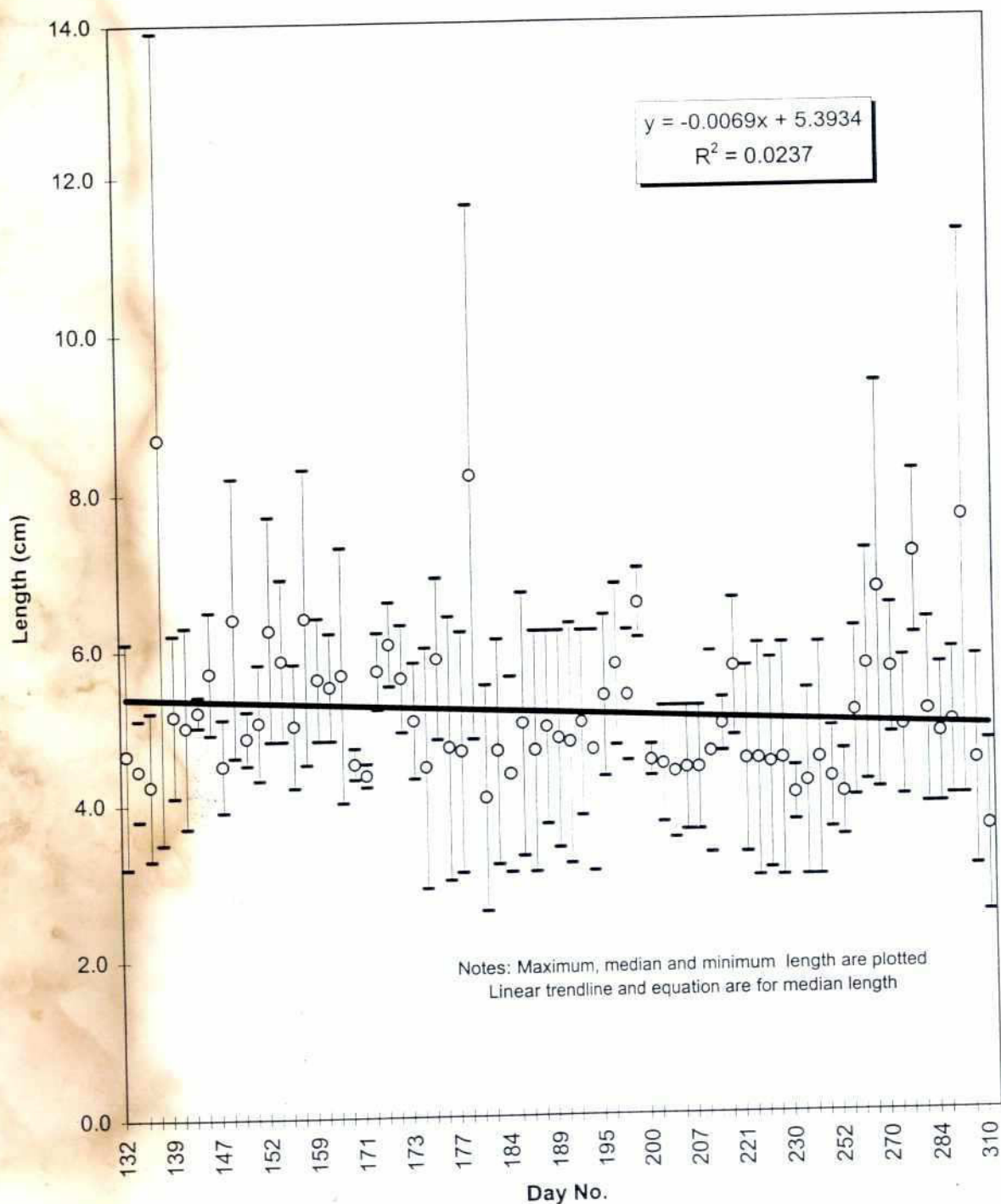
TAKI - River to Haor Migration



606
Figure 98

CHANGE IN BODY LENGTH OVER TIME
OF FISH SAMPLED IN FISHPASS

ICHA - River to Haor Migration



602

Figure 99

CHANGE IN BODY LENGTH OVER TIME OF FISH SAMPLED IN FISHPASS

ICHA - Haor to River Migration

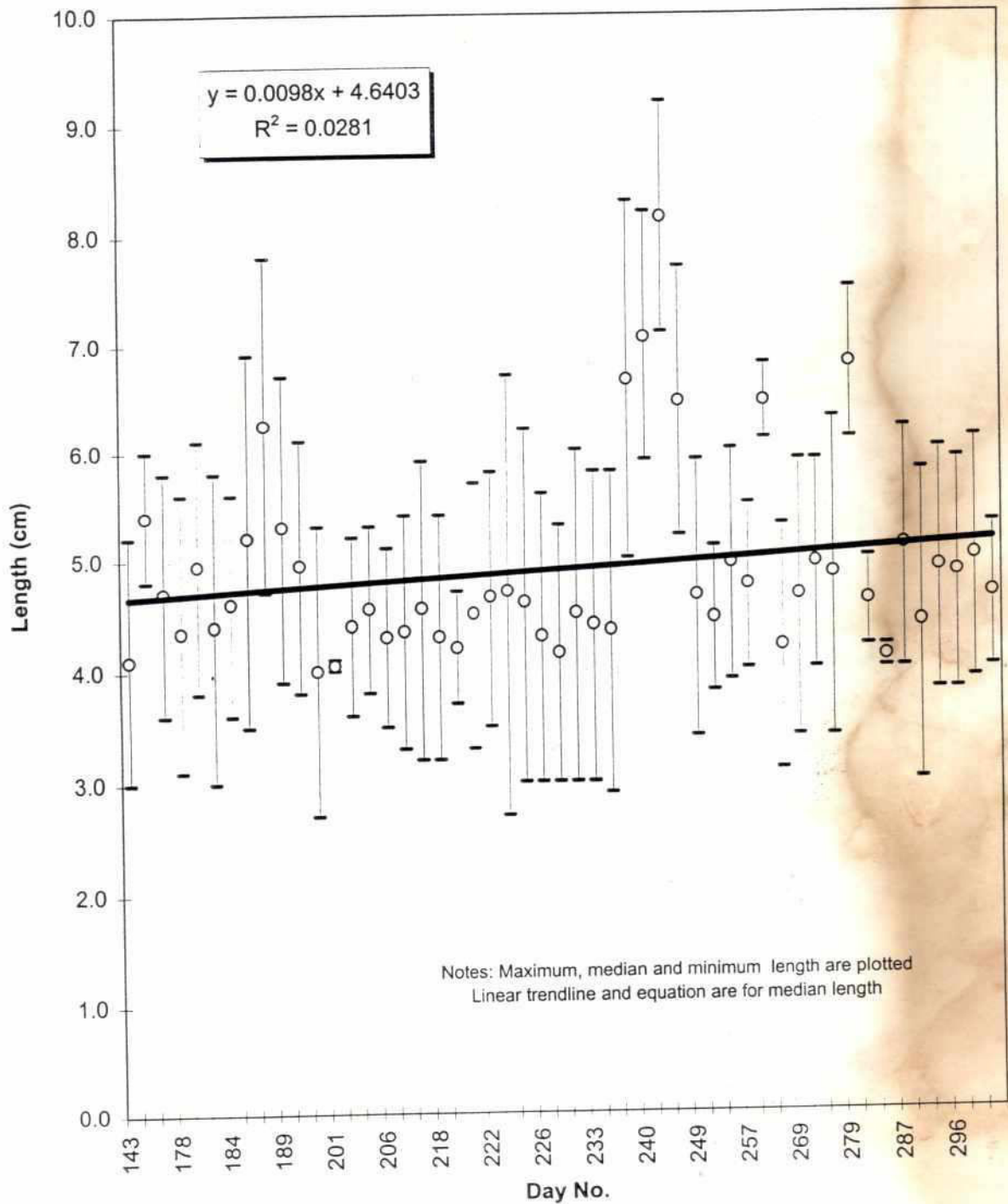
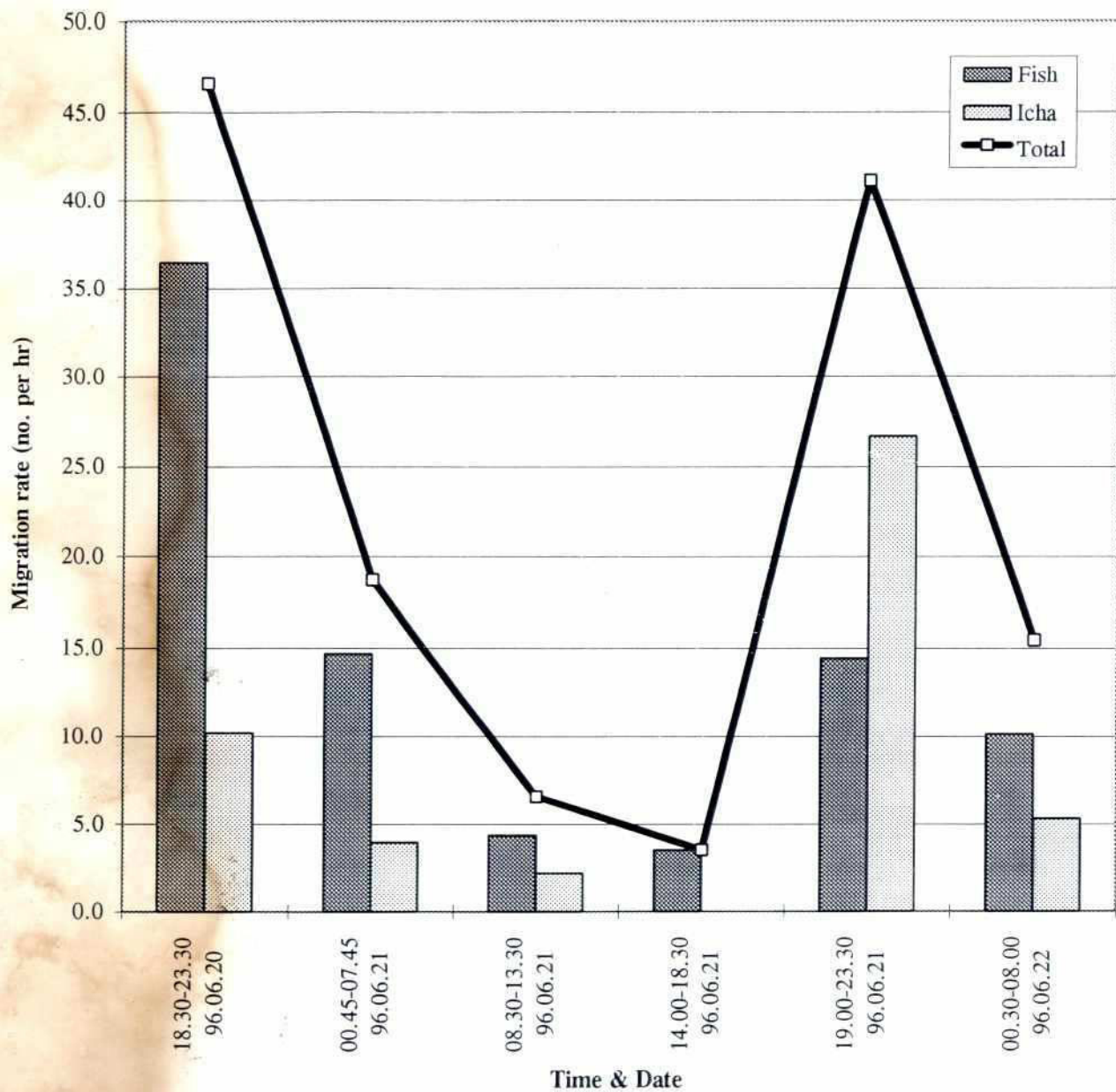


Figure 100

DIURNAL VARIATION IN MIGRATION RATE
Direction of Migration: River to Haor

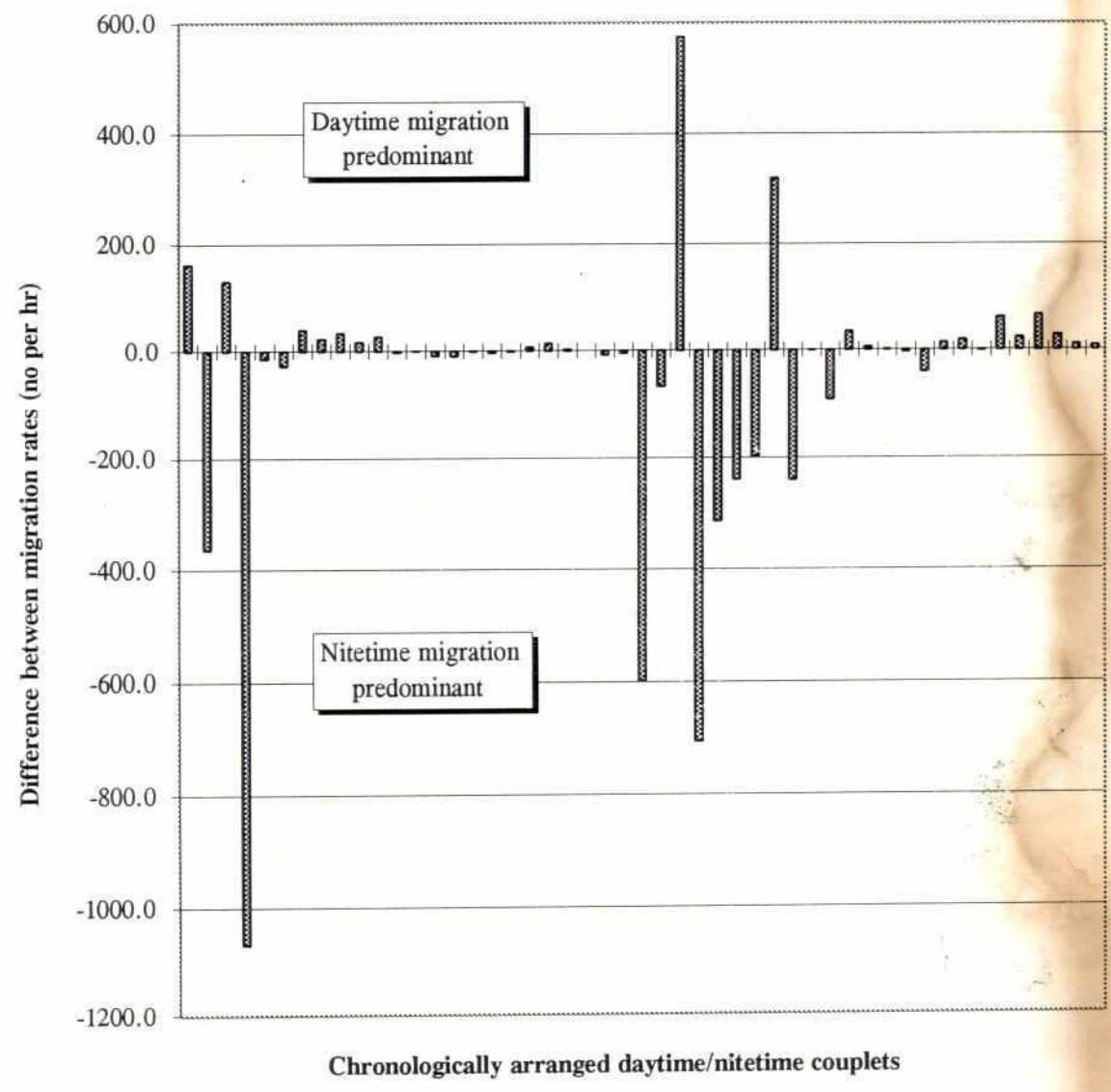


C04

Figure 101

DIFFERENCE BETWEEN DAYTIME
AND NITETIME MIGRATION RATES
Direction of Migration: River to Haor

FISH

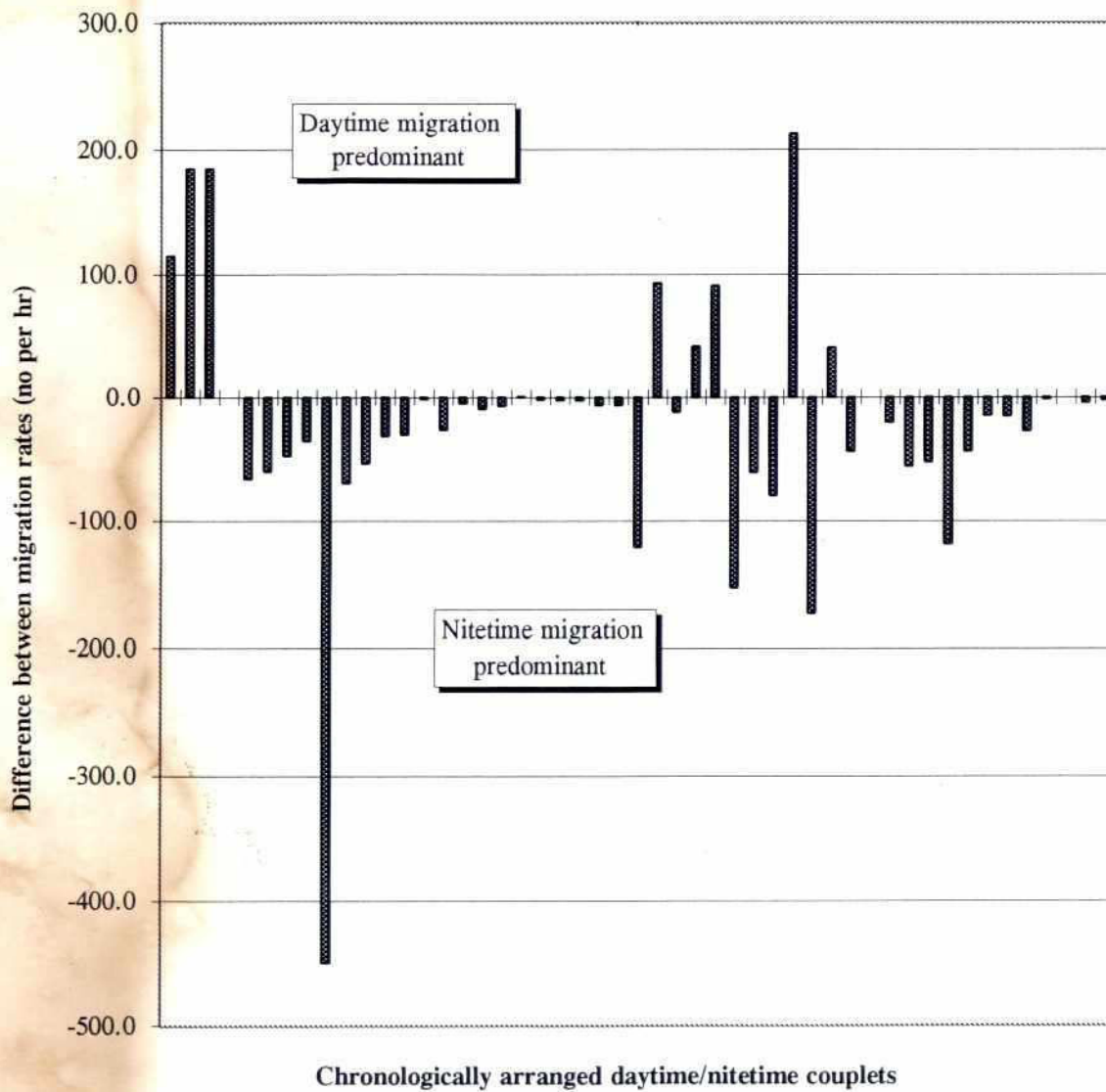


409

Figure 102

DIFFERENCE BETWEEN DAYTIME
AND NITETIME MIGRATION RATES
Direction of Migration: River to Haor

ICHA



005

Figure 103

FISH PRODUCTION IN KAWADIGHI HAOR
from beels during the dry season
and the floodplain during the monsoon

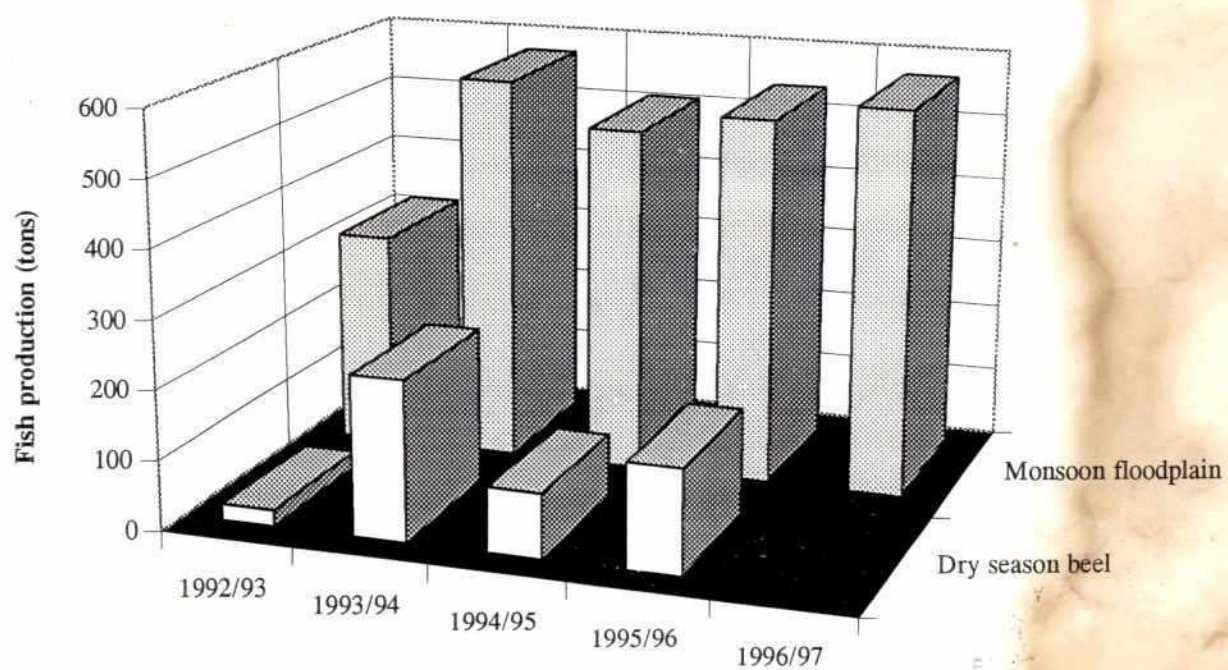
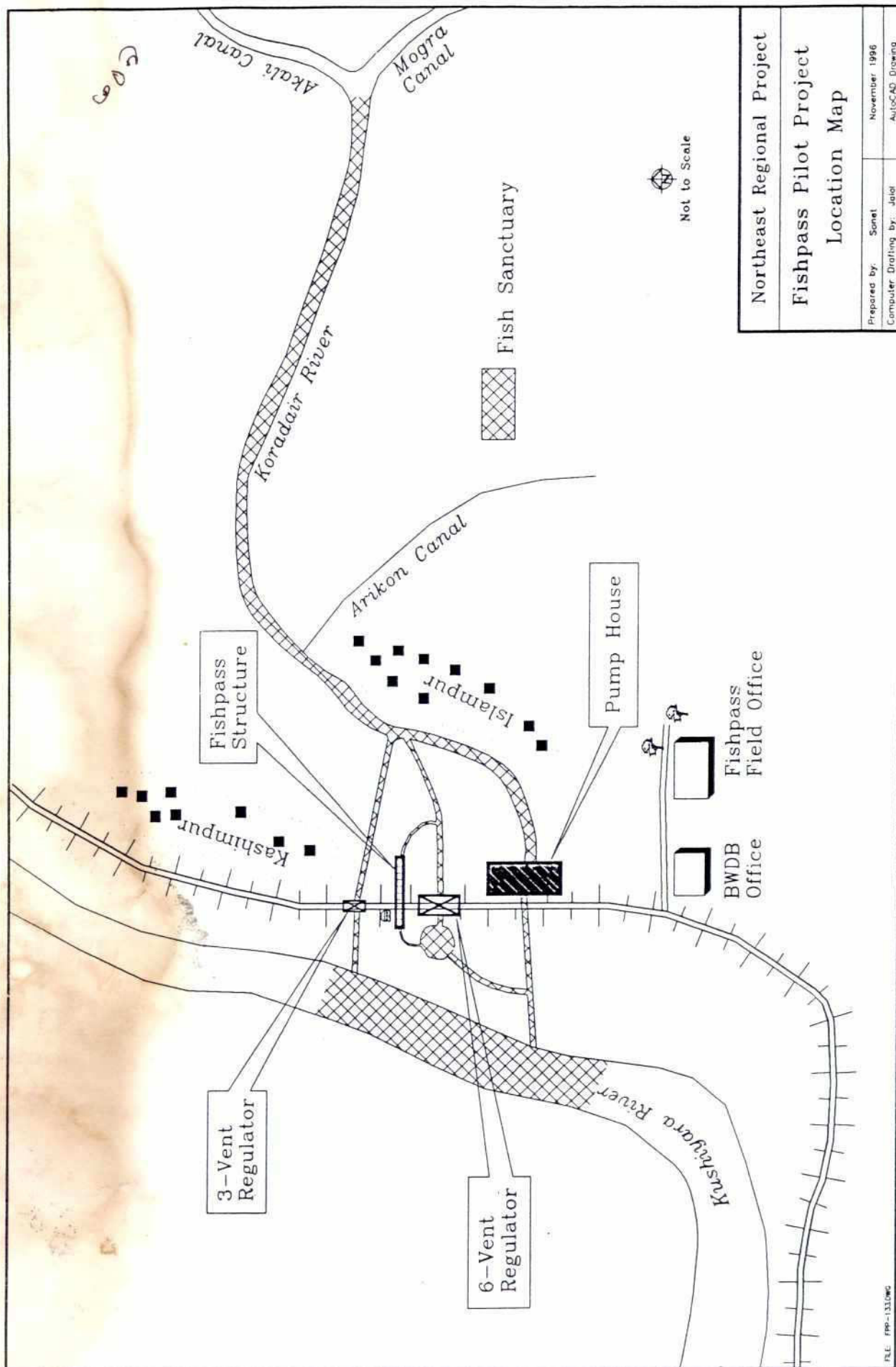


Figure 104



620

Figure 105

RELATIONSHIP BETWEEN FLOOD INTENSITY
& FISH PRODUCTION (in the same year)
IN KAWADIGHI HAOR

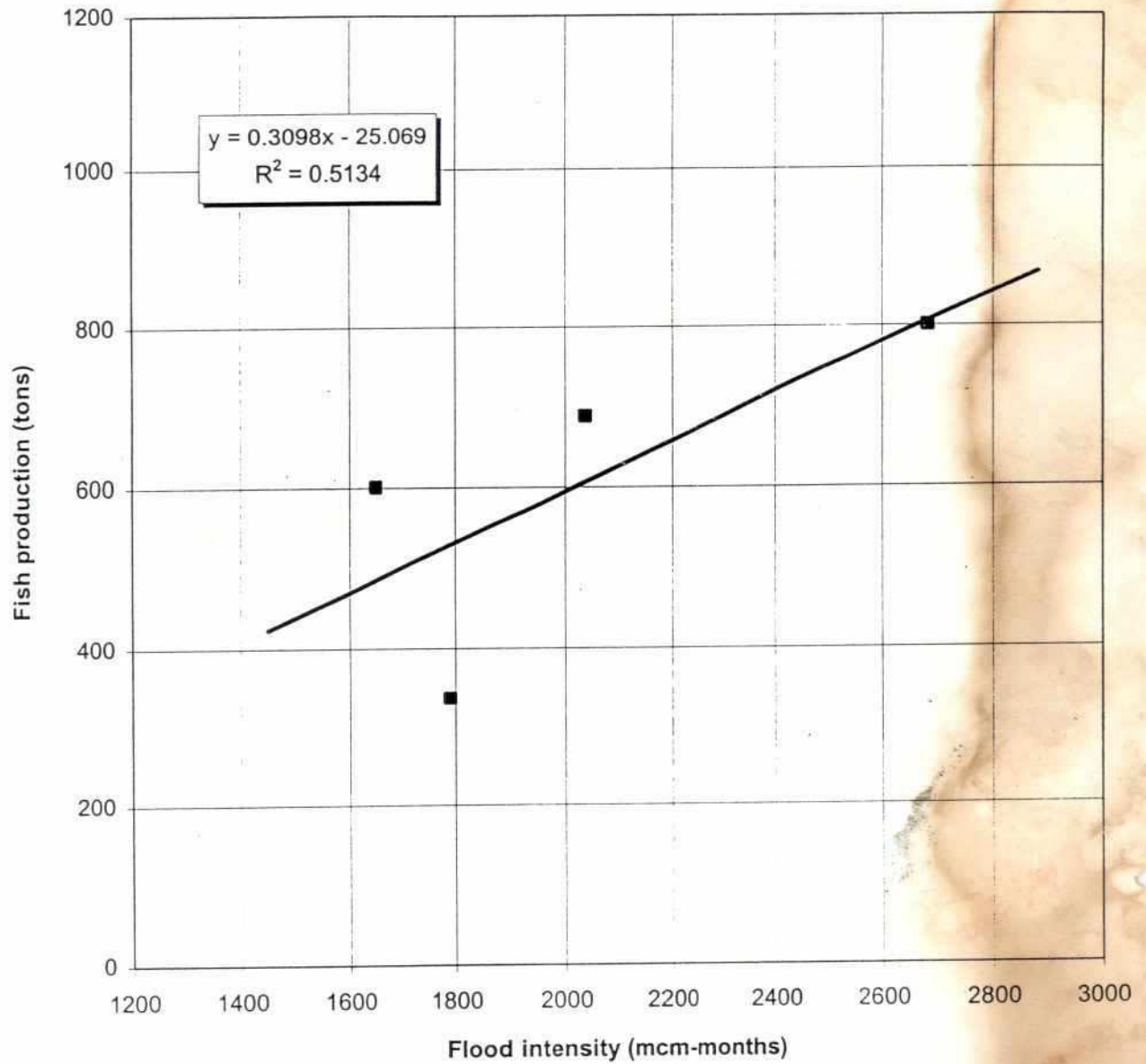
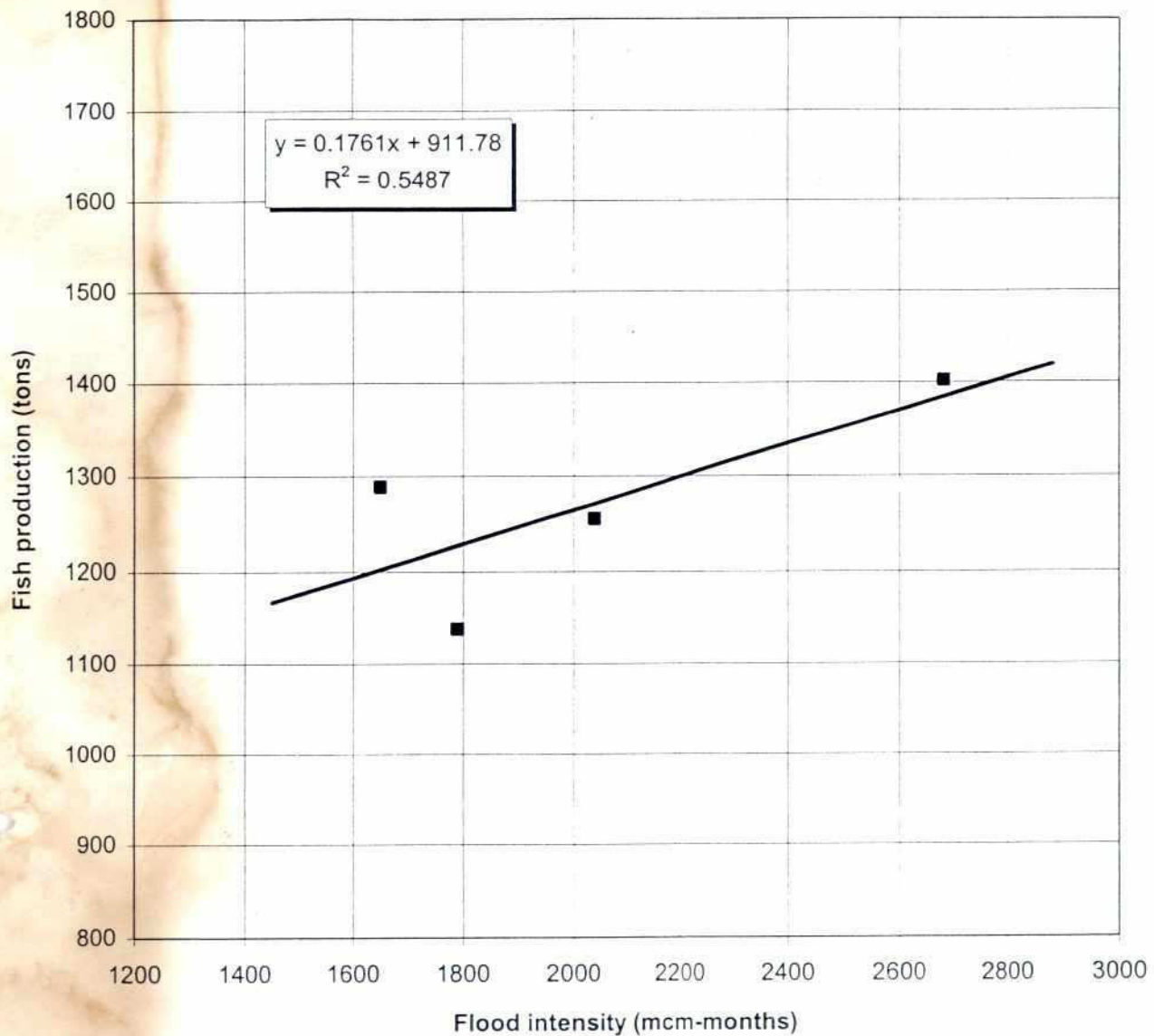


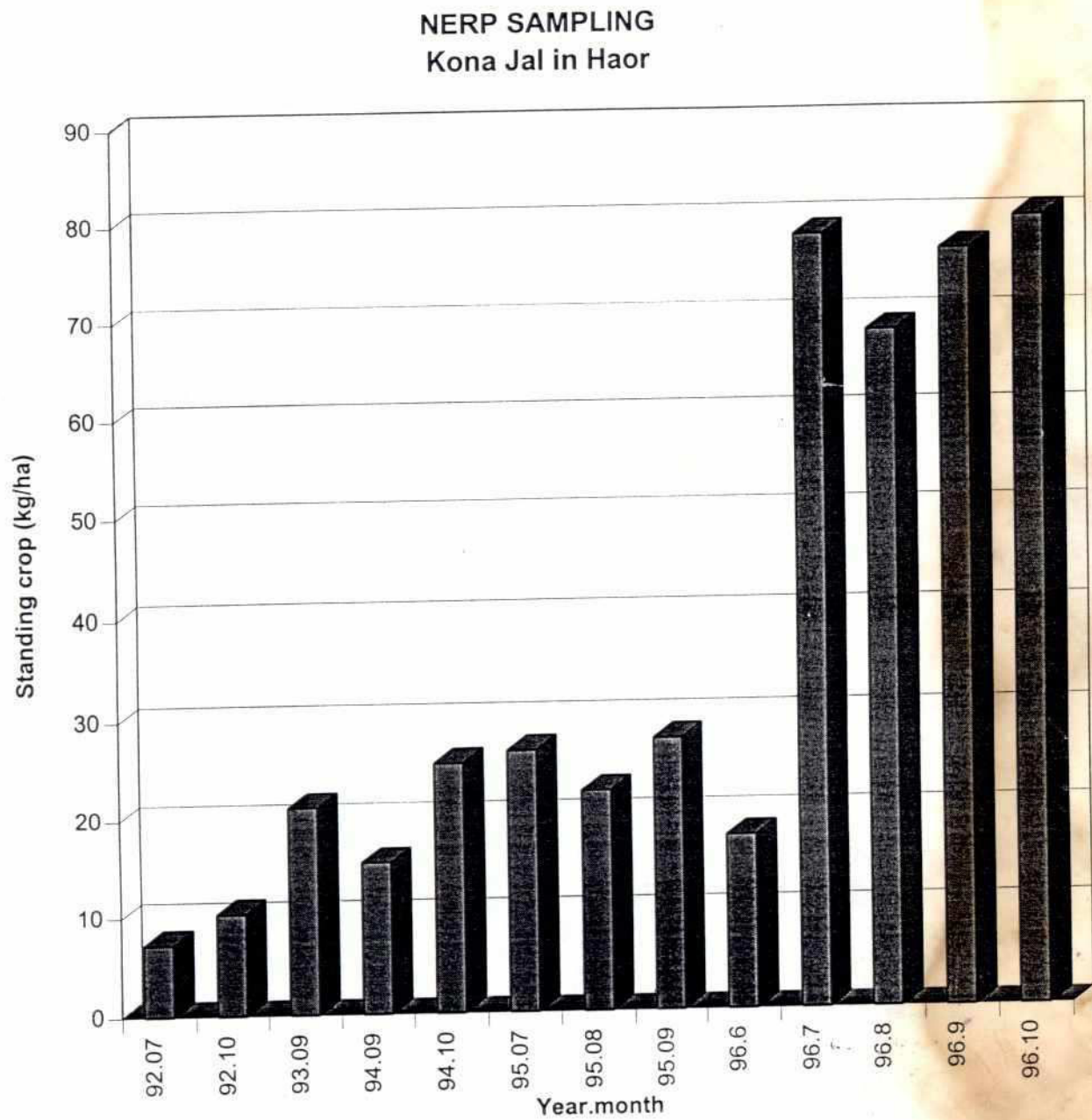
Figure 106

RELATIONSHIP BETWEEN FLOOD INTENSITY
& FISH PRODUCTION (in the same year plus the following year)
FOR KAWADIGHI HAOR



002

Figure 107



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Figure 108

NERP SAMPLING
Kona Jal in River

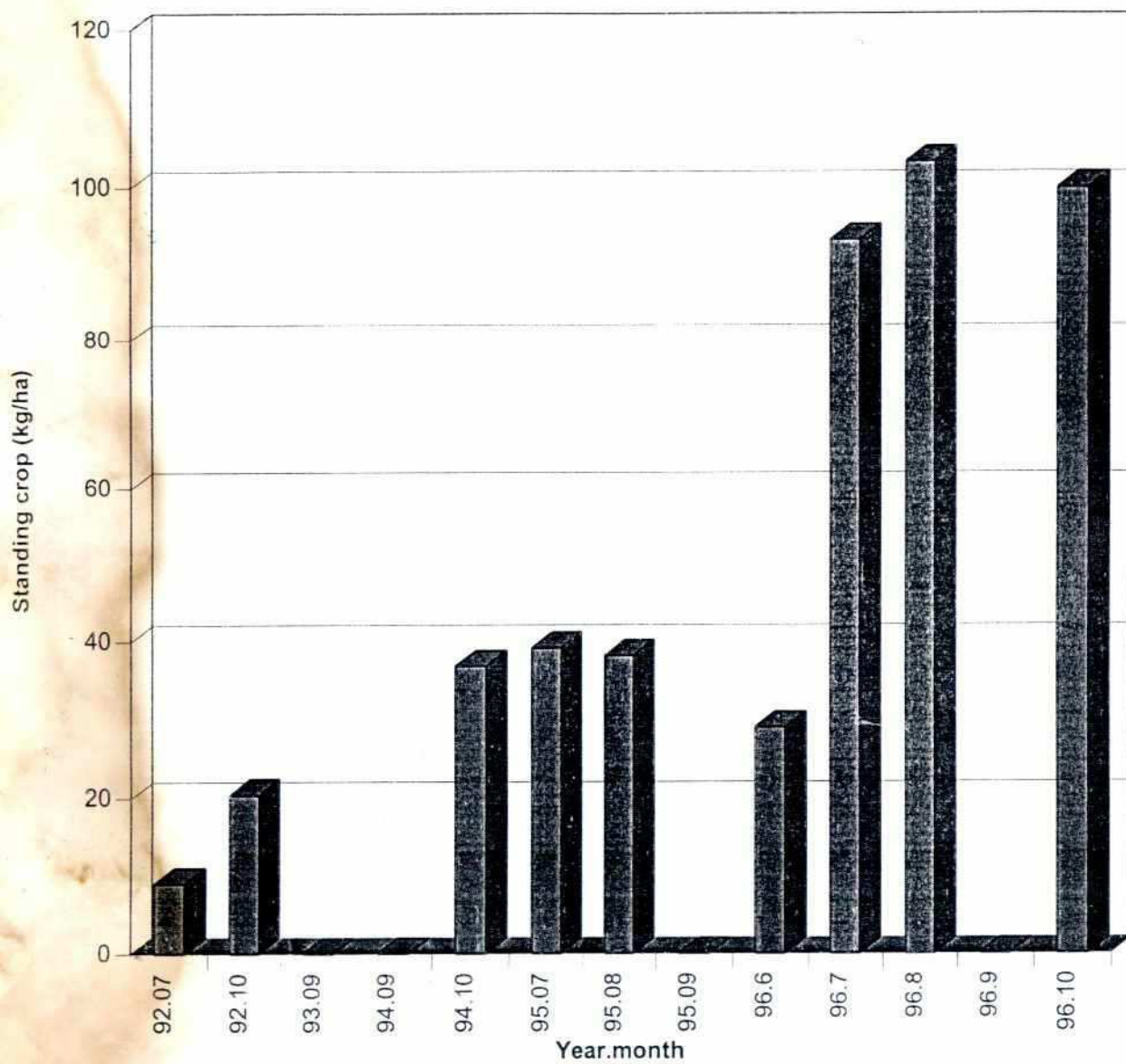


Figure 109

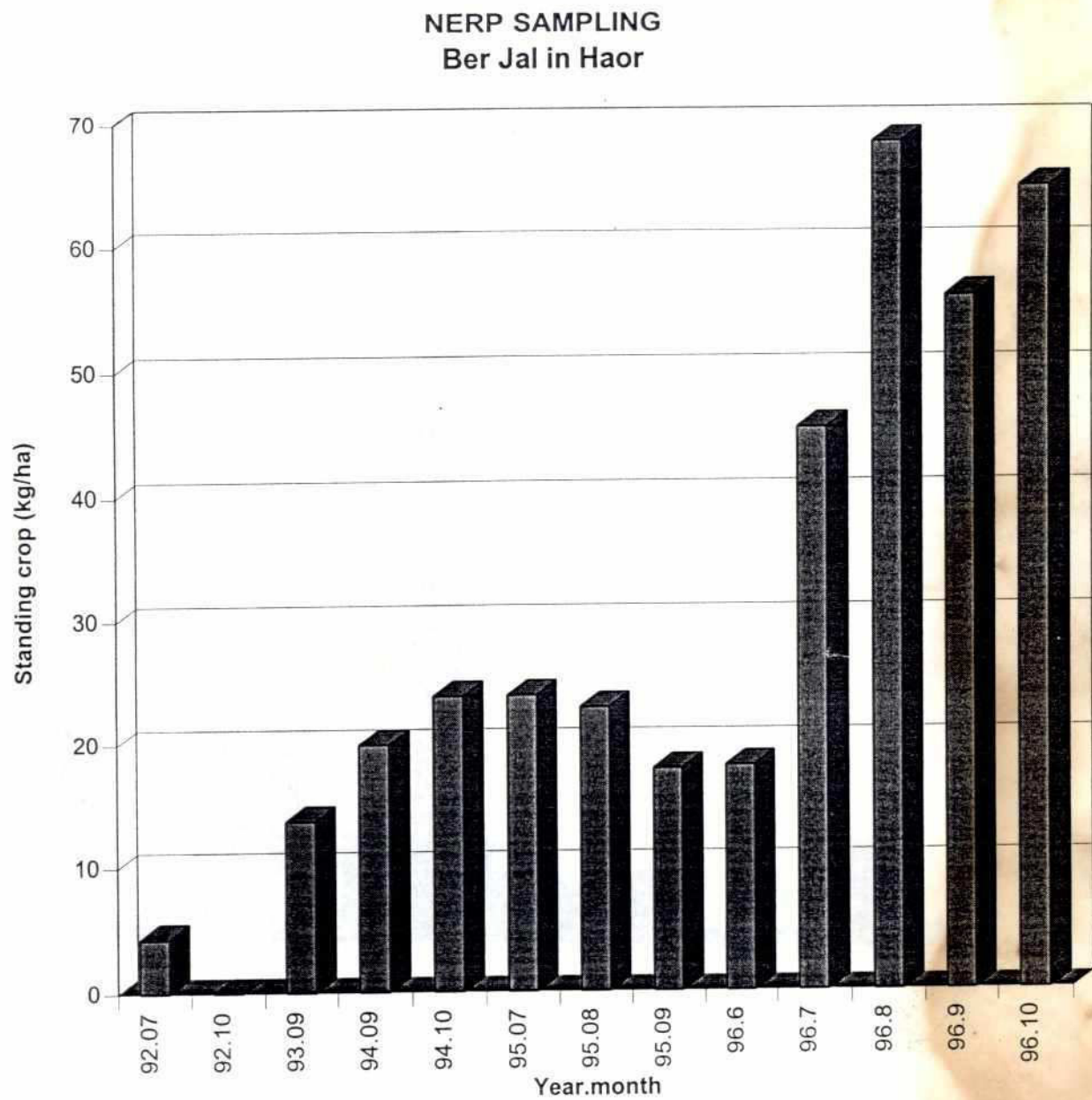
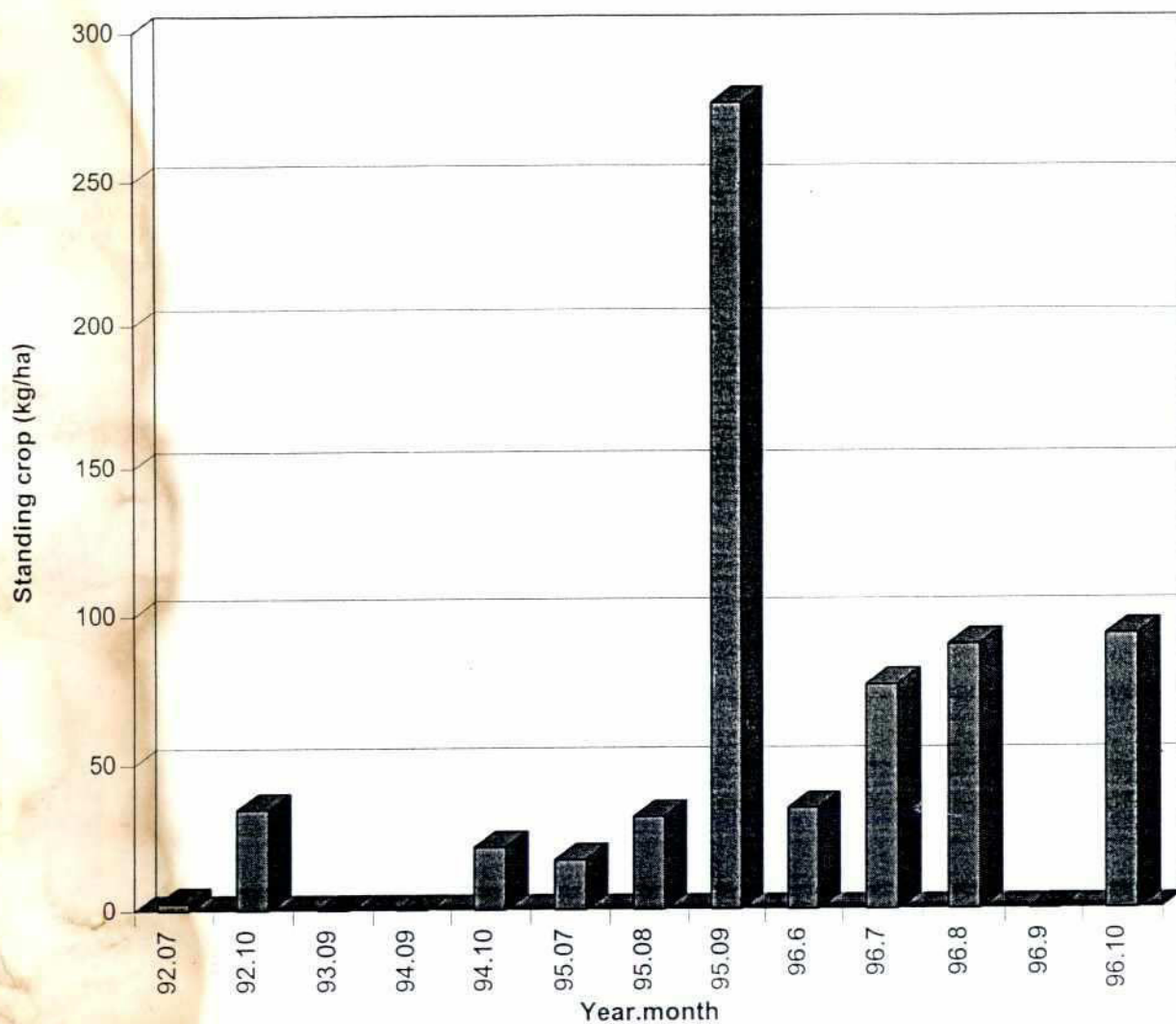


Figure 110

NERP SAMPLING
Ber Jal in River



ABUNDANCE OF RUI

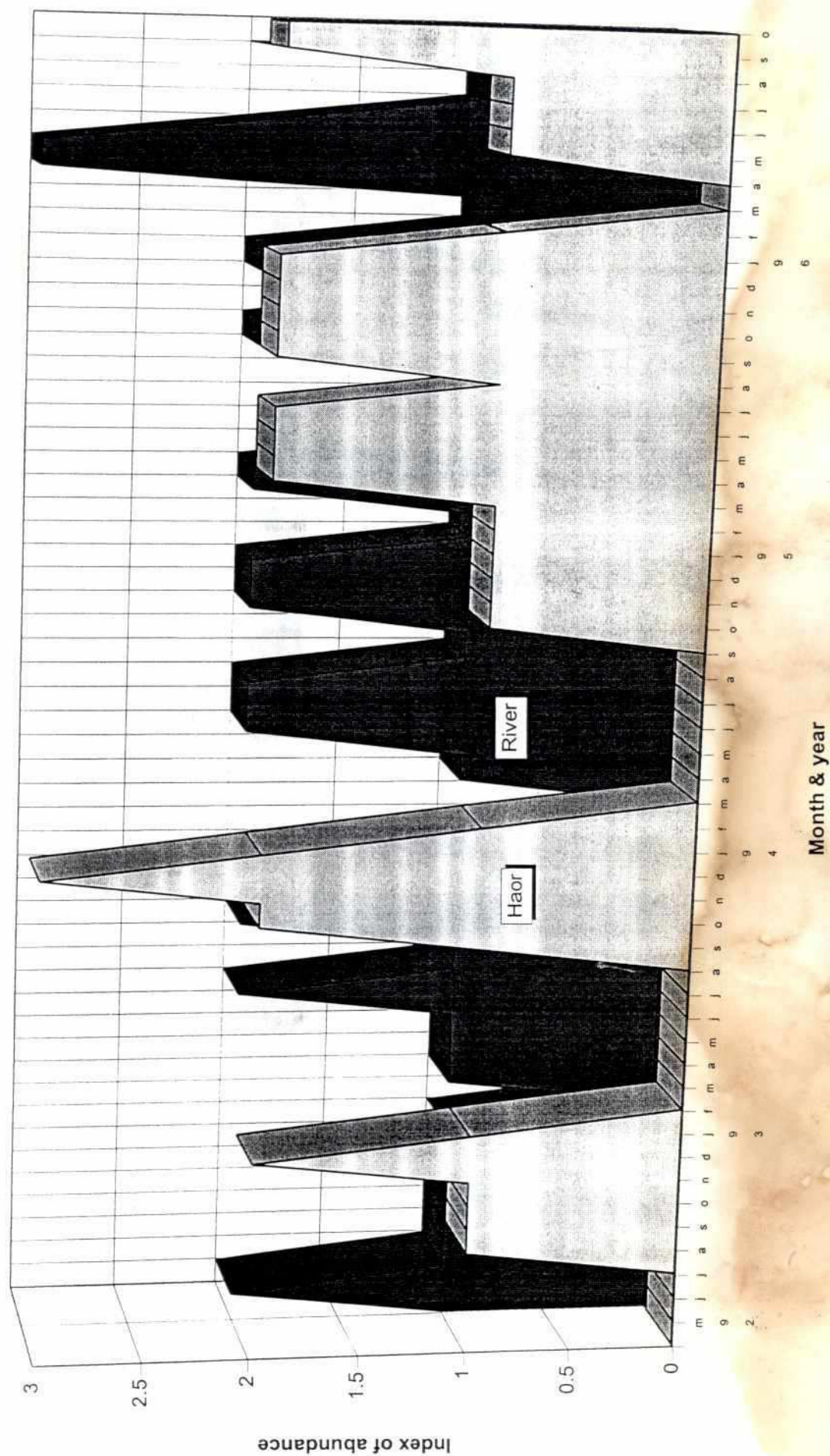
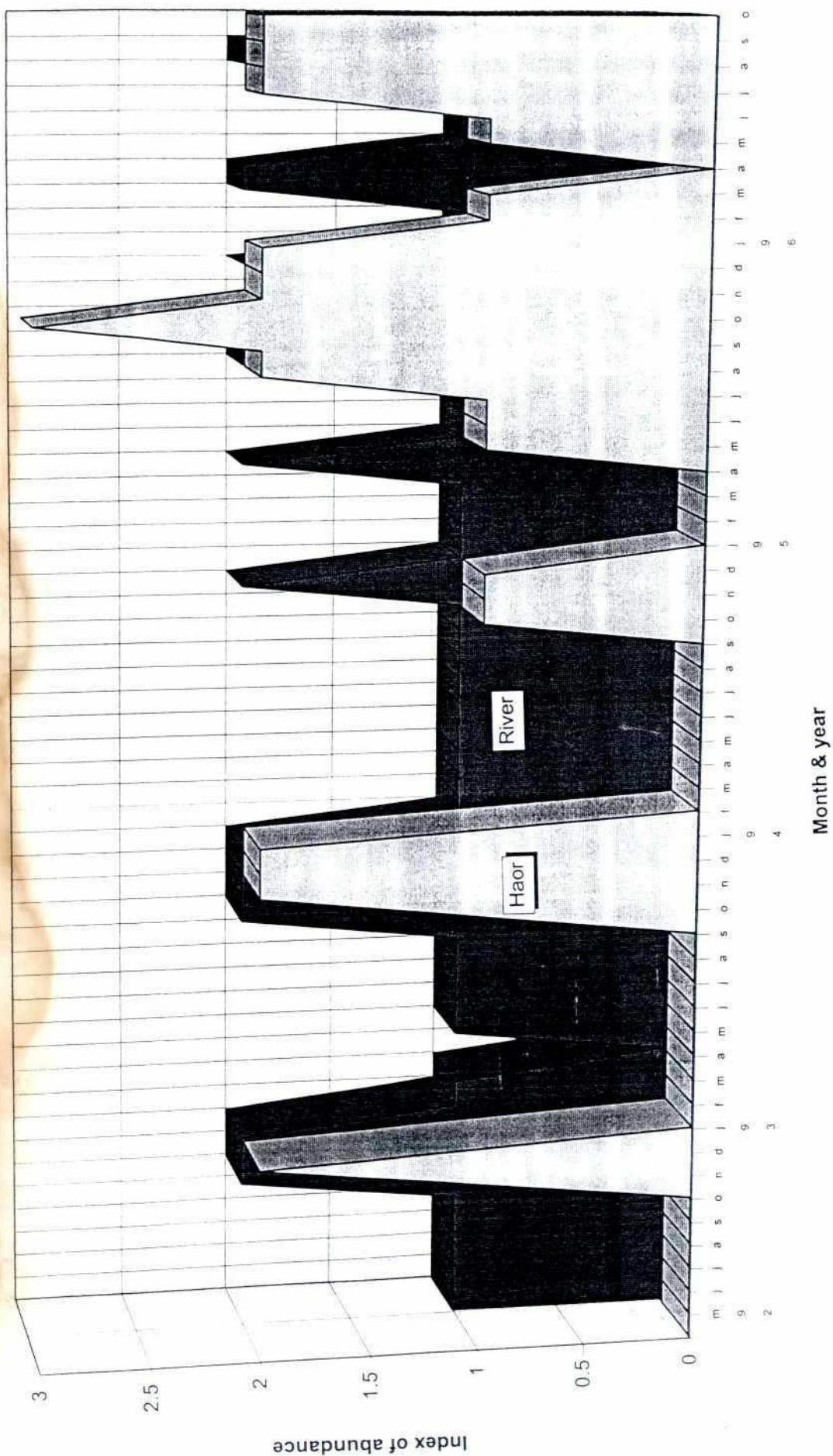


Figure 111

ABUNDANCE OF KALIBAUSH

Figure 112



ABUNDANCE OF GONIA

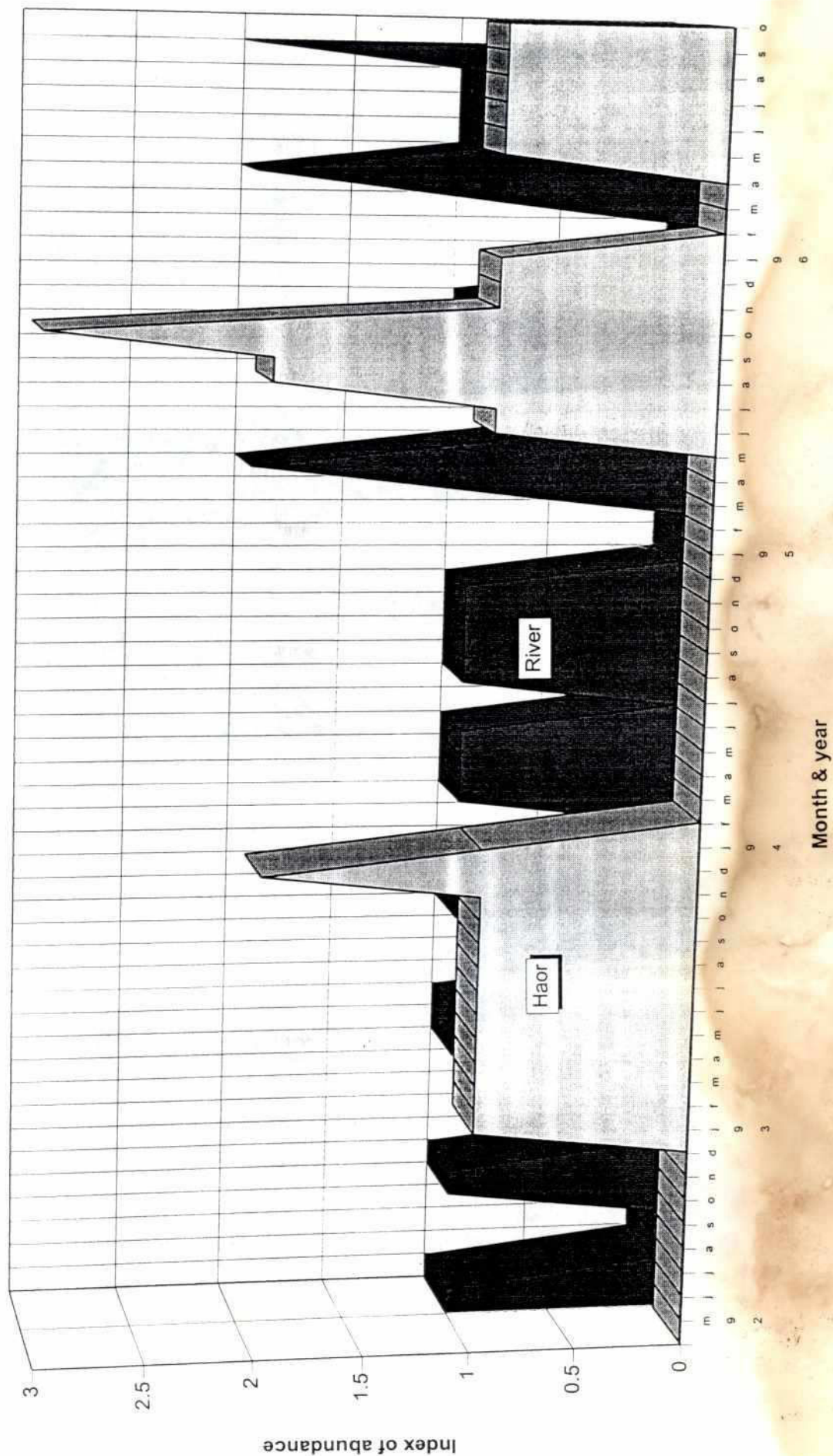
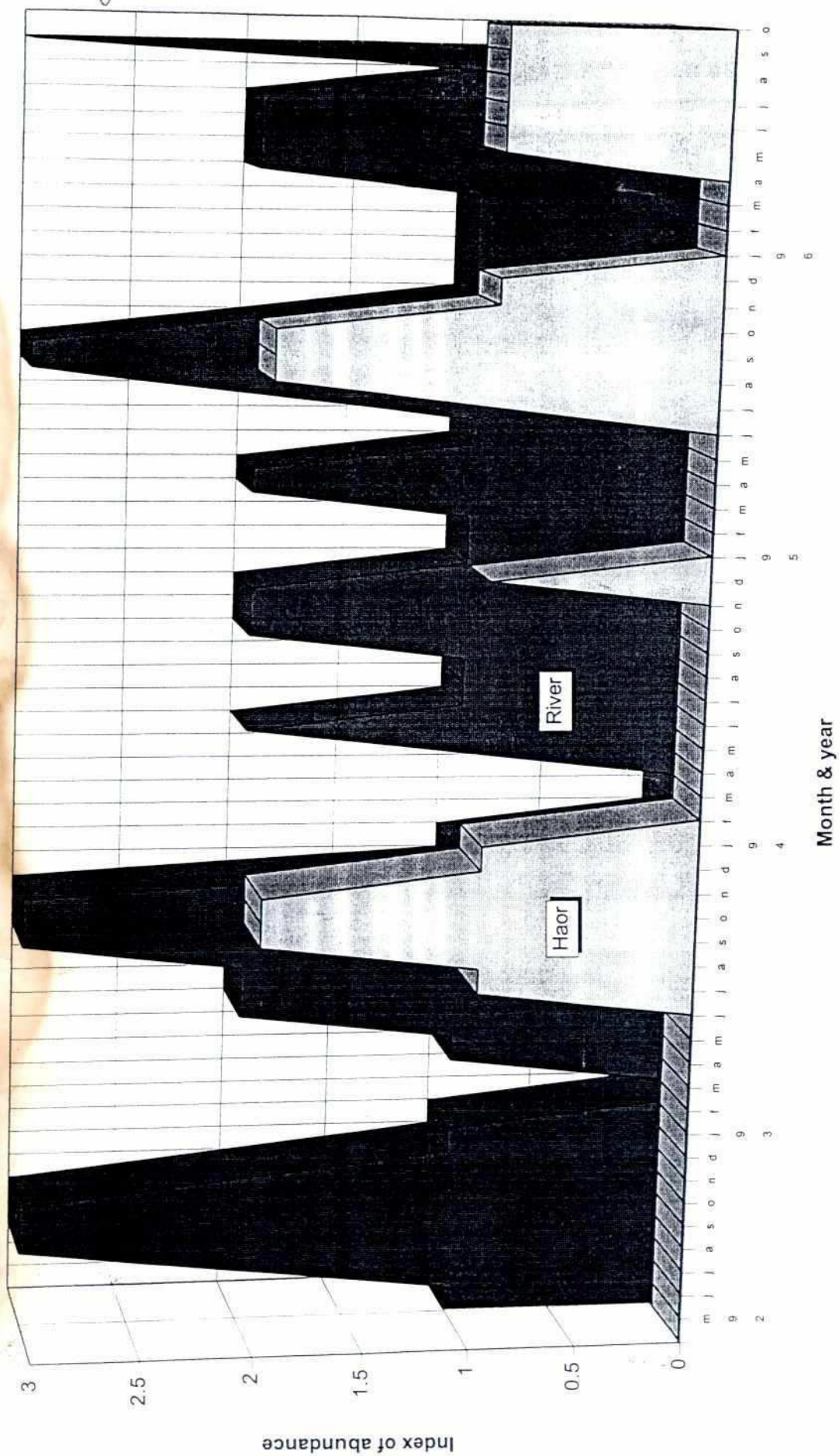


Figure 113

007

ABUNDANCE OF LACHU

Figure 114



ABUNDANCE OF AIR

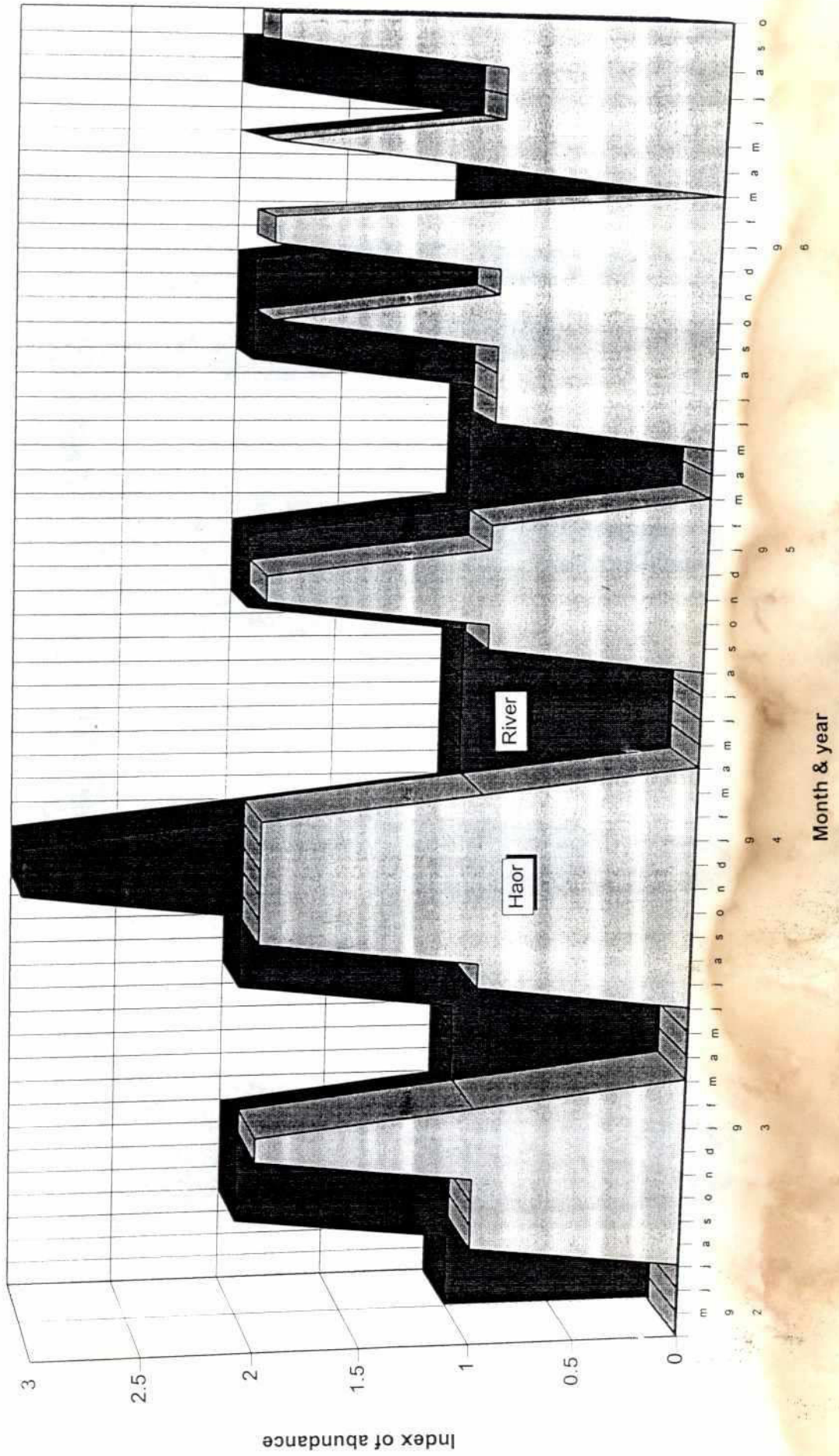
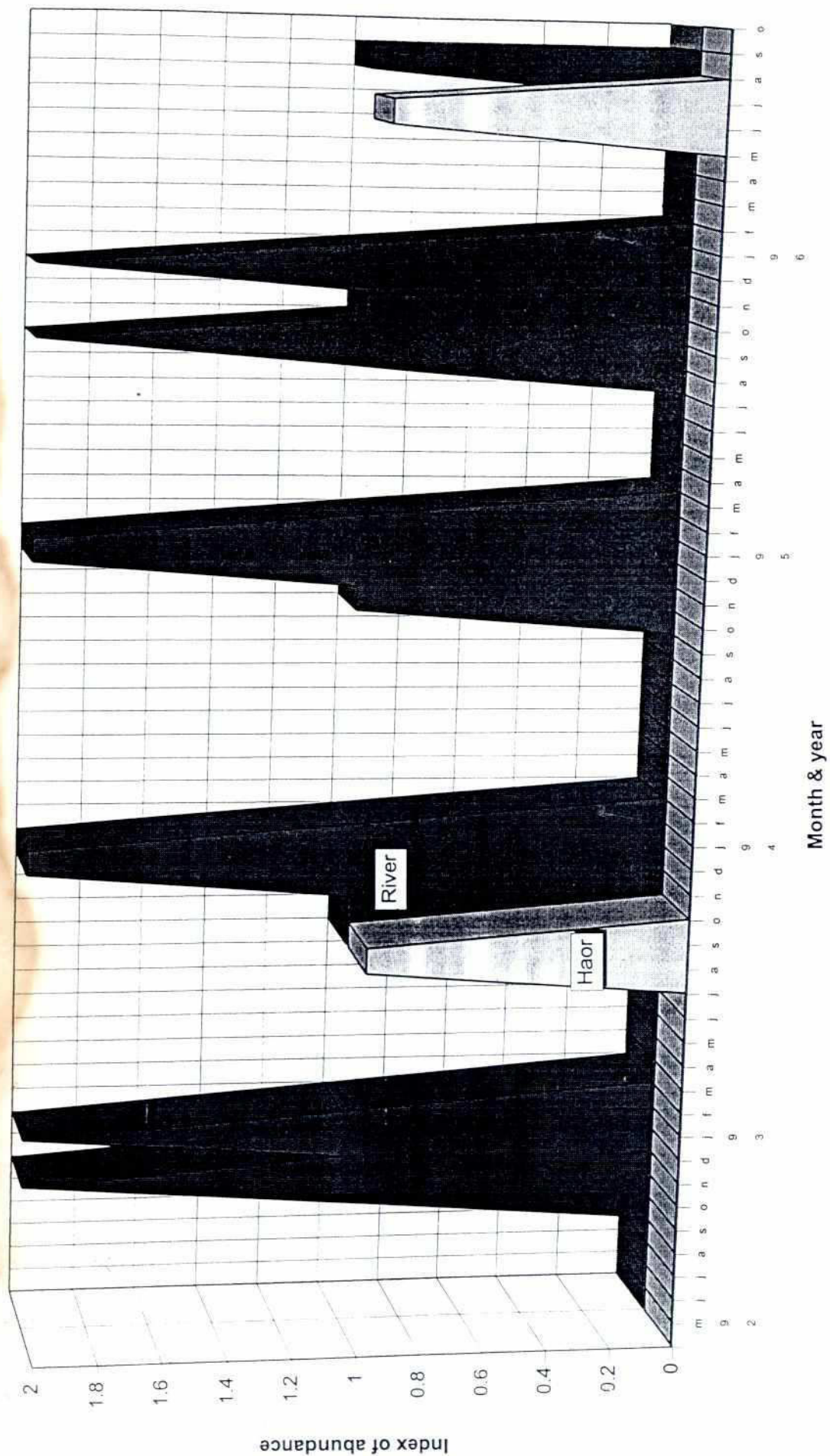


Figure 115

ABUNDANCE OF BAGAIR

Figure 116



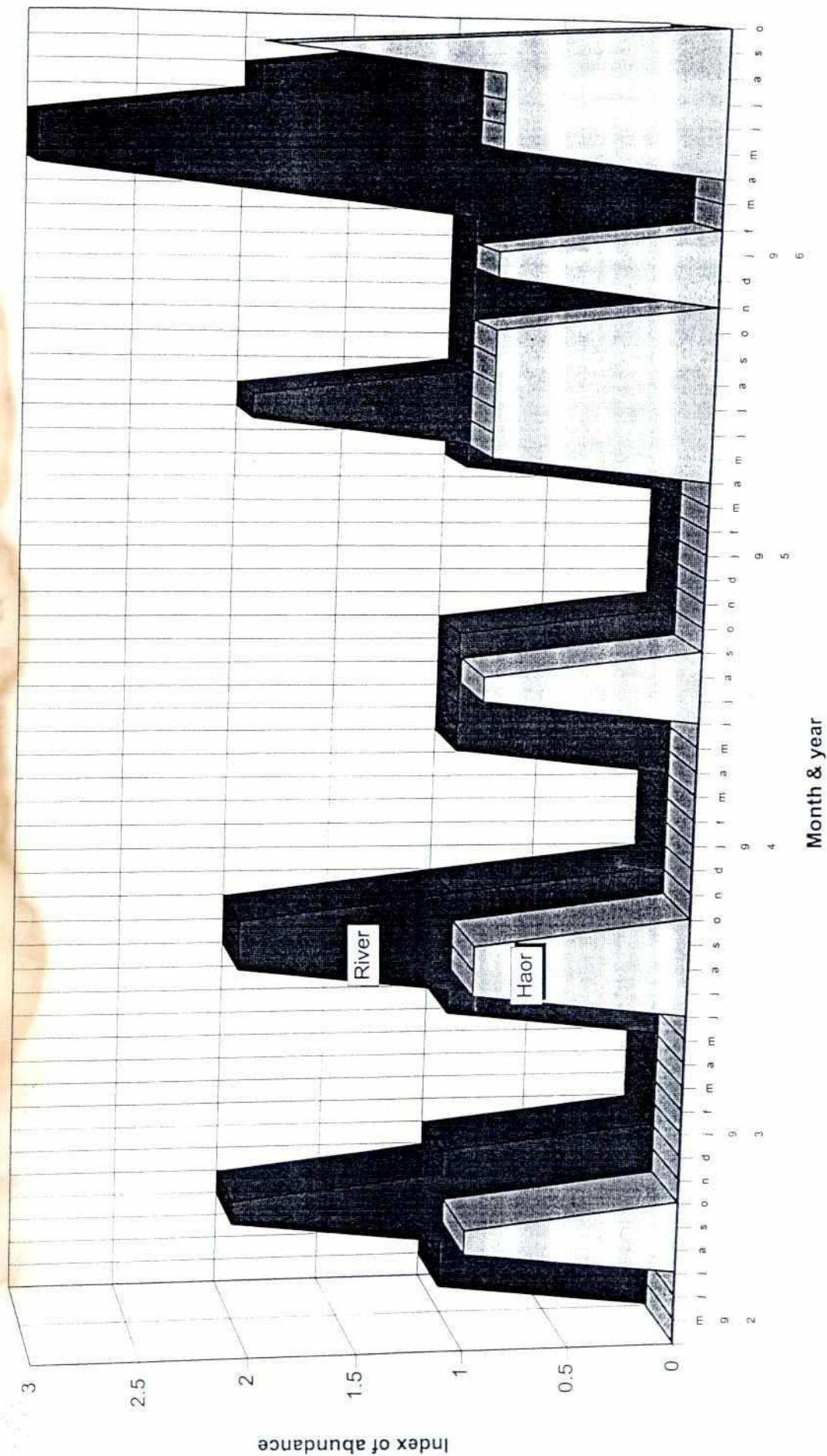
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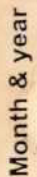


ABUNDANCE OF GOLDA CHINGRI

Figure 118



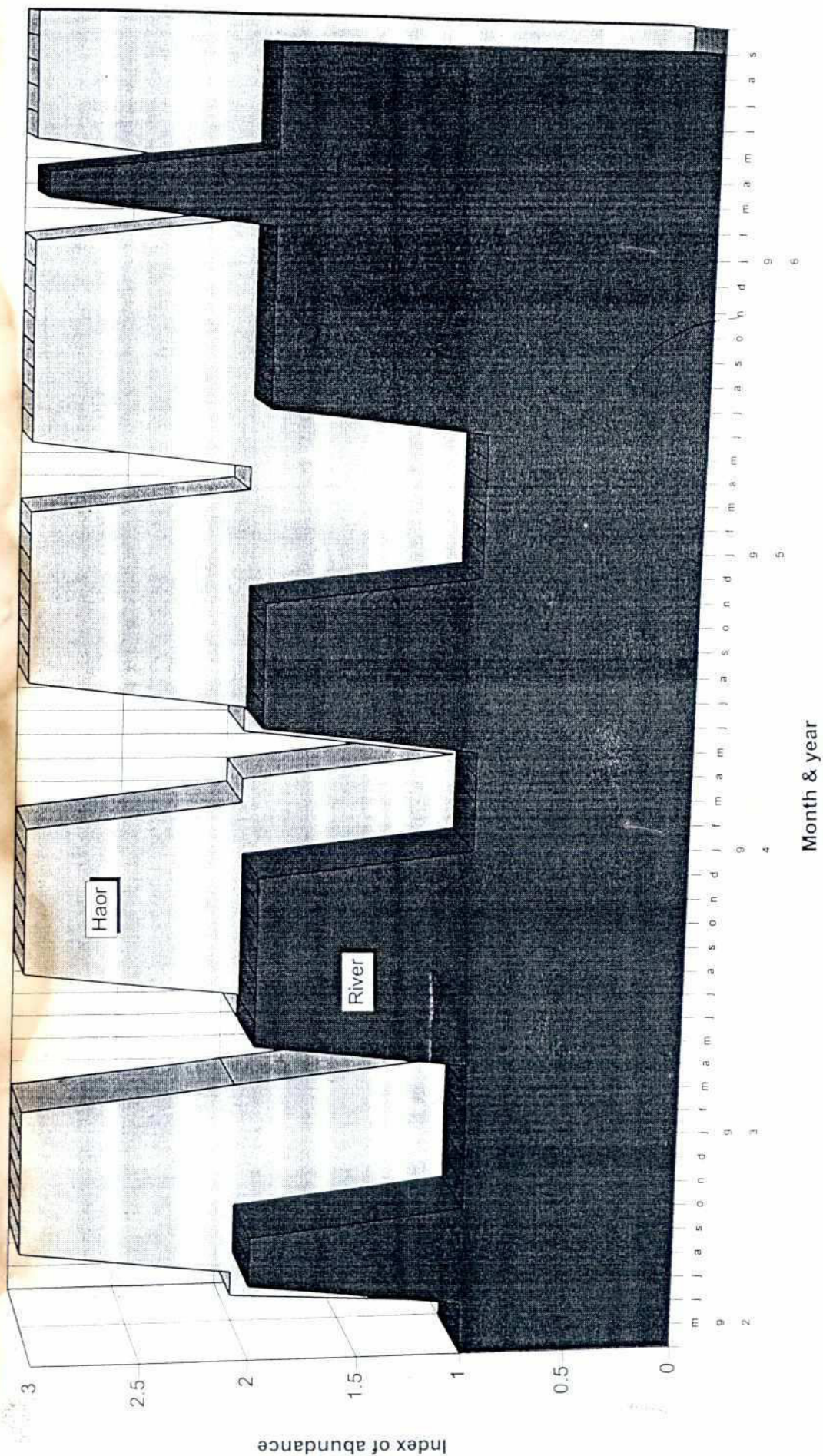
628



627

ABUNDANCE OF CHANDA

Figure 120



ABUNDANCE OF CHAPILA

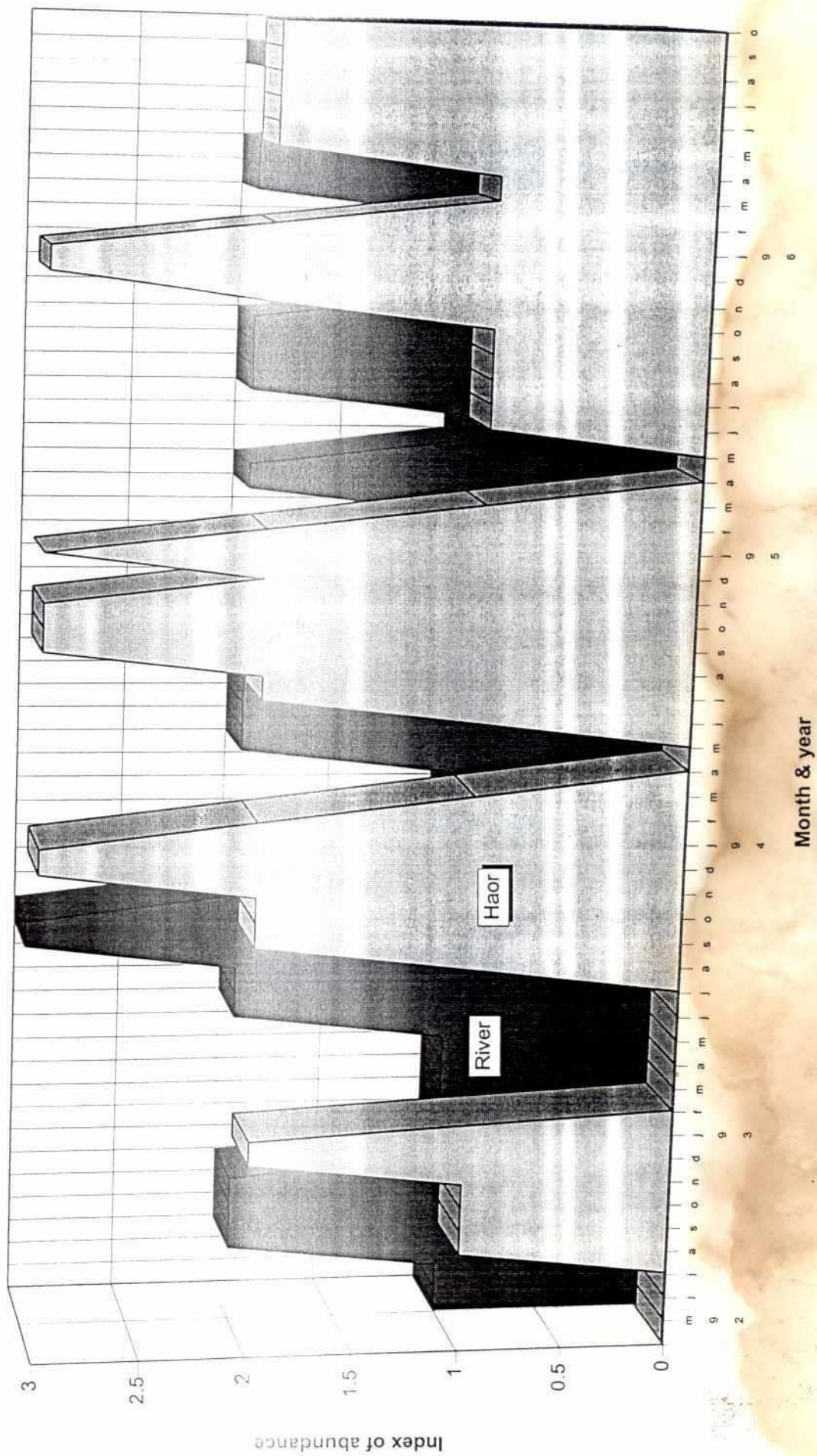
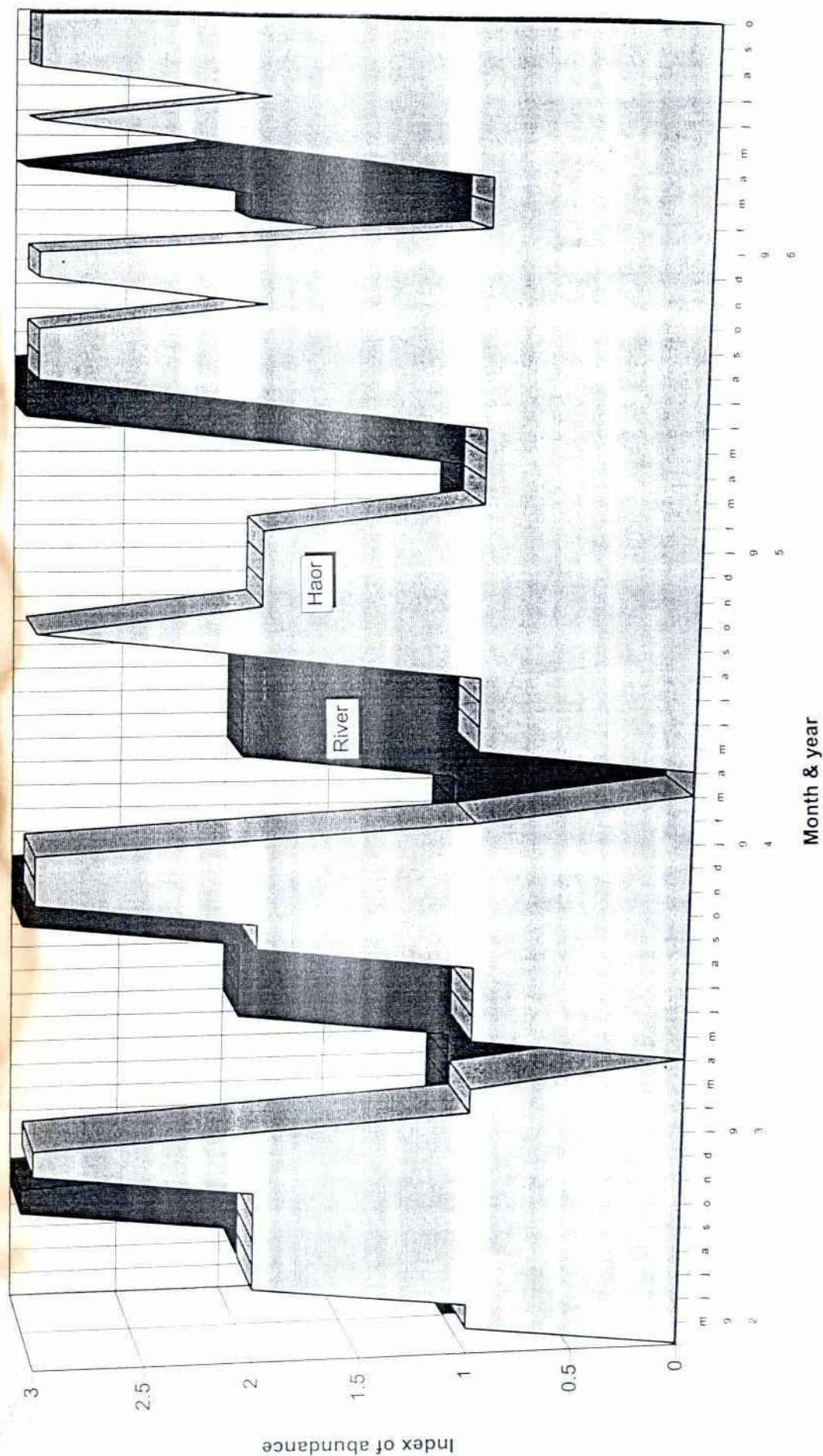


Figure 121

Figure 122

ABUNDANCE OF MOLA



026

0267

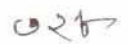
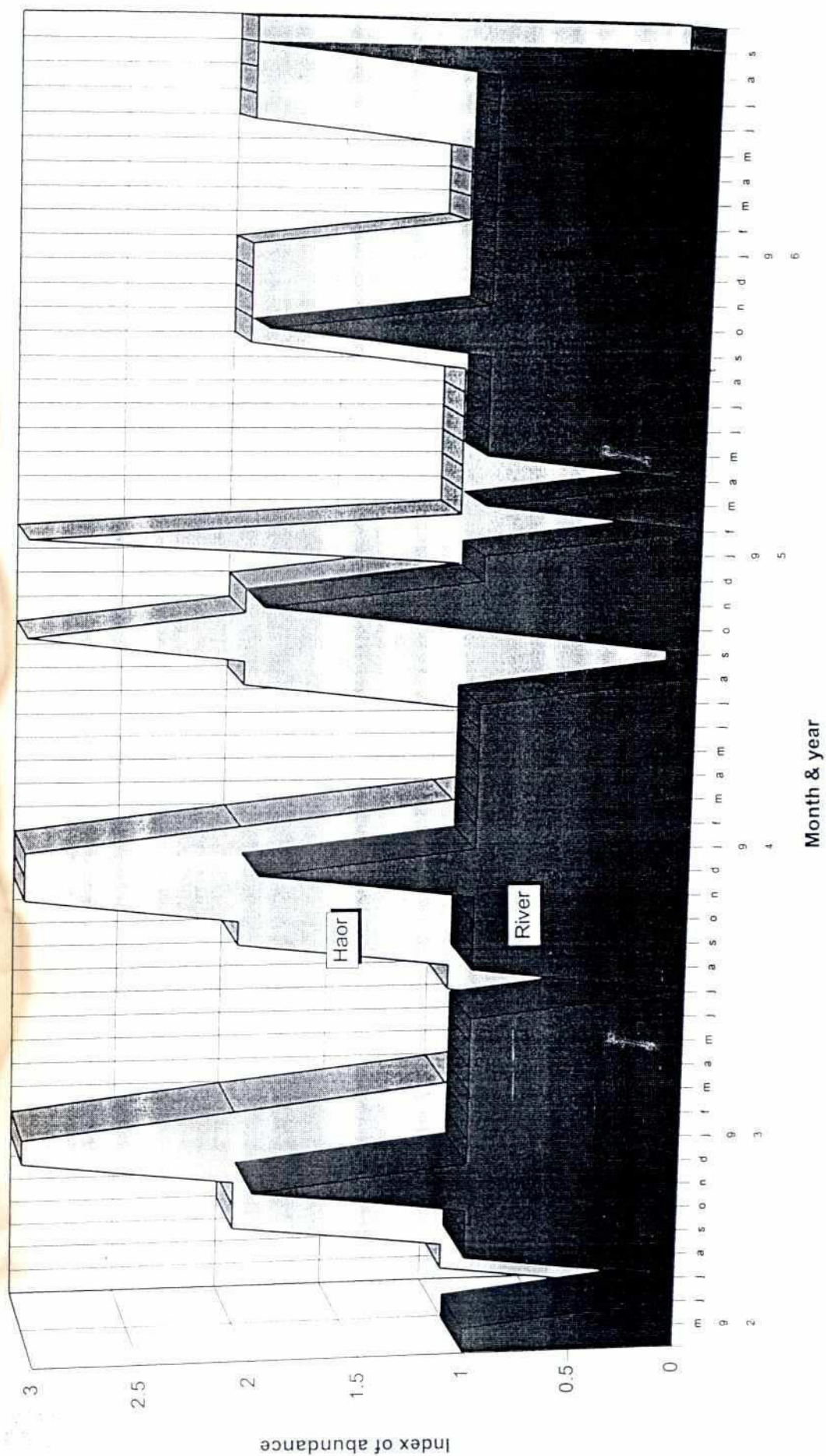


Figure 124

ABUNDANCE OF TENGRA



ABUNDANCE OF BHEDA

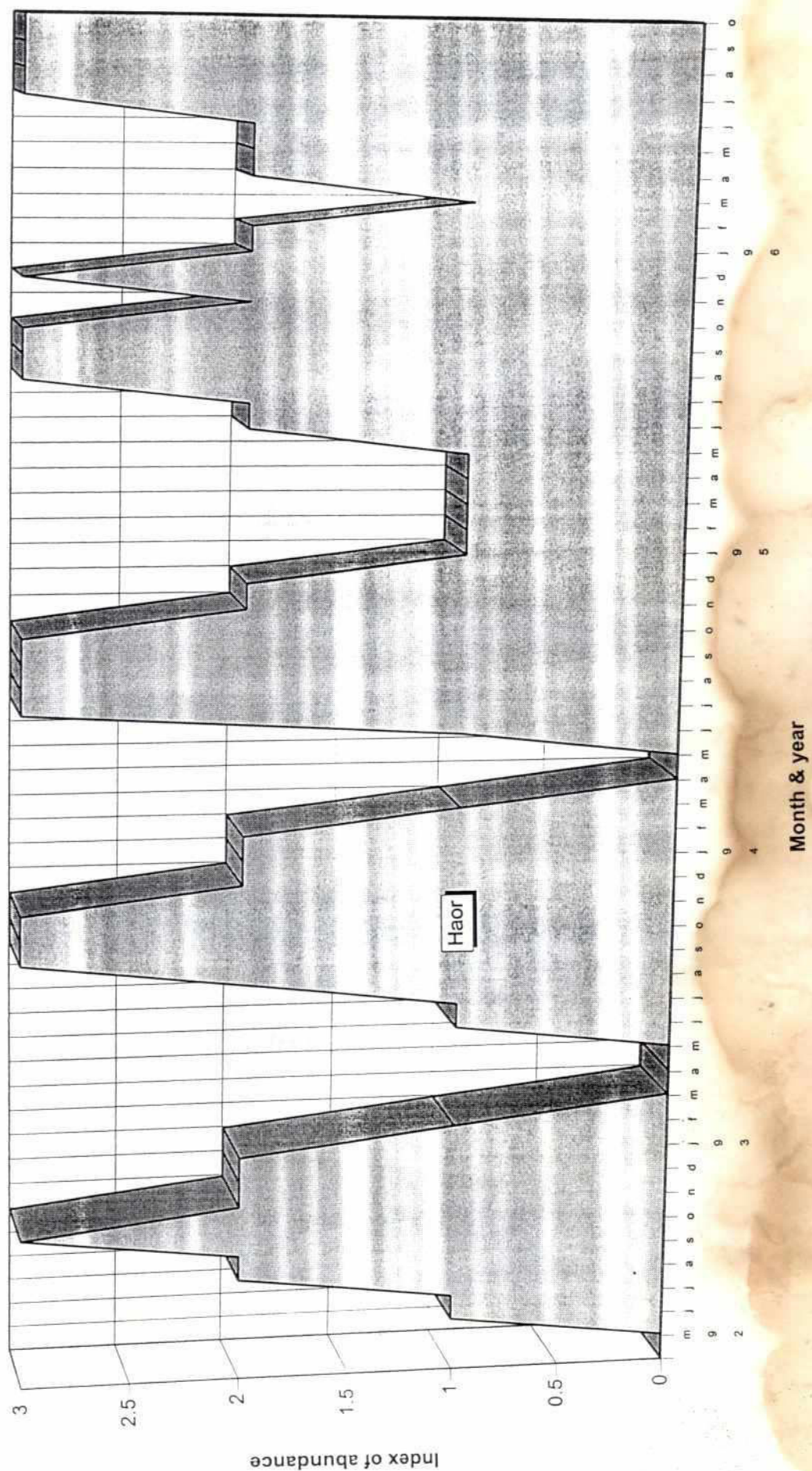
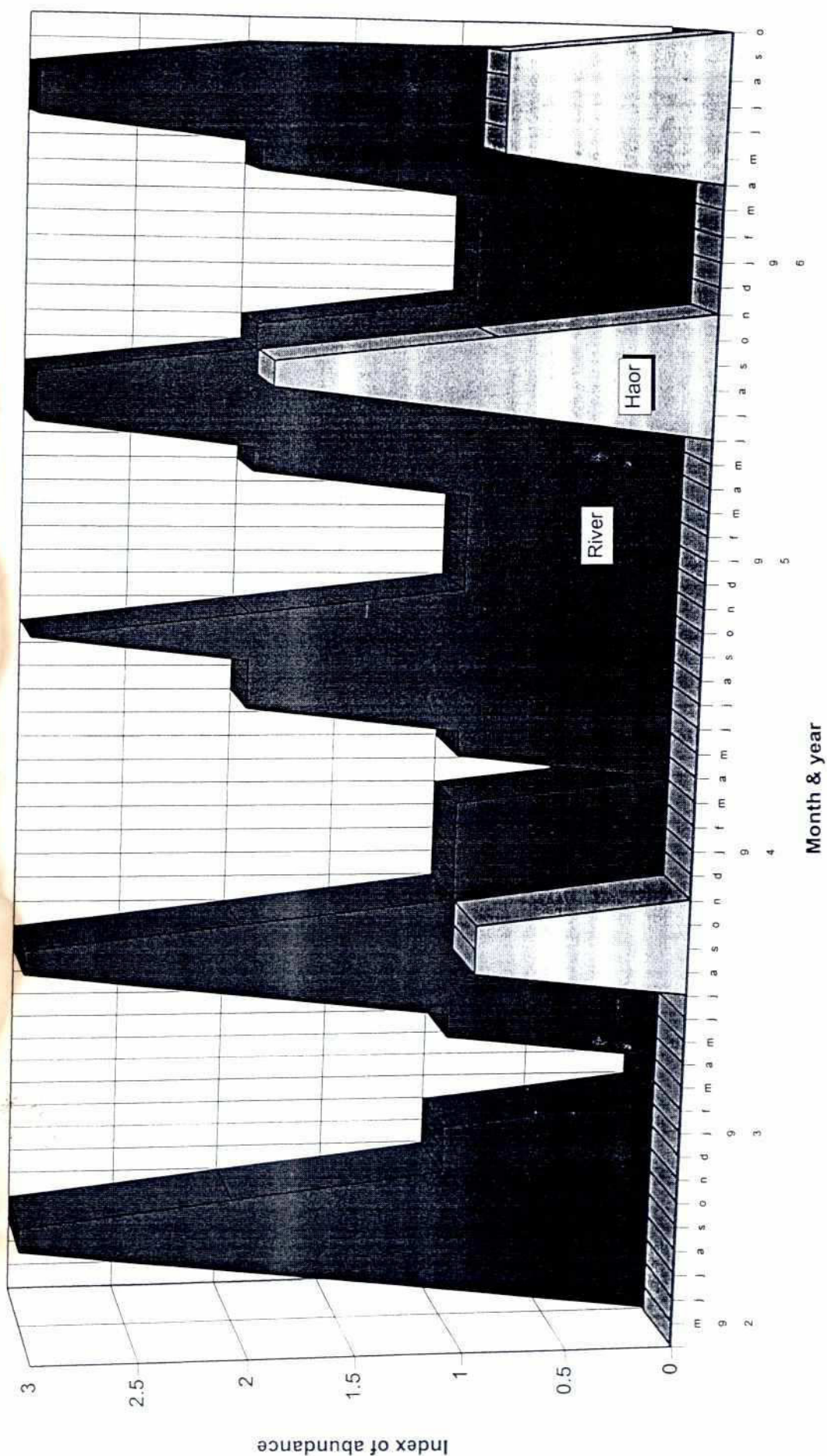


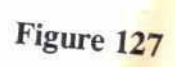
Figure 125

ABUNDANCE OF BACHA

Figure 126



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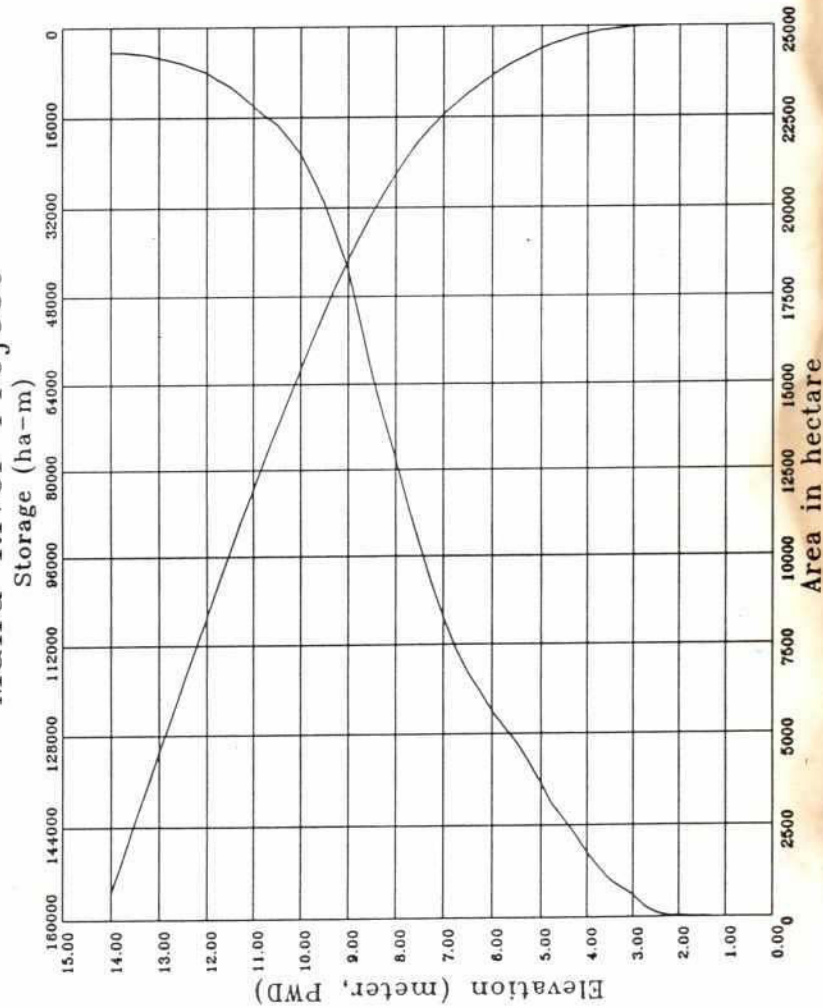
قصص

قصص



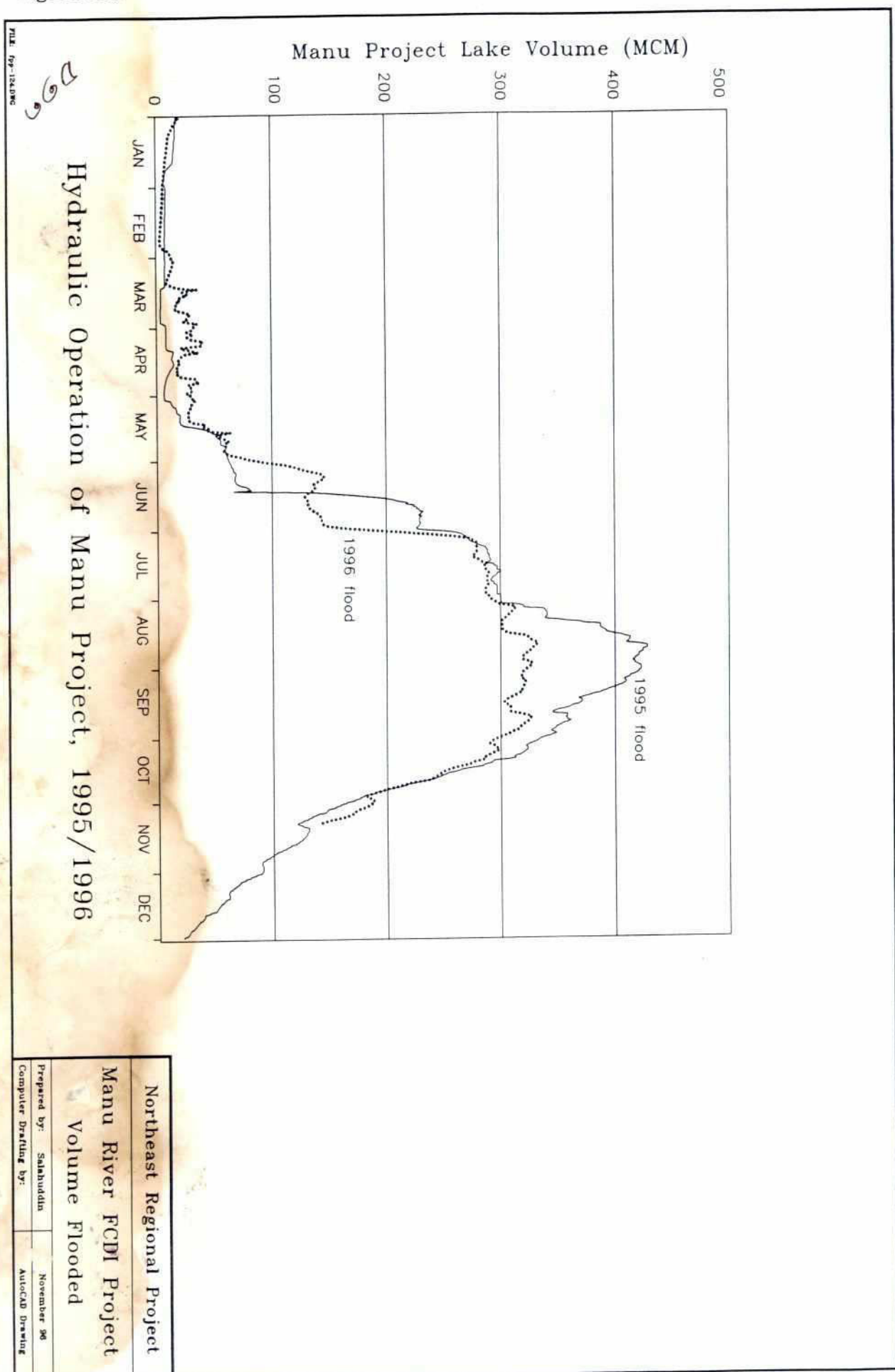
Elevation (m PWD)	Area (ha)	Storage (ha-m)
1.00	0.00	0.00
1.25	6.38	0.80
1.50	19.13	3.99
1.75	25.51	9.57
2.00	44.65	18.34
2.25	51.02	30.30
2.50	140.31	54.21
2.75	299.76	109.22
3.00	612.28	223.23
3.25	816.38	401.81
3.50	1033.23	633.01
3.75	1396.77	936.76
4.00	1773.07	1332.99
4.25	2251.42	1836.05
4.50	2678.74	2452.32
4.75	3080.55	3172.23
5.00	3667.32	4015.72
5.25	4209.45	5000.31
5.50	4745.20	6119.65
5.75	5185.28	7360.95
6.00	5644.49	8714.68
6.25	6192.99	10194.36
6.50	6715.98	11807.98
6.75	7366.54	13568.30
7.00	8278.58	15523.94
7.25	9254.41	17715.56
7.50	10376.93	20169.48
7.75	11493.07	22903.23
8.00	12806.93	25940.73
8.25	13999.61	29291.55
8.50	15300.71	32954.08
8.75	16761.26	36961.83
9.00	18266.46	41340.30
9.25	19274.17	46032.87
9.50	20122.44	50957.45
9.75	20849.53	56078.95
10.00	21474.57	61369.46
10.25	21927.40	66794.70
10.50	22303.70	72323.59
10.75	22546.06	77929.81
11.00	22807.56	83599.02
11.25	23094.57	89336.78
11.50	23349.89	95142.31
11.75	23521.89	101001.26
12.00	23719.61	106906.45
12.25	23853.54	112853.09
12.50	23987.48	118833.22
12.75	24070.39	124840.45
13.00	24134.17	130866.02
13.25	24229.84	136911.53
13.50	24274.49	142974.57
13.75	24300.00	149046.38
14.00	24300.00	155121.38

Manu River Project



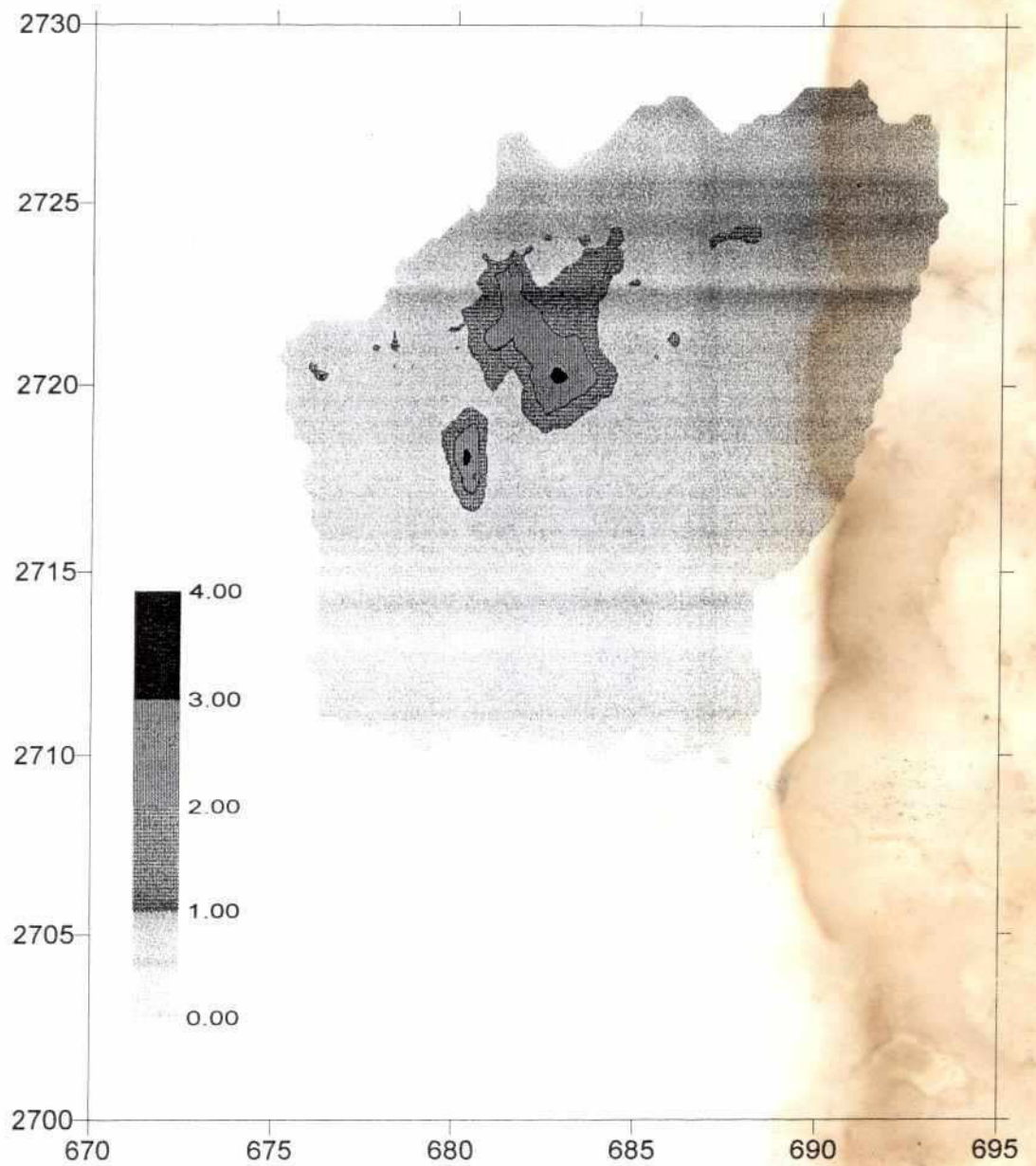
Elevation - Area - Storage
Manu River Project

Figure 130



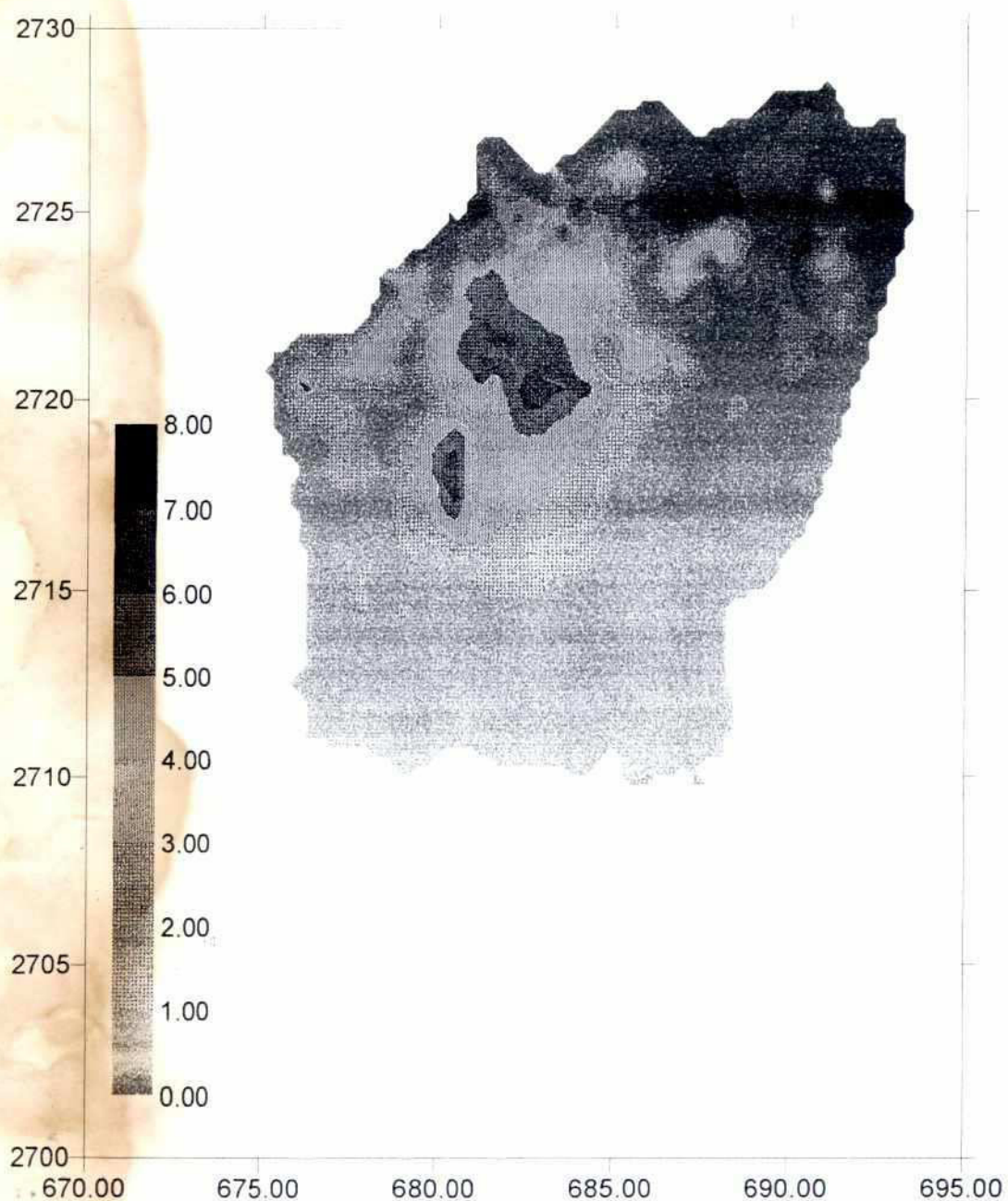
065

Figure 131



PRE-MONSAOON FLOOD, MAY 15, WL = 5.16 (m PWD)

Figure 132



MONSOON FLOOD HFI = 8.52 (m PWD)

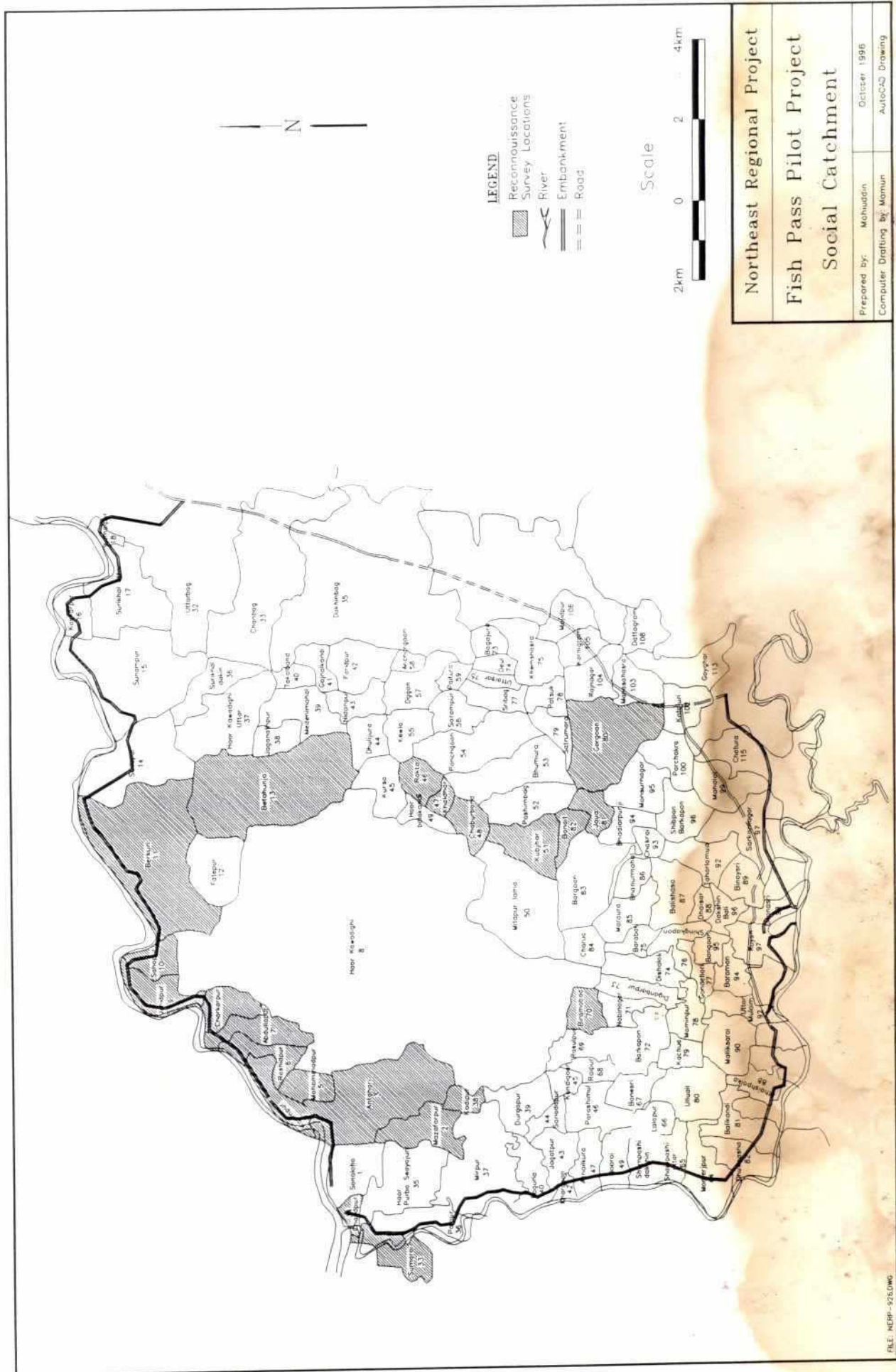


Figure 134 : Population Growth

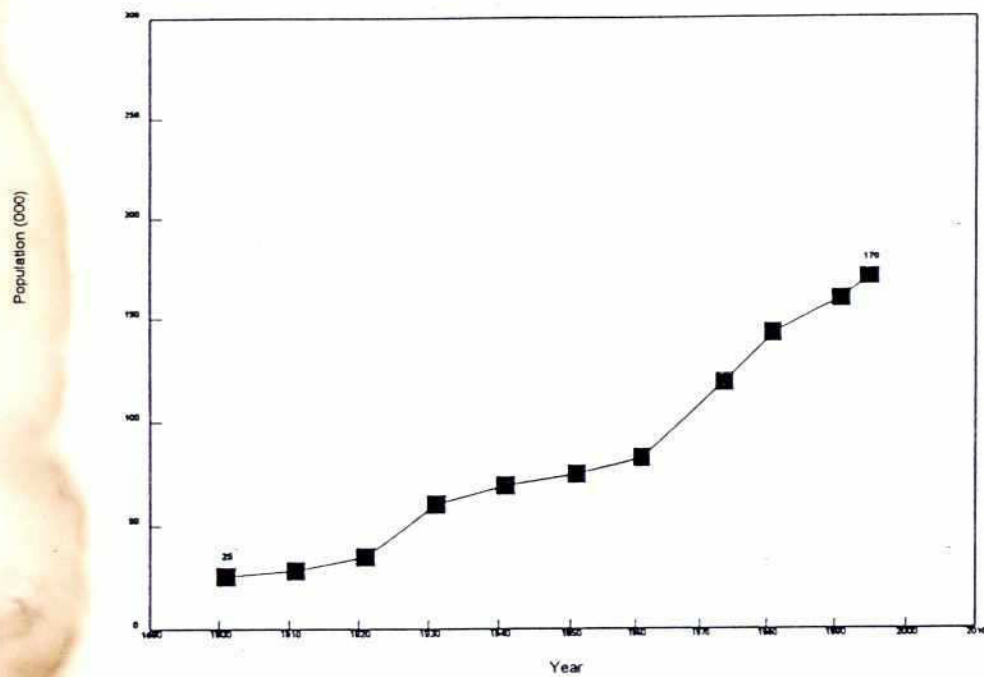


Figure 135 Ethnic Distribution of Households

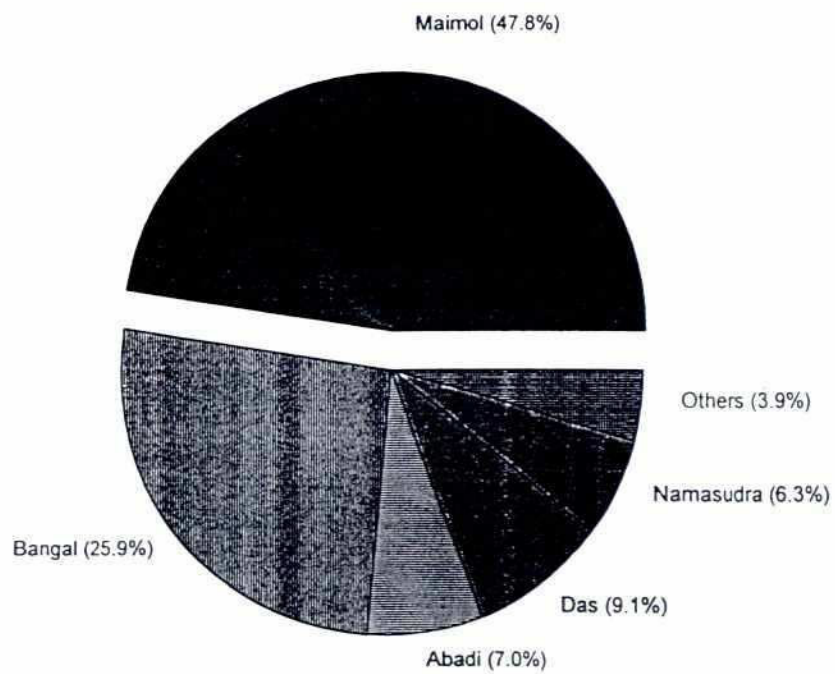


Figure 136 Livelihood Sources

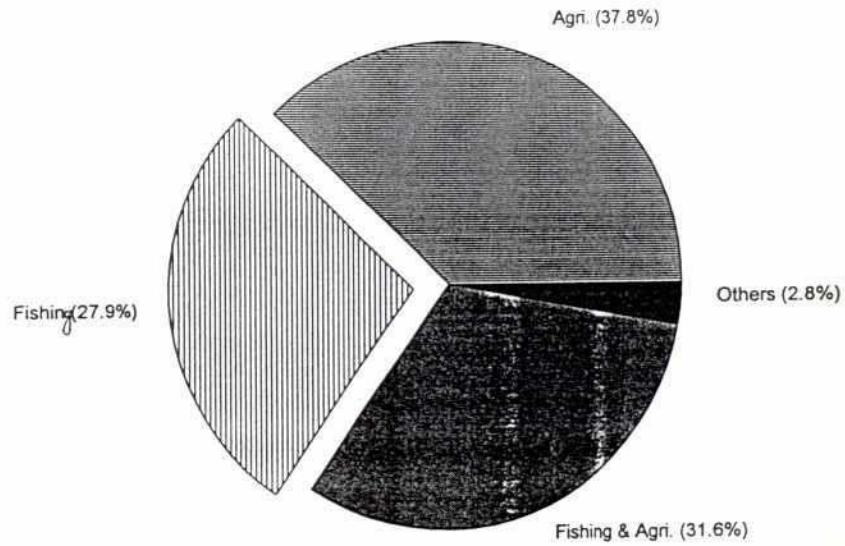
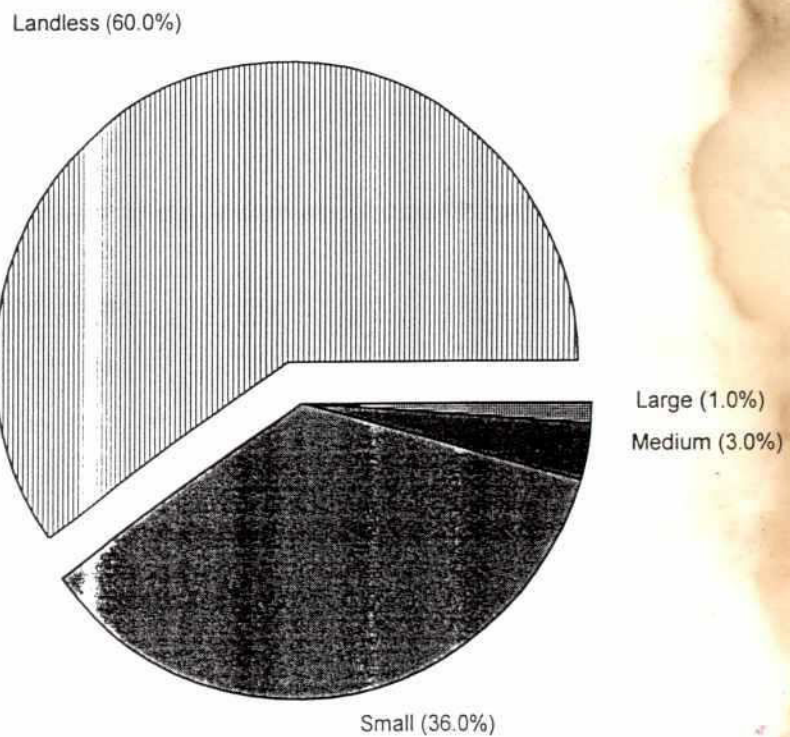


Figure 137 : Land Ownership Pattern of Beel Fishers



ANNEX A

HYDROLOGY AND FISHPASS
OPERATION DATABASES

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ANNEX A
HYDROLOGY AND FISHPASS
OPERATION DATABASES

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DAILY WATER LEVEL AND VELOCITY DATA

Notes:

1: When water surface profile is steeper than fishpass bed profile, maximum velocity occurs at slot #1.

2: When water surface profile is milder than fishpass bed profile, maximum velocity occurs at slot #16.

3: Negative velocity indicates flow from haor to river.

Date	Day No.	WL (m PWD) R/S	WL (m PWD) C/S	Head Diff. (meter)	Maximum Velocity in fishpass (m/sec)	Location
01-Jan-96	1	3.86	4.32	-0.46	---	---
02-Jan-96	2	3.83	4.29	-0.46	---	---
03-Jan-96	3	3.80	4.17	-0.37	---	---
04-Jan-96	4	3.77	4.12	-0.35	---	---
05-Jan-96	5	3.74	4.09	-0.35	---	---
06-Jan-96	6	3.71	4.04	-0.33	---	---
07-Jan-96	7	3.66	3.96	-0.30	---	---
08-Jan-96	8	3.64	3.93	-0.29	---	---
09-Jan-96	9	3.62	3.88	-0.26	---	---
10-Jan-96	10	3.61	3.86	-0.25	---	---
11-Jan-96	11	3.59	3.85	-0.26	---	---
12-Jan-96	12	3.58	3.83	-0.25	---	---
13-Jan-96	13	3.56	3.81	-0.25	---	---
14-Jan-96	14	3.56	3.80	-0.24	---	---
15-Jan-96	15	3.55	3.78	-0.23	---	---
16-Jan-96	16	3.54	3.77	-0.23	---	---
17-Jan-96	17	3.53	3.76	-0.23	---	---
18-Jan-96	18	3.51	3.73	-0.22	---	---
19-Jan-96	19	3.49	3.70	-0.21	---	---
20-Jan-96	20	3.48	3.68	-0.20	---	---
21-Jan-96	21	3.47	3.66	-0.19	---	---
22-Jan-96	22	3.47	3.65	-0.18	---	---
23-Jan-96	23	3.45	3.63	-0.18	---	---
24-Jan-96	24	3.44	3.62	-0.18	---	---
25-Jan-96	25	3.43	3.60	-0.17	---	---
26-Jan-96	26	3.42	3.59	-0.17	---	---
27-Jan-96	27	3.40	3.57	-0.17	---	---
28-Jan-96	28	3.38	3.54	-0.16	---	---
29-Jan-96	29	3.36	3.52	-0.16	---	---
30-Jan-96	30	3.35	3.51	-0.16	---	---
31-Jan-96	31	3.34	3.50	-0.16	---	---
01-Feb-96	32	3.32	3.48	-0.16	---	---
02-Feb-96	33	3.30	3.48	-0.18	---	---
03-Feb-96	34	3.29	3.47	-0.18	---	---
04-Feb-96	35	3.25	3.46	-0.21	---	---
05-Feb-96	36	3.25	3.46	-0.21	---	---
06-Feb-96	37	3.16	3.46	-0.30	---	---
07-Feb-96	38	3.13	3.45	-0.32	---	---

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08-Feb-96	39	3.11	3.43	-0.32	---	---
09-Feb-96	40	3.10	3.42	-0.32	---	---
10-Feb-96	41	3.08	3.39	-0.31	---	---
11-Feb-96	42	3.07	3.38	-0.31	---	---
12-Feb-96	43	3.06	3.37	-0.31	---	---
13-Feb-96	44	3.05	3.36	-0.31	---	---
14-Feb-96	45	3.04	3.34	-0.30	---	---
15-Feb-96	46	3.03	3.32	-0.29	---	---
16-Feb-96	47	3.01	3.29	-0.28	---	---
17-Feb-96	48	3.00	3.28	-0.28	---	---
18-Feb-96	49	2.98	3.26	-0.28	---	---
19-Feb-96	50	2.97	3.25	-0.28	---	---
20-Feb-96	51	2.96	3.24	-0.28	---	---
21-Feb-96	52	2.95	3.21	-0.26	---	---
22-Feb-96	53	2.94	3.20	-0.26	---	---
23-Feb-96	54	2.94	3.20	-0.26	---	---
24-Feb-96	55	2.96	3.22	-0.26	---	---
25-Feb-96	56	2.97	3.24	-0.27	---	---
26-Feb-96	57	3.24	3.46	-0.22	---	---
27-Feb-96	58	3.39	3.79	-0.40	---	---
28-Feb-96	59	3.46	3.90	-0.44	---	---
29-Feb-96	60	3.48	3.94	-0.46	---	---
01-Mar-96	61	3.53	3.97	-0.44	---	---
02-Mar-96	62	3.58	4.08	-0.50	---	---
03-Mar-96	63	3.58	4.09	-0.51	---	---
04-Mar-96	64	3.56	4.05	-0.49	---	---
05-Mar-96	65	3.55	4.05	-0.50	---	---
06-Mar-96	66	3.53	4.00	-0.47	---	---
07-Mar-96	67	3.50	3.97	-0.47	---	---
08-Mar-96	68	3.46	3.94	-0.48	---	---
09-Mar-96	69	3.40	3.86	-0.46	---	---
10-Mar-96	70	3.37	3.81	-0.44	---	---
11-Mar-96	71	3.34	3.77	-0.43	---	---
12-Mar-96	72	3.30	3.67	-0.37	---	---
13-Mar-96	73	3.36	3.91	-0.55	---	---
14-Mar-96	74	3.46	4.20	-0.74	---	---
15-Mar-96	75	5.16	4.86	0.30	---	---
16-Mar-96	76	5.86	4.44	1.42	1.61	Slot 1
17-Mar-96	77	6.08	4.59	1.49	1.66	Slot 1
18-Mar-96	78	6.15	4.47	1.68	1.79	Slot 1
19-Mar-96	79	5.98	4.26	1.72	1.81	Slot 1
20-Mar-96	80	5.87	4.36	1.51	1.67	Slot 1
21-Mar-96	81	5.67	4.16	1.51	1.67	Slot 1
22-Mar-96	82	5.44	4.21	1.23	---	---
23-Mar-96	83	5.06	4.21	0.85	---	---
24-Mar-96	84	4.81	4.16	0.65	---	---
25-Mar-96	85	4.56	4.56	0.00	---	---
26-Mar-96	86	4.46	4.68	-0.22	---	---
27-Mar-96	87	4.36	4.61	-0.25	---	---
28-Mar-96	88	4.61	4.58	0.03	---	---
29-Mar-96	89	6.01	4.46	1.55	1.70	Slot 1
30-Mar-96	90	6.53	4.86	1.67	1.78	Slot 1
31-Mar-96	91	6.98	4.81	2.17	2.08	Slot 1

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01-Apr-96	92	7.31	4.76	2.55	2.23	Slot 16
02-Apr-96	93	7.56	4.73	2.83	2.31	Slot 16
03-Apr-96	94	7.68	4.56	3.12	2.39	Slot 16
04-Apr-96	95	7.70	4.76	2.94	2.34	Slot 16
05-Apr-96	96	7.71	4.58	3.13	2.39	Slot 16
06-Apr-96	97	7.67	4.66	3.01	2.36	Slot 16
07-Apr-96	98	7.57	5.01	2.56	2.23	Slot 16
08-Apr-96	99	7.46	4.96	2.50	2.22	Slot 16
09-Apr-96	100	7.30	4.96	2.34	2.17	Slot 16
10-Apr-96	101	7.15	4.36	2.79	2.30	Slot 16
11-Apr-96	102	7.06	4.71	2.35	2.17	Slot 16
12-Apr-96	103	6.76	4.88	1.88	1.91	Slot 1
13-Apr-96	104	6.56	4.46	2.10	2.04	Slot 1
14-Apr-96	105	6.36	4.38	1.98	1.97	Slot 1
15-Apr-96	106	6.16	4.34	1.82	1.87	Slot 1
16-Apr-96	107	5.90	4.26	1.64	1.76	Slot 1
17-Apr-96	108	5.56	4.31	1.25	1.50	Slot 1
18-Apr-96	109	5.48	4.29	1.19	1.45	Slot 1
19-Apr-96	110	5.30	4.24	1.06	---	---
20-Apr-96	111	5.14	4.18	0.96	---	---
21-Apr-96	112	4.98	4.30	0.68	---	---
22-Apr-96	113	5.08	4.26	0.82	---	---
23-Apr-96	114	5.29	4.30	0.99	---	---
24-Apr-96	115	5.34	4.81	0.53	---	---
25-Apr-96	116	5.45	4.81	0.64	---	---
26-Apr-96	117	5.48	4.92	0.56	0.92	Slot 1
27-Apr-96	118	5.61	4.61	1.00	1.31	Slot 1
28-Apr-96	119	5.69	4.69	1.00	1.31	Slot 1
29-Apr-96	120	5.71	4.71	1.00	1.31	Slot 1
30-Apr-96	121	5.69	4.71	0.98	1.29	Slot 1
01-May-96	122	5.51	4.56	0.95	1.27	Slot 1
02-May-96	123	5.50	4.71	0.79	1.14	Slot 1
03-May-96	124	5.52	4.71	0.81	1.15	Slot 1
04-May-96	125	5.50	4.81	0.69	1.05	Slot 1
05-May-96	126	5.50	4.76	0.74	1.09	Slot 1
06-May-96	127	5.52	4.71	0.81	1.15	Slot 1
07-May-96	128	5.50	4.71	0.79	1.14	Slot 1
08-May-96	129	5.50	4.66	0.84	1.18	Slot 1
09-May-96	130	5.48	4.61	0.87	1.20	Slot 1
10-May-96	131	5.92	4.61	1.31	1.54	Slot 1
11-May-96	132	6.43	4.62	1.81	1.87	Slot 1
12-May-96	133	6.60	4.61	1.99	1.98	Slot 1
13-May-96	134	6.85	4.61	2.24	2.12	Slot 1
14-May-96	135	7.23	4.71	2.52	2.22	Slot 16
15-May-96	136	8.03	5.06	2.97	2.34	Slot 16
16-May-96	137	8.15	4.98	3.17	2.40	Slot 16
17-May-96	138	8.26	5.16	3.10	2.38	Slot 16
18-May-96	139	8.24	5.12	3.12	2.39	Slot 16
19-May-96	140	8.22	5.56	2.66	2.26	Slot 16
20-May-96	141	8.20	5.34	2.86	2.31	Slot 16
21-May-96	142	8.10	5.37	2.73	2.28	Slot 16
22-May-96	143	8.09	5.48	2.61	2.25	Slot 16
23-May-96	144	7.92	5.54	2.38	2.18	Slot 16

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24-May-96	145	7.74	5.46	2.28	2.14	Slot 1
25-May-96	146	7.53	5.48	2.05	2.01	Slot 1
26-May-96	147	7.56	5.46	2.10	2.04	Slot 1
27-May-96	148	7.38	5.44	1.94	1.95	Slot 1
28-May-96	149	7.46	5.48	1.98	1.97	Slot 1
29-May-96	150	7.57	5.53	2.04	2.01	Slot 1
30-May-96	151	7.70	5.72	1.98	1.97	Slot 1
31-May-96	152	8.04	5.82	2.22	2.11	Slot 1
01-Jun-96	153	8.12	6.00	2.12	2.05	Slot 1
02-Jun-96	154	8.44	6.17	2.27	2.14	Slot 1
03-Jun-96	155	8.58	6.40	2.18	2.09	Slot 1
04-Jun-96	156	8.63	6.52	2.11	2.05	Slot 1
05-Jun-96	157	8.60	6.60	2.00	1.98	Slot 1
06-Jun-96	158	8.67	6.70	1.97	1.96	Slot 1
07-Jun-96	159	8.67	6.83	1.84	1.89	Slot 1
08-Jun-96	160	8.61	6.87	1.74	1.82	Slot 1
09-Jun-96	161	8.52	6.88	1.64	1.76	Slot 1
10-Jun-96	162	8.44	6.85	1.59	1.73	Slot 1
11-Jun-96	163	8.34	6.80	1.54	1.69	Slot 1
12-Jun-96	164	8.24	6.76	1.48	1.65	Slot 1
13-Jun-96	165	8.08	6.78	1.30	1.53	Slot 1
14-Jun-96	166	7.98	6.77	1.21	1.47	Slot 1
15-Jun-96	167	7.88	6.74	1.14	1.41	Slot 1
16-Jun-96	168	7.80	6.68	1.12	1.40	Slot 1
17-Jun-96	169	7.70	6.65	1.05	1.35	Slot 1
18-Jun-96	170	7.61	6.66	0.95	1.27	Slot 1
19-Jun-96	171	7.52	6.69	0.83	1.17	Slot 1
20-Jun-96	172	7.61	6.68	0.93	1.25	Slot 1
21-Jun-96	173	7.54	6.70	0.84	1.18	Slot 1
22-Jun-96	174	7.48	6.70	0.78	1.13	Slot 1
23-Jun-96	175	7.50	6.74	0.76	1.11	Slot 1
24-Jun-96	176	7.55	6.79	0.76	1.11	Slot 1
25-Jun-96	177	7.56	6.82	0.74	1.09	Slot 1
26-Jun-96	178	7.53	6.84	0.69	1.05	Slot 1
27-Jun-96	179	7.51	6.85	0.66	1.02	Slot 1
28-Jun-96	180	7.44	6.85	0.59	0.95	Slot 1
29-Jun-96	181	7.41	6.86	0.55	0.91	Slot 1
30-Jun-96	182	7.39	6.89	0.50	0.86	Slot 1
01-Jul-96	183	7.43	7.06	0.37	0.72	Slot 1
02-Jul-96	184	8.03	7.35	0.68	1.04	Slot 1
03-Jul-96	185	8.51	7.61	0.90	1.23	Slot 1
04-Jul-96	186	8.85	7.81	1.04	1.34	Slot 1
05-Jul-96	187	8.98	7.99	0.99	1.30	Slot 1
06-Jul-96	188	9.02	8.10	0.92	1.24	Slot 1
07-Jul-96	189	9.03	8.13	0.90	1.23	Slot 1
08-Jul-96	190	9.02	8.15	0.87	1.20	Slot 1
09-Jul-96	191	9.01	8.15	0.86	1.19	Slot 1
10-Jul-96	192	9.00	8.15	0.85	1.19	Slot 1
11-Jul-96	193	9.02	8.15	0.87	1.20	Slot 1
12-Jul-96	194	9.02	8.15	0.87	1.20	Slot 1
13-Jul-96	195	9.00	8.14	0.86	1.19	Slot 1
14-Jul-96	196	8.96	8.12	0.84	1.18	Slot 1
15-Jul-96	197	8.96	8.16	0.80	1.14	Slot 1

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16-Jul-96	198	8.98	8.18	0.80	1.14	Slot 1
17-Jul-96	199	8.95	8.22	0.73	1.08	Slot 1
18-Jul-96	200	8.94	8.20	0.74	1.09	Slot 1
19-Jul-96	201	8.93	8.20	0.73	1.08	Slot 1
20-Jul-96	202	8.95	8.22	0.73	1.08	Slot 1
21-Jul-96	203	8.95	8.23	0.72	1.07	Slot 1
22-Jul-96	204	8.93	8.22	0.71	1.07	Slot 1
23-Jul-96	205	8.92	8.22	0.70	1.06	Slot 1
24-Jul-96	206	8.91	8.22	0.69	1.05	Slot 1
25-Jul-96	207	8.91	8.22	0.69	1.05	Slot 1
26-Jul-96	208	8.98	8.23	0.75	1.10	Slot 1
27-Jul-96	209	8.88	8.22	0.66	1.02	Slot 1
28-Jul-96	210	8.79	8.21	0.58	0.94	Slot 1
29-Jul-96	211	8.73	8.21	0.52	0.88	Slot 1
30-Jul-96	212	8.69	8.21	0.48	0.84	Slot 1
31-Jul-96	213	8.78	8.23	0.55	0.91	Slot 1
01-Aug-96	214	8.78	8.23	0.55	0.91	Slot 1
02-Aug-96	215	8.74	8.25	0.49	0.85	Slot 1
03-Aug-96	216	8.72	8.27	0.45	0.81	Slot 1
04-Aug-96	217	8.62	8.29	0.33	0.67	Slot 1
05-Aug-96	218	8.62	8.38	0.24	0.56	Slot 1
06-Aug-96	219	8.63	8.39	0.24	0.56	Slot 1
07-Aug-96	220	8.60	8.38	0.22	0.53	Slot 1
08-Aug-96	221	8.49	8.36	0.13	0.38	Slot 1
09-Aug-96	222	8.42	8.35	0.07	0.27	Slot 1
10-Aug-96	223	8.38	8.34	0.04	0.19	Slot 1
11-Aug-96	224	8.30	8.31	-0.01	0.09	Slot 1
12-Aug-96	225	8.35	8.31	0.04	0.19	Slot 1
13-Aug-96	226	8.40	8.31	0.09	0.31	Slot 1
14-Aug-96	227	8.46	8.31	0.15	0.42	Slot 1
15-Aug-96	228	8.49	8.31	0.18	0.47	Slot 1
16-Aug-96	229	8.52	8.32	0.20	0.50	Slot 1
17-Aug-96	230	8.60	8.34	0.26	0.58	Slot 1
18-Aug-96	231	8.70	8.44	0.26	0.58	Slot 1
19-Aug-96	232	8.75	8.47	0.28	0.61	Slot 1
20-Aug-96	233	8.79	8.48	0.31	0.65	Slot 1
21-Aug-96	234	8.82	8.51	0.31	0.65	Slot 1
22-Aug-96	235	8.87	8.52	0.35	0.70	Slot 1
23-Aug-96	236	8.87	8.51	0.36	0.71	Slot 1
24-Aug-96	237	8.87	8.49	0.38	0.73	Slot 1
25-Aug-96	238	8.87	8.48	0.39	0.74	Slot 1
26-Aug-96	239	8.85	8.46	0.39	0.74	Slot 1
27-Aug-96	240	8.81	8.45	0.36	0.71	Slot 1
28-Aug-96	241	8.77	8.43	0.34	0.68	Slot 1
29-Aug-96	242	8.73	8.43	0.30	0.64	Slot 1
30-Aug-96	243	8.73	8.48	0.25	0.57	Slot 1
31-Aug-96	244	8.69	8.49	0.20	0.50	Slot 1
01-Sep-96	245	8.66	8.48	0.18	0.47	Slot 1
02-Sep-96	246	8.65	8.46	0.19	0.48	Slot 1
03-Sep-96	247	8.63	8.44	0.19	0.48	Slot 1
04-Sep-96	248	8.62	8.43	0.19	0.48	Slot 1
05-Sep-96	249	8.57	8.43	0.14	0.40	Slot 1
06-Sep-96	250	8.56	8.42	0.14	0.40	Slot 1

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07-Sep-96	251	8.57	8.45	0.12	0.37	Slot 1
08-Sep-96	252	8.57	8.45	0.12	0.37	Slot 1
09-Sep-96	253	8.50	8.44	0.06	0.24	Slot 1
10-Sep-96	254	8.40	8.44	-0.04	0.23	Slot 1
11-Sep-96	255	8.34	8.43	-0.09	0.42	Slot 1
12-Sep-96	256	8.27	8.43	-0.16	0.63	Slot 1
13-Sep-96	257	8.17	8.41	-0.24	0.84	Slot 1
14-Sep-96	258	8.08	8.38	-0.30	0.99	Slot 1
15-Sep-96	259	8.00	8.35	-0.35	1.10	Slot 1
16-Sep-96	260	7.89	8.33	-0.44	1.30	Slot 1
17-Sep-96	261	7.84	8.32	-0.48	1.38	Slot 1
18-Sep-96	262	7.80	8.35	-0.55	1.53	Slot 1
19-Sep-96	263	7.76	8.36	-0.60	1.62	Slot 1
20-Sep-96	264	7.78	8.36	-0.58	1.58	Slot 1
21-Sep-96	265	7.78	8.36	-0.58	1.58	Slot 1
22-Sep-96	266	7.97	8.43	-0.46	1.34	Slot 1
23-Sep-96	267	8.08	8.48	-0.40	1.21	Slot 1
24-Sep-96	268	8.08	8.48	-0.40	1.21	Slot 1
25-Sep-96	269	8.05	8.47	-0.42	1.26	Slot 1
26-Sep-96	270	8.01	8.46	-0.45	1.32	Slot 1
27-Sep-96	271	7.96	8.43	-0.47	1.36	Slot 1
28-Sep-96	272	8.02	8.42	-0.40	1.21	Slot 1
29-Sep-96	273	7.98	8.41	-0.43	1.28	Slot 1
30-Sep-96	274	7.93	8.37	-0.44	1.30	Slot 1
01-Oct-96	275	7.95	8.35	-0.40	1.21	Slot 1
02-Oct-96	276	7.90	8.31	-0.41	1.24	Slot 1
03-Oct-96	277	7.81	8.28	-0.47	1.36	Slot 1
04-Oct-96	278	7.75	8.25	-0.50	1.42	Slot 1
05-Oct-96	279	7.78	8.23	-0.45	1.32	Slot 1
06-Oct-96	280	7.99	8.27	-0.28	0.94	Slot 1
07-Oct-96	281	8.05	8.28	-0.23	0.82	Slot 1
08-Oct-96	282	8.06	8.29	-0.23	0.82	Slot 1
09-Oct-96	283	7.98	8.26	-0.28	0.94	Slot 1
10-Oct-96	284	7.92	8.23	-0.31	1.01	Slot 1
11-Oct-96	285	7.85	8.20	-0.35	1.10	Slot 1
12-Oct-96	286	7.78	8.20	-0.42	1.26	Slot 1
13-Oct-96	287	7.66	8.13	-0.47	1.36	Slot 1
14-Oct-96	288	7.61	8.10	-0.49	1.40	Slot 1
15-Oct-96	289	7.45	8.03	-0.58	1.58	Slot 1
16-Oct-96	290	7.26	7.97	-0.71	1.83	Slot 1
17-Oct-96	291	7.13	7.93	-0.80	1.99	Slot 1
18-Oct-96	292	7.08	7.90	-0.82	2.03	Slot 1
19-Oct-96	293	7.01	7.88	-0.87	2.12	Slot 1
20-Oct-96	294	6.97	7.85	-0.88	2.14	Slot 1
21-Oct-96	295	6.94	7.82	-0.88	2.14	Slot 1
22-Oct-96	296	6.62	7.70	-1.08	2.47	Slot 1
23-Oct-96	297	6.54	7.63	-1.09	2.49	Slot 1
24-Oct-96	298	6.36	7.55	-1.19	2.65	Slot 1
25-Oct-96	299	6.21	7.48	-1.27	2.78	Slot 1
26-Oct-96	300	6.11	7.41	-1.30	2.82	Slot 1
27-Oct-96	301	5.96	7.34	-1.38	2.95	Slot 1
28-Oct-96	302	5.92	7.30	-1.38	2.95	Slot 1
29-Oct-96	303	6.07	7.36	-1.29	2.81	Slot 1

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30-Oct-96	304	6.38	7.37	-0.99	2.32	Slot 1
31-Oct-96	305	6.64	7.35	-0.71	1.83	Slot 1
01-Nov-96	306	6.77	7.32	-0.55	1.53	Slot 1
02-Nov-96	307	6.74	7.27	-0.53	1.49	Slot 1
03-Nov-96	308	6.70	7.20	-0.50	1.42	Slot 1
04-Nov-96	309	6.76	7.19	-0.43	1.28	Slot 1
05-Nov-96	310	6.66	7.14	-0.48	1.38	Slot 1
06-Nov-96	311	6.56	7.07	-0.51	1.44	Slot 1
07-Nov-96	312	6.44	6.95	-0.51	1.44	Slot 1
08-Nov-96	313	6.32	6.86	-0.54	1.51	Slot 1
09-Nov-96	314	6.28	6.79	-0.51	1.44	Slot 1

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A.2 Daily Operational Record of Fishpass

DAILY OPERATIONAL RECORD OF FISHPASS

Note: Shaded cells indicate actual operation period (AOP) of the fishpass

Date	Day	R/S Water level		R/S gate		Comments
	no.	below sill (hr)	above sill (hr)	closed (hr)	open (hr)	
96.01.01	1	24	0	0	24	Dry season; river level low - below R/S invert level
96.01.02	2	24	0	0	24	"
96.01.03	3	24	0	0	24	"
96.01.04	4	24	0	0	24	"
96.01.05	5	24	0	0	24	"
96.01.06	6	24	0	0	24	"
96.01.07	7	24	0	0	24	"
96.01.08	8	24	0	0	24	"
96.01.09	9	24	0	0	24	"
96.01.10	10	24	0	0	24	"
96.01.11	11	24	0	0	24	"
96.01.12	12	24	0	0	24	"
96.01.13	13	24	0	0	24	"
96.01.14	14	24	0	0	24	"
96.01.15	15	24	0	0	24	"
96.01.16	16	24	0	0	24	"
96.01.17	17	24	0	0	24	"
96.01.18	18	24	0	0	24	"
96.01.19	19	24	0	0	24	"
96.01.20	20	24	0	0	24	"
96.01.21	21	24	0	0	24	"
96.01.22	22	24	0	0	24	"
96.01.23	23	24	0	0	24	"
96.01.24	24	24	0	0	24	"
96.01.25	25	24	0	0	24	"
96.01.26	26	24	0	0	24	"
96.01.27	27	24	0	0	24	"
96.01.28	28	24	0	0	24	"
96.01.29	29	24	0	0	24	"
96.01.30	30	24	0	0	24	"
96.01.31	31	24	0	0	24	"

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96.02.01	32	24	0	0	24	"
96.02.02	33	24	0	0	24	"
96.02.03	34	24	0	0	24	"
96.02.04	35	24	0	0	24	"
96.02.05	36	24	0	0	24	"
96.02.06	37	24	0	0	24	"
96.02.07	38	24	0	0	24	"
96.02.08	39	24	0	0	24	"
96.02.09	40	24	0	0	24	"
96.02.10	41	24	0	0	24	"
96.02.11	42	24	0	0	24	"
96.02.12	43	24	0	0	24	"
96.02.13	44	24	0	0	24	"
96.02.14	45	24	0	0	24	"
96.02.15	46	24	0	0	24	"
96.02.16	47	24	0	0	24	"
96.02.17	48	24	0	0	24	"
96.02.18	49	24	0	0	24	"
96.02.19	50	24	0	0	24	"
96.02.20	51	24	0	0	24	"
96.02.21	52	24	0	0	24	"
96.02.22	53	24	0	0	24	"
96.02.23	54	24	0	0	24	"
96.02.24	55	24	0	0	24	"
96.02.25	56	24	0	0	24	"
96.02.26	57	24	0	0	24	PMF#1 begins, but peak does not reach R/S invert level
96.02.27	58	24	0	0	24	
96.02.28	59	24	0	0	24	
96.02.29	60	24	0	0	24	

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96.03.01	61	24	0	0	24	
96.03.02	62	24	0	0	24	
96.03.03	63	24	0	0	24	
96.03.04	64	24	0	0	24	
96.03.05	65	24	0	0	24	
96.03.06	66	24	0	0	24	
96.03.07	67	24	0	0	24	
96.03.08	68	24	0	0	24	
96.03.09	69	24	0	0	24	
96.03.10	70	24	0	0	24	
96.03.11	71	24	0	0	24	
96.03.12	72	24	0	0	24	
96.03.13	73	24	0	0	24	
96.03.14	74	24	0	0	24	
96.03.15	75	24	0	0	24	PFM#2 begins
96.03.16	76	7	17	7	17	R/S invert level surpassed by river level first time in 1996
96.03.17	77	0	24	24	0	Gates closed; fabrication of cages
96.03.18	78	0	24	24	0	
96.03.19	79	0	24	24	0	
96.03.20	80	0	24	24	0	
96.03.21	81	0	24	24	0	
96.03.22	82	12	12	12	12	PFM#2 recedes below R/S invert level
96.03.23	83	24	0	0	24	
96.03.24	84	24	0	0	24	
96.03.25	85	24	0	0	24	
96.03.26	86	24	0	0	24	
96.03.27	87	24	0	0	24	
96.03.28	88	24	0	0	24	
96.03.29	89	0	24	24	0	PMF#3 begins, but R/S gate closed for constructing cages & maintenance
96.03.30	90	0	24	24	0	"
96.03.31	91	0	24	24	0	"

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96.04.01	92	0	24	24	0	"
96.04.02	93	0	24	24	0	"
96.04.03	94	0	24	23.83	0.17	Opened 10 min for testing cages
96.04.04	95	0	24	18	6	Gate open 18.00 to 24.00
96.04.05	96	0	24	18	6	Gate open 0.00 to 06.00; closed due to protest
96.04.06	97	0	24	23.75	0.25	Gate open 15 min for discharge measurement
96.04.07	98	0	24	24	0	Protest from farmers (until completion of boro harvest on 10 May)
96.04.08	99	0	24	24	0	
96.04.09	100	0	24	24	0	
96.04.10	101	0	24	24	0	
96.04.11	102	0	24	24	0	
96.04.12	103	0	24	24	0	
96.04.13	104	0	24	24	0	
96.04.14	105	0	24	24	0	
96.04.15	106	0	24	24	0	
96.04.16	107	0	24	24	0	
96.04.17	108	0	24	24	0	
96.04.18	109	0	24	24	0	
96.04.19	110	24	0	0	24	PMF#3 recedes below R/S invert level
96.04.20	111	24	0	0	24	
96.04.21	112	24	0	0	24	
96.04.22	113	24	0	0	24	
96.04.23	114	24	0	0	24	
96.04.24	115	24	0	0	24	
96.04.25	116	24	0	0	24	
96.04.26	117	0	24	24	0	PMF#4 raises water level marginally above invert level
96.04.27	118	0	24	24	0	
96.04.28	119	0	24	24	0	
96.04.29	120	0	24	24	0	
96.04.30	121	0	24	24	0	

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96.05.01	122	0	24	24	0	
96.05.02	123	0	24	24	0	
96.05.03	124	0	24	24	0	
96.05.04	125	0	24	24	0	
96.05.05	126	0	24	24	0	
96.05.06	127	0	24	24	0	
96.05.07	128	0	24	24	0	
96.05.08	129	0	24	24	0	
96.05.09	130	0	24	24	0	
96.05.10	131	0	24	24	0	MF#1 begins
96.05.11	132	0	24	0	24	Gate opened, water level rising, began routine fish sampling
96.05.12	133	0	24	0	24	
96.05.13	134	0	24	0	24	
96.05.14	135	0	24	0	24	
96.05.15	136	0	24	0	24	
96.05.16	137	0	24	0	24	
96.05.17	138	0	24	0	24	
96.05.18	139	0	24	0	24	
96.05.19	140	0	24	0	24	
96.05.20	141	0	24	0	24	
96.05.21	142	0	24	0	24	
96.05.22	143	0	24	0	24	
96.05.23	144	0	24	0	24	
96.05.24	145	0	24	0	24	
96.05.25	146	0	24	0	24	
96.05.26	147	0	24	0	24	
96.05.27	148	0	24	0	24	
96.05.28	149	0	24	0	24	
96.05.29	150	0	24	0	24	
96.05.30	151	0	24	0	24	
96.05.31	152	0	24	0	24	MF#2 begins

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96.06.01	153	0	24	0	24
96.06.02	154	0	24	0	24
96.06.03	155	0	24	0	24
96.06.04	156	0	24	0	24
96.06.05	157	0	24	0	24
96.06.06	158	0	24	0	24
96.06.07	159	0	24	0	24
96.06.08	160	0	24	0	24
96.06.09	161	0	24	0	24
96.06.10	162	0	24	0	24
96.06.11	163	0	24	0	24
96.06.12	164	0	24	0	24
96.06.13	165	0	24	0	24
96.06.14	166	0	24	0	24
96.06.15	167	0	24	0	24
96.06.16	168	0	24	0	24
96.06.17	169	0	24	0	24
96.06.18	170	0	24	0	24
96.06.19	171	0	24	0	24
96.06.20	172	0	24	0	24
96.06.21	173	0	24	0	24
96.06.22	174	0	24	0	24
96.06.23	175	0	24	0	24
96.06.24	176	0	24	0	24
96.06.25	177	0	24	0	24
96.06.26	178	0	24	0	24
96.06.27	179	0	24	0	24
96.06.28	180	0	24	0	24
96.06.29	181	0	24	0	24
96.06.30	182	0	24	0	24

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96.07.01	183	0	24	0	24	
96.07.02	184	0	24	0	24	MF#3 begins
96.07.03	185	0	24	0	24	
96.07.04	186	0	24	0	24	
96.07.05	187	0	24	0	24	
96.07.06	188	0	24	0	24	
96.07.07	189	0	24	0	24	
96.07.08	190	0	24	0	24	
96.07.09	191	0	24	0	24	
96.07.10	192	0	24	0	24	
96.07.11	193	0	24	0	24	
96.07.12	194	0	24	0	24	
96.07.13	195	0	24	0	24	C/S deck submerged by flooding in haor (continually to 13 Oct)
96.07.14	196	0	24	0	24	
96.07.15	197	0	24	0	24	
96.07.16	198	0	24	0	24	
96.07.17	199	0	24	0	24	
96.07.18	200	0	24	0	24	
96.07.19	201	0	24	0	24	
96.07.20	202	0	24	0	24	
96.07.21	203	0	24	0	24	
96.07.22	204	0	24	0	24	
96.07.23	205	0	24	0	24	
96.07.24	206	0	24	0	24	
96.07.25	207	0	24	0	24	
96.07.26	208	0	24	0	24	
96.07.27	209	0	24	0	24	
96.07.28	210	0	24	0	24	
96.07.29	211	0	24	0	24	
96.07.30	212	0	24	0	24	
96.07.31	213	0	24	0	24	

Continued

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96.08.01	214	0	24	0	24	
96.08.02	215	0	24	0	24	
96.08.03	216	0	24	0	24	
96.08.04	217	0	24	0	24	
96.08.05	218	0	24	0	24	
96.08.06	219	0	24	0	24	
96.08.07	220	0	24	0	24	
96.08.08	221	0	24	0	24	
96.08.09	222	0	24	0	24	
96.08.10	223	0	24	0	24	
96.08.11	224	0	24	0	24	
96.08.12	225	0	24	0	24	
96.08.13	226	0	24	0	24	
96.08.14	227	0	24	0	24	
96.08.15	228	0	24	0	24	
96.08.16	229	0	24	0	24	MF#4 begins
96.08.17	230	0	24	0	24	
96.08.18	231	0	24	0	24	
96.08.19	232	0	24	0	24	
96.08.20	233	0	24	0	24	
96.08.21	234	0	24	0	24	
96.08.22	235	0	24	0	24	
96.08.23	236	0	24	0	24	
96.08.24	237	0	24	0	24	
96.08.25	238	0	24	0	24	
96.08.26	239	0	24	0	24	
96.08.27	240	0	24	0	24	
96.08.28	241	0	24	0	24	
96.08.29	242	0	24	0	24	
96.08.30	243	0	24	0	24	
96.08.31	244	0	24	0	24	

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96.09.01	245	0	24	0	24
96.09.02	246	0	24	0	24
96.09.03	247	0	24	0	24
96.09.04	248	0	24	0	24
96.09.05	249	0	24	0	24
96.09.06	250	0	24	0	24
96.09.07	251	0	24	0	24
96.09.08	252	0	24	0	24
96.09.09	253	0	24	0	24
96.09.10	254	0	24	0	24
96.09.11	255	0	24	0	24
96.09.12	256	0	24	0	24
96.09.13	257	0	24	0	24
96.09.14	258	0	24	0	24
96.09.15	259	0	24	0	24
96.09.16	260	0	24	0	24
96.09.17	261	0	24	0	24
96.09.18	262	0	24	0	24
96.09.19	263	0	24	0	24
96.09.20	264	0	24	0	24
96.09.21	265	0	24	0	24
96.09.22	266	0	24	0	24
96.09.23	267	0	24	0	24
96.09.24	268	0	24	0	24
96.09.25	269	0	24	0	24
96.09.26	270	0	24	0	24
96.09.27	271	0	24	0	24
96.09.28	272	0	24	0	24
96.09.29	273	0	24	0	24
96.09.30	274	0	24	0	24

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96.10.01	275	0	24	0	24	
96.10.02	276	0	24	0	24	
96.10.03	277	0	24	0	24	
96.10.04	278	0	24	0	24	
96.10.05	279	0	24	0	24	
96.10.06	280	0	24	0	24	
96.10.07	281	0	24	0	24	
96.10.08	282	0	24	0	24	
96.10.09	283	0	24	0	24	
96.10.10	284	0	24	0	24	
96.10.11	285	0	24	0	24	
96.10.12	286	0	24	0	24	
96.10.13	287	0	24	0	24	
96.10.14	288	0	24	0	24	
96.10.15	289	0	24	0	24	
96.10.16	290	0	24	0	24	
96.10.17	291	0	24	0	24	
96.10.18	292	0	24	0	24	
96.10.19	293	0	24	0	24	
96.10.20	294	0	24	0	24	
96.10.21	295	0	24	0	24	
96.10.22	296	0	24	0	24	
96.10.23	297	0	24	0	24	
96.10.24	298	0	24	0	24	
96.10.25	299	0	24	0	24	
96.10.26	300	0	24	0	24	
96.10.27	301	0	24	0	24	
96.10.28	302	0	24	0	24	
96.10.29	303	0	24	0	24	
96.10.30	304	0	24	0	24	
96.10.31	305	0	24	0	24	

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C/S deck emerges above flood level of haor

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96.11.01	306	0	24	0	24	
96.11.02	307	0	24	0	24	
96.11.03	308	0	24	0	24	
96.11.04	309	0	24	0	24	
96.11.05	310	0	24	0	24	
Subtotal (hrs)		2131	5309	990.58	6449.42	
% of total hrs		28.6	71.4	13.3	86.7	
Total hours		7440		7440		
Total days		310		310		

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ANNEX B
WATER BALANCE MODEL

ANNEX B: WATER BALANCE MODEL

To investigate quantitatively the hydraulic operation of MRP in quantitative detail, a mathematical model of the project water balance was developed. Although this model is set up specifically for MRP, it could be applied to any non-submersible embankment type project with little or no modification.

The model incorporates inflow into the project area and outflow from the project area. The water balance model accounts for effects from rainfall, evaporation, the Manu barrage, the 3- and 6-vent regulators, upstream *chorras*, the Kashimpur pumphouse, infiltration, evaporation, and the fishpass (Table B1). The model provides a comparative statement of various inflows and outflows.

The model represents a quantitative estimation. The database used for the water balance model includes:

- Water Level (R/S and C/S)
- Rainfall
- Evaporation
- Drainage through pump house
- Manu barrage irrigation inflow
- Fishpass inflow / outflow
- Drainage regulator operating period
- Project elevation-area-storage data

Since rainfall and evaporation are available as daily data, the time step used for the model was 24 hours.

Manu River Project Area

MRP is located at the toe of the Bhatera Hills. The project area is 243 Km². Since the project receives runoff from the upper catchment (Bhatera Hills), the upper catchment area has a hydrological effect on MRP and must be included in the total runoff area.

$$\text{AREA} = \text{AP} + \text{AB}$$

$$\text{AREA} = \text{Total runoff area}$$

$$\text{AP} = \text{Project area (243 Km}^2\text{)}$$

$$\text{AB} = \text{Upper catchment area}$$

The elevation of MRP area varies from 1.00 m PWD to 14.00 m PWD. The upper catchment area lies within the Bhatera Hills, and elevation varies up to 433 m PWD.

Nature and Estimation of Flows

Inflow Through Manu Barrage Irrigation Canal: The two main irrigation intake canals from Manu barrage are Manumukh main canal and Rajnagar main canal. The normal pool level of

the barrage is 12.03 m PWD. At this pool level, inflow through these two irrigation canals is 5.7 m³/sec. Fifty percent of the irrigation water is stored in *beels*. The water flows overland and through drainage channels.

Inflow or Outflow Through the Fishpass Structure: During the pre-monsoon and monsoon seasons, the direction of flow at the structure is from R/S to C/S. Measured flows from R/S to C/S vary up to 1.20 m³/sec. During the post-monsoon and dry seasons, the flow direction is from C/S to R/S. Flow from C/S to R/S varies up to 1.5 m³/sec. Discharges have been measured at different head differences, and coefficients of discharge have been calculated for flows in both directions.

Outflow Through Pump House: There are eight electrically driven pumps at the Kashimpur pumping station. Each pump has a discharge capacity of 4.25 m³/sec. During the pre-monsoon season, pumps are operated to maintain *haor* water level at 4.12 m PWD. This protects *boro* crops from inundation. During the monsoon season, pumps remain in operation to protect *b. aman* from submergence. When water level in the *haor* reaches homestead level, all the pumps remain in operation.

Outflow through Drainage regulators: There are two main drainage sluices in the Kushiya section of the project embankment. The 6-vent (1.83 m x 1.52 m) sluice has invert level at 4.10 m PWD, and the 3-vent (1.83 m x 1.52 m) sluice has invert level at 1.40 m PWD. These drainage sluices allow gravity drainage of water from the project area when water levels in the Kushiya river permit. Analytical discharge computation for drainage regulators are expressed later in this annex.

Inflow through other Systems: Other inflow systems are:

- through inlet structures set in the project embankment
- over any submerged portion of the project embankment
- through any public cuts or breaches in the project embankment
- inflow from *chhoras*;
- leakage through hydraulic structures.

Rainfall

At present, there are three rain gauges operating near MRP area. These are at Moulvibazar (R-122), Chandbagh (R-104), and Langla (R-117). Daily rainfall was considered as the average of these three rainfall stations' data.

Evaporation

Since evaporation in an area varies less than rainfall, MRP evaporation is reasonably represented by the Bangladesh pan data for Srimangal. For the most part, the record of this pan is acceptable. Any anomalous recordings, such as 33 mm/day, are ignored. In all such cases the daily evaporation is reduced to 7.62 mm/day, which is recognized by the BWDB as the maximum possible daily pan evaporation. There are also one or two days of missing data.

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The missing values are estimated by linear interpolation between the preceding and following days' evaporation values.

Infiltration

The infiltration is assumed equal to be 2 mm/day. This value is typical of measurements taken in paddy lands that are similar to those in MRP.

It is assumed that infiltration occurs only in conjunction with rainfall:

If rainfall ≥ 2.00 mm : Infiltration = 2.00 mm

If rainfall ≤ 2.00 mm : Infiltration = Rainfall

Infiltration occurs only during the pre-monsoon and dry seasons. Afterwards, soil becomes saturated.

Elevation - Area - Storage Data : Area has been computed from the BWDB 1 : 15,840 scale map. Project area spot elevations are digitized. In locations where data are not given (*beels*), spot elevations are provided through field verification. A contour map with a grid of 0.25 km x 0.25 km was prepared using computer software (figure B1). Storage has been computed from elevation - area data.

Leakage Through 3-vent Regulator: Successive discharges have been measured in front of the 3-vent regulator. They were measured for different head differences across the structure, and only when the gate was closed. The invert level of the structure is 1.41 m PWD and the soffit level is 3.23 m PWD. Since water level rarely falls below soffit level of the regulator, full flow discharges within the structure are either from R/S to C/S or C/S to R/S. From the discharge analysis, it is estimated that an equivalent area of 0.94 m² remains open when the gate is closed. During the pre-monsoon and monsoon period, significant leakage occurs through the 3-vent regulator.

Inflow from Upstream Chhoras: Runoff from the upper catchment area comes into the project through many *chhoras*, culverts, and pipes. To reduce waterlogging and keep lands near the upper catchment free from floods, many culverts and pipes are provided along Moulvibazar - Fenchuganj road. Inflow from *chhoras* may be caused by local rainfall or by rainfall in upper areas. The major upstream *chhoras* are:

- Akali Chhora
- Binnojuri Chhora
- Udna Chhora
- Kuchimura Chhora
- Khoiyajani Chhora
- Haar Chhora
- Dhamai Chhora
- Kalanou Chhora

Discharge Computation Through Drainage Sluices

Types of Flow Through Sluices

Flow through a sluice may be classified into two general types, depending upon the existing headwater and tailwater levels. If the inlet and outlet are submerged, the sluice vent will flow full (like a pipe). If the inlet and outlet are not submerged, the vent will flow partially full and act as an open channel.

For practical purposes, the two general types can be broken down into six specific types of flow.

Type 1 Inlet and outlet submerged

The outlet is submerged by high tailwater. The vent will flow full with the control at the outlet. Discharge is a function of head differential between inlet and outlet water levels.

$$q = C_d D (2gh)^{1/2}$$

where	C_d	=	Coefficient of discharge
	D	=	Height of vent
	g	=	Acceleration due to gravity (9.81 m/sec ²)
	h	=	Head difference across the structure

C_d = function of inlet coefficient, exit coefficient, length of barrel, roughness coefficient, acceleration due to gravity, and hydraulic radius

Type 2 Inlet submerged, outlet not submerged, vent hydraulically long

Although the tailwater level is below the vent soffit, the vent will flow full. The vent is sufficiently long for friction forces to cause the depth of flow to expand, filling the vent. This type is common in long culverts, but will not usually occur in sluices.

Type 3 Inlet submerged, outlet not submerged, vent hydraulically short

This is the same as type 2, except the vent will not flow full. This is the usual sluice condition; the headwater depth is greater than 1.5 times the vent height. The control is at the entrance and similar to orifice discharge.

$$q = C_q D (2gH)^{1/2}$$

where	C_q	=	Coefficient of discharge
	D	=	Height of gate
	g	=	Acceleration due to gravity
	H	=	Inlet depth of water

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C_q is a function of height of the gate and depth of water

Type 4 Inlet not submerged, high tailwater

When the head water depth is less than 1.5 times the vent height, the entrance is not sealed by water. The sluice acts as a broadcreast weir. The tail water level is higher than the critical flow depth through the vent. This type is also associated with a drowned out hydraulic jump. The control is at the outlet.

$$q = C_1 d_1 (2gh)^{1/2}$$

where C_1 = Coefficient of discharge
 d_1 = depth of vent
 g = Acceleration due to gravity
 h = Head difference

C_1 is a function of entrance co-efficient

Type 5 Inlet not submerged, low tailwater

Type 5 is similar to type 4, except the tailwater depth is less than critical flow depth through the vent. This type will usually occur when a stilling pool or downstream drop is part of the structure, and the flow is made to pass through critical depth. A hydraulic jump usually occurs downstream. The control is at the outlet.

$$q = C_2 H^{3/2}$$

where C_2 = Discharge coefficient
 H = Inlet height of water
 C_2 is a function of entrance co-efficient.

Type 6 Inlet not submerged, low tailwater

This is the same as type 5, except the vent invert slope is greater than critical. Since sluices are usually designed with a flat invert, this type will not occur.

Table Computation

The water balance computation presented in Tables B1 to B7 for 1996 includes the following data and computations:

Column 1 : Date

Column 2 and 3 : R/S water level and C/S water level

Column 4 : Area submerged at C/S water level. Area has been computed from elevation - area- storage data

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Column 5 : Storage inside the project, computed from elevation-area- storage data

Column 6 : Daily change of storage

Column 7, 8, and 9 : Daily rainfall data at Moulvibazar, Langla, and Chandbagh

Column 10 : Average rainfall of Moulvibazar, Langla, and Chandbagh

Column 11 : Daily infiltration data (2.00 mm/day)

Column 12 : Daily evaporation data

Column 13 : Inflow from rainfall

$$\text{runoff} = \text{Project area (ha)} * \text{average rainfall (m/day)}$$

Column 14 : Inflow through fishpass : The following formula has been used to compute discharge in m^3/sec

$$Q = 8.64C_dA(2gh)^{1/2} \quad (\text{ha-m/day})$$

C_d is the co-efficient of discharge calibrated from measured velocity and discharge data.

Column 15 : Inflow through barrage. At full supply level, inflow through canal is $5.71 \text{ m}^3/\text{s}$

$$Q = 5.71 * 8.64 \quad (\text{ha-m/day})$$

50% of the inflow is considered as storage

Column 16 : Leakage through 3-vent regulator. During gate closed condition leakage area is 0.94 m^2 :

$$Q = C_d 0.94(2gh)^{1/2} * 8.64 \quad (\text{ha-m/day})$$

Column 17 : Inflow from upstream chhoras

$$\text{upstream inflow} = \text{Change of storage} - \text{Inflow} + \text{outflow} \quad (\text{ha-m/day})$$

Column 18 : Outflow through pumphouse

$$Q = 4.25 * (\text{operating hour}) * 0.36 \quad (\text{ha-m/day})$$

Columns 19 and 20 : 3-vent and 6-vent regulator discharges are computed using formulae from the BWDB hydrological design manual

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Column 21 : Outflow through fishpass. The following formulae have been used to compute discharge:

$$Q = C_1 d_1 (2gh)^{1/2} * 8.64 \text{ (ha-m/day) (Flow type 4)}$$

$$Q = C_2 H^{3/2} * 8.64 \text{ (ha-m/day) (Flow type 5)}$$

Coefficient of discharges have been computed from measured velocities and discharge data.

Column 22 : Infiltration is considered up to July. For project submerged area, outflow through infiltration = area submerged * infiltration * 24.30 (ha-m/day)

For project dry area :

If rain $\geq$ 2.00 mm : Infiltration = 2.00 mm Outflow = Area dry * 24.30 * infiltration (ha-m/day)

If rain < 1.00 mm : Infiltration = rain (mm) Outflow = Area dry * rain * 24.30 (ha-m/day)

Total outflow through infiltration = outflow from submerged area + outflow from dry area.

Column 23 : Outflow through evaporation

For submerged area : Outflow through evaporation (E_1),

$$E_1 = \text{Evaporation} * \text{Area submerged} / 1000 \text{ (ha-m/day)}$$

For dry area : If Rain - Infiltration $\geq$ Evaporation,

$$\text{Outflow, } E_2 = \text{Evaporation} * \text{Area dry} / 1000 \text{ (ha-m/day)}$$

If Rain - Infiltration < Evaporation,

$$\text{Outflow, } E_2 = (\text{Rain} - \text{Infiltration}) * \text{Area dry} / 1000 \text{ (ha-m/day)}$$

$$\text{Total Evaporation} = E_1 + E_2$$

The MRP total inflow and outflow for 1996 (March-September) is shown in tables B1 to B7.

Conclusion and Recommendation

There were several sources of uncertainty in the water balance model:

- the water balance model is based on a single reservoir system, however during the pre-monsoon and dry seasons, multiple reservoir systems exist. Any rainfall into the project area or inflow from the upper catchment into lower

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areas and is stored in *beels*. There is therefore variation of water levels in the project from upper areas to lower area. During the monsoon season, two reservoirs are formed: Boro Kawadighi Haor and Chotto Kawadighi Haor. The same situation exists, but since there are only two waterbodies the deviation from the model is less severe;

- recorded water levels at *haor* side are taken during both pump operating and non-operating periods. Water level fluctuated up to eight centimeters due to pump operation. Due to inter-flow system among reservoirs and pump operation, project still water level could not be measured;
- topographic maps used for storage computation were prepared by BWDB in 1960. Present topography, especially at *beel* areas, has changed due to inflow from upstream *chhoras*. Developed elevation - storage data differ from actual storage data;
- no rainfall station is available inside the project area. Only three adjacent rainfall stations' data are used for computation. The average of three stations' rainfall data is used for rainfall inflow. The isohyetal map indicates wide variation of rainfall over the project area. Rainfall also varies with time at different locations. Evaporation considered Srimangal pan evaporation data, which is 30 km from MRP. Groundwater effect is not considered in the model.

To achieve more accurate results from the model, it is recommended to set water level gauges at different locations inside the project area. Data should be gathered from more rainfall stations so that the average can represent a reasonable value. Inflow from upstream areas should be monitored throughout the year to verify the model data. Data on topography of the *beel* area needs to be updated.

Impact of Fishpass Inflow

Rainfall impact: During the 1996 pre-monsoon season, maximum measured inflow through the fishpass was 11 ha-m/day. This is much less than evaporation and infiltration losses. There is a decrease in water level if no rainfall occurs and no inflow comes from upstream. Water level will remain constant if the rainfall is 5 mm-8 mm. Because of the inefficient drainage system, any rainfall above 30 mm during the pre-monsoon season causes an increase in water level in successive days. MRP was designed to keep the water level in fishery areas under 4.11 m PWD. Area under 4.11 m PWD is 1983 ha, and storage is 1554 ha-m (figure B1). If the drainage system is improved and fishery areas remain under 4.11 m PWD, then occasional high rainfall runoff will be stored in the fisheries. This will cause little or no damage to low-lying irrigable area.

Pumphouse effect: There are eight pumps, each having an outflow capacity of 36.72 ha-m/day. During the low water of the pre-monsoon season, two pumps are sufficient. The number of pumps can be increased with the increase in water level. Without considering evaporation and

infiltration, if one pump remains in operation for four to six hours it can bail out the inflow from the fishpass. Inundation impacts are shown graphically in figures B2 to B4.

Irrigation and groundwater impact: Manu River irrigation inflow starts in January and continues until the end of March. Irrigation inflow from the Manu River varies with the supply level, from 5 to 6 m³/sec. Some seepage is observed into deeper *beels* and main drainage channels. Kushiya River water level remains below *haor* water level during this period if flooding does not occur, allowing gravity drainage. Outflow through the 3-vent regulator is 2-3 m³/sec.

There is a perception among farmers that crops can be damaged when the fishpass gate opens. To keep the gate open during the upcoming pre-monsoon season, holding some public meetings is suggested. These can give the farmers physical understanding of the field situation when the fishpass is in operation. Some water level gauges should be set in *beel* areas to verify fluctuation of water levels. To reduce the apprehension of farmers and mitigate the impact of rainfall, BWDB pumps should remain operating at full capacity. A rubber dam can be considered at the confluence of Mogra Channel and Akali Channel.

Table B1
Manu River Project
Water Balance Model

Period : March 1996

Date	RSWL	CRSWL	Area Submerged	Project Storage	Change of Storage	Rainfall			Average Rainfall	Infiltration	Evaporation	Inflow into the Project through					Outflow from the Project through					
						Multibarcan	Length	Chertogh				Rainfall	Fairpase	Barrage	3 - Vent Regulator	Upstream Chertosa	Pumphouse	3-vent Regulator	6-vent Regulator	Fairpase	Infiltration	Evaporation
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01-Mar-96	3.53	3.97	1727.91	1265.44	0.00	0	0	0	0	2	4.05	0.00		25.92	0.00	209.75		16.66			3.46	7.02
02-Mar-96	3.56	4.06	1506.14	1493.97	208.53	0	0	0	0	2	4.05	0.00		25.92	0.00	23.68		17.80			3.85	7.83
03-Mar-96	3.56	4.09	1945.26	1514.09	20.12	0	0	0	0	2	4.06	0.00		25.92	0.00	-76.64		17.97			3.69	7.91
04-Mar-96	3.56	4.05	1668.74	1433.60	-60.49	0	0	0	0	2	4.57	0.00		25.92	0.00	3.99		17.63			3.74	8.54
05-Mar-96	3.56	4.05	1668.74	1433.60	0.00	0	0	0	0	2	5.06	0.00		25.92	0.00	-95.50		17.80			3.74	9.49
06-Mar-96	3.53	4.00	1773.07	1332.99	-100.61	0	0	0	0	2	4.57	0.00		25.92	0.00	-44.62		17.19			3.56	8.11
07-Mar-96	3.50	3.87	1727.91	1385.44	-47.55	0	0	0	0	2	4.57	0.00		25.92	0.00	-44.92		17.19			3.46	7.90
08-Mar-96	3.46	3.94	1682.76	1237.89	-47.55	0	0	0	0	2	4.06	0.00		25.92	0.00	-126.05		17.45			3.37	6.84
09-Mar-96	3.40	3.86	1562.34	1111.10	-126.79	0	0	0	0	2	4.57	0.00		25.92	0.00	-77.87		17.02			3.12	7.14
10-Mar-96	3.37	3.81	1487.06	1031.96	-79.24	1	0	8	3	2	3.56	72.90		25.92	0.00	-91.66		16.66			46.60	5.29
11-Mar-96	3.34	3.77	1426.67	968.46	-63.40	0	0	0	1	2	3.56	16.20		25.92	0.00	-131.24		16.50			16.10	5.07
12-Mar-96	3.30	3.67	1380.44	839.56	-128.90	0	70	182	87	2	3.56	2122.20		25.92	0.00	-1647.03		15.29			46.60	6.41
13-Mar-96	3.36	3.91	1637.60	1190.35	300.79	7	0	0	2	2	5.03	96.70		25.92	0.00	537.97		16.66			46.60	8.24
14-Mar-96	3.46	4.20	2156.75	1726.44	545.09	0	0	0	0	2	5.97	0.00		25.92	0.00	253.39		21.80			4.31	12.67
15-Mar-96	5.16	4.30	2336.86	1969.30	223.66	0	0	0	0	2	5.99	0.00		25.92	0.00	13.74		62.02			4.67	13.06
16-Mar-96	5.66	4.44	2576.18	2204.42	345.12	0	0	0	0	2	5.06	0.00		25.92	0.00	29.96		137.70			5.15	13.09
17-Mar-96	6.08	4.59	2823.99	2711.49	467.07	0	0	0	0	2	6.10	0.00		25.92	0.00	30.67		156.87			5.65	17.21
18-Mar-96	6.15	4.47	2627.46	2278.37	-333.12	0	0	0	0	2	5.06	0.00		25.92	0.00	-401.50		156.06			5.25	13.35
19-Mar-96	5.98	4.25	2298.51	1880.70	-617.67	0	0	0	0	2	5.06	0.00		25.92	0.00	-6.83		161.11			4.54	11.82
20-Mar-96	5.87	4.20	2156.75	1726.44	-126.26	0	0	0	0	2	5.50	0.00		25.92	0.00	30.84		129.59			4.31	12.05
21-Mar-96	5.67	4.16	2079.21	1654.95	-90.49	0	0	0	0	2	5.06	0.00		25.92	0.00	30.84		122.40			4.16	10.56
22-Mar-96	5.44	4.21	2174.68	1726.56	100.61	0	3	2	2	2	5.06	40.50		25.92	0.00	27.91		64.15			41.22	11.05
23-Mar-96	5.06	4.21	2174.68	1726.56	0.00	0	0	3	1	2	4.84	24.30		25.92	0.00	-23.86		112.91			26.47	10.74
24-Mar-96	4.81	4.16	2079.21	1654.95	-100.61	10	0	0	3	2	5.41	81.00		25.92	0.00	30.30		89.51			46.60	11.25
25-Mar-96	4.56	4.06	2775.17	2626.10	870.15	0	0	0	0	2	5.06	0.00		25.92	0.00	370.65		31.37			5.56	14.10
26-Mar-96	4.46	4.06	2568.04	2370.66	345.56	0	16	27	14	2	5.50	348.30		25.92	0.00	-338.35		41.31			46.60	13.67
27-Mar-96	4.36	4.61	2665.54	2769.06	-201.56	11	6	0	6	2	3.02	137.70		25.92	0.00	-26.69		66.80			46.60	73.29
28-Mar-96	4.81	4.58	2807.32	2682.89	-66.39	0	27	0	9	2	4.06	218.70		25.92	0.00	-340.44		80.12			46.60	96.76
29-Mar-96	6.01	4.46	2810.37	2263.72	-289.97	15	82	66	51	2	4.12	1298.30		25.92	0.00	31.28		69.05			46.60	100.12
30-Mar-96	6.53	4.86	3336.73	3643.37	1189.65	81	20	41	47	2	2.76	1150.20		25.92	0.00	-1128.79		134.95			46.60	66.87
31-Mar-96	6.98	4.81	3201.37	3374.67	-198.70	35	12	0	16	2	5.34	380.70		25.92	0.00	-106.84		159.20			46.60	129.86

Table B2
Manu River Project
Water Balance Model

Period : April 1996

Date	RSM (in PMD)	CSWL (in PMD)	Area Submerged (ha)	Project Storage (ha-m)	Change of Storage (ha-m)	Rainfall				Average Rainfall (mm/day)	Infiltration (mm/day)	Evaporation (mm/day)	Inflow into the Project through					Outflow from the Project through				
						Maukibazar (mm/day)	Langla (mm/day)	Chandabagh (mm/day)	Rainfall (mm/day)				Rainfall (ha-m/day)	Fishpass (ha-m/day)	Barage (ha-m/day)	3 - Vent Regulator (ha-m/day)	Upstream Channel (ha-m/day)	Pumphouse (ha-m/day)	3-vent Regulator (ha-m/day)	6-vent Regulator (ha-m/day)	Fishpass (ha-m/day)	Infiltration (ha-m/day)
01-Apr-96	7.31	4.77	3127.49	3206.71	-134.96	0	0	0	0	0	2	3.56	0.00		40.09	-1.55	175.03				6.25	11.12
02-Apr-96	7.56	4.72	3032.33	3065.84	-153.87	0	0	0	0	0	2	4.57	0.00		42.25	0.77	167.08				6.06	13.66
03-Apr-96	7.68	4.67	2961.97	2941.86	-143.98	0	0	0	0	0	2	4.57	0.00		44.41	83.74	137.55				5.90	13.50
04-Apr-96	7.70	4.66	2935.90	2913.06	-28.80	0	0	0	0	0	2	5.06	0.00		43.11	55.30	164.02				5.87	14.91
05-Apr-96	7.71	4.63	2867.68	2836.67	-66.39	0	2	0	0	1	2	4.05	16.20		44.50	35.36	150.71			20.06	11.69	
06-Apr-96	7.67	4.60	2839.46	2740.28	-86.39	0	0	0	0	0	2	3.56	0.00		43.63	227.33	140.00			5.68	10.10	
07-Apr-96	7.57	4.64	2903.75	2855.47	115.19	0	3	0	0	1	2	5.51	24.30		40.18	209.12	115.21			27.20	15.99	
08-Apr-96	7.46	4.68	2958.04	2970.66	115.19	9	0	0	0	3	2	5.06	72.90		39.74	136.84	159.12			46.60	15.06	
09-Apr-96	7.30	4.69	2884.12	2899.45	26.79	0	0	0	0	0	2	5.06	0.00		36.45	49.76	124.70			5.97	15.16	
10-Apr-96	7.15	4.67	2861.87	2841.86	-57.59	0	0	0	0	0	2	5.59	0.00		41.99	0.81	106.79			5.90	16.50	
11-Apr-96	7.06	4.64	2903.75	2855.47	-86.39	0	0	0	0	0	2	5.59	0.00		36.53	-30.71	100.98			5.61	16.23	
12-Apr-96	6.76	4.60	2839.46	2740.28	-115.19	0	0	0	0	0	2	5.59	0.00		34.47	-41.20	86.80			5.66	15.67	
13-Apr-96	6.56	4.56	2775.17	2825.10	-115.16	0	0	0	0	0	2	5.06	0.00		36.46	-67.96	121.64			5.55	14.10	
14-Apr-96	6.36	4.50	2679.74	2492.32	-172.76	0	0	0	0	0	2	4.57	0.00		35.34	-15.36	100.98			5.36	12.25	
15-Apr-96	6.16	4.46	2610.37	2303.72	-86.60	0	0	0	0	0	2	4.06	0.00		33.67	21.83	113.63			5.22	10.61	
16-Apr-96	5.90	4.43	2559.09	2279.76	-73.96	0	0	0	0	0	2	4.06	0.00		32.14	-0.15	90.42			5.12	10.40	
17-Apr-96	5.56	4.40	2507.81	2305.81	-73.95	0	0	0	0	0	2	4.57	0.00		28.08	-4.31	81.24			5.02	11.47	
18-Apr-96	5.48	4.37	2456.53	2131.86	-73.95	0	20	0	0	7	2	6.10	162.00		27.39	133.61	83.54			48.60	116.91	
19-Apr-96	5.30	4.40	2507.81	2205.81	73.95	6	0	0	0	2	2	6.10	48.60		25.83	132.85	94.10			48.60	15.29	
20-Apr-96	5.14	4.42	2542.00	2255.11	49.30	0	27	36	21	2	2	4.57	510.30		24.62	-69.40	52.02			48.60	111.10	
21-Apr-96	4.96	4.52	2710.88	2509.91	254.80	20	2	0	7	2	2	3.66	178.20		20.74	106.79	81.70			46.60	86.04	
22-Apr-96	5.08	4.55	2759.10	2566.30	86.39	0	0	0	0	0	2	5.06	0.00		22.72	95.74	60.13			5.52	14.02	
23-Apr-96	5.29	4.56	2775.17	2625.10	28.80	0	72	30	34	2	2	5.56	826.20		24.97	-86.36	62.88			48.60	136.01	
24-Apr-96	5.34	4.74	3064.48	3143.43	518.33	29	22	44	32	2	2	5.90	769.50		18.32	-19.65	41.31			48.60	143.37	
25-Apr-96	5.45	4.90	3432.61	3676.32	534.89	26	26	0	17	2	2	5.75	421.20		20.13	-56.95	61.20			46.60	136.73	
26-Apr-96	5.48	4.94	3506.50	3813.28	134.96	20	0	0	7	2	2	5.00	162.00		16.84	113.16	63.34			46.60	114.58	
27-Apr-96	5.61	4.96	3673.44	3960.76	67.48	0	0	0	0	0	2	3.56	0.00		25.14	3.65	110.16			7.15	12.71	
28-Apr-96	5.69	4.93	3503.02	3779.54	-101.22	0	0	0	0	0	2	5.59	0.00		25.14	34.63	100.67			7.01	19.57	
29-Apr-96	5.71	4.91	3466.06	3712.06	-67.48	0	0	0	0	0	2	5.59	0.00		25.14	47.13	113.53			6.91	19.31	
30-Apr-96	5.69	4.89	3400.14	3644.59	-67.48	0	0	0	16	2	2	4.06	437.40		24.88	2.28	114.75			46.60	96.76	
01-May-96	5.51	4.95	3549.97	3847.02	202.44	0	0	54	16	2	2	4.06										

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Table B3
Manu River Project
Water Balance Model

Period : May 1996

Date	R/SWL (mm/day)	C/SWL (mm/day)	Area Submerged (ha)	Project Storage (ha-m)	Change of Storage (ha-m)	Rainfall			Average Rainfall (mm/day)	Infiltration (mm/day)	Evaporation (mm/day)	Inflow into the Project through					Outflow from the Project through								
						Maulibazar (mm/day)	Lungle (mm/day)	Chandabagh (mm/day)				Rainfall (ha-m/day)	Fishpass (ha-m/day)	Barraige (ha-m/day)	3 - Vent Regulator (ha-m/day)	Upstream Chitras (ha-m/day)	Pumphouse (ha-m/day)	3-vent Regulator (ha-m/day)	6-vent Regulator (ha-m/day)	Fishpass (ha-m/day)	Infiltration (ha-m/day)	Evaporation (ha-m/day)			
01-May-96	5.51	4.96	3732.36	4133.87	469.29	0	32	15	16	2	4.06	360.70			24.54	-273.62	63.04			19	21	22		23	90.76
02-May-96	5.50	5.01	3699.01	4055.10	-76.77	0	0	0	0	2	3.00	0.00			22.36	-25.42	85.37								11.07
03-May-96	5.52	4.98	3620.36	3648.24	-106.86	4	12	16	11	2	5.02	259.20			22.64	87.53	52.63								121.89
04-May-96	5.50	5.02	3710.69	4094.48	146.25	7	0	0	2	2	5.06	56.70			20.91	-67.36	89.05								18.85
05-May-96	5.50	5.00	3620.36	3948.24	-146.25	0	0	0	0	2	4.57	0.00			21.60	-12.81	119.95								16.56
06-May-96	5.52	4.96	3626.50	3813.28	-134.96	0	0	0	0	2	6.10	0.00			22.64	-19.50	109.55								21.50
07-May-96	5.50	4.96	3432.61	3678.32	-134.96	0	0	0	0	2	5.59	0.00			22.36	22.41	119.95								19.18
08-May-96	5.50	4.92	3362.20	3577.11	-101.21	0	0	0	0	2	4.95	0.00			23.07	-15.93	118.73								16.65
09-May-96	5.49	4.90	3269.32	3442.15	-134.96	0	0	0	0	2	4.57	0.00			23.41	-14.42	88.74								14.94
10-May-96	5.52	4.97	3197.90	3340.93	-101.22	0	36	36	25	2	6.10	569.40			26.77	11.83	105.88								148.13
11-May-96	6.43	4.97	3432.61	3678.32	337.39	52	10	6	23	2	6.16	565.80	3.31		33.78	27.17	113.22								148.59
12-May-96	6.60	5.06	3643.85	3661.98	303.66	10	18	21	16	2	5.49	395.30	3.99		35.42	13.91	116.26								133.46
13-May-96	6.65	5.10	3732.36	4133.87	151.89	25	20	21	22	2	2.96	534.63	5.00		37.58	-66.56	113.83								72.51
14-May-96	7.23	5.16	3694.17	4439.56	275.69	56	45	42	47	2	4.02	1190.20	6.50		36.92	-443.17	56.69								97.76
15-May-96	8.03	5.40	4167.76	4990.93	561.37	0	9	0	3	2	2.54	72.90	9.95		43.29	-45.86	136.77								10.64
16-May-96	8.15	5.36	4122.71	4642.78	-118.15	8	23	0	10	2	4.06	251.10	9.99		44.76	127.96	168.30								96.76
17-May-96	8.26	5.40	4167.76	4990.93	119.15	15	3	23	14	2	4.00	332.10	10.41		44.24	44.05	156.06								97.20
18-May-96	8.24	5.44	4262.31	5099.86	128.93	0	25	62	29	2	3.05	704.70	10.33		44.41	-361.85	140.61								74.07
19-May-96	8.22	5.60	4316.60	5204.18	134.32	36	0	0	12	2	4.94	263.50	10.20		40.95	293.46	56.61								119.94
20-May-96	8.20	5.67	4509.47	5627.14	402.86	0	0	0	0	2	4.06	0.00	10.19		42.51	-26.10	133.57								16.33
21-May-96	8.10	5.62	4445.16	5482.92	-134.32	15	9	0	8	2	6.70	194.40	9.99		41.56	84.04	132.50								148.89
22-May-96	8.09	5.63	4445.16	5482.92	0.00	0	0	0	0	2	4.57	0.00	9.65		40.61	37.05	147.65								20.32
23-May-96	7.92	5.61	4402.32	5403.27	-89.55	0	0	0	0	2	6.10	0.00	8.95		38.79	34.53	136.17								26.84
24-May-96	7.74	5.61	4359.46	5313.73	-89.54	0	4	27	10	2	6.10	251.10	8.71		37.80	182.48	149.18								148.13
25-May-96	7.53	5.65	4423.75	5448.05	134.32	0	0	0	0	2	4.06	0.00	8.02		36.94	3.84	155.30								17.96
26-May-96	7.56	5.63	4359.46	5313.73	-134.32	0	17	15	11	2	4.06	259.20	7.45		36.46	171.74	148.41								96.76
27-May-96	7.36	5.66	4445.16	5482.92	179.09	1	67	72	47	2	5.52	1134.00	8.67		34.99	-232.13	133.86								134.23
28-May-96	7.46	5.60	4748.20	6119.65	626.83	115	15	0	43	2	2.62	1053.00	7.00		36.34	152.16	142.29								63.57
29-May-96	7.57	5.95	5097.26	7112.69	993.04	9	57	49	36	2	1.78	931.50	7.44		35.86	-266.11	97.92								43.16
30-May-96	7.70	6.05	5277.12	7631.70	519.01	27	20	0	16	2	2.00	360.70	7.94		36.34	-38.01	126.23								46.60
31-May-96	8.04	6.07	5332.23	7794.14	162.44	1	130	82	61	2	2.20	1482.30	9.27		37.41	-1261.47	145.35								50.56

Table B4
Manu River Project
Water Balance Model

Period : June 1996

Date	R/S WL (m PWD)	C/S WL (m PWD)	Area Submerged (ha)	Project Storage (ha-m)	Change of Storage (ha-m)	Rainfall			Average Rainfall (mm/day)	Infiltration (mm/day)	Evaporation (mm/day)	Inflow into the Project through					Outflow from the Project through					
						Macrodrain (mm/day)	Large (mm/day)	Chardbagh (mm/day)				Rainfall (ha-m/day)	Firpasa (ha-m/day)	Barrage (ha-m/day)	3 - Vent Regulator (ha-m/day)	Upstream Chinara (ha-m/day)	Pumphouse (ha-m/day)	3-vent Regulator (ha-m/day)	6-vent Regulator (ha-m/day)	Firpasa (ha-m/day)	Infiltration (ha-m/day)	Evaporation
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01-Jun-96	8.12	6.18	6039.41	9780.05	651.06	130	12	30	5.7	2	3.00	1363.20	9.46		-36.63	-435.41	140.35				48.60	72.90
02-Jun-96	8.44	6.30	6047.58	10517.08	737.03	22	27	48	32	2	3.16	785.70	10.57		37.84	44.34	107.71				48.60	76.09
03-Jun-96	8.58	6.40	6056.78	11162.53	645.45	23	20	23	22	2	3.00	534.60	11.16		37.07	473.36	148.41				48.60	72.90
04-Jun-96	8.63	6.52	6066.02	11848.81	786.28	30	15	0	15	2	3.66	364.50	11.26		36.55	461.67	173.04				48.60	80.04
05-Jun-96	8.60	6.60	6076.20	12512.11	663.30	0	3	85	39	2	1.97	712.80	11.02		35.51	124.00	82.77				48.60	47.82
06-Jun-96	8.67	6.70	6086.43	13216.24	704.13	12	26	0	13	2	2.38	324.00	11.22		35.25	903.70	189.87				48.60	57.83
07-Jun-96	8.87	6.83	6098.39	14184.10	977.86	7	16	30	18	2	3.05	429.30	11.02		34.13	151.77	190.64				48.60	74.07
08-Jun-96	8.81	6.87	6104.32	14507.01	312.91	20	0	0	7	2	3.48	162.00	10.64		33.18	209.70	204.71				48.60	83.98
09-Jun-96	8.82	6.88	6140.80	14585.23	78.22	0	1	0	0	2	4.57	81.0	10.16		32.14	36.66	186.51				21.17	36.85
10-Jun-96	8.44	6.86	7767.84	14428.78	-156.45	0	0	0	0	2	4.54	0.00	9.80		31.71	-15.01	210.36				15.54	36.27
11-Jun-96	8.34	6.83	7858.30	14184.10	-234.68	0	2	0	1	2	5.59	16.20	9.37		31.19	-17.97	204.26				26.41	40.60
12-Jun-96	8.24	6.80	7548.95	13959.43	-234.67	2	0	0	1	2	1.84	16.20	9.93		30.59	16.91	188.19				14.61	26.90
13-Jun-96	8.08	6.76	7475.98	13802.98	-156.45	0	0	0	0	2	4.00	0.00	8.05		28.68	107.07	177.17				14.95	26.90
14-Jun-96	7.98	6.77	7439.50	13724.75	-78.23	0	0	0	0	2	6.10	0.00	7.54		27.65	-19.14	182.68				14.88	45.35
15-Jun-96	7.88	6.74	7340.52	13487.89	-236.86	0	0	0	0	2	5.59	0.00	7.09		26.87	-74.93	184.88				14.06	41.02
16-Jun-96	7.80	6.70	7236.43	13216.24	-281.65	0	22	9	10	2	5.59	251.10	6.81		26.81	-26.53	275.42				48.60	136.79
17-Jun-96	7.70	6.68	7184.38	13075.41	-140.83	1	0	5	2	2	5.59	48.60	6.36		25.75	101.61	234.40				48.60	40.15
18-Jun-96	7.61	6.66	7132.34	12934.58	-140.83	0	18	2	7	2	4.57	162.00	5.87		24.54	387.80	189.26				48.60	111.10
19-Jun-96	7.52	6.69	7210.41	13145.89	211.31	22	19	0	14	2	4.92	332.10	5.32		22.90	-109.11	183.46				48.60	119.66
20-Jun-96	7.81	6.88	7184.38	13075.41	-70.41	32	26	0	19	2	7.56	409.80	5.82		24.28	50.01	176.87				48.60	183.61
21-Jun-96	7.54	6.70	7236.43	13216.24	140.83	30	9	45	26	2	6.00	880.40	5.40		23.07	-105.65	151.47				48.60	121.50
22-Jun-96	7.48	6.74	7340.52	13407.88	281.65	5	14	25	15	2	1.87	356.40	5.09		22.20	8.21	148.18				48.60	45.49
23-Jun-96	7.50	6.78	7403.02	13646.53	148.64	20	8	33	20	2	1.40	484.10	5.08		21.95	-141.86	140.30				48.60	33.92
24-Jun-96	7.55	6.78	7475.98	13802.98	156.45	4	29	46	26	2	3.40	639.90	5.21		21.95	-236.43	143.06				48.60	82.52
25-Jun-96	7.56	6.80	7548.95	13959.43	156.45	54	19	18	30	2	3.00	737.10	5.18		21.80	-23.09	149.84				48.60	72.90
26-Jun-96	7.53	6.86	7767.84	14428.78	469.35	6	3	0	4	2	2.84	89.10	4.95		20.91	44.23	186.01				48.60	22.81
27-Jun-96	7.51	6.85	7731.30	14350.56	-78.22	3	0	0	1	2	5.08	24.30	4.81		20.39	188.11	186.31				32.03	36.28
28-Jun-96	7.44	6.85	7731.30	14350.56	0.00	0	0	0	11	4	4.06	89.10	4.43		19.27	213.13	187.69				48.60	31.42
29-Jun-96	7.41	6.88	7767.84	14428.78	78.22	8	2	37	16	2	4.03	380.70	4.24		18.66	51.41	73.75				48.60	97.98
30-Jun-96	7.39	6.89	7877.28	14683.46	234.68	7	19	56	27	2	3.24	864.30	4.02		17.80	827.88	0.00				48.60	78.03
01-Jul-96		7.06	8512.78	16049.93	1366.47																	

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Table B5

Manu River Project
Water Balance Model

Period : July 1996

Date	R/S/L (m PWD)	C/S/L (m PWD)	Area Submerged (ha)	Project Storage (ha-m)	Change of Storage (ha-m)	Rainfall			Average Rainfall (mm/day)	Infiltration (mm/day)	Evaporation (mm/day)	Inflow into the Project through					Outflow from the Project through					
						Maukhobzar (mm/day)	Largi (mm/day)	Chandbagh (mm/day)				Rainfall (ha-m/day)	Fishkasa (ha-m/day)	Barrage (ha-m/day)	3 - Vent Regulator (ha-m/day)	Upstream Chikrasa (ha-m/day)	Pumphouse (ha-m/day)	3-vent Regulator (ha-m/day)	6-vent Regulator (ha-m/day)	Fishkasa (ha-m/day)	Infiltration (ha-m/day)	Evaporation (ha-m/day)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01-Jul-96	7.43	7.06	8512.78	16048.93	1366.47	22	104	151	92	2	3.00	2243.70	3.60		15.29	536.11	0.00				48.60	72.90
02-Jul-96	8.03	7.36	9703.42	16697.13	2647.20	118	84	146	116	2	3.00	2816.80	6.11		20.74	-48.96	0.00				48.60	72.90
03-Jul-96	8.51	7.61	10668.03	21372.33	2875.20	45	69	91	86	2	3.00	1660.50	8.15		23.86	688.91	0.00				48.60	72.90
04-Jul-96	8.85	7.81	11808.40	23632.23	2258.90	68	73	0	47	2	3.07	1142.10	9.58		25.86	1341.44	208.54				48.60	74.06
05-Jul-96	8.96	7.99	12754.36	25819.23	2187.00	18	9	70	32	2	3.03	766.70	9.76		24.97	960.42	226.75				48.60	73.68
06-Jul-96	9.02	8.10	13284.00	27281.06	1461.83	8	5	32	15	2	3.97	364.50	9.59		24.11	374.75	225.63				48.60	96.42
07-Jul-96	9.03	8.13	13427.12	27863.16	402.10	10	14	54	26	2	4.56	631.80	9.53		23.86	-8.47	231.34				48.60	110.71
08-Jul-96	9.02	8.15	13522.54	27961.22	266.06	7	16	21	15	2	4.02	366.40	9.36		23.41	-0.66	242.35				48.60	97.59
09-Jul-96	9.01	8.15	13522.54	27961.22	0.00	0	12	0	4	2	3.05	97.20	9.31		23.33	226.34	244.80				48.60	62.77
10-Jul-96	9.00	8.15	13522.54	27961.22	0.00	1	4	11	5	2	3.02	128.60	9.24		23.16	132.48	172.58				48.60	73.29
11-Jul-96	9.02	8.15	13522.54	27961.22	0.00	2	0	0	1	2	2.94	16.20	9.36		23.41	237.30	212.36				34.23	39.70
12-Jul-96	9.02	8.15	13522.54	27961.22	0.00	3	0	24	9	2	2.00	218.70	9.42		23.41	-73.86	214.51				48.60	48.60
13-Jul-96	9.00	8.14	13474.83	27817.19	-134.03	0	0	1	0	2	2.03	8.10	9.37		23.33	-49.56	201.35				30.56	27.36
14-Jul-96	8.96	8.12	13379.42	27549.12	-268.07	0	44	30	25	2	2.00	569.40	9.09		23.07	216.12	214.35				48.60	48.60
15-Jul-96	8.96	8.16	13070.25	28006.25	536.13	34	11	36	27	2	2.39	656.10	8.91		22.46	-89.91	222.77				48.60	56.13
16-Jul-96	8.96	8.18	13065.96	28353.32	266.07	18	10	7	12	2	3.27	283.50	8.96		22.46	571.99	222.77				48.60	79.41
17-Jul-96	8.95	8.22	13856.49	28689.45	536.13	3	7	10	7	2	3.00	162.00	8.55		21.51	-115.66	222.77				48.60	72.90
18-Jul-96	8.94	8.20	13781.07	28621.39	-268.06	7	2	0	3	2	3.00	72.90	8.56		21.60	213.71	226.90				48.60	41.26
19-Jul-96	8.93	8.20	13781.07	28621.39	0.00	0	20	43	21	2	4.57	510.30	8.50		21.51	116.33	228.69				48.60	111.10
20-Jul-96	8.95	8.22	13656.49	28689.45	266.06	1	0	2	1	2	2.33	24.30	8.55		21.51	366.17	216.04				38.16	32.31
21-Jul-96	8.95	8.23	13904.20	29023.48	134.03	2	12	20	11	2	2.36	275.40	8.50		21.34	-107.78	225.06				48.60	57.83
22-Jul-96	8.93	8.22	13856.49	28689.45	-134.03	3	13	8	8	2	5.49	194.40	8.41		21.17	198.98	241.89				48.60	133.46
23-Jul-96	8.92	8.22	13856.49	28689.45	0.00	8	3	10	7	2	2.36	170.10	8.33		21.00	134.06	227.05				48.60	57.83
24-Jul-96	8.91	8.22	13856.49	28689.45	0.00	0	0	0	0	2	3.44	0.00	8.26		20.91	267.35	221.09				27.71	47.72
25-Jul-96	8.91	8.22	13856.49	28689.45	0.00	0	11	0	4	2	3.58	86.10	8.26		20.91	278.65	164.63				48.60	49.66
26-Jul-96	8.96	8.23	13904.20	29023.48	134.03	5	0	0	0	2	5.22	40.50	8.72		21.77	126.11	215.42				45.13	72.56
27-Jul-96	8.86	8.22	13856.49	28689.45	-134.03	7	6	0	4	2	3.95	105.30	8.03		20.39	63.01	203.03				48.60	79.13
28-Jul-96	8.79	8.21	13606.76	28756.42	-134.03	0	4	17	7	2	2.40	170.10	7.40		19.16	113.63	203.49				48.60	56.22
29-Jul-96	8.73	8.21	13606.76	28756.42	0.00	0	10	11	7	2	3.05	170.10	6.93		18.14	131.75	204.26				48.60	74.07
30-Jul-96	8.69	8.21	13606.76	28756.42	0.00	84	25	0	36	2	2.09	882.90	6.61		17.45	-344.24	196.23				48.60	50.84
31-Jul-96	8.78	8.23	13604.20	29023.48	268.06	5	9	12	9	2	2.40	210.60	7.21		18.66	-13.96	115.67				48.60	59.22

Table B6
Manu River Project
Water Balance Model
Period : August 1996

Date	R/SWL (m PWD)	C/SWL (m PWD)	Area Submerged (ha)	Project Storage (ha-m)	Change of Storage (ha-m)	Rainfall			Average Rainfall (mm/day)	Evaporation (mm/day)	Inflow into the Project through					Outflow from the Project through					Evaporation	
						Moulkibazar (mm/day)	Langla (mm/day)	Chandbagh (mm/day)			Rainfall (ha-m/day)	Fishpasa (ha-m/day)	Barage (ha-m/day)	3 - Vent Regulator (ha-m/day)	Upteam Chhokra (ha-m/day)	Pumphouse (ha-m/day)	3-vent Regulator (ha-m/day)	6-vent Regulator (ha-m/day)	Fishpasa (ha-m/day)	Infiltration (ha-m/day)		
01-Aug-96	8.76	8.27	14103.70	29684.55	293.00	12	24	4	13	2.49	324.00	7.21	16.66	16	17	189.57	18	19	20	21	22	23
02-Aug-96	8.74	8.26	14155.74	29731.05	146.50	5	3	70	26	2.49	631.80	6.77	17.63	17	18	176.64	17	18	19	20	21	22
03-Aug-96	8.72	8.25	14207.79	29877.55	146.50	2	0	23	8	3.00	202.50	6.49	16.85	16	17	225.68	225.68	241.13	241.13	241.13	241.13	241.13
04-Aug-96	8.62	8.31	14311.87	30770.56	293.01	0	172	0	57	4.06	1363.20	5.48	14.43	14	15	241.13	241.13	241.13	241.13	241.13	241.13	241.13
05-Aug-96	8.62	8.35	14530.05	30796.56	596.00	83	3	52	46	6.03	1117.80	4.76	12.27	12	13	231.34	231.34	231.34	231.34	231.34	231.34	231.34
06-Aug-96	8.63	8.39	14728.23	31342.57	569.01	0	1	3	1	6.08	32.40	4.77	12.27	12	13	242.35	242.35	242.35	242.35	242.35	242.35	242.35
07-Aug-96	8.60	8.36	14676.18	31196.07	-146.50	0	0	0	0	4.57	0.00	4.56	11.75	11	12	247.25	247.25	247.25	247.25	247.25	247.25	247.25
08-Aug-96	8.69	8.36	14572.09	30903.06	-293.01	0	3	0	0	2.49	24.30	3.49	9.07	9	10	161.57	161.57	161.57	161.57	161.57	161.57	161.57
09-Aug-96	8.42	8.35	14530.05	30796.56	-146.50	1	5	0	2	6.05	46.60	2.65	6.65	6	7	236.53	236.53	236.53	236.53	236.53	236.53	236.53
10-Aug-96	8.38	8.34	14469.01	30510.06	-146.50	8	10	7	8	6.54	202.50	2.13	5.01	5	6	246.64	246.64	246.64	246.64	246.64	246.64	246.64
11-Aug-96	8.30	8.31	14311.87	30770.56	-439.50	0	2	0	1	2.20	16.20	3.05	0.00	0	1	264.98	247.40	247.40	247.40	247.40	247.40	247.40
12-Aug-96	8.35	8.31	14311.87	30770.56	0.00	0	2	0	1	2.54	16.20	2.11	5.01	5	6	262.97	214.66	214.66	214.66	214.66	214.66	214.66
13-Aug-96	8.40	8.31	14311.87	30770.56	0.00	60	5	0	26	2.41	666.50	2.81	7.52	7	8	236.53	236.53	236.53	236.53	236.53	236.53	236.53
14-Aug-96	8.46	8.33	14415.96	30463.56	293.00	2	18	0	7	2.02	162.00	3.68	9.76	9	10	237.61	237.61	237.61	237.61	237.61	237.61	237.61
15-Aug-96	8.49	8.32	14353.92	30317.06	-146.50	8	27	0	12	3.05	263.50	4.02	10.63	10	11	241.13	241.13	241.13	241.13	241.13	241.13	241.13
16-Aug-96	8.52	8.32	14353.92	30317.06	0.00	36	12	0	17	3.36	405.00	4.25	11.23	11	12	236.68	236.68	236.68	236.68	236.68	236.68	236.68
17-Aug-96	8.50	8.34	14469.01	30510.06	293.00	32	26	74	45	2.36	1066.40	4.50	12.79	12	13	235.01	235.01	235.01	235.01	235.01	235.01	235.01
18-Aug-96	8.70	8.44	14998.45	32075.07	1465.01	16	62	59	46	3.56	1125.90	5.06	12.79	12	13	222.77	222.77	222.77	222.77	222.77	222.77	222.77
19-Aug-96	8.75	8.48	15196.62	32661.06	596.01	3	9	21	11	2.95	267.30	5.31	13.31	13	14	221.84	221.84	221.84	221.84	221.84	221.84	221.84
20-Aug-96	8.79	8.48	15196.62	32661.06	0.00	4	23	16	14	3.84	346.30	5.82	14.00	14	15	225.22	225.22	225.22	225.22	225.22	225.22	225.22
21-Aug-96	8.82	8.51	15269.13	33114.39	453.31	36	8	21	22	4.06	535.50	5.67	14.00	14	15	254.59	254.59	254.59	254.59	254.59	254.59	254.59
22-Aug-96	8.87	8.52	15417.55	33274.70	160.31	4	0	34	13	2.92	307.80	6.07	14.86	14	15	206.63	206.63	206.63	206.63	206.63	206.63	206.63
23-Aug-96	8.87	8.51	15359.13	33114.39	-160.31	0	0	0	0	3.92	0.00	6.15	15.12	15	16	225.22	225.22	225.22	225.22	225.22	225.22	225.22
24-Aug-96	8.87	8.49	15248.67	33007.56	-308.81	0	0	0	0	3.05	0.00	6.30	15.47	15	16	222.77	222.77	222.77	222.77	222.77	222.77	222.77
25-Aug-96	8.87	8.48	15196.62	32661.06	-146.50	0	0	0	0	2.54	0.00	6.37	15.72	15	16	208.08	208.08	208.08	208.08	208.08	208.08	208.08
26-Aug-96	8.85	8.46	15062.53	32368.06	-293.00	0	0	0	0	4.06	0.00	6.33	15.72	15	16	213.59	213.59	213.59	213.59	213.59	213.59	213.59
27-Aug-96	8.81	8.45	15040.49	32221.57	-146.51	0	6	0	2	4.57	46.60	6.04	15.12	15	16	197.52	197.52	197.52	197.52	197.52	197.52	197.52
28-Aug-96	8.77	8.43	14636.40	31628.57	-293.00	2	0	6	3	6.57	64.50	5.82	14.89	14	15	189.21	189.21	189.21	189.21	189.21	189.21	189.21
29-Aug-96	8.73	8.43	14636.40	31628.57	0.00	1	17	26	15	3.05	366.40	5.44	13.74	13	14	198.29	198.29	198.29	198.29	198.29	198.29	198.29
30-Aug-96	8.73	8.48	15196.62	32661.06	732.51	7	8	84	33	2.48	801.90	5.02	12.53	12	13	229.90	229.90	229.90	229.90	229.90	229.90	229.90
31-Aug-96	8.69	8.49	15248.67	32607.56	146.50	20	0	6	6	9.00	302.50	4.49	11.23	11	12	223.99	223.99	223.99	223.99	223.99	223.99	223.99



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Period : September 1996

Date	RSWL (m PWD)	CSWL (m PWD)	Area Submerged (ha)	Project Storage (ha-m)	Change of Storage (ha-m)	Rainfall			Average Rainfall (mm/day)	Infiltration (mm/day)	Evaporation (mm/day)	Inflow into the Project through					Outflow from the Project through						
						Multibazzer (mm/day)	Langla (mm/day)	Chandabagh (mm/day)				Rainfall (ha-m/day)	Fiafcase (ha-m/day)	Barrage (ha-m/day)	3 - Vent Regulator (ha-m/day)	Upstream Chloras (ha-m/day)	Pumphouse (ha-m/day)	3-vent Regulator (ha-m/day)	6-vent Regulator (ha-m/day)	Fiafcase (ha-m/day)	Infiltration (ha-m/day)	Evaporation (ha-m/day)	
01-Sep-96	8.66	8.48	15196.62	32661.06	-146.50	0	15	3	6	3.00	146.60	13	14	15	16	17	18	19	20	21	22	23	
02-Sep-96	8.65	8.46	15002.53	32368.06	-280.00	10	0	0	3	4.06	81.00	4.33	10.63	10.97	10.97	10.97	241.13	80.65	133.10	3.75	29.96	48.60	72.30
03-Sep-96	8.63	8.44	14896.45	32075.07	-280.01	0	1	0	0	3.76	8.10	4.42	10.97	10.97	10.97	10.97	220.32	7.02	177.42	4.37	29.67	46.60	61.34
04-Sep-96	8.62	8.43	14836.40	31826.57	-146.50	0	4	2	2	5.05	48.60	4.29	10.97	10.97	10.97	214.36	154.22	10.02	177.42	5.21	42.36	33.08	56.36
05-Sep-96	8.57	8.43	14936.40	31826.57	0.00	0	0	6	2	6.92	46.60	3.96	9.42	9.42	9.42	163.62	220.32	12.27	307.28	6.22	46.60	48.60	76.40
06-Sep-96	8.56	8.42	14864.36	31762.07	-146.50	0	56	0	19	2.78	453.60	3.69	9.42	9.42	9.42	327.53	236.68	18.86	326.92	9.66	46.60	46.60	67.46
07-Sep-96	8.57	8.45	15040.49	32221.57	439.50	60	2	15	26	4.54	623.70	3.47	8.73	8.73	8.73	-279.09	197.98	13.74	242.87	6.80	29.36	48.60	110.22
08-Sep-96	8.57	8.45	15340.49	32221.57	0.00	2	0	2	1	2.84	32.40	3.47	8.73	8.73	8.73	65.78	170.29	14.86	262.44	7.03	29.04	42.43	44.16
09-Sep-96	8.50	8.44	14868.45	32075.07	-146.50	0	0	0	0	3.05	0.00	0.00	2.73	6.13	6.13	115.45	48.65	16.68	284.19	7.60	28.63	29.96	46.68
10-Sep-96	8.40	8.44	14868.45	32075.07	0.00	0	0	0	0	4.57	0.00	0.00	0.00	0.00	0.00	49.41	48.65	17.45	307.28	6.22	46.60	46.60	66.53
11-Sep-96	8.34	8.43	14836.40	31826.57	-146.50	0	0	0	0	4.57	0.00	32.40	0.00	0.00	0.00	243.15	220.32	18.86	326.92	9.66	46.60	46.60	66.29
12-Sep-96	8.27	8.43	14936.40	31826.57	0.00	4	0	0	1	4.00	32.40	0.00	0.00	0.00	0.00	-30.64	48.65	10.02	177.42	5.21	42.36	59.75	59.75
13-Sep-96	8.17	8.41	14832.31	31632.57	-280.00	0	0	0	0	3.05	0.00	0.00	0.00	0.00	0.00	-129.28	48.65	12.27	217.21	5.86	29.66	29.66	46.21
14-Sep-96	8.08	8.36	14676.18	31196.07	-439.50	0	0	0	0	4.57	0.00	0.00	0.00	0.00	0.00	-79.85	48.65	13.74	242.87	6.80	29.36	48.60	67.10
15-Sep-96	8.00	8.35	14520.05	30756.56	-439.51	0	0	0	0	5.59	0.00	0.00	0.00	0.00	0.00	101.51	48.65	14.86	262.44	7.03	29.04	48.60	81.14
16-Sep-96	7.89	8.33	14415.96	30463.56	-280.00	0	0	0	0	5.06	0.00	0.00	0.00	0.00	0.00	274.03	48.65	16.68	284.19	7.60	28.63	29.96	73.23
17-Sep-96	7.84	8.32	14363.92	30317.06	-146.50	0	26	0	9	4.06	210.60	210.60	210.60	210.60	210.60	709.21	48.65	17.45	307.28	6.22	46.60	46.60	96.76
18-Sep-96	7.80	8.35	14520.05	30756.56	439.50	4	16	39	20	4.00	477.90	477.90	477.90	477.90	477.90	170.64	48.65	18.86	326.92	9.66	46.60	46.60	97.20
19-Sep-96	7.76	8.36	14572.06	30903.06	146.50	6	46	37	30	4.10	720.90	720.90	720.90	720.90	720.90	-200.89	48.65	19.44	343.57	8.77	46.60	46.60	99.63
20-Sep-96	7.78	8.36	14572.06	30903.06	0.00	3	70	0	34	4.10	591.30	591.30	591.30	591.30	591.30	-77.23	48.65	19.16	337.74	8.92	46.60	46.60	99.63
21-Sep-96	7.78	8.36	14572.06	30903.06	0.00	51	107	37	65	4.10	1579.50	1579.50	1579.50	1579.50	1579.50	-39.69	48.65	19.16	337.74	9.15	46.60	46.60	99.63
22-Sep-96	7.77	8.43	14836.40	31826.57	1025.51	65	3	39	36	4.10	866.70	866.70	866.70	866.70	866.70	340.29	48.65	17.02	300.80	8.43	46.60	46.60	96.63
23-Sep-96	8.08	8.48	15196.62	32661.06	732.51	2	10	12	8	4.10	194.40	194.40	194.40	194.40	194.40	257.96	48.65	15.90	280.45	7.78	46.60	46.60	96.63
24-Sep-96	8.08	8.48	15196.62	32661.06	0.00	2	18	14	11	4.10	275.40	275.40	275.40	275.40	275.40	30.91	48.65	15.90	280.45	8.22	46.60	46.60	96.63
25-Sep-96	8.05	8.47	15144.58	32514.58	-146.50	0	0	0	0	4.25	0.00	0.00	0.00	0.00	0.00	260.35	48.65	16.33	287.45	8.36	30.29	64.36	64.36
26-Sep-96	8.01	8.46	15092.53	32368.06	-146.50	0	14	0	5	3.05	113.40	113.40	113.40	113.40	113.40	-110.91	48.65	16.85	297.56	6.44	46.60	46.60	70.56
27-Sep-96	7.96	8.43	14836.40	31826.57	-439.51	4	0	0	1	2.70	32.40	32.40	32.40	32.40	32.40	233.54	48.65	17.19	304.04	6.52	42.36	40.33	40.33
28-Sep-96	8.02	8.42	14864.36	31762.07	-146.50	2	12	0	5	2.82	113.40	113.40	113.40	113.40	113.40	154.23	48.65	16.85	297.56	7.65	46.60	46.60	61.33
29-Sep-96	7.96	8.41	14832.31	31632.57	-146.50	3	0	4	2	3.96	56.70	56.70	56.70	56.70	56.70	-219.63	48.65	16.50	280.82	8.05	46.60	46.60	59.06
30-Sep-96	7.93	8.37	14624.14	31048.56	-566.01	0	0	0	0	2.54	0.00	0.00	0.00	0.00	0.00	92.31	48.65	16.86	294.19	8.05	29.25	29.25	37.15
01-Oct-96			14520.05	30756.56	-280.00																		

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Figure B1

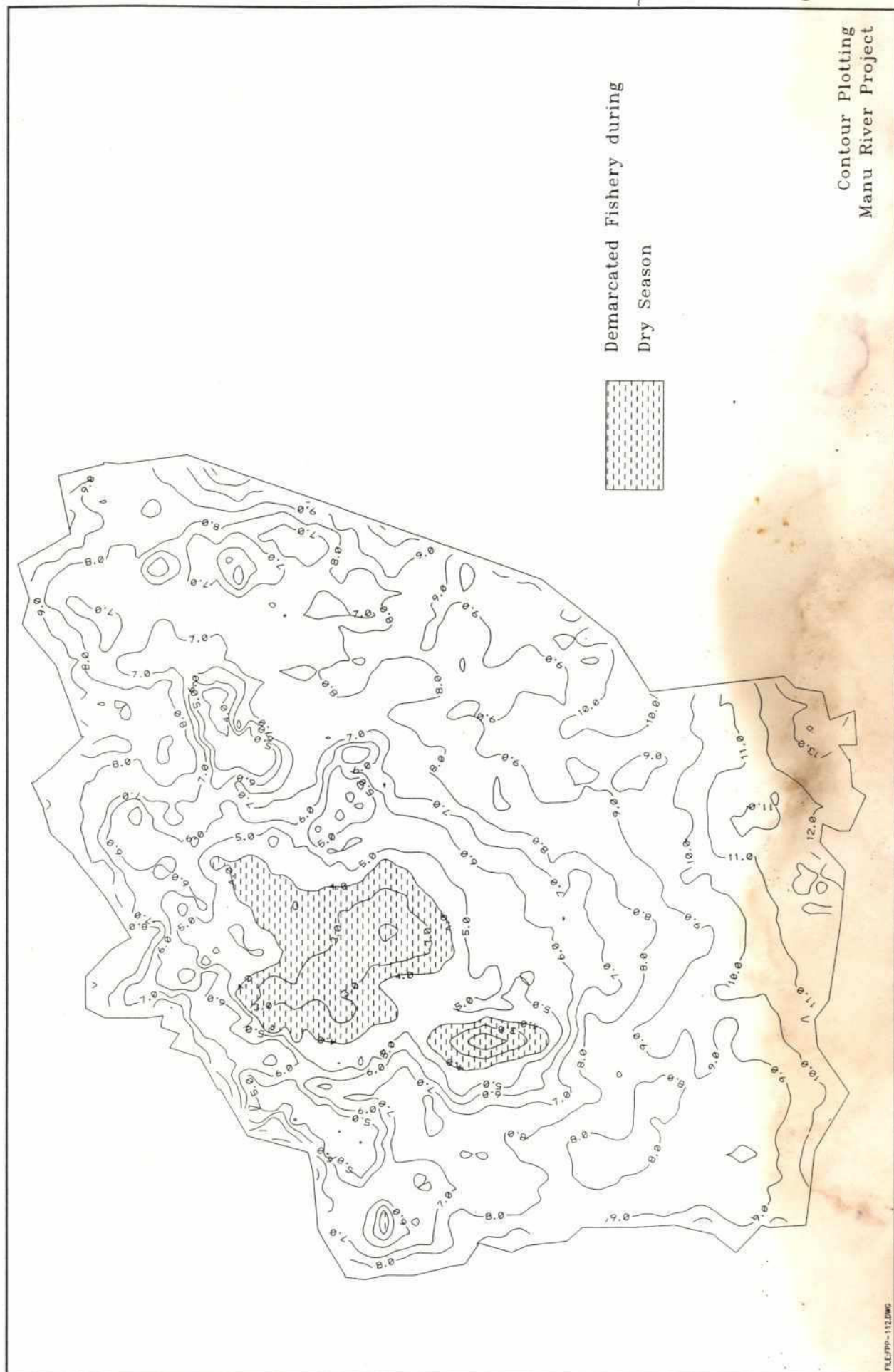
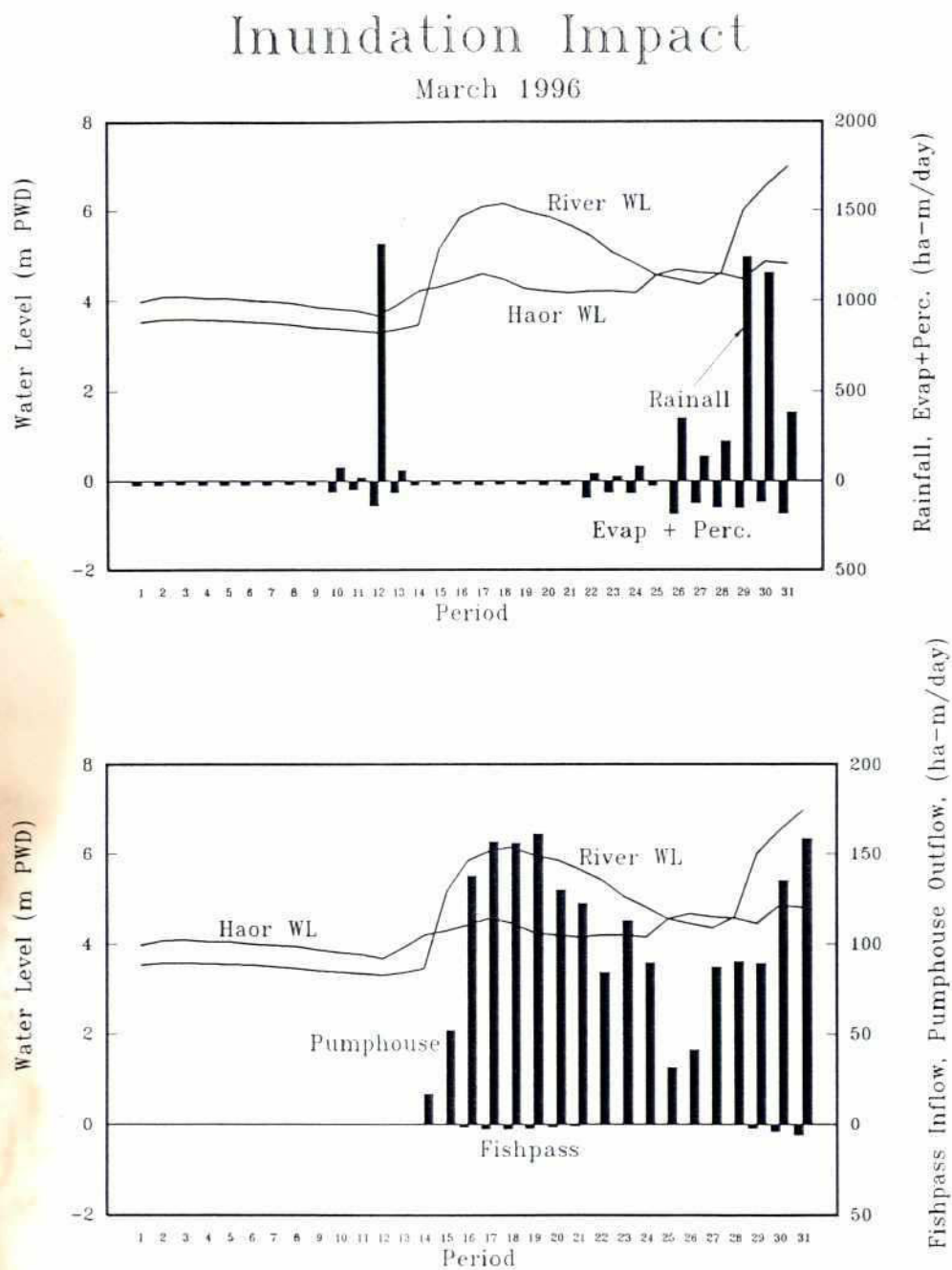


Figure B2



Northeast Regional Project

Fishpass Pilot Project
Inflow / Outflow Impact

Prepared by: Salahuddin

November, 96

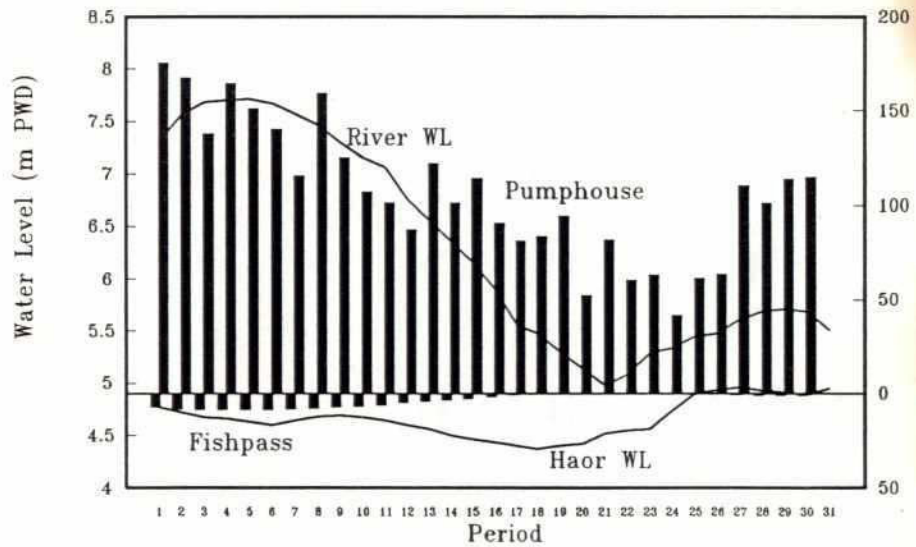
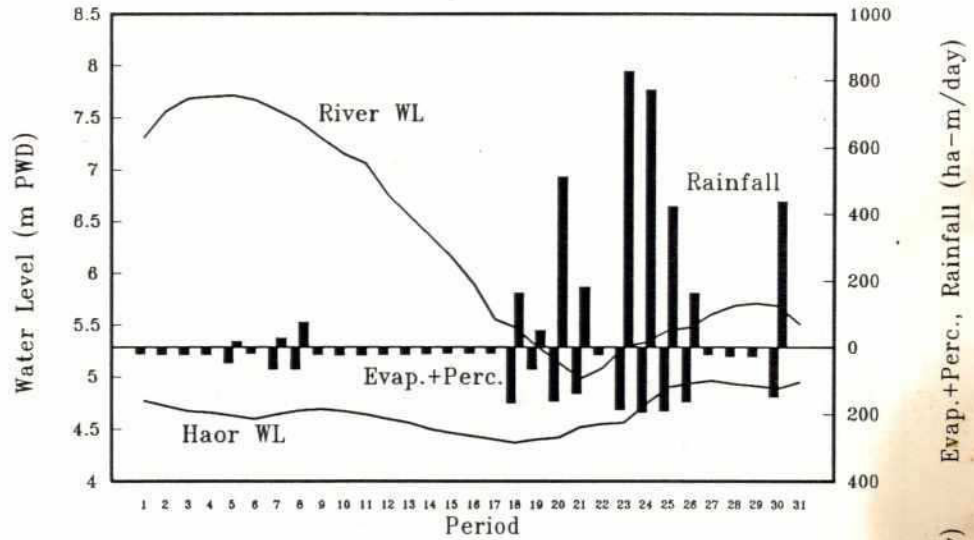
Computer Drafting by:

AutoCAD Drawing

Figure B3

Inundation Impact

April 1996



Northeast Regional Project

Fishpass Pilot Project
Inflow / Outflow Impact

Prepared by: Salahuddin

November 96

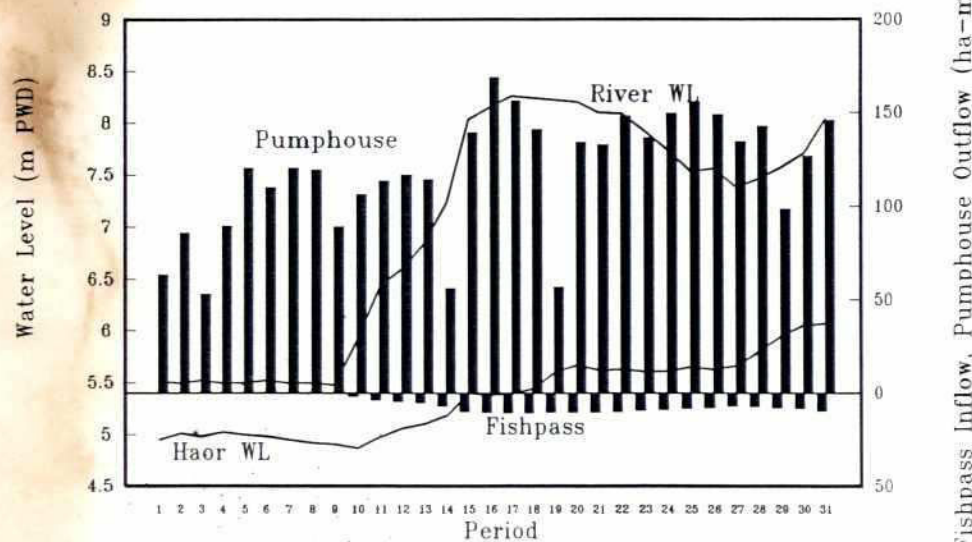
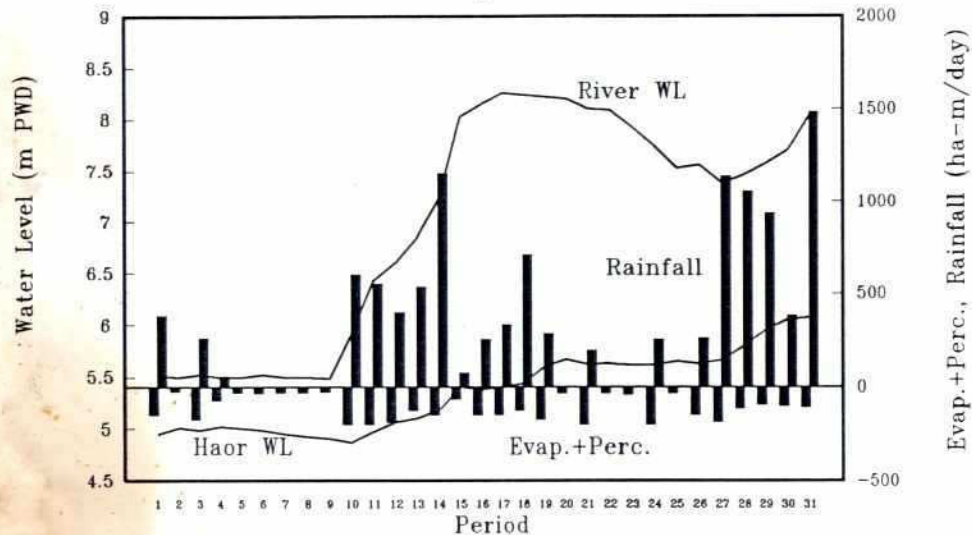
Computer Drafting by:

AutoCAD Drawing

Figure B4

Inundation Impact

May 1996



Northeast Regional Project

Fishpass Pilot Project
Inflow / Outflow Impact

Prepared by: Salahuddin

November 96

Computer Drafting by:

AutoCAD Drawing

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ANNEX C
MRP IRRIGATION SYSTEM STUDY

C1. BACKGROUND INFORMATION

C1.1 Location and Boundaries

The MRP lies between longitudes 91°40' and 92°00', and latitudes 24°55' and 24°40'N. It is situated immediately north of Moulvibazar, about 175 km northeast of Dhaka and 80 km southwest of Sylhet. Administratively, it falls within the Moulvibazar District and includes:

- Chandnighat, Akhikura, and Ekatuna union *parishads* of Moulvibazar *thana*;
- Rajnagar, Mansurnagar, Uttar Bhagh, Panchgaon, Munshibazar, Fatehpur, and Tengra union *parishads* of Rajnagar *thana*.

The municipal area of Moulvibazar is located mainly on the left bank of the Manu River, and is outside the project area.

C1.2 Project Infrastructure

The MRP is a large and complex project. It was conceived to protect about 243 km² and irrigate 120 km² of agricultural land between the Kushiya and Manu Rivers. The scheme was originally proposed in 1960 and was completed in 1983.

The area was subjected to damage from floods in the two rivers every year. Three causes of flooding are:

- backwater flooding from the Kushiya River during the pre-monsoon period (March-mid-April) which flooded *boro* crops in the lower areas;
- overbank spilling from the Manu and Kushiya Rivers during the monsoon period which flooded *aus* and *aman* crops, and
- runoff from the Bhatara Hills and the project area during times of heavy rainfall which contributed to the flooding and waterlogging of the low-lying areas.

It was written in the design report that the project area had a deficit of rice production of about 20%, and that the flood damage was about 40% of rice production. The rice shortage was projected to further increase with the increasing population. The stated objectives of the project were:

- to protect the area from floods;
- to provide irrigation facilities to offset the adverse effects of the dry season;
- to provide adequate drainage facilities to deal with monsoon runoff, and
- to increase rice production by protecting the project area from flooding, providing irrigation for winter crops, and introducing improved agricultural practices and cropping patterns.

The project consists of a flood embankment along the right bank of the Manu River from the southern end of the Bhatara Hills to Manumukh (Manu section), and along the left bank of the Kushiya River from the northern end of the Bhatara Hills to Manumukh (Kushiya section).

The Kashimpur pumping station, located on the left bank of the Kushiya River about 3.5 km upstream of Manumukh, is used to drain the project area when the water levels in the

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Kushiyara River are higher than in the *haor*. There are also two drainage sluices at Kashimpur. These drain the *haor* by gravity whenever the water levels in the river are lower than those in the *haor*.

The drainage system was intended to maintain water levels between elevations 4.1 m PWD and 7.16 m PWD. The pumps were supposed to operate whenever the project water level rose above 4.1 m PWD.

There is a barrage across the Manu River 3.8 km upstream of Moulvibazar. It diverts water into an irrigation system which supports 12000 ha of gravity irrigation and 877 ha of LLP irrigation. The system was designed to irrigate the relatively higher lands in the project area; those located between elevation 6.6 m and 11.1 m.

There was unauthorized public cutting of the Manu embankment in 1984, and from 1990 onwards. This caused severe damage to the embankment and to the irrigation and drainage systems. During planning of the project, many people living along the right bank of the Manu River refused to accept the proposed embankment setback of 120 m (400 ft) from the river. The area is densely populated and many residents would have had to be relocated; since they were not threatened by flooding at the time, they refused to relocate. Consequently, the alignment was altered, leaving many residences outside the project embankment. These unprotected areas have subsequently flooded, and people residing outside the embankment, along a 12.5 km length between Baliarbagh and Palpur, have responded by cutting the embankment to allow the flood waters to spill away from their area.

Flow through these cuts causes considerable damage to crops within the project area. It also overloads the capacity of the pump station and drainage sluices. In order to relieve flooding, farmers living within the project area have started to cut the Kushiyara section of the project embankment. The problem has been aggravated by the recent occurrence of severe floods, rising of flood water levels due to increasing rainfall, and confinement effects from project embankments and other embankments located further upstream.

About 23.7 km of secondary embankments have been built along the right bank of the Manu River to further protect these areas.

C1.3 Topography and Drainage

The project encompasses an area of about 24,300 ha. It receives runoff from the Bhatera Hills, located to the east. It is roughly trapezoidal in shape, measuring 22.8 km along the southwest-northeast axis and 14.8 km wide. It is bounded by the Kushiyara River to the north, the foot of the Bhatera Hills to the east, and the Manu River to the south and west.

Elevations within the project area range from 1 m PWD at the centre of Kawadighi Haor, to 12.5 m PWD at the foot of the Bhatera Hills and 433 m at the peak of the Bhatera Hills. The land forms a concave alluvial plain which slopes upward towards the Bhatera Hills and the surrounding river levees. River banks surrounding the project area are raised or "perched". They were formed by periodic overtopping during floods and deposition of the suspended bed material near the river. Flood water accumulates within the project area and the deeper *haors*. The topography of the project area is shown in figure B1, in appendix B.

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There are about 50 *beels* in the project area. These include the main *haor* (Boro Kawadighi) and a smaller group of *beels* (Chhoto Kawadighi). Other smaller *beels* are located in the northeast and northwest portions of the project area.

The area is dissected by numerous former distributaries of the Manu River, tributaries of the Kushiya River, and many small drainage *khals*. Drainage water from most of the area is conveyed by natural drainage channels to Kawadighi Haor. From there it is discharged to the Kushiya River through two drainage sluices at Kashimpur. When the water levels are higher in the river than in the *haor* (during flood stages and pre-monsoon floods), the sluices cannot drain. The Kashimpur pumps are operated to drain the project area.

There are 15 *chhoras* (drainage channels) coming from the Bhatara Hills. Depending on rainfall and inflow, thirteen carry water throughout the year. This water is used for irrigating the land in Kawadighi Haor; many areas in Chhoto Kawadighi Haor are irrigated by *chhora* water. The incoming *chhoras* are :

- Akali Chhora
- Binnajori Chhora
- Udna Chhora
- Kuchimura Chhora
- Kaliajuri Chhora
- Puranuli Chhora
- Pagla Chhora
- Haar Chhora
- Goali Chhora
- Dhamai Chhora
- Jamir Chhora
- Kalamua Chhora
- Marua Chhora
- Madra Chhora
- Kamal Chhora

C1.4 Flood Embankments

Project Embankment: A 59.9 km long flood embankment exists along the north, west, and south sides of the project area. The embankment protects the area from high floods in the Manu and Kushiya Rivers. The 28.3 km long Kushiya section of the embankment extends along the left bank of the Kushiya River upstream of Manumukh until Muktupur, which is located at the northern end of the Bhatara Hills. This forms the northern project boundary. The 31.6 km long Manu section of the embankment extends along the right bank of the Manu River upstream of Manumukh until Haripasha, which is located at the southern end of the Bhatara Hills. This forms the project's western and southern boundaries. The foot of the Bhatara hill forms the eastern boundary of the project. The crest of the Manu section of the embankment slopes downwards from 16.66 m PWD at Haripur. It drops to 14.59 m PWD at Moulvibazar, and to 11.75 m PWD at Manumukh. The crest of Kushiya section slopes from 12.06 m PWD at Muktupur to 10.96 m PWD at Manumukh. Both sections of the embankment have 1:2.5 riverside slopes, 1:2 or 1:2.5 countryside slopes, and a crest width of 4.3 m.

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Secondary Embankment: During planning of the MRP, many people living along the right bank of the Manu River refused to accept the proposed 120 m standard setback distance from the river. The alignment was altered, leaving many residences outside the project embankment.

Construction of the project embankment and continuous confinement of the Manu River upstream of the project area have resulted in higher river stages. This seriously affect the more vulnerable areas on the right bank of the Manu River. About 23.7 km of secondary embankment have been built along the right bank of the Manu River to protect these areas. This is constantly being strengthened and raised to protect vulnerable residences. Nevertheless, flooding has persistently recurred in these areas, and the residents have been cutting project embankments whenever their property has been flooded. This enables fast drainage of the flood water, but flow through these cuts causes considerable damage to crops within the project area. In addition, six drainage syphons have been constructed under the project embankment downstream of the barrage. These also discharge into the project area.

C1.5 Irrigation Canals

Irrigation water diverted by the Manu barrage is conveyed to the fields via a 105.3 km canal system. The system consists of 2 main canals, 14 secondary canals, and 14 tertiary canals. The 18.6 km Manumukh main canal conveys water to the west. The 18.1 km Rajnagar main canal conveys it to the east. There 48.9 km of secondary canals, and 19.7 km of tertiary canals.

There has been a general deterioration of the canal system, primarily due to inadequate maintenance and overtopping. The canals cannot support the flood water coming from cuts in the project embankment. Many are choked by aquatic vegetation, and many canal banks have been cut to facilitate drainage. Some canal beds are badly silted as a result of flood water inundation, and bunds have been constructed in some canals for fishing.

C1.6 Drainage Channels

Natural drainage channels form the main drainage network within the project. No new drainage channel was constructed in the project during project construction period. The main channels include :

- Akali Chhora
- Udna Chhorra
- Kufianara Channel
- Munia Channel
- Machua Channel
- Langun Channel
- Digola Channel
- Lash Channel
- Machuakhali Channel
- Mogra Channel
- Koradair Channel

Drainage water from most of the area is conveyed by these channels to Kawadighi Haor. From there it is discharged to the Kushiyara River via the Koradair Khal. This is done through two drainage sluices or, during high river stages, by pumping at Kashimpur pumping station.

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Kawadighi Haor, located in the northeast of the project area, is the largest perennial water body inside the MRP. Most of the *beels* in the project area dry up during dry season.

C1.7 Bridges and Culverts

There are 39 bridges and culverts on the project canals; these are the responsibility of BWDB, and are in good condition. Other bridges and culverts within the project area are generally in reasonable condition, but a number of *thana* structures require urgent repair; in some cases, replacement.

C1.8 Manu Barrage

The Manu barrage is located about 3.8 km upstream of Chandighat Bridge in Moulvibazar. It was constructed at a loop in the Manu River. This loop has become the de-silting basin for the whole irrigation system. The depth of silt which has accumulated in the de-silting basin since the beginning of the project is 0.6 m. The eight 7.31 m x 3.81 m flood gates of the barrage have a total safe discharge capacity of 1274 m³/s. The normal pool level of the barrage is at 12.03 m PWD. The highest water level recorded is 12.95 m PWD. Irrigation water is diverted at the barrage through a 5-vent intake sluice discharging into the de-silting basin. Each vent is 1.52 m x 1.83 m.

C1.9 Kashimpur Pumping Station

The Kashimpur pumping station is located on the left bank of the Kushiya River. It is about 3.5 km east of Manumukh, along the Koradair Khal as it comes from Kawadighi Haor. It has eight electrically driven pumps, each of capacity 4.25 m³/s. The pumps are operated when high river stages prevent gravity drainage through the two main drainage sluices at Kashimpur. Pumping records show that pumps are operated:

- during March and April, to maintain the water level in Kawadighi Haor at 4.1 m PWD. This protects *boro* crops from flooding. Pumps are normally in operation when *haor* water level reaches 4.0 m PWD. Additional pumps are started as inundation increases, and all pumps are in operation when the intake channel has adequate storage, and
- during the period July-September, to protect broadcast *aman* (b. *aman*) crops from submergence by maintaining water level in Kawadighi Haor below 7.15 m PWD. Pumping normally begins in March/April, and remains operating until river water level is lower than *haor* water level.

C1.10 Drainage Structures

Main drainage sluices

There are two main drainage sluices in the Kushiya River section of the project embankment. These are located on Koradair Khal immediately east of the pumping station. The 6-vent sluice has an invert level of 4.1 m PWD, and the 3-vent sluice has an invert level of 1.4 m PWD. These drainage sluices allow gravity drainage of water from the project area when water levels in the Kushiya River permit. Considerable leakage through the 3-vent sluice into the project area has been observed during high river stages, when pumping is in progress, and also in the dry season.

Surface Drainage Sluice

There are six surface drainage sluices in the Manu section of the project embankment between Haripasha and the Manu barrage. These are single or two vent RCC box structures with riverside metal flap gates. They are used to drain water which has accumulated between the project and secondary embankments.

C1.11 Irrigation Structures

Bifurcation Structure: Bifurcation structures regulate water flow from the de-silting basin into the Manumukh and Rajnagar main canals. These RCC structures incorporate two head regulators from the main canals and a vehicular access bridge. Flows through the three vents of each regulator are controlled by vertical lift gates.

Group Regulators: Group regulators are provided at the junction of the main and secondary canals. There are eight group regulators in the Manumukh canal system, and six in the Rajnagar canal system. Each group regulator consists of a cross regulator in the main canal and a head regulator discharging to the secondary canal. The cross and head regulators consist of RCC boxes with varying ventage (1 to 3) fitted with vertical lift gates.

Cross regulators: In addition to the cross regulators incorporated in the group regulators, there are two cross regulators in the Manumukh main canal and two others in the Rajnagar main canal.

Group Checks: Group checks are provided at the junction of secondary and tertiary canals. There are six group checks in the Manumukh canal system and seven in the Rajnagar canal system. Each group check consists of a cross check on the secondary canal, and a head check on the tertiary canal. These structures are similar to the group regulators, only smaller.

Cross Checks: In addition to the cross checks incorporated in the group checks, there are 5 cross checks in the Manumukh canal system and 13 in the Rajnagar canal system.

Fall-Cum-Checks: There are several fall-cum-checks in the Manu canal system, and four in the Rajnagar canal system. The fall-cum-checks consist of RCC floors and walls fitted with a metal shutter upstream of the glacies. Falls are either 0.30 m or 0.45 m.

Turnouts: There are 262 turnouts delivering irrigation water to the fields from the tertiary and secondary canals, and in some cases from main canals. These structures consist of a single 250 mm diameter RCC pipe 20-25 m long. The pipe is laid at field level between the canal and the fields.

Tail Structures: There are 15 tail structures in the Manumukh canal system, and 14 in the Rajnagar canal system. The tail structures each consist of an RCC box with varying ventage (1 to 3) fitted with vertical lift gates.

LLP inlets: There are 19 LLP inlets through the Kushiya River section of the project embankment. Each inlet consists of a single 250 mm diameter RCC pipe, an RCC intake fitted with a flap gate on the riverside, and an RCC outlet fitted with a vertical lift gate on the countryside. In most cases gates are damaged or missing.

C1.12 Syphons

Syphons are provided to drain rain water that accumulates in pockets. They are placed either through the project embankment, or under an adjacent canal. There are 7 syphons through the embankment, and 38 syphons through irrigation canals; 9 of the latter are in the Manu canal system and 29 are in the Rajnagar canal system. Heavy silting of the syphons occurs. They require regular maintenance, but this is not always available. As a result, the syphons are often blocked or their capacity significantly reduced. BWDB has proposed seven additional syphons to relieve local drainage congestion.

C1.13 Manu Project *Beel* Area

The project area contains the outstandingly important wetland Kawadighi Haor; which has an area of 85 km². *Beels* in the project area are as follows:

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<i>Beel Names</i>	<i>Area (ha)</i>	<i>Beel Names</i>	<i>Area (ha)</i>
Singua Beel	14.37	Kaliara Doba	
Hawa Beel	61.54	Kalibari Khal	4.09
Majerband Beel	76.72	Kanaki Gang	5.26
Patasingra Beel	233.79	Kati taka Beel	1.62
Goali Beel	13.87	Ghaagatia Beel	0.41
Shalkatua Beel	48.87	Charupama Beel	2.74
peala Beel	11.19	C.M. Karsha Beel	6.00
Kaliakuli Beel	9.68	Chapra Beel	3.65
Noamati Beel	25.91	Chowdighi Beel	0.45
Hawa Beel	24.62	Chota existence Beel	0.51
Melaghar Beel	12.19	Jibonia Beel	5.06
Munia River	16.84	Jira Beel	4.37
Akali Nadi	24.85	Daldalia Beel	6.11
Erali Pukhuria	14.06	Dewan Dighi	4.29
Chatla Bhurijuri	12.12	Nalua Gang	7.81
Bodirbhara Beel	11.63	Nagori Gang	6.60
Koradair River	13.65	P. Matikura Beel	2.15
Niamoter Doba	12.94	Baladmara Beel	0.32
Bhobanaga Beel	12.72	Balita Beel	3.83
Nalua Nadi	10.29	Bacha Dubi Beel	1.40
Karadair Nadi 2	8.40	Boicha Beel	2.65
Machuakhali fishery	36.44	Bagan Beel	0.49
Agadubi Beel	0.4	Kukua Beel	5.79
akali Nadi up		Satbhuterdebi Beel	1.61
Upper Goali Beel	2.92	Harium Beel	4.13
Koradair Nadi 1	4.21	Ulauli Beel	2.66
Koia Beel	2.12	Dhansara Beel	3.15
Karira Nadi	5.10	Sagar Dighi	1.65
Total Jalmohal Area = 833.46 ha			

C2. STATUS OF DRAINAGE SYSTEM

C2.1 Pre-monsoon / Dry Season Drainage

The project area is comprised of 24,300 ha of land. In addition, it receives runoff from eastern hilly areas. The majority of the runoff from the upper catchment flows into the project area through these *chhoras*:

- Akali Chhora
- Binnojuri Chhora
- Udna Chhora
- Kuchimura Chhora
- Pagla Chhora
- Haar Chhora
- Dhamai Chhora
- Madra Chhora

Most of the *chhoras* are blocked by successive earthen bunds. The retained water is used for irrigation and domestic purposes. In case of excessive rainfall in the upper catchment, however, flow occurs at the incoming *chhoras*. The runoff that enters the project area from the northeast part of the MRP flows through Akali Chhora, Binnojuri Chhora, and Udna Chhora. This runoff is stored at Boro Kawadighi Haor. The runoff that enters the project area from the east and northeast flows through Udna Chhora, Kuchimura Chhora, Pagla Chhora, Haar Chhora, Dhamai Chhora, and Madra Chhora. This runoff is stored at Chotto Kawadighi Haor.

There are about 50 *beels* in the project area (figure C1). The drainage channel system is interlinked with these *beels*. Drainage flow is not only governed by the channel system, but also by storage at *beel* areas. Initially, runoff is stored in the *beel* areas. Additional runoff flows through the channel system. Chotto Kawadighi Haor is drained by Munia Channel. Though the cross-sectional area of Munia Channel is adequate, the backwater effect of Boro Kawadighi Haor causes slow drainage from Chotto Kawadighi Haor. This congestion results in damage of *boro* crops. The major affected *beels* are:

- Bara Beel
- Bhurburi Beel
- Balita Beel
- Pukhuria Beel
- Singua Beel
- Bhurijuri Channel (large water body)

Boro crops at Chotto Kawadighi Haor are frequently partially or completely ruined. This drainage problem can be reduced by excavating (increasing slope of the channel and increasing conveyance) these main channels:

- Kulaimara Channel
- Munia Chhanel
- Akali Channel

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The drainage problem can also be mitigated by construction of a new drainage channel from Kuchimura Channel to Udna Chhora. This will divert storage from Chotto Kawadighi Haor to Boro Kawadighi Haor.

Langun Channel and Machua Channel receive runoff from areas to the southwest of MRP. They drain into Akali Chhora. Runoff from the south is received by Digola Channel, and drains into Machua Channel and Patasingra Beel. Southwestern runoff is carried by Lash Channel, and drains into Patasingra Beel. The northwestern runoff is received by Machakhali Channel, and drains into Patasingra beel. The northern catchment runoff is received by Munia channel, and drains into Akali Chhora. Patasingra Beel water is drained by Mogra canal. Ulauli, Shalkatua, Rukkha, Majherbanda, and Chatla Beel water is drained by Akali Chhora. Mogra and Akali Chhoras join together and form Koradair Channel. Koradair Channel is the only drainage outlet of MRP. The *beels* of Boro Kawadighi Haor in which *boro* crops are affected are :

- Machuakhali Beel
- Kapania Beel
- Patasingra Beel
- Chalia Beel
- Shalkatua Beel
- Rukkha Beel
- Ulauli Beel

The drainage through the Koradair River is either by regulators or the pumping station. During the dry season, drainage is carried out by the 3-vent regulator. In the pre-monsoon season, drainage is carried out by the pumping station. The drainage system is shown in figure C2 and figure C3.

C2.2 Monsoon / Post Monsoon Drainage

During the monsoon and pre-monsoon seasons, there are only two waterbodies in the project area: Boro Kawadighi Haor and Chhoto Kawadighi Haor. When flood levels are high, 60% - 75% of the project area remains submerged. All the incoming *chhoras* from the upper catchment remain active, so overland runoff continues entering through small openings. The runoff stores in both the *haors*.

The upper areas of the southeast and southern portions of the project remain flood free. The only active (monsoon) channels identified are Lang channel, Langun Channel, Kodali Channel, and Machua Channel. To keep water level at 7.16 (m PWD), monsoon outflow is carried out by eight pumps, which have a total discharge capacity of 35 m³/s. There is a rise in water level in the project area during the monsoon season since the combined inflow from the upper catchment and rainfall is greater than the discharge by the pumps. During the post-monsoon season when river level is lower than the *haor* water level, gravity drainage starts through the 6-vent regulator. For efficient discharge of the storage during the post-monsoon and pre-monsoon seasons, BWDB (O & M circle, Moulvibazar) has proposed construction of a 3-vent regulator at Machuakhali Channel.

C3. STATUS OF IRRIGATION SYSTEM

C3.1 Water Distribution

The irrigation command area in MRP is 12000 ha. Water is conveyed to the fields by two main canal systems. One is the Manu main canal which travels along the right bank of the Manu River. The other is the Rajnagar main canal, which travels along the southern and eastern parts of the project area. The total system consists of 105.3 km of canals. This canal system comprises:

Main canals	36.7 km
Secondary canals	48.9 km
Tertiary canals	19.7 km

The Manumukh main canal is 18.6 km long, and its distributaries are 30 km long. Command area of the Manumukh canal system is about 6000 ha. Area irrigated in the 1995-96 dry season was 2100 ha (approx.). Irrigation discharge through the Manumukh main canal is 2.81 m³/s.

The Rajnagar main canal is 18.1 km long, and its distributaries are 38.6 km long. Command area of the Rajnagar canal system is 6000 ha. Area irrigated in the 1995-96 dry season was 5200 ha (approx.). Irrigation discharge through the Rajnagar main canal is 2.90 m³/s. The irrigation system is shown in figure C4 and figure C5.

Distribution System: Irrigation water supply starts from the end of December and continues until mid-March, when the Manu barrage closes. The pool level of the barrage is 12.03 m PWD. At this level, the main canals maintain full water supply. Water is supplied simultaneously by both the main canals. Distribution of water from main canals to fields through secondary and tertiary canals starts from the upstream reaches of the main canals. A cyclic order is maintained for water distribution in the secondary canals. This means that first upstream fields are irrigated, then fields in the middle reaches are irrigated, and finally downstream fields are irrigated. This cycle is repeated until the end of March. Twenty to twenty-five meter long turnouts are used between the canals and the fields. Manumukh main canal's excess irrigation water falls into Patasingra Beel through overland flows and the following drainage channels: Lash Channel, Machuakhali Channel, and Naria Channel. Rajnagar canal's excess irrigation water is received by Langun Channel, Machua Channel, Digola Channel, Akali Chhora, and Udna Chhora. This water falls in Patasingra Beel and Majherbanda Beel, and also passes through Akali Chhora.

C3.2 Water Use in Post Monsoon / Dry Season Cropping

Surface water available for cropping purposes in the post-monsoon and dry seasons is from:

- Water resources in Bhatara hill
- Water resources from storage in the project area
- Irrigation water from the Manu River
- Kushiyara River water by LLPs

Surface water and ground water from Bhatara Hills enters the project area through many *chorras*. This water is used for local *boro* cultivation.

Since the area is embanked, and the river water level remains higher than project water level, during the monsoon season rainfall in the project area and runoff from the upper catchment is stored in the project area. This water is drained through the 6-vent regulator. The area which dries is irrigated with storage water. The low-lying area is irrigated by *beel* water.

There are 19 LLP inlets through the Kushiya River on the northeast side of the MRP. Each RCC inlet consists of a single 250 mm diameter pipe fitted with gates on both sides. Most of these inlets are partially damaged. Farmers do not use the inlets for irrigation. Cropping areas from different water resources are shown in figure C6.

Area irrigated by different sources of water are as follows :

Incoming upstream water	1600	ha
Post-monsoon storage water	4300	ha
Irrigation water	7300	ha
Kushiya River water	Nil	

HYV and Local *Boro* Cropping: Cost and yield of HYV *boro* is higher than that of local *boro*, but the cropping period is also longer. Since low areas submerge after little rainfall or inflow from the upper catchment, farmers prefer local *boro* cropping in lower areas. The shorter cropping period reduces the risk of crop damage.

C3.3 1995-96 Dry Season Wet Area

Beels within the Machuakhali *beel* system remained submerged during the 1995-96 dry season. These were Chamka, Dariganga, Topka, Diba Topka, Homia, Chatla, Singua, Petua, and Machuakhali *Beels*. These *beels* are interconnected by the Machuakhali Channel. Originally, Machuakhali was a drainage channel which drained *beel* and floodplain waters into the Manu River. The channel therefore slopes towards the Manu River (in the reverse direction of the present drainage system). Since the storage water of the Machuakhali *Beel* system is drained through Patasingra *Beel*, and due to influence of irrigation water distribution through the Manu main canal, water depth in the Machuakhali Channel and *beel* system is higher than other channels and *beels* in the project area.

Among other *beels*, Patasingra *Beel* is a permanent waterbody. It is of one of the lowest pockets in the project area, and influenced by irrigation water coming through Machuakhali Channel, Machua Channel, and Lash Channel. Singua *Beel* and Bhuribhuri *Beel* also remained under water because of slow drainage of the system and incoming water from *chhoras*. Pukhuria *Beel* remained underwater since the bed level of the channel which flows into the *beel* is at a higher elevation than the *beel* bed level. The drainage system is also slow. A portion of Shalkatua *Beel* remained shallowly submerged. The 1995-96 dry season wet area is shown in figure C1. The underwater area of different *beels* is presented below:

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Name of <i>beel</i>	Area in ha (approx.)	Depth in meter
Machuakhali	90	5
Patasingra	160	3
Shalkatua	74	1.5
Singua	35	3
Bhurburi	20	2
Pukhuria	20	3

C3.4 Dry Season Flow System

During the dry season incoming water through *chhoras* is blocked by earthen dams. This is done for irrigation purposes. Post-monsoon water stored in Chotto Kawadighi Haor is slowly drained by Munia Channel, which falls into Akali Chhora. Irrigation water which comes through Manumukh main canal is received by Machuakhali Channel and Lash Channel. This water is stored in Kawadighi Haor, and then drained by Mogra-Koradair Channel. Rajnagar main canal's irrigation water is received by Digola, Machua, and Akali Chhoras. It is drained by Akali Chhora into Koradair Channel. Akali Chhora and Mogra Channel join to form Koradair Channel, through which total flow is discharged into the Kushiya River. This is controlled by the 3-vent regulator. The following discharges were measured during the dry season (11 February 1996):

Akali Channel	0.6	m ³ /s
Mogra Channel	0.6	m ³ /s
Koradair Khal	1.6	m ³ /s
Manumukh main canal	2.8	m ³ /s
Rajnagar main canal	2.9	m ³ /s

A schematic dry season flow system is shown in figure C7.

C4. FLUSHING OF IRRIGATION WATER

During the monsoon and post-monsoon seasons, the water volume in the *haor* is much higher than during the dry season. There are also only two waterbodies in the project area during the monsoon and pre-monsoon seasons, but during the dry season the reduced water volume is spread over different *beels* and channels.

When water level is high, the inflow from upstream *chhoras* mixes with the high volume of these two water bodies. Significant inflow and outflow also occurs during the monsoon and post-monsoon seasons. During the dry season, the inflow and outflow is much less. The upstream *chhoras* carry pesticides which pollute the *beels*. Decomposition of aquatic plants also occurs in the dry season, which contributes to pollution and increases turbidity. This pollution and increased turbidity of water is pathogenic to fish. From the field study, it is evident that diseases start when the water begins to drop below *beel* banks. About 40-50% of fish are affected by diseases.

In order to reduce the turbidity and pollution of *beel* water, continuous flushing of Manu River water through irrigation canals is required. The inflow of water will be drained through drainage regulators.

Water Distribution System

Flushing can be activated through Manumukh main canal and Rajnagar main canal. For efficient flushing and to minimize water loss, the following irrigation canal and drainage channel system can be considered:

Discharge through Manumukh main canal. The secondary and tertiary canals which can be used are MR₁, MR₁R₂, MR₂L₂, MR₂L₁, MR₄, and MR₆. This irrigation water will fall into the Lash Channel or lands adjacent to Patasingra Beel. Water will be drained into the Kushiya River through the Lash/Digora Channel-Patasingra Beel-Mogra Channel-Koradair Channel drainage system.

Discharge through Rajnagar main canal. Distributory canals which can be used are RL₂, RL₂L₁, RL₂R₁, RL₄, RL₅ and RL₆L₁. Irrigation canal water will then flow into Digola Channel, Machua channel, and Akali Chhora. This water will be drained into the Kushiya River through the Digola Channel-Patasingra Beel-Mogra Channel-Koradair Channel drainage system and Machua Channel-Shalkatua Beel-Majherbanda Beel-Akali Chhora-Koradair Channel drainage system.

Total inflow from irrigation canals is 5.70 m³/sec. One opening of a regulator (1.52 m x 1.83 m) under full flow condition discharges more than 5 m³/sec during the dry season. This irrigation inflow can be discharged by one vertical gate of a drainage regulator, so the proposed flushing and drainage system will cause no additional storage in the project area. Proposed flushing and drainage systems are shown in figure C4 and figure C5.

Irrigation Canal Status :

Name	Discharge (m ³ /s)	Length (km)	No. of Turn out	Crop at Canal End	Harvesting Period	Physical Status	Canal end Distance from <i>beel</i> or Chhanel (m)
Manu	2.81	12				Good	
Rajnagar	2.90	18				Good	
MR ₂	0.94	5.73	17	B. <i>aman</i> , T. <i>aman</i>	Nov. 30	T. <i>aman</i> at the canal bed	
MR ₂ L ₁	0.20	1.53	4	B. <i>aman</i> , T. <i>aman</i>	Nov. 30	Weeds and water hyacinth at canal bed	250
MR ₂ L ₂	0.17	1.14	4	B. <i>aman</i>	Nov. 10	Good	400
MR ₄	0.29	1.45	6	B. <i>aman</i> , T. <i>aman</i>	Nov. 30	Good	250
RL ₂ L ₁	0.20	1.45	8	B. <i>aman</i>	Nov. 10	Canal banks breached	300
RL ₂	0.67	5.57	21				
RL ₄	0.95	6.20	27	B. <i>aman</i>	Nov. 10		
RL ₅	0.48	3.55	10	B. <i>aman</i> , T. Aman	Nov. 30	Breached, and public cut,	500
RL ₆ L ₁	0.21	1.06	5	B. <i>aman</i>	Nov. 10	Good	
RL ₆	0.53	3.94	15	B. <i>aman</i>	Nov. 10	Good	500
MR ₆				B. <i>aman</i> T. <i>aman</i>	Nov. 30	Good	300

Flushing Period

It is evident that fish diseases start when individual waterbodies form. Flushing of irrigation water should be started when banks of the *beels* are submerged by 0.30 m. Some of the irrigation canals are not directly connected with channels or *beels*, and will not be able to support the inflow of water. Some overland flow will occur during the flushing period. It has been verified in the field that overland flow will occur on 100-500 m of land adjacent to these canals. On these lands, either *b. aman* or *t. aman* is cultivated. Since harvesting of *t. aman* will be completed by the end of November, it is recommended to start flushing Manu River water from the first week of December.

Use of RCC Pipe: Depending on *haor* water level, fish can begin contracting diseases as early as November. *Aman* is still being cultivated at this time, and it is not possible to begin flushing Manu River water. This problem can be overcome by connecting the end of the canal to the edge of the *beel* using 0.45-.60 m dia RCC pipe. Approximately 2500 m of pipe will be required for the total flushing system. If pipes are used, it will be possible to flush river water at any time during the post-monsoon or dry seasons.

C4.1 Maintenance Works and Necessary Steps

Some irrigation canal banks are damaged by flood water. There are also public cuts that were done because of waterlogging and to hasten drainage. These banks need to be improved. There are some aquatic weeds in the canal bed and earthen dams which also have to be removed.

To avoid overland flow, turnouts in the main canals and secondary canals will have to be closed by wooden or steel plates. Earthen materials can be used to close turnouts that have small diameters. To raise the water level of the Manu River to pool level (12.03 m PWD), Manu barrage gates need to be closed about ten days before flushing begins.

C4.2 BWDB Assistance

MRP is operated and monitored by BWDB and the Manu barrage is under the control of BWDB. To flush Manu River water into the Kawadighi Haor, gates of the Manu barrage have to be closed by the middle of October. Gate operation of Manu barrage and irrigation structures have to be maintained by BWDB. Assistance from BWDB field staff is also essential to those who control internal irrigation structures.

Water Quality Test

Before flushing starts, Manu River water quality should be tested to avoid any adverse effects in the *beel* area. During flushing, the water quality of inflow from *chhoras*, *beel* water, and outgoing water through the regulator should be tested to observe the impact of flushing.

C4.3 Agricultural Recommendation

Beel fishing and *boro* cultivation in the project area begin simultaneously. Irrigating the *beel* areas before catching all the fish causes fish migration. This results in the decrease of the total catch. Moreover, fishing is time and labor intensive when the water volume in fishing areas increases. It has been reported that barrage water supply to *boro* land is delayed in the interest

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of fishermen and lessees. Timely, reliable, and regular supply of water are the important factors in HYV *boro* cultivation. Irrigation starting date is fixed in consultation with farmers. Accordingly, farmers prepare seedbeds, raise seedlings, and start transplantation. Delays in irrigation damages seedlings, hampers transplantation, and frustrates farmers.

Timely irrigation is critical to sensitive HYV cultivation practices. HYV *boro* rice is entirely irrigated by water from project canals. According to some farmers, maximizing HYV *boro* yields is generally unachievable. Surplus rice growers lose incentive because of low returns. Adoption of improved cultivation and soil management practices, along with timely and adequate irrigation and drainage, are required to improve HYV *boro* yield levels.

In some areas, farmers benefit from the delay in water supply from project canals. According to them, their lands remained waterlogged for a substantial part of the post-monsoon season. Consequently, the soils lose the capacity to bear draft animals, making tillage difficult in winter. The farmers stopped or delayed barrage water supply in their area in order to make the land ready for tillage in *aus* season.

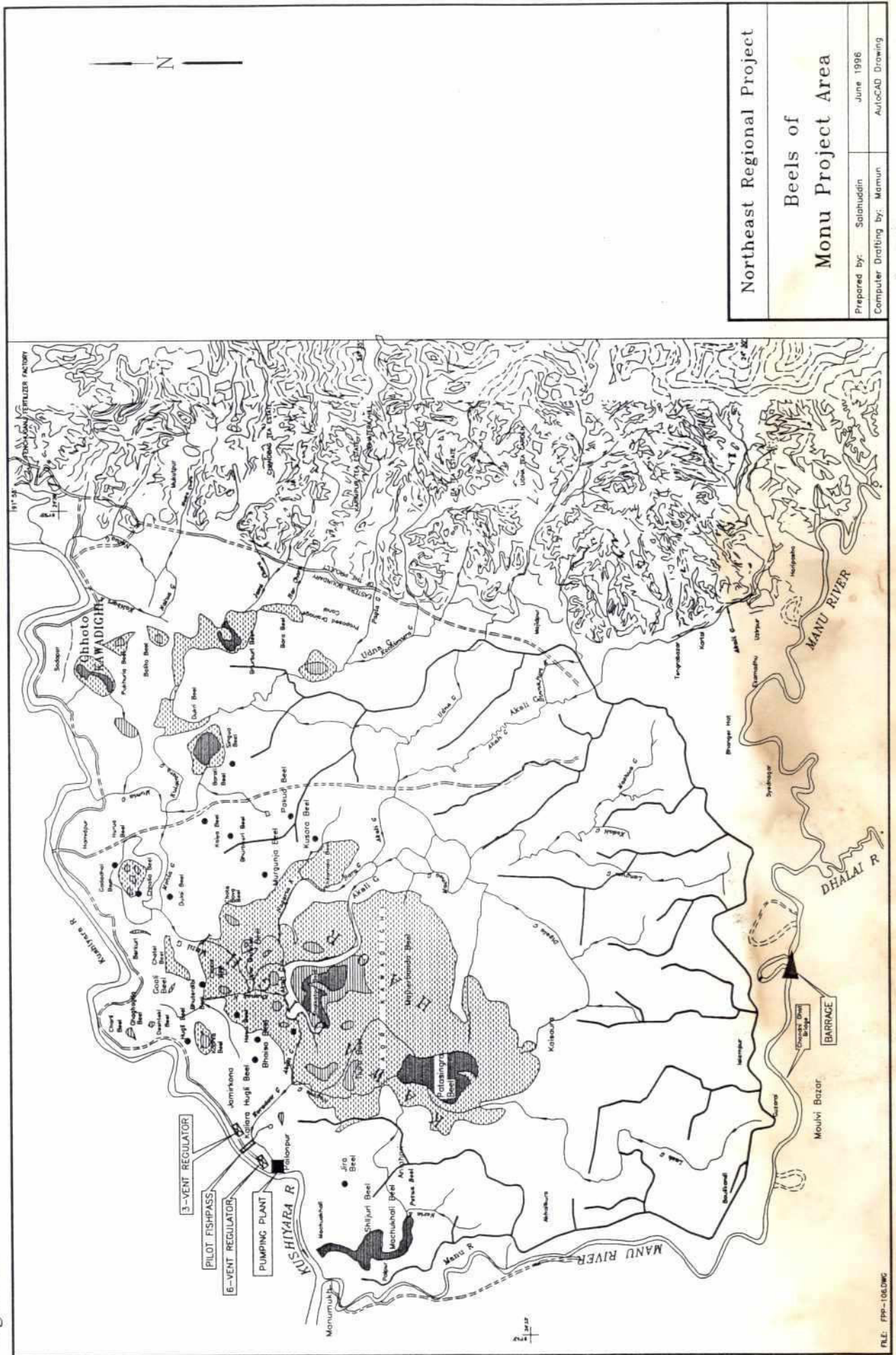
C4.5 Social Activities

To improve water quality in the *haor*, regular flushing of the *haor* bed in the post-monsoon period is needed. This may be done by using existing irrigation canals. This is likely to submerge some land which is currently under *aman* cultivation, and may affect some farmers.

Maintaining adequate water quality is imperative for conservation and improvement of fish resources in Kawadighi Haor. This necessitates some activities to motivate and mobilise the concerned community. These include :

- identification of impacted areas and villages;
- organizing community meetings for exchange of ideas and information, and
- preparing an information sheet on probable impacts on fish resources and *aman* crops.

Figure C1



Northeast Regional Project	
Beels of	
Monu Project Area	
Prepared by: Salahuddin	June 1996
Computer Drafting by: Mamun	AutoCAD Drawing

Figure C2

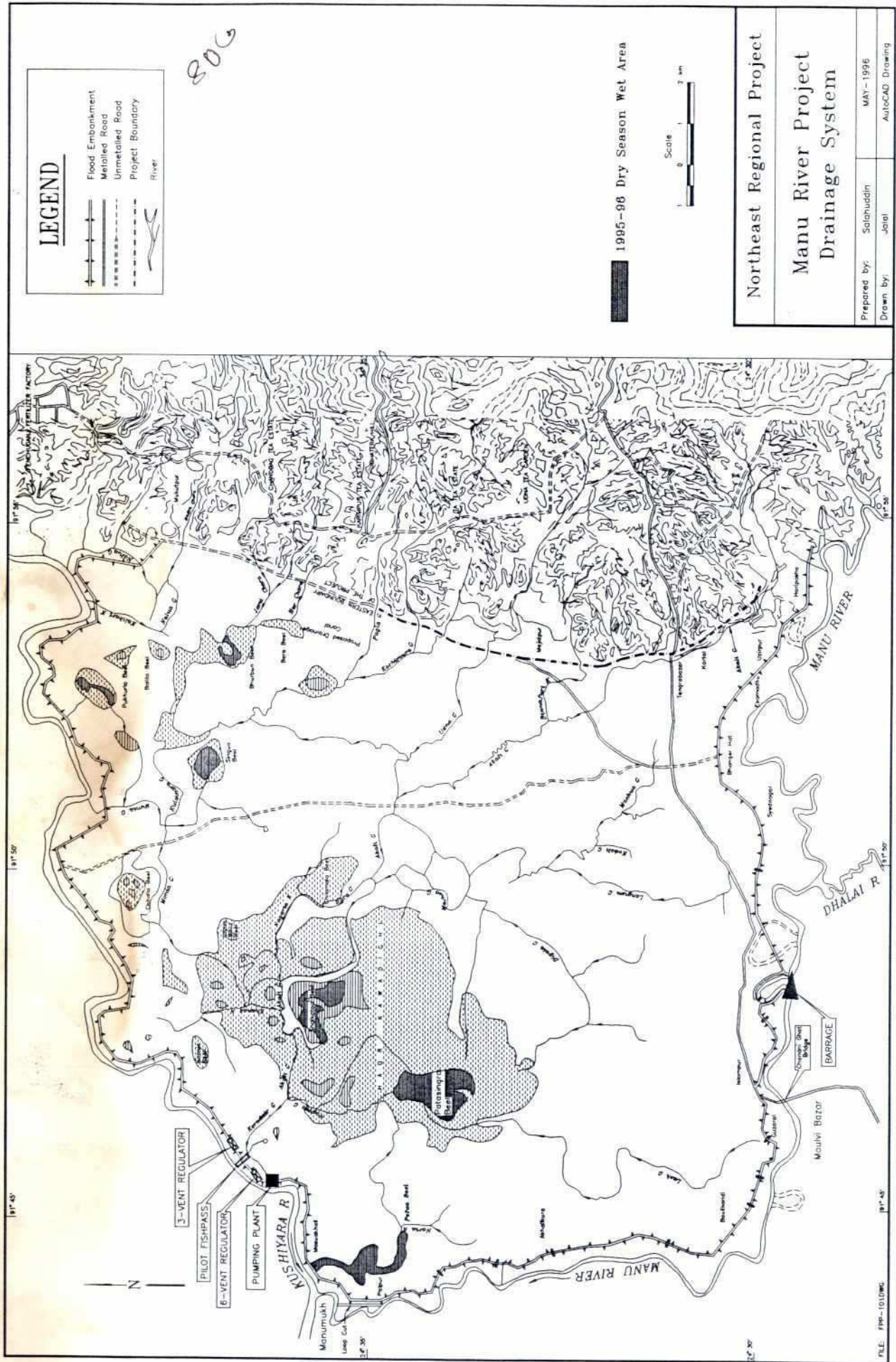


Figure C3

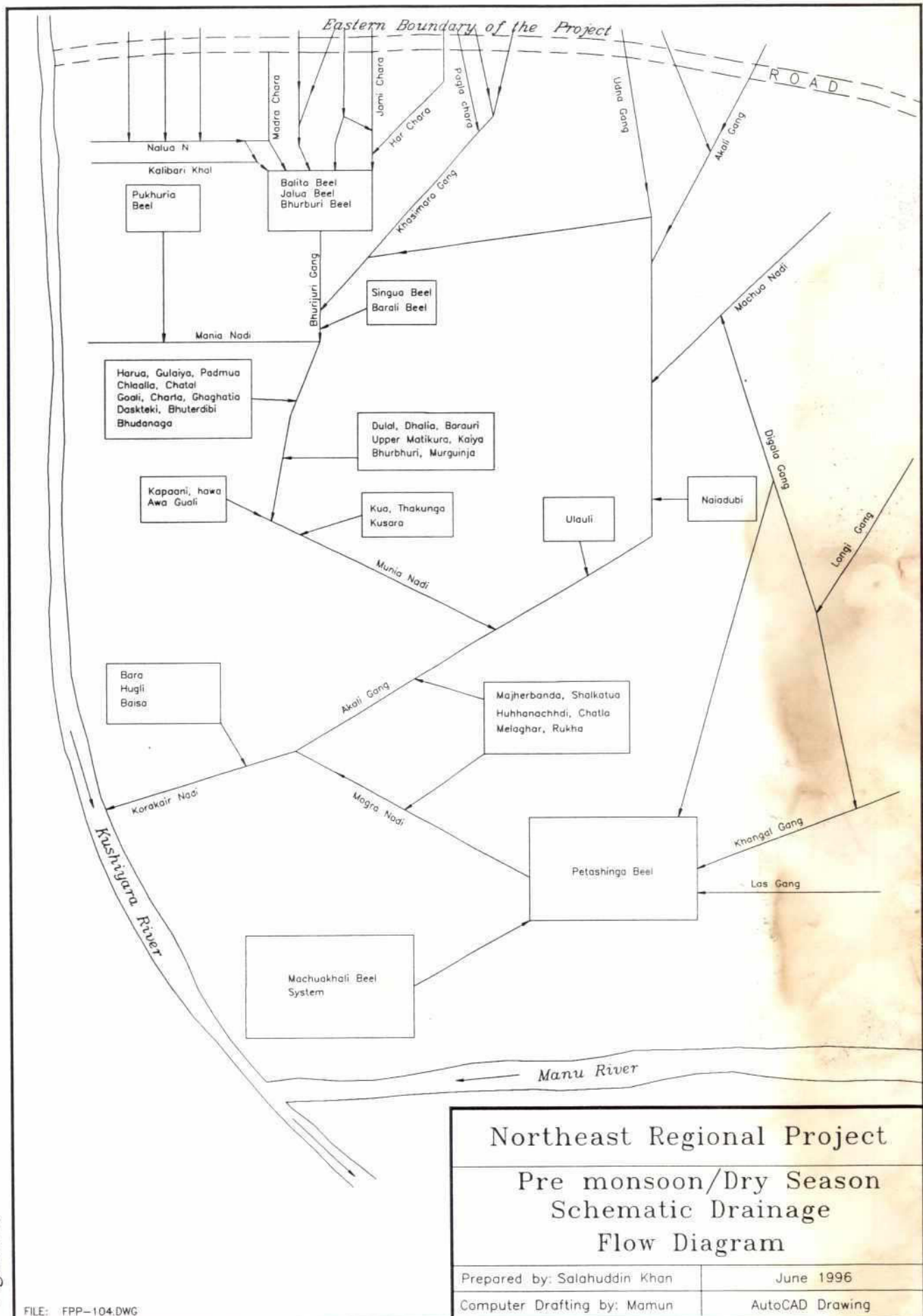


Figure C4

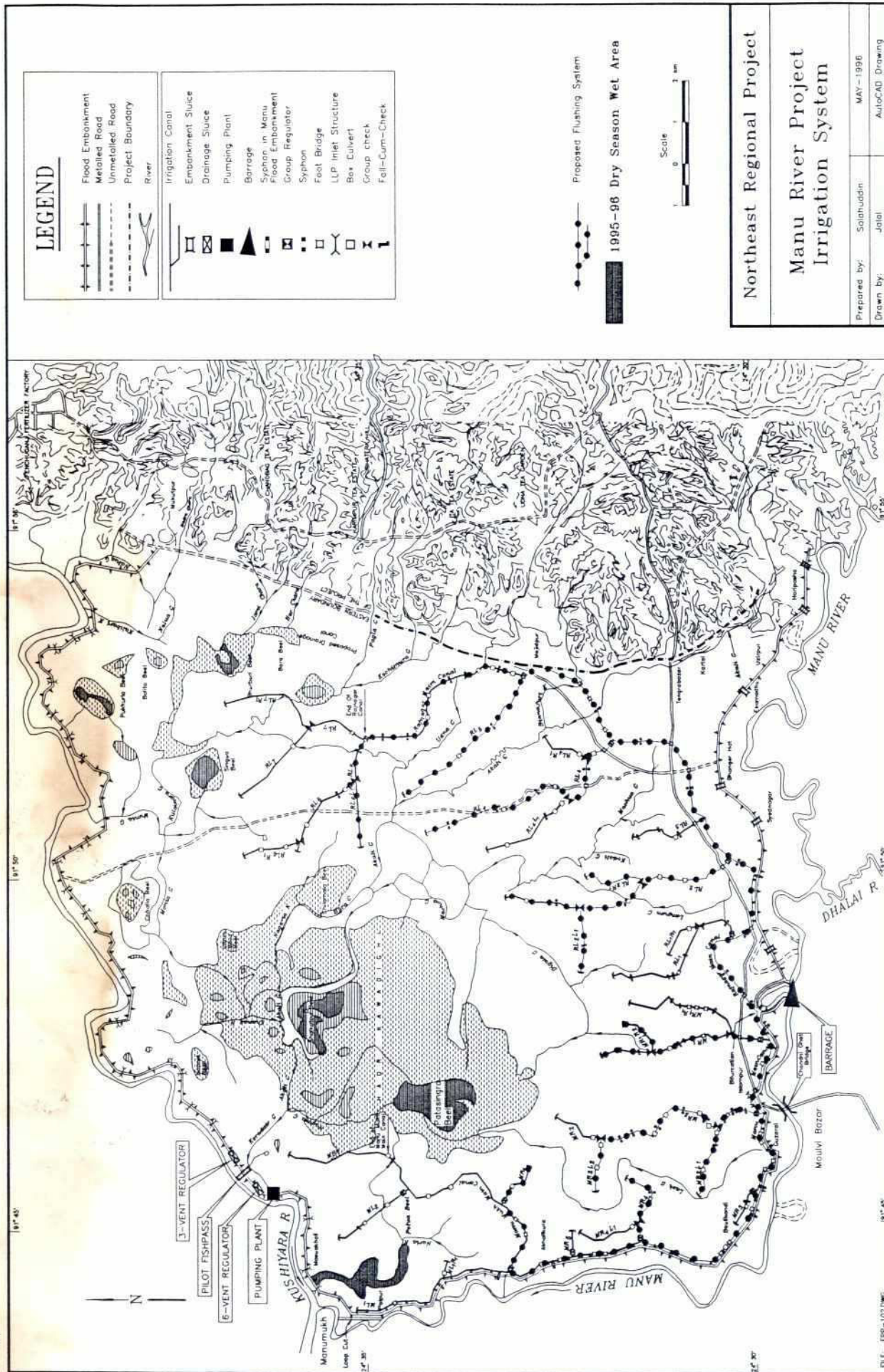
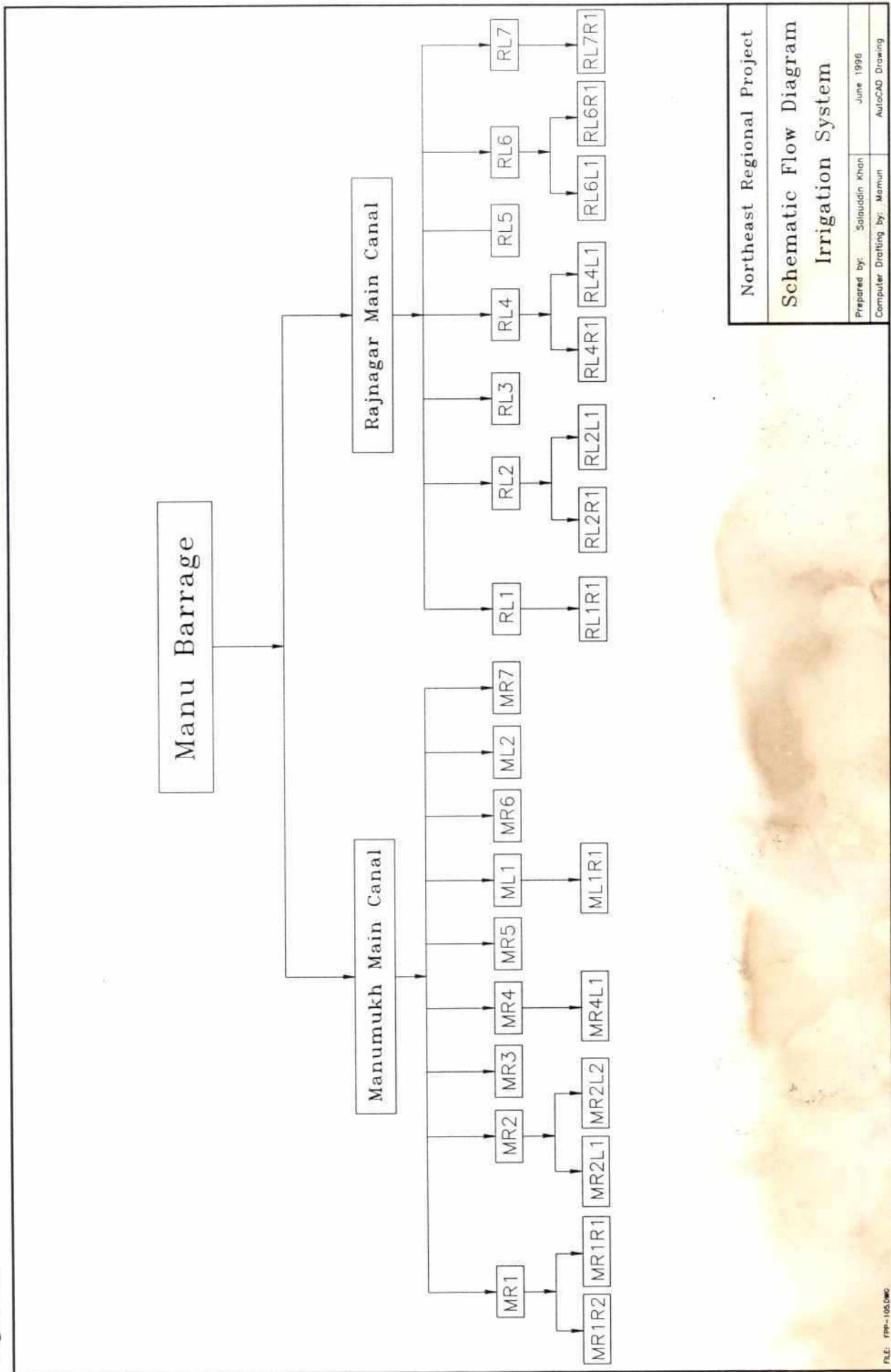


Figure C5



Northeast Regional Project

Schematic Flow Diagram
Irrigation System

Prepared by: Solaudin Khan
Computer Drafting by: Mamun
June 1996
AutoCAD Drawing

Figure C6

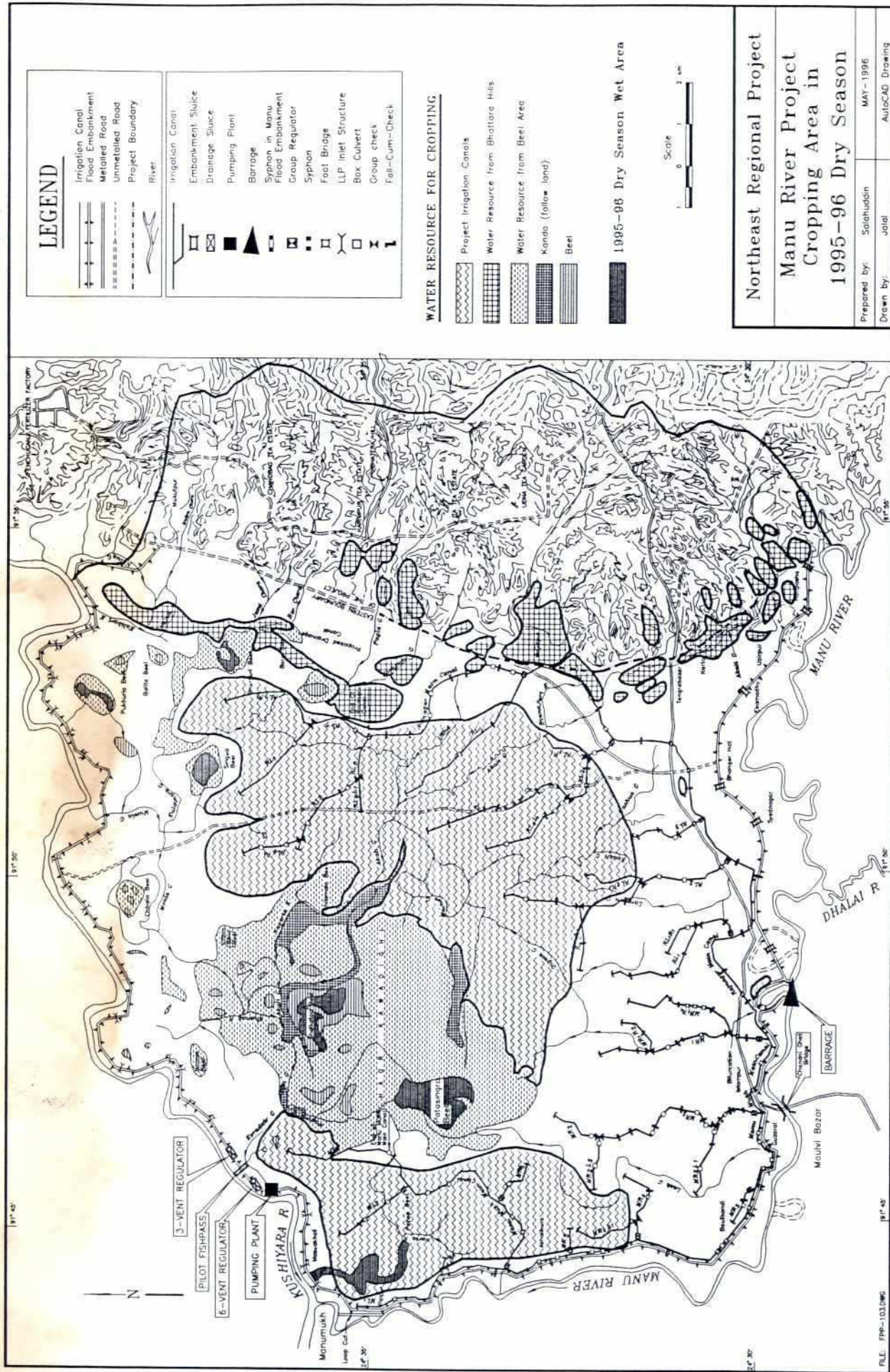
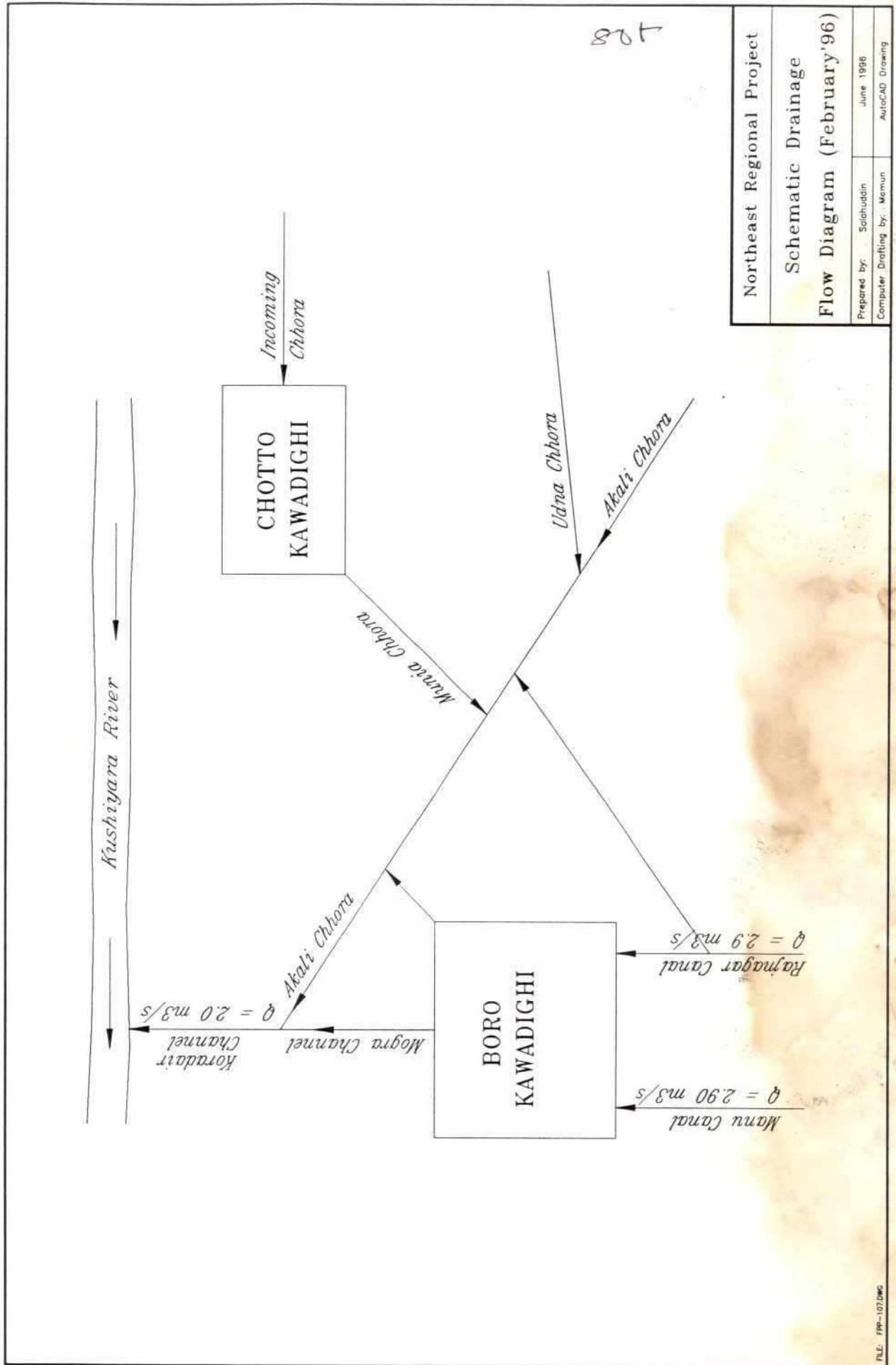


Figure C7



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ANNEX D
FISHPASS SAMPLING DATABASES

APPENDIX D: FISHPASS SAMPLING DATABASES

D.1 Sampling Results - Raw Data

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SAMPLING RESULTS - Raw Data													
Set No.	Date 1996	Day no.	Water Level		Sampling Time		Duration hours	Observation Chamber		Species	No	Length (cm)	
			R/S	C/S	Begin	End		R/S	C/S			Minimum	Maximum
125	96.04.03	94	7.22	4.42	10.30	10.40	0.17		X	Buritengra	91	6.8	7
										Gulsha	1	7.5	7
										Chanda	28	4.1	5
										Mola	2	3.8	5
										Chirka baim	1		16
										Chela	1		6
										Total	124		
126	96.05.11	132	6.43	4.05	17.00	20.30	3.50		X	Air	10	8.4	11
										Chapila	15	6.8	11
										Naptani	1		6
										Bacha	1		10
										Taki	1		
										Kaikka	2	14	15
										Bheda	6	6.8	10
										Gutum	9	6.2	10
										Potka	1		4
										Ketchki	2	3.3	4
										Chanda	210	3.5	4
										Puti	133	4	10
										Shing	1		
										Mola	11	4	4
										Bailla	50	5.1	10
										Dhela	1		6
										Kholisha	1		
										Boicha	1		
										Batashi	35	8.7	
										Tengra	39	5	
										Gulsha	17	5.4	
										Darkina	1		
										Sub total	548		
										Icha	1750	3.2	
										Total	2298		
127	96.05.12	133	6.47	4.04	1.00	5.00	4.00		X	Air	25	8	11
										Boal	1		2
										Bacha	13	9.9	11
										Golda	19	9.3	11
										Chapila	33	6.5	11
										Mola	32	4.1	
										Chanda	462	3.6	
										Puti	69	4.2	
										Chirka baim	11	10.2	11
										Pabda	3	8.3	
										Chela	28	6.1	
										Gutum	13	6.3	11
										Bheda	4	6.6	11
										Kaikka	6	6.9	
										Gilachaki	9	4.1	
										Darkina	17	4.5	
										Batashi	79	7.2	
										Bailla	8	6.3	
										Tengra	17	5.1	
										Gulsha	9	8.2	
										Total	858		
128	96.05.12a	133	6.6	4.72	12.00	14.00	2.00		X	Shole	1		
										Chapila	65	5.3	
										Chela	17	6.2	
										Mola	23	4.1	
										Chanda	353	3.7	
										Ketchki	3	4.2	
										Kaikka	13	10.5	
										Chirka baim	7	8.7	
Potka	28	4.5											

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										Gutum	7	6.3	5.1
										Golda	29	9.3	14.1
										Bheda	17	4.9	6.3
										Puti	22	4.1	8.3
										Bacha	2	10.5	11.9
										Batashi	146	8.5	10.5
										Tengra	13	5.3	6.6
										Gulsha	7	5.8	9.9
										Sub total	753		
										Icha	230	3.8	5.1
										Total	983		
129	96.05.13	134	6.85	4.61	12.45	14.00	1.25		X	Air	3	8.5	13.2
										Puti	9	7.1	8.6
										Bailla	12	8	19.2
										Bacha	5	3	10.5
										Chapila	7	6.2	11
										Chela	6	6.5	10.4
										Ketchki	53	4.5	4.9
										Rani	1		6.9
										Batashi	128	7.2	8.8
										Chanda	325	4.7	5.7
										Bheda	25	6.7	9.8
										Gutum	7	6.8	9.2
										Chirka Baim	56	9.7	16.1
										Tengra	12	4.5	6.2
										Kaikka	5	8.3	11.6
										Mola	63	5.1	6
										Gilachaki	15	5	5.5
										Potka	20		
										Total	752		
130	96.05.15	136	7.23	4.61	18.00	21.00	3.00		X	Air	179	8.2	13.4
										Boal	45	8.7	11
										Pabda	2	7.6	8
										Gulsha	13	12.5	15.1
										Golda	12	9.8	15.2
										Gilachaki	43	4.1	6.9
										Rani	5	6.3	7
										Baim	7	9.7	11
										Shing	11	6.3	7.8
										Chanda	1680	5	5.6
										Tengra	316	5.2	6.1
										Batashi	280	8	8.5
										Gutum	31	7.1	8.3
										Jainzza	4	3.5	4.1
										Puti	20	3.3	4
										Bailla	24	9.2	10.7
										Potka	10	4.5	6.2
										Bheda	36	8	12.1
										Mola	110	8.3	9.2
										Ketchki	84	4.4	4.5
										Lachu	2	15.2	16.1
										Bacha	4	13.5	15.7
										Kaikka	16	10.9	18.7
										Chela	68	5.3	6.7
										Sub total	3002		
										Icha	14000	3.3	5.2
										Total	17002		
131	96.05.15	137	8.03	4.98	13.30	14.30	1.00		X	Gonia	14	22	23.6
										Lachu	1		16
										Gulsha	4	13.5	15.5
										Meni	95	11	13.5
										Chela	28	10.1	13.9
										Bacha	13	10.9	13.1
										Potka	1		4.5
										Gutum	36	7	8.8
										Batashi	26	8.5	9.7
										Tengra	13	4.5	6
										Chanda	217	4.5	5.7
										Puti	10	7.5	8

										Darkina	15	5.2	6
										Chirkabaim	41	12.3	14
										Boicha	23	4.3	4.8
										Gilachanda	19	4.5	7
										Cheka	4	3.5	4
										Boroicha	10	11.2	5
										Mola	28	5.9	8.8
										Ketchki	38	4.3	5
										Sub total	636		
										Icha	185	3.5	13.9
										Total	821		
								X		Air	13	7.3	
132	96.05.17	138	8.26	5.16	18.00	21.00	3.00			Kalibaush	21	25	
										Foli	11	13.9	
										Lachu	9	11	
										Pabda	1		11.7
										Golda	62	18.1	
										Baim	1		55
										Bacha	2	11	13.2
										Batashi	155	7.9	11.3
										Chela	38	5.8	10.7
										Mola	49	4.1	5.3
										Tengra	116	4.2	6.1
										Shing	5	5.9	7.2
										Bheda	3	9.2	11.3
										Gutum	8	6.5	11.2
										Boicha	36	3.8	4.3
										Bailla	43	5	6.2
										Kholisha	19	3.3	5.6
										Potka	3	4.5	4.8
										Garua	1		11
										Chapila	1		7.3
										Chanda	915	3.8	4.9
										Cheka	1		11.3
										Taki	3	7.8	19.2
										Poa	1		9.9
										Total	1517		
								X		Air	37	8.1	13.3
133	96.05.18	139	8.24	5.12	18.00	21.00	3.00			Kalibaush	14	25.3	29
										Gulsha	19	10.2	19.1
										Golda	74	11.9	15.5
										Bacha	18	9.5	11.5
										Puti	28	4.5	8
										Mola	45	4.8	9
										Batashi	70	6.7	8.4
										Bailla	37	6	10.1
										Rani	17	5.1	7.1
										Gutum	7	8.2	9.1
										Kaikka	9	10	14.1
										Chata	17	4.6	5.2
										Baim	2	17.6	23.6
										Bheda	13	6.5	11.2
										Shing	11	5.6	7.1
										Chela	22	6.3	7.1
										Chanda	788	3.9	5.3
										Tengra	19	4.2	6.2
										Ghagot	1		6.5
										Darkina	12	4.3	4.8
										Potka	7		
										Gilachaki	5	3.7	4.1
										Chapila	47	5.2	9
										Sub total	1319		
										Icha	6340	4.1	6
										Total	7659		
								X		Gulsha	2	10.1	18
134	96.05.20	141	8.18	5.34	13.30	15.30	2.00			Bheda	51	8	12
										Chela	10	12	12
										Darkina	20	5	5
										Baim	35	10	14

									Mola	44	8.9	9.9
									Chanda	185	5.1	6.2
									Rani	4	7.3	8.1
									Bailla	3	10.3	16.2
									Batashi	58	7.9	8
									Boicha	15	5	5.5
									Potka	1		6.5
									Bacha	6	10.2	14.1
									Chapila	4	6.8	8.2
									Tengra	12	7.1	9.9
									Puti	18	3.5	6
									Ketchki	18	4	5.6
									Kholisha	1		6.5
135	96.05.20a	141	8.16	5.35	18.15	22.00	3.75	X	Total	487		
									Air	9	4.3	5.1
									Boal	1		22.7
									Foli	1		27.8
									Icha	3850	3.7	6.3
									Golda	38	17.3	7.1
									Bheda	8	10.5	12.7
									Chirkabaim	11	11.7	17.2
									Shing	17	6.1	7.2
									Boicha	13	5.2	6.8
									Kholisha	21	5.7	7
									Mola	37	3.8	5.1
									Puti	38	4.1	9.3
									Darkina	19	3.2	4.2
									Chanda	502	3.5	4.9
									Chela	15	6.3	8.2
									Naptani	7	6.1	6.8
									Ketchki	5	3.8	4.4
									Gutum	13	5.2	8.3
									Bailla	47	4.8	10.3
									Batashi	184	8.2	11.1
									Taki	8	12.7	7.7
									Bacha	3	4.7	9.7
									Chapila	39	5.7	7.9
									Cheka	1		29.1
									Kaikka	9	13.2	19.1
									Tengra	23	4.6	6.7
136	96.05.21	142	8.1	5.37	18.30	22.30	4.00	X	Total	4919		
									Rui	1		3.5
									Baim	2	20.3	46
									Golda	26	7.2	16.2
									Chapila	3	5.2	6.1
									Batashi	105	7.6	9.3
									Mola	24	6.9	8.9
									Chanda	312	4.5	5.2
									Puti	17	3.4	6.3
									Chirkabaim	5	7.3	9.2
									Kholisha	5	4.3	5.5
									Chela	4	5.1	11.6
									Gulsha	3	13.2	15.5
									Gutum	4	6.4	7.9
									Tengra	6	5.2	6.3
									Kaikka	5	12.4	17.4
									Shing	5	6.1	7.9

										Lachu	1		17.7
										Rani	1		6.5
										Puti	1		3.3
										Darkina	1		4.3
										Shing	2	6	6.3
										Sub total	13		
										Icha	13	3	5.2
										Total	26		
138	96.05.23	144	7.89	5.44	9.00	12.30	3.50	X		Bacha	9	13	19.8
										Total	9		
139	96.05.24	145	7.74	5.46	18.00	22.00	4.00	X		Chela	1		9.1
										Jainzza	1		4.2
										Puti	1		4
										Total	3		
140	96.05.25	146	7.53	5.48	18.00	24.00	6.00		X	Air	3	8.1	10.3
										Foli	1		21
										Puti	17	4.8	7.9
										Chanda	65	4.1	5.4
										Bheda	2	6.2	6.8
										Bamosh	4	32.1	36.3
										Rani	1		7.6
										Gulsha	1		6.6
										Potka	1		5.9
										Shing	5	6	8.5
										Jainzza	1		7.3
										Mola	21		
										Bailla	3	6.3	7.6
										Kaikka	2	5.5	6
										Batashi	2	8.3	8.6
										Dhela	4	7.1	5.5
										Chapila	2	3.7	3.9
										Golda	25	9.2	10.1
										Cheka	2	13.9	18
										Gutum	1		8.1
										Boicha	1		3.8
										Sub total	164		
										Icha	128	4.9	6.5
										Total	292		
141	96.05.26	147	7.56	5.46	18.30	22.30	2.00		X	Air	7	12.1	16.2
										Chapila	6	4	7
										Mola	18	5.8	9.7
										puti	9	4.5	8.5
										Shing	7	6.5	8.1
										Bamosh	5	28.8	32.2
										Golda	4	10	11.1
										Bheda	1		6.5
										Potka	5	6.1	7.8
										Kaikka	1		10.2
										Chanda	44	4.5	6.5
										Rani	1		8
										Bacha	3	3	11
										Naptani	1		6.9
										Bailla	7	6.8	7.2
										Gutum	11	6.1	7.3
										Tengra	6	5.1	6.7
										Sub total	136		
										Icha	168	3.9	5.1
										Total	304		
142	96.05.28	149	7.47	5.51	7.00	9.00	2.00		X	Bheda	3	7.6	13.7
										Chapila	7	9.9	12
										Kaikka	2	18.7	19.8
										Potka	1		8.3
										Chanda	36	4.5	7.8
										Baim	1		9.5
										Chela	1		12
										Puti	3	3.8	4.6
										Gutum	1		6.5
										Bailla	7	8.6	9
										Ketchki	17	2.9	3.4

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										Total	79		
143	96.05.28a	149	7.57	5.53	19.00	23.00	4.00		X	Kalibaush	1		3.8
										Air	10	12.7	14
										Foli	1		15.9
										Chanda	89	4.2	6.3
										Bamosh	3	27.6	31
										Mola	52	6.7	8.8
										Puti	6	3.3	4.5
										Jainzza	2	4.3	5
										Potka	1		6.1
										Shing	7	5.8	11.2
										Chapila	9	8.3	13.2
										Batashi	16	8.3	9.4
										Bheda	2	10.1	14
										Tengra	4	5.2	6.8
										Golda	9	10.6	12.8
										Bailla	4	5.3	7.8
										Taki	1		13.2
										Bacha	3	6.7	10.1
										Naptani	2	5.8	6.2
										Sub total	222		
										Icha	265	4.6	8.2
										Total	487		
144	96.05.29	150	7.7	5.75	11.30	13.45	2.25		X	Bheda	1		12.5
										Puti	6	4.8	9.3
										Bacha	1		9.8
										Potka	1		6.2
										Chanda	31	4.8	7.5
										Rani	3	6.5	9
										Baim	7	10.7	11.5
										Dhela	8	5.5	6.5
										Gutum	2	5.2	6.9
										Sub total	60		
										Icha	14	4.5	5.2
										Total	74		
145	96.05.30	151	7.84	5.82	9.00	12.00	3.00		X	Bacha	1		10.8
										Batashi	17	8.6	9.1
										Bheda	21	6.7	13.3
										Chela	30	4.8	12.9
										Puti	2	7.8	9.9
										Potka	3	7.1	7.8
										Gulsha	1		21
										Baim	7	7.9	11.2
										Kaikka	2	14.4	17
										Chapila	10	4.8	5.7
										Chanda	169	4.3	5.6
										Tengra	8	5.7	7.2
										Gutum	1		6.3
										Puti	5	5.2	5.9
										Mola	13	8.7	6.9
										Total	290		
146	96.05.30a	151	8.04	5.88	19.00	23.00	4.00		X	Air	1		8
										Pabda	1		24.7
										Chapila	3	4.2	6.3
										Batashi	22	7.9	9.3
										Puti	13	3.8	4.7
										Baim	8	7.3	8.2
										Gutum	2	8.1	8.6
										Bheda	1		7.6
										Tengra	7	7.2	10.3
										Gulsha	1		13.3
										Potka	2	6.1	6.8
										Mola	28	8.3	9.9
										Cheka	3	18.1	24.3
										Golda	14	7.6	11.9
										Chanda	85	3.8	4.9
										Naptani	1		5.2
										Koi	2	4.1	4.74
										Boicha	11	3.6	4.1

									Bacha	2	10.9	13.3
									Jainzza	1		4.6
									Chela	21	8.1	9.3
									Sub total	229		
									Icha	190	4.3	5.8
									Total	419		
147	96.05.31	152	8.02	5.85	15.00	19.30	4.50	X	Mola	29	6.9	8.8
									Chapila	14	7.2	8.5
									Puti	17	4.2	5.3
									Chanda	204	3.7	5.9
									Golda	12	8.1	15.2
									Bheda	2	8.3	10.1
									Bailla	8	6.2	8.2
									Batashi	18	8	8.4
									Potka	3	6.2	9.3
									Bamosh	4	24.1	31.3
									Rani	3	4.2	6.8
									Gutum	11	6	7.3
									Gulsha	7	4.2	18.1
									Chirka	6	3.1	8.3
									taki	3	18.1	24.7
									Kaikka	7	8.3	13.7
									Bacha	1		11.2
									Shing	8	5.7	6.9
									Naptani	2	4.3	5.2
									Sub total	359		
									Icha	54	4.8	7.7
									Total	413		
148	96.06.01	153	8.12	6	12.30	14.00	1.50	X	Lachu	1		16.5
									Bacha	1		12.7
									Bheda	6	5.8	12.5
									Chela	25	10	10.7
									Puti	8	5.9	8.3
									Tengra	6	5.3	6.1
									Chirka	7	10	11.2
									Kaikka	1		12
									Bailla	1		10
									Potka	27	4.2	6.8
									Boicha	7	4.9	5.2
									Chanda	58	3.4	5.9
									Gulsha	1		14.7
									Gutum	1		6.5
									Total	150		
149	96.06.01a	153	8.4	6.1	18.45	22.45	4.00	X	Pabda	5	10.7	13.2
									Puti	17	6	8.8
									Golda	19	9.2	18.6
									Tengra	6	5.4	6.5
									Kotibacha	2	6	7.5
									Baim	2	17.6	30
									Gutum	5	8.1	8.6
									Chirka	6	6.7	11.2
									Chela	27	10	11.3
									Chanda	125	4.2	6.1
									Mola	17	7.8	8.8
									Gulsha	3	6.1	8.9
									Batashi	21	7.7	8.6
									Boicha	7	5	5.3
									Bheda	6	7	8.2
									Sub total	268		
									Icha	1800	4.8	6.9
									Total	2068		
150	96.06.02	154	8.5	5.8	19.00	23.00	4.00	X	Air	8	11.6	13.4
									Bagair	1		6.3
									Gulsha	2	8.3	24.2
									Puti	6	4.7	8.2
									Bheda	2	10.2	14.4
									Batashi	32	8.4	9.3
									Shing	8	5.7	6.6
									Tengra	9	3.9	6.1

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									Golda	16	11.2	17.6
									Mola	38	7.6	8.9
									Foli	2	14.1	17.2
									Gutum	3	6.2	7.3
									Pabda	2	8.7	13.2
									Kholisha	13	7.1	8.1
									Boicha	16	4.8	6.2
									Chela	26	6.9	11.1
									Baim	1		39.2
									Chirka	4	7.2	8.3
									Tengra	13	5.8	7.1
									Taki	2	7.1	14.3
									Jainzza	3	5.1	5.7
									Chanda	207	4.5	6.8
									Dhela	6	4.7	6
									Kotibacha	1		8.7
									Sub total	421		
									Icha	2320	4.2	5.8
									Total	2741		
151	96.06.03	155	8.66	6.63	18.30	22.30	4.00	X	Batashi	14	7.8	8.6
									Mola	15	8.1	89
									Gutum	1		6.3
									Bamosh	1		28.8
									Shing	1		15.2
									Darkina	2	6.3	6.4
									Dhela	4	5.8	7.2
									Chanda	8	4.6	5.4
									Bacha	2	4.2	4.5
									Total	48		
152	96.06.04	156	8.61	6.51	13.00	16.00	3.00	X	Bacha	3	6.9	12.9
									Rani	1		5.9
									Chanda	23	4.2	5.8
									Puti	1		4.1
									Tengra	1		4.5
									Total	29		
153	96.06.05	157	8.65	6.48	9.00	11.00	2.00	X	Bacha	5	7.2	13.1
									Rani	3	5.8	6.2
									Puti	2	4.1	4.8
									Total	10		
154	96.06.06	158	8.68	6.78	17.00	22.30	5.50	X	Air	3	10.3	13.6
									Mola	32	7.3	8.2
									Chapila	13	6	14.1
									Chanda	150	4.2	5.3
									Boicha	3	6.1	6.8
									Gutum	29	6.2	7.8
									Batashi	48	8.1	9.6
									Puti	17	5.2	7.8
									Chela	11	8	11.6
									Shing	3	6.9	10.3
									Golda	11	8	19.3
									Bheda	12	16.9	16.9
									Dhela	2	4.7	6.2
									Bacha	5	11.3	14.4
									Bamosh	1		32.6
									Potka	9	6.2	7.1
									Kaikka	2	16.1	18.9
									Chirka	9	8.4	9.2
									Baim	1		34.3
									Tengra	15	4.9	6.1
									Gulsha	5	7.2	12.3
									Darkina	7	5.6	7.8
									Sub total	388		
									Icha	720	4.5	8.3
									Total	1108		
155	96.06.07	159	8.63	6.84	18.00	22.30	4.50	X	Bacha	3	12.7	
									Gulsha	2	8.2	
									Tengra	19	6.9	
									Baim	1		36.8
									Kaikka	2	17.1	18.3

										Boicha	3	5.3	5.8
										Golda	23	7.3	18.9
										Batashi	19	7.5	9.4
										Kholisha	4	5.9	6.6
										Mola	24	7.1	8.5
										Chanda	78	4.6	5.2
										Shing	16	5.1	7.3
										Gutum	7	6.9	2.6
										Puti	7	4.2	8.1
										Bheda	3	7.9	11.2
										Chapila	7	4.3	14.7
										Taki	1		13.3
										Sub total	219		
										Icha	314	4.8	6.4
										Total	533		
156	96.06.08	160	8.53	6.85	8.00	11.00	3.00		X	Kalibaush	1		4.2
										Foli	2	16.2	18
										Pabda	5	6.2	8.9
										Lachu	2	17.2	19.2
										Guisha	4	7.2	12.6
										Puti	9	6.1	7.3
										Bheda	7	10.4	14.8
										Chela	23	8.3	11.1
										Mola	29	7.2	8.3
										Potka	6	6	7.2
										Shing	5	4.5	5.7
										Rani	2	7.2	8.1
										Chanda	97	5.1	6.3
										Jainzza	3	6.2	6.6
										Total	195		
157	96.06.09	161	8.51	6.86	18.30	23.30	5.00		X	Air	9	10.2	13.1
										Shing	12	5.8	10.4
										Golda	21	6	18
										Chanda	106	4.4	6.1
										Bheda	2	9.6	12.1
										Mola	7	8	9.3
										Chapila	6	6.3	15
										Batashi	11	8.2	9.3
										Gutum	2	6.9	10.3
										Boicha	3	4.8	5.4
										Kholisha	2	5.7	6.3
										Puti	5	4.2	8.6
										Dhela	1		5.2
										Koi bandi	1		6.1
										Tengra	1		6.3
										Potka	1		4.8
										Sub total	190		
										Icha	268	4.8	6.2
										Total	458		
158	96.06.10	162	8.42	6.81	12.30	15.30	3.00		X	Lachu	1		18.1
										Bacha	6	11.3	18.2
										Puti	4	6.2	7.8
										Chanda	11	3.7	5.4
										Total	22		
159	96.06.11	163	8.32	6.77	12.30	15.30	3.00		X	Bailla	2	6.8	7.2
										Gutum	7	5	6.9
										Gilla chanda	1		5.2
										Chanda	28	3.7	5.1
										Puti	8	4.9	5.8
										Bheda	4	6.1	7.3
										Tengra	3	4.5	5.1
										Potka	14	6.7	6.8
										Total	67		
160	96.06.12	164	8.2	6.77	12.00	14.00	2.00		X	Baim	12	11.6	19.5
										Puti	10	4.8	5.8
										Tengra	2	4.6	5.1
										Gila chanda	3	4.8	5.2
										Chela	3	6.1	6.8
										Gutum	5	4.8	6.3

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									Rani	1		6.6
									Bheda	6	4.2	7.6
									Chanda	38	3.3	5.7
									Total	80		
161	96.06.13	165	8.07	6.78	12.00	14.30	2.50	X	Bheda	5	6	8.5
									Puti	10	4.3	5.8
									Chanda	44	3.6	5.1
									Chirka	3	6.5	8.1
									Gutum	7	5	7.2
									Tengra	3	4.6	5.1
									Bailla	1		7.2
									Gilachanda	1		5.3
									Total	74		
162	96.06.14	166	7.96	6.76	15.00	18.00	3.00	X	Puti	11	4.8	8.3
									Chanda	12	4.2	5.6
									Bacha	2	13.8	16.3
									Chirka	1		11.4
									Total	26		
163	96.06.14 a	166	7.96	6.76	18.00	23.00	5.00	X	Bacha	2	8	12.1
									Magur	2	12.1	20.5
									Chapila	40	4.5	9.5
									Puti	12	3.1	5.5
									Chanda	78	4	6.5
									Shing	3	7.5	8.9
									Taki	2	8.2	11.1
									Batashi	5	7.4	8.5
									Boicha	3	4.5	5.1
									Ketchki	2	3.5	3.6
									Tengra	6	6	8.5
									Potka	5	6.1	6.7
									Foli	1		5
									Golda	3	8.5	18.5
									Sub total	164		
									Icha	158	4	7.3
									Total	322		
164	96.06.15	167	7.83	6.72	10.00	14.00	4.00	X	Puti	15	4.6	6
									Chanda	48	2.5	5.9
									Chapila	36	4.1	12.2
									Chela	5	6.5	6.8
									Potka	11	5.6	6.2
									Gutum	3	5.2	6.1
									Bailla	3	4.5	5.1
									Ketchki	5	3.5	3.7
									Kaikka	3	5	5.2
									Sub total	129		
									Icha	4	4.3	4.7
									Total	133		
165	96.06.16	168	7.76	6.66	18.00	23.00	5.00	X	Bacha	4	14.1	18.2
									Matibangra	2	6.3	6.6
									Total	6		
166	96.06.17	169	7.68	6.65	13.00	19.00	6.00	X	Bacha	1		18
									Bailla	2	8.2	11.6
									Chapila	2	4.8	5.55
									Chanda	21	5.3	6.1
									Potka	16	6.6	6.8
									Total	42		
167	96.06.18	170	7.61	6.66	8.00	12.00	4.00	X	Bacha	4	14.8	19
									Baim	2	12.2	13.8
									Shing	2	5.7	16.8
									Puti	3	7.7	8.1
									Rani	1		6.8
									Total	12		
168	96.06.19	171	7.57	6.69	18.00	22.00	4.00	X	Bacha	1		14.3
									Bailla	7	4.6	5
									Chapila	16	4.5	13.6
									Shing	8	7.2	8.2
									Puti	6	3.7	6.3
									Baim	2	6.9	11.3
									Chela	9	5.1	8.2

									Chanda	28	2.7	6.1
									Sub total	77		
									Icha	103	4.2	4.5
									Total	180		
169	96.06.20	172	7.57	6.69	0.00	7.00	7.00	X	Bacha	4	14	17.2
									Lachu	2	12	13.2
									Matibangra	2	6.1	7.3
									Shing	5	7.3	9.3
									Chanda	8	5.5	6.16
									Total	21		
170	96.06.20 a	172	7.62	6.61	13.00	18.00	5.00	X	Bacha	3	16.3	19.7
									Chela	14	5.5	9
									Puti	8	4.5	7.5
									Chanda	7	5	5.9
									Chirka	1		7.2
									Total	33		
171	96.06.20 b	172	7.62	6.61	18.30	23.30	5.00	X	Air	49	6.4	6.6
									Tengra	17	6.2	7.5
									Gulsha	2	7.5	7.9
									Bacha	1		13
									Puti	13	5.1	8.1
									Chapila	4	6.6	9
									Chanda	69	4.9	6.6
									Naptani	1		5.6
									Ketchki	3	4.1	4.5
									Gutum	8	6.4	6.7
									Batashi	2	7.2	7.4
									Shing	7	9.2	10.3
									Bailla	6	4.8	5.7
									Sub total	182		
									Icha	51	5.2	6.2
									Total	233		
172	96.06.21	173	7.62	6.63	0.45	7.45	7.00	X	Air	2	11	21.2
									Kaikka	1		19.6
									Bacha	1		12.1
									Chapila	1		9.1
									Puti	3	5.2	5.9
									Rani	1		10.9
									Tengra	7	9.1	9.8
									Ketchki	4	4.1	4.5
									Gutum	11	6.2	7.6
									Bheda	1		6.5
									Dhela	3	6.7	7.5
									Bailla	2	5.1	9
									Chanda	66	4.3	6.2
									Sub total	103		
									Icha	28	5.5	6.6
									Total	131		
173	96.06.21 a	173	7.59	6.71	8.30	13.30	5.00	X	Bheda	1		10.5
									Chanda	18	3.2	6.1
									Ketchki	3	4	5
									Sub total	22		
									Icha	11	4.9	6.3
									Total	33		
174	96.06.21 b	173	7.56	6.71	14.00	18.30	4.50	x	Chanda	12	4.7	5.6
									Potika	4	5.7	6.1
									Total	16		
175	96.06.21 c	173	7.52	6.72	19.00	23.30	4.50	X	Air	2	6.9	7.1
									Bacha	2	7.7	8.2
									Chapila	9	3.9	10.2
									Chanda	38	2.6	6.1
									Mola	3	6.7	7.8
									Gutum	3	6.9	7.9
									Bailla	1		8.2
									Puti	3	5.2	5.3
									Ketchki	4	3.9	4
									Sub total	65		
									Icha	120	4.3	5.8
									Total	185		

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176	96.06.22	174	7.48	6.7	0.30	8.00	7.50		X	Air	1		7
										Bacha	1		14.6
										Chanda	62	5.3	5.7
										Chapila	8	5.7	8.3
										Ketchki	1		4
										Puti	1		3.8
										Mola	1		6.6
										Gutum	1		5.7
										Sub total	76		
										Icha	40	2.9	6
										Total	116		
177	96.06.22 a	174	7.45	6.72	19.00	8.00	13.00		X	Bacha	2	10.5	22
						(96.06.23)				Lachu	2	4.1	4.2
										Jainzza	2	6.8	6.9
										Naptani	1		5.8
										Gutum	2	7	7.2
										Mola	1		7.3
										Puti	3	3.9	7.6
										Sub total	13		
										Icha	206	4.8	6
										Total	219		
178	96.06.23	175	7.47	6.75	10.00	18.00	8.00		X	Puti	2	4.9	5.6
										Chanda	13	5.4	6.2
										Mola	2	7.1	7.3
										Gutum	1		7.8
										Total	18		
179	96.06.23 a	175	7.45	6.77	19.00	6.30	11.50		X	Baim	2	7.1	8.3
						(96.06.24)				Chapila	62	5.1	10.2
										Dhela	7	5.8	6.9
										Puti	5	4.3	8
										Chanda	47	4.1	6.2
										Kotibacha	4	8	12.7
										Mola	6	6.5	7.8
										Gutum	3	7.5	8.1
										Sub total	136		
										Icha	108	4.8	6.9
										Total	244		
180	96.06.24	176	7.55	6.79	9.00	17.00	8.00		X	Chapila	40	3.7	8.6
										Bailla	2	6.3	7.4
										Gutum	2	6.4	6.8
										Chanda	30	3.5	5.9
										Dhela	1		4.1
										Potka	5		
										Sub total	80		
										Icha	20	3	6.4
										Total	100		
181	96.06.24 a	176	7.55	6.8	21.00	7.00	10.00		X	Bacha	2	9	13.3
						(96.06.25)				Chapila	1		5.9
										Puti	1		5.5
										Chanda	10	3.4	5.6
										Sub total	14		
										Icha	70	3.6	5.8
										Total	84		
182	96.06.25	177	7.56	6.82	9.00	15.00	6.00		X	Bacha	13	13.1	16.5
										Puti	4	4.3	7.2
										Chanda	12	3.2	5.6
										Chela	1		8.1
										Total	30		
183	96.06.25 a	177	7.54	6.83	21.00	8.00	11.00		X	Bacha	1		12.3
										Garua	2	11.5	12.4
										Puti	3	4.3	8.3
										Chapila	8	4.1	7.7
										Dhela	1		3.9
										Kazoli	2	9.3	11.3
										Chanda	11	3.2	5.3
										Gutum	3	5.5	7.8
										Bailla	1		6.4
										Shing	1		6.7
										Mola	7	3.6	7.1

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										Potka	3	5.2	6.3
										Sub total	43		6.2
										Ichha	22	3.1	
										Total	65		11.9
									X	Bacha	12	9.2	9.5
										Chapila	13	5.2	7.8
										Rani	2	7.2	14.7
										Kaikka	1		5.8
										Chanda	44	3.9	6.2
										Bailla	2	5.1	8.2
										Puti	5	3.8	9.7
										Gutum	1		10.1
										Chirka	1		6.5
										Potka	3	6.1	
										Total	84		9.8
										Bacha	1		6.8
									X	Puti	12	5.1	7.2
										Mola	1		7.2
										Chapila	15	4.9	
										Sub total	29		5.6
										Ichha	10	3.1	
										Total	39		6.3
										Chapila	1		9.2
										Chela	12	5.3	5.8
										Bailla	1		6.7
										Gutum	2	5.9	4.2
										Dhela	1		4.8
										Ketchki	1		5.4
										Matibangra	1		8.1
										Puti	2	4.3	6.1
										Chanda	19	4.1	
										Total	40		5.8
										Rui	1		16.4
									X	Golda	1		11.2
										Bacha	4	8.6	8.9
										Chapila	18	6.8	7.6
										Mola	53	4.8	6.1
										Dhela	12	4.9	5.8
										Chanda	78	3.1	10.2
										Chela	5	5.1	14.6
										Kaikka	1		5.1
										Puti	7	4.6	11.6
										Bheda	9	4.8	
										Sub total	189		11.6
										Ichha	35	4.8	
										Total	224		4.7
										Rui	1		13.6
									X	Bacha	2	13.3	9.2
										Chapila	8	4.3	7.8
										Mola	3	3.9	6.1
										Bailla	1		13.6
										Kaikka	1		6.5
										Puti	7	4.2	9
										Rani	1		10
										Chela	3	5.1	5
										Chanda	17	3.1	
										Total	44		16
										Bacha	3	12.6	9
										Chapila	5	4.8	5
										Chanda	18	3.5	6
										Potka	2	5.2	
										Sub total	28		
										Ichha	33	3.8	
										Total	61		
										Bacha	1		
									X	Bailla	4	4.7	
										Gutum	16	3.5	
										Chanda	6	4.7	
										Puti			

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191	96.06.29 a	181	7.4	6.87	20.00	7.00	11.00		X	Total	28		
						(96.06.30)				Air	1		18.3
										Golda	1		18.6
										Bacha	9	10.8	20.2
										Chapila	51	5.8	11.5
										Shing	1		9.3
										Baim	1		9.9
										Puti	1		4.1
										Chela	3	5.4	10.7
										Jainzza	11	6.4	9.1
										Kazoli	17	5.6	8.1
										Gutum	2	6.5	11.1
										Chanda	153	2.9	7.1
										Mola	5	5.7	8.5
										Bailla	1		4.9
										Dhela	1		4.6
										Potka	2	6.1	6.3
										Bamosh	1		38
										Sub total	261		
192	96.06.30	182	7.38	6.89	11.00	16.00	5.00		X	Icha	73	2.6	5.5
										Total	334		
										Bacha	1		15.7
										Chapila	9	4.4	9.3
										Mola	17	4.3	7.4
										Puti	13	4.4	8.1
										Chela	5	9.2	12.1
										Chanda	29	3.9	6.2
										Bailla	2	6.2	7.9
										Bheda	6	6.4	10.1
										Potka	3	5.9	6.3
										Kaikka	1		17.6
										Rani	2	4.3	5.4
										Dhela	3	4	4.6
										Gutum	1		7.2
193	96.06.30 a	182	7.39	6.93	20.00	7.00	11.00		X	Total	92		
						(96.07.01)				Bacha	4	11.3	19.6
										Chapila	3	3.6	12.1
										Rani	1		8.5
										Chanda	18	3.2	5.9
										Gutum	5	6.8	11.3
										Puti	8	3.3	8.2
										Sub total	39		
194	96.07.01	183	7.48	7.11	12.00	17.00	5.00		X	Icha	19	3	5.8
										Total	58		
										Bacha	12	14.1	14.8
										Chapila	122	5.1	6.2
										Mola	235	4.2	7.2
										Dhela	71	4.2	4.5
										Chela	42	9.7	10.3
										Puti	35	3.6	6.1
										Chanda	970	3.9	6.2
										Potka	12	5.8	6.2
										Total	1499		
195	96.07.01 a	183	8.05	7.76	19.00	7.00	12.00		X	Air	127	10.1	30.3
						(96.07.02)				Bagair	42	5.1	5.6
										Golda	71	12.6	16.9
										Gulsha	23	6.5	13.6
										Shing	3	8.8	12.4
										Batashi	229	5.8	8.8
										Dhela	41	3.7	4.7
										Bheda	27	4.9	8.1
										Chapila	880	3.2	9.6
										Mola	780	3.8	8.7
										Gutum	38	5.3	9.9
										Kaikka	43	7.8	15.8
										Chela	169	4.3	9.9
										Chanda	4260	3.1	5.8
										Kazoli	117	5.2	11.7
										Chirka	13	6.9	7.3

										Tengra	94	4.4	6
										Bailla	71	4.4	22
										Puti	267	3.8	9
										Ketchki	70	3.7	4
										Naptani	14	3	4
										Potka	27	6.2	6
										Sub total	7406		
										Icha	1455	3.2	6
196	96.07.02	184	8.09	7.39	10.00	14.00	4.00		X	Total	8861		
										Rui	7	14.7	16
										Air	71	19.7	20.8
										Boal	4	34.3	38
										Bacha	12	10.3	20
										Chela	78	4.5	10
										Bailla	41	5.2	18.8
										Bheda	38	5.6	8.9
										Chapila	146	3.7	10.9
										Mola	248	4.3	6.8
										Chanda	1245	3.2	5.9
										Kazoli	77	5.1	10.8
										Puti	129	3.3	8.2
										Darkina	13	4.2	6.1
										Dhela	75	3.4	5.8
										Napit koi	10	3.2	3.8
										Sub total	2194		
										Icha	859	3.1	5.6
197	96.07.02 a	184	8.38	7.54	23.00	7.00	8.00		X	Total	3053		
						(96.07.03)				Rui	9	11.5	13.2
										Kalibaush	2	15.5	16.2
										Bacha	22	11.2	13.9
										Batashi	79	6.3	8.9
										Baim	28	7	11.3
										Kazoli	79	5.3	11.6
										Dhela	21	4.7	5.8
										Golda	21	12.5	17.3
										Ketchki	73	3.2	4.1
										Chapila	142	6.5	9.2
										Jainzza	70	6.8	6.9
										Chanda	1223	4.1	6.2
										Mola	344	4.6	7.2
										Chela	76	6.5	9.9
										Potka	21	5.5	5.9
										Sub total	2210		
										Icha	1826	3.6	5.6
198	96.07.03	185	8.52	7.62	9.00	17.00	8.00		X	Total	4036		
										Kalibaush	3	19.5	22.3
										Bacha	21	14.7	15.2
										Chela	138	5.4	9.2
										Gutum	11	6.1	6.3
										Dhela	71	4.3	4.7
										Chapila	221	6.2	6.5
										Matibangra	1		5.3
										Puti	71	7.2	7.5
										Chanda	587	4.1	6.2
199	96.07.03 a	185	8.73	7.77	23.00	5.00	6.00		X	Total	1124		
						(96.07.04)				Mrigel	11	27.5	29.5
										Air	18	9.2	11.7
										Bagair	12	5	5.3
										Golda	71	9.7	15.8
										Gulsha	47	6	13.3
										Tengra	218	6.1	8.7
										Foli	11	5.8	6.9
										Chapila	227	6.5	9.8
										Mola	1805	5.9	8.7
										Chanda	3520	2.9	5.6
										Shing	17	7.3	18.6
										Batashi	219	7.7	8.8
										Chela	123	4.7	10.7
										Gutum	37	6.3	9.3

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										Puti	298	3.2	9.6
										Kaikka	6	12.2	17.2
										Dhela	48	5	5.6
										Darkina	19	5.7	5.9
										Naptani	29	5.5	6.5
										Rani	11	6.6	8.5
										Sub total	6747		
										Icha	1216	3.3	6.7
										Total	7963		
200	96.07.04	186	8.87	7.83	13.00	18.00	5.00		X	Lachu	14	11.3	14.4
										Bacha	18	9.2	11.4
										Bheda	73	6.8	10.9
										Rani	24	6.9	8
										Mola	183	4.4	7.1
										Chanda	1064	3.1	6.2
										Bailla	17	5.6	6.7
										Puti	144	3.4	8.7
										Chirka	15	9.7	15
										Ketchki	277	3.8	5.8
										Jainzza	18	7.6	8.8
										Batashi	225	8.3	10.2
										Kaikka	17	19.3	22
										Sub total	2089		
										Icha	1222	3.1	6.2
										Total	3311		
201	96.07.04 a	186	8.93	7.9	22.00	5.00	7.00		X	Kalibaush	7	13.5	16.2
					(96.07.05)					Bacha	23	9.8	18.6
										Chanda	726	4.3	6.2
										Puti	127	4.5	6.5
										Rani	40	7.5	7.7
										Chapila	116	7	12.5
										Sub total	1039		
										Icha	949	3.5	6.9
										Total	1988		
202	96.07.05	187	8.99	8	10.00	16.00	6.00		X	Bacha	13	12.3	16.7
										Chela	72	9.2	10.1
										Mola	116	4.3	7.3
										Chanda	479	3.8	5.9
										Puti	75	4.6	7.9
										Potka	41	5.8	6.2
										Chirka	1		9.7
										Total	797		
203	96.07.05 a	187	9.02	8.08	22.00	6.00	8.00		X	Rui	13	6.3	9.2
					(96.07.06)					Air	89	9.3	26.5
										Golda	77	10.2	16.9
										Bacha	15	11.6	17.1
										Chapila	121	4.2	9.6
										Mola	1812	4	7.5
										Puti	267	3.2	8.2
										Rani	24	4.7	7.9
										Chela	77	6.8	9.9
										Bheda	14	5.1	8.7
										Bailla	63	6.2	7.8
										Kaikka	14	13.6	17.6
										Kazoli	83	10	12.1
										Jainzza	45	4.9	6.2
										Dhela	73	4.2	5.3
										Bamosh	12	26.6	29.7
										Shing	14	10.5	23.6
										Taki	12	12.1	13.6
										Gutum	38	8.1	10.3
										Gulsha	47	8.3	13.4
										Tengra	198	4.6	7.1
										Chanda	2750	4	5.8
										Sub total	5858		
										Icha	1226	3.7	6.2
										Total	7084		
204	96.07.06	188	9.02	8.1	11.00	17.00	6.00		X	Kalibaush	22	13.2	16.5
										Gonia	12	17.5	18.9

									Air	73	12	16.7
									Bacha	23	13.2	14
									Shing	27	11	21.3
									Kaikka	13	14	18.3
									Bailla	42	5.9	7.3
									Bheda	27	9	15.1
									Puti	147	4.3	6.7
									Chela	118	5	11.1
									Dhela	36	3.4	5.1
									Chanda	1171	4	6.8
									Chapila	213	5	9.1
									Batashi	239	7.2	9.2
									Rani	74	6.2	6.8
									Darkina	16	5.2	5.7
									Baim	23	11	14.3
									Naptani	22	7	7.2
									Mola	583	4	7.6
									Potka	74	6.3	7.1
									Total	2955		
205	96.07.06 a	188	9.02	8.11	23.00	5.00	6.00	X	Boal	2	34.3	35.6
						(96.07.07)			Air	53	12.5	17.7
									Bacha	21	15.6	18.8
									Rani	21	4.8	5.1
									Puti	26	4.1	7.8
									Chanda	816	4	5.9
									Chapila	143	4.6	7.2
									Batashi	171	7.3	10.2
									Mola	143	5.2	7.9
									Sub total	1396		
									Icha	1250	4.7	7.8
									Total	2646		
206	96.07.08	190	9.02	8.15	2.00	6.00	4.00	X	Ilish	1		22.4
									Rui	11	4.6	7.2
									Gonia	9	6.3	7.4
									Air	12	15	15.4
									Golda	27	8.8	11.3
									Bacha	11	11.9	17.6
									Tengra	81	8.7	9.4
									Gulsha	22	10.2	11.2
									Bailla	25	5.8	9.8
									Mola	183	6.3	7.4
									Baim	4	9.1	14.1
									Batashi	137	7.8	10.4
									Gilachaki	21	8.2	8.4
									Chapila	85	8.8	10.7
									Shing	4	9.3	12.4
									Rani	16	4.1	6.3
									Napit koi	13	3.3	3.9
									Bamosh	11	21.3	27.6
									Naptani	15	6.2	6.8
									Potka	5	5.3	5.9
									Cheka	5	5.7	5.9
									Sub total	698		
									Icha	217	3.4	6.2
									Total	915		
207	96.07.08 a	190	9.02	8.15	21.00	1.00	4.00	X	Air	11	9.5	10.4
						(96.07.09)			Boal	2	38.9	41.5
									Golda	74	7.2	10.8
									Bacha	12	20.3	21
									Chapila	143	4.2	10.5
									Mola	187	6.2	9.2
									Batashi	86	7.5	10.5
									Dhela	17	5.5	7.1
									Bailla	14	5.1	10
									Chanda	810	6.4	6.7
									Chirka baim	1		12.2
									Puti	23	5.1	5.2
									Chela	22	9.2	9.5
									Rani	12	6.1	6.2

										Tengra	11	4.9	5.7
										Napit koi	3	4.3	4.5
										Gulsha	1		9
										Kaikka	1		22
										Potka	16	5.7	6.1
										Cheka	2	3.3	5.2
										Sub total	1448		
										Icha	842	3.9	6.7
										Total	2290		
208	96.07.09	191	9.01	8.15	13.00	15.00	2.00	X		Kalibaush	1		12.5
										Bacha	2	17	22.5
										Gutum	12	6.2	6.3
										Puti	77	4.5	6.8
										Chanda	183	5.2	5.7
										Rani	11	5.8	6
										Total	286		
209	96.07.10	192	9.01	8.15	4.00	7.00	3.00	X		Bacha	12	13.1	21.3
										Chanda	128	5.1	6.3
										Mola	42	6.2	7.3
										Puti	12	4.1	6.6
										Chapila	23	7.8	14.2
										Sub total	217		
										Icha	223	3.8	6.1
										Total	440		
210	96.07.10 a	192	9	8.15	10.30	13.00	2.50		X	Chirka baim	11	6.7	7.3
										Mola	77	4.3	6.9
										Rani	14	3.8	4.9
										Chanda	212	4.8	6.3
										Potka	11	5.9	6.1
										Total	325		
211	96.07.11	193	9.01	8.15	3.00	7.00	4.00		X	Kalibaush	1		51
										Gonia	7	3.9	4.3
										Air	13	27.2	29.8
										Lachu	12	4.5	5.2
										Bacha	7	11.8	12.2
										Golda	14	9.1	13.5
										Magur	1		14.4
										Shing	11	5.7	5.8
										Pabda	10	10.8	11.2
										Baim	12	9.3	10.7
										Bailla	21	7.6	8
										Ketchki	47	3.6	5.1
										Batashi	122	7.3	10.5
										Chapila	125	6.1	10.8
										Bheda	4	6.2	10.1
										Gulsha	1		10.5
										Dhela	41	3.6	5.7
										Chanda	741	2.8	5.9
										Puti	84	3.6	7.6
										Mola	39	4.3	7.9
										Sub total	1313		
										Icha	243	3.2	6.3
										Total	1556		
212	96.07.11 a	193	9.02	8.15	11.00	14.00	3.00	X		Boal	1		39.3
										Bacha	12	14.6	19.3
										Lachu	7	10.5	12.5
										Chanda	177	4.5	6.3
										Chela	22	8.7	11.7
										Puti	47	4.3	9.1
										Total	265		
213	96.07.11 b	193	9.02	8.15	22.00	1.00	3.00		X	Air	12	17.6	23.5
						(96.07.12)				Bacha	3	11.7	17.6
										Golda	17	12.6	16.1
										Shing	5	9.7	12.7
										Tengra	27	8.3	8.9
										Gulsha	16	9	13.6
										Chapila	37	5.2	10.1
										Kazoli	23	11.3	12.7
										Puti	41	4.8	8.2

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										Chanda	821	4.1	6.4
										Dhela	43	3.7	5.2
										Chirka baim	3	8.6	9.7
										Ketchki	45	4.1	5.1
										Darkina	6	4.2	4.8
										Mola	29	4.3	7.1
										Sub total	1128		
										Icha	829	3.8	6.2
										Total	1957		
214	96.07.13	195	9	8.15	3.00	7.00	4.00		X	Air	44	12.1	26.7
										Bacha	13	16.3	17.8
										Golda	41	11	16.7
										Tengra	42	5.5	6.8
										Gulsha	15	9.9	11.6
										Shing	13	13.1	14.6
										Baim	11	15.5	32.4
										Chapila	73	6.2	10.1
										Mola	177	4.3	7.8
										Chanda	831	3	6.1
										Puti	129	4.1	8.6
										Rani	15	4	7.3
										Chela	43	9	12.6
										Kaikka	12	13.3	19
										Dhela	19	4.4	5
										Darkina	5	4.2	5.4
										Sub total	1483		
										Icha	750	3.1	6.2
										Total	2233		
215	96.07.13 a	195	9	8.15	10.00	13.00	3.00		X	Ilish	2	19.3	22.1
										Air	26	27	28.3
										Bacha	12	8.1	19.2
										Bailla	42	7.1	11.1
										Taki	7	17.6	18
										Mola	410	6.3	7.9
										Chela	138	5.7	9.9
										Dhela	86	4.8	9
										Chapila	144	6.1	16.2
										Kazoli	128	5.3	8.4
										Chanda	874	4.6	5.7
										Shing	12	13	15.2
										Batashi	129	7.6	10.3
										Rani	44	6	6.9
										Potka	19	6.2	7.1
										Sub total	2073		
										Icha	324	4.3	6.4
										Total	2397		
216	96.07.14	196	9	8.45	0.30	5.00	4.50		X	Ilish	1		19.2
										Rui	4	5.6	5.8
										Air	45	26.2	30
										Golda	42	10.9	16.7
										Bacha	11	18.6	20
										Rani	21	4.8	5.2
										Mola	148	6.5	8.2
										Dhela	15	5	8.9
										Batashi	144	7.6	10.5
										Chanda	1290	3.7	6.8
										Chapila	170	4.8	7.6
										Taki	1		10.9
										Bailla	43	5.5	10.4
										Shing	1		12.5
										Kazoli	81	7.5	8.6
										Potka	9	6.2	7.7
										Sub total	2026		
										Icha	1444	4.7	6.8
										Total	3470		
217	96.07.14 a	196	8.96	8.18	18.00	22.00	4.00		X	Bacha	14	18.7	22.1
										Tengra	41	8.8	10.7
										Rani	12	6.8	7.2
										Chanda	78	4.8	6.3

218	96.07.15	197	8.96	8.19	10.00	12.00	2.00	X	Total	145		
									Bacha	8	19	21.7
									Chanda	76	4.7	6.5
									Puti	17	4.1	6.8
									Baim	9	13.8	28.6
									Total	110		
219	96.07.16	198	8.96	8.2	1.00	5.00	4.00	X	Ilish	1		22.3
									Golda	16	8	12.9
									Pabda	7	9.7	10.1
									Batashi	24	7.3	10.2
									Mola	45	6.2	7.8
									Chapila	12	3	7.6
									Bailla	15	6.2	10
									Rani	12	3.2	4.8
									Dhela	7	5	6.4
									Sub total	139		
									Icha	857	4.5	6.2
									Total	996		
220	96.07.16 a	198	9	8.22	13.00	16.00	3.00	X	Tengra	7	8.2	9.6
									Rani	17	6.1	6.8
									Chanda	74	5.2	6.2
									Potka	4	4.1	5.3
									Sub total	102		
									Icha	122	6.1	7
									Total	224		
221	96.07.17	199	9.02	8.23	3.00	6.00	3.00	X	Boal	2	37.4	39.2
									Golda	11	15.6	16.1
									Bailla	13	8.1	16.3
									Chapila	23	7.1	10.3
									Puti	25	4.2	8.2
									Mola	47	6.1	7.7
									Dhela	12	5.2	5.8
									Chanda	247	5.2	6.1
									Total	380		
222	96.07.17 a	199	8.95	8.22	12.30	15.30	3.00	X	Bacha	1		11.3
									Chirka Baim	1		5.9
									Rani	2	4.2	5
									Titputi	3	2.5	3
									Chanda	9	3.8	5.1
									Total	16		
223	96.07.18	200	8.94	8.2	18.00	22.00	4.00	X	Rui	1		17.5
									Boal	2	28.6	31.7
									Bacha	2	13.1	15
									Puti	14	3	3.5
									Chanda	172	3.5	5.1
									Chirka Baim	13	6	7.1
									Sub total	204		
									Icha	177	4.3	4.7
									Total	381		
224	96.07.18 a	200	8.94	8.19	10.00	12.00	2.00	X	Puti	17	2.3	3.5
									Chanda	140	3.7	5.2
									Rani	12	4	5.3
									Chirka Baim	2	6	6.2
									Total	171		
225	96.07.19	201	8.93	8.2	4.00	7.00	3.00	X	Bacha	11	12.5	13.5
									Rani	2	4.5	5.1
									Chanda	16	3.7	5.3
									Sub total	29		
									Icha	25	2.7	5.3
									Total	54		
226	96.07.19 a	201	8.93	8.2	13.00	16.00	3.00	X	Bacha	4	11.9	13
									Chanda	24	3.8	5.1
									Sub total	28		
									Icha	12	4	4.1
									Total	40		
227	96.07.20	202	8.95	8.2	2.00	5.00	3.00	X	Ilish	1		21.1
									Bacha	18	12.1	14.7
									Lachu	3	14.5	18.6
									Rani	12	4.7	5.1

										Shing	11	5.4	5.7
										Puti	23	3.5	4
										Chanda	171	3.2	5.2
										Total	239		
228	96.07.20 a	202	8.95	8.2	12.00	14.00	2.00		X	Puti	15	3.5	4.7
										Dhella	12	3.1	4.1
										Rani	1		4.5
										Chanda	141	3.4	5.2
										Total	169		
229	96.07.21	203	8.95	8.22	19.00	22.30	3.50		X	Kalibaush	2	17.5	18.8
										Bacha	12	13.5	15.1
										Rani	1		4.7
										Puti	15	4	5.1
										Chanda	72	3.7	5
										Sub total	102		
										Icha	77	3.6	5.2
										Total	179		
230	96.07.22	204	8.93	8.22	3.00	6.00	3.00		X	Bacha	12	13	14.6
										Foli	4	16.2	17.5
										Chanda	73	3.5	5.5
										Sub total	89		
										Icha	189	3.8	5.3
										Total	278		
231	96.07.23	205	8.91	8.22	5.00	8.00	3.00		X	Ilish	1		20.1
										Bacha	13	14	15.1
										Rani	11	4.5	4.9
										Puti	25	4	5.1
										Chirka Baim	3	6	7.1
										Chanda	73	3.6	5.3
										Sub total	126		
										Icha	117	3.7	5.2
										Total	243		
232	96.07.24	206	8.92	8.22	21.00	24.00	3.00		X	Kalibaush	1		15.2
										Bacha	12	14	15.2
										Puti	23	4	6.1
										Dhela	12	5.1	5.2
										Shing	2	5.7	6.1
										Chanda	74	3.9	5.5
										Sub total	124		
										Icha	179	3.5	5.2
										Total	303		
233	96.07.24 a	206	8.91	8.22	10.00	12.00	2.00		X	Bacha	1		14.6
										Chanda	8	3.7	5
										Sub total	9		
										Icha	5	3.5	5.1
										Total	14		
234	96.07.25	207	8.91	8.22	7.00	10.00	3.00		X	Bacha	7	14.3	16
										Puti	13	4.1	5
										Rani	12	4.5	5
										Chanda	78	3.7	5.6
										Sub total	110		
										Icha	11	3.6	5.2
										Total	121		
235	96.07.25 a	207	8.94	8.23	17.30	20.30	3.00		X	Boal	2	35.4	37.8
										Bacha	4	14	16.1
										Puti	73	4	5.2
										Shing	2	5.9	6
										Dhela	13	5	5.6
										Chanda	145	3.7	5.5
										Sub total	239		
										Icha	169	3.6	5.2
										Total	408		
236	96.07.26	208	8.96	8.22	14.00	17.00	3.00		X	Bacha	4	17.3	22.4
										Kazoli	13	9.4	10.1
										Total	17		
237	96.07.27	209	8.89	8.22	3.00	7.00	4.00		X	Bacha	13	14.5	18.9
										Golda Chingri	21	13.8	14.6
										Chapila	47	4.3	8.1
										Rani	11	5.8	6.4

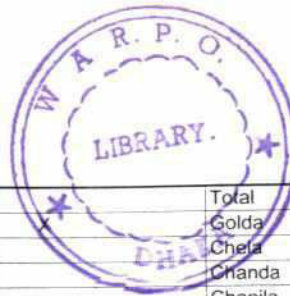
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									Chanda	170	3.6	5.9
									Mola	49	4.4	6.8
									Kazoli	22	9.3	11.4
									Bailla	1		7.4
									Dhela	10	4.1	4.2
									Sub total	344		
									Icha	475	3.3	5.9
									Total	819		
238	96.07.28	210	8.78	8.21	9.00	12.00	3.00	X	Bacha	11	13.6	15.8
									Shing	7	9.7	11.4
									Kazoli	23	9.6	11.1
									Jainzza	14	4.7	7.1
									Chela	22	9.9	10.3
									Chapila	43	4.4	8
									Bheda	7	4.9	5.6
									Chanda	172	4.1	5.4
									Total	299		
239	96.07.28 a	210	8.74	8.21	22.00	1.00	3.00	X	Bacha	11	14.7	15.2
									Jainzza	13	4.7	5.4
									Sub total	24		
									Icha	47	3.3	5.4
									Total	71		
240	96.07.29	211	8.72	8.21	12.00	15.30	3.50	X	Bacha	10	13.6	14.9
									Kazoli	7	9.8	11.2
									Chanda	33	3.6	5.1
									Puti	11	4.7	5.8
									Total	61		
241	96.07.29 a	211	8.71	8.21	22.00	0.30	2.50	X	Bacha	1		13.2
									Lachu	7	12.2	14.2
									Golda Chingri	2	15.6	16.1
									Rani	1		7.1
									Chapila	13	4.3	7.2
									Bailla	1		7.3
									Batashi	4	6.8	8.1
									Chanda	4	3.6	5.3
									Sub total	33		
									Icha	15	3.2	5.9
									Total	48		
242	96.07.30	212	8.69	8.21	11.00	13.00	2.00	X	Bacha	14	13	16.1
									Golda Chingri	1		15.1
									Kazoli	1		12
									Shing	1		12.3
									Bailla	1		7.4
									Chapila	12	3.7	4.3
									Kaikka	2	5.9	7.6
									Puti	1		6.2
									Dhela	18	3.9	5.1
									Chanda	45	3.8	6.1
									Total	96		
243	96.07.31	213	8.78	8.23	20.00	24.00	4.00	X	Bacha	11	19.7	21.2
									Bailla	2	14.1	15
									Chapila	13	8.3	12.2
									Chanda	78	6.2	6.8
									Rani	14	6.3	7.1
									Sub total	118		
									Icha	177	4.6	5.3
									Total	295		
244	96.08.01	214	8.78	8.23	10.00	12.00	2.00	X	Bacha	7	18.6	22
									Rani	11	6.6	7.6
									Bata	1		13.4
									Chanda	36	4.8	6.6
									Total	55		
245	96.08.01 a	214	8.78	8.24	20.00	22.30	2.50	X	Bacha	4	17.2	18.7
									Lachu	3	17	21.9
									Kazoli	14	9.7	10.2
									Golda	3	11	17.6
									Total	24		
246	96.08.02	215	8.75	8.25	3.00	7.00	4.00	X	Kalibaush	2	17.3	18.1
									Bacha	7	16.5	18

									Lachu	9	13.5	14.7
									Golda	43	8	11.6
									Rani	16	5.7	7.3
									Kazoli	21	6.7	7.8
									Bailla	12	9	16.4
									Chanda	83	4.7	6.3
									Sub total	193		
									Icha	119	4.8	6.6
									Total	312		
247	96.08.02 a	215	8.74	8.25	14.00	16.00	2.00	X	Bacha	9	19	23.1
									Bata	1		16.2
									Lachu	2	8	11.2
									Total	12		
248	96.08.03	216	8.72	8.27	7.00	10.30	3.50	X	Kalibaush	1		16.2
									Bacha	2	15	19.3
									Lachu	1		20.1
									Golda	1		12.2
									Chanda	12	6	6.5
									Total	17		
249	96.08.03 a	216	8.65	8.27	19.00	22.00	3.00	X	Foli	1		21.3
									Bacha	3	17	21.1
									Golda	1		15.2
									Rani	1		6.8
									Kazoli	15	7.2	8.1
									Total	21		
250	96.08.04	217	8.62	8.29	2.00	5.30	3.50	X	Bacha	7	18.1	21.3
									Golda	2	14.3	16.1
									Kazoli	15	10.1	10.4
									Chanda	26	5.5	6.2
									Total	50		
251	96.08.05	218	8.63	8.38	18.30	22.00	3.50	X	Bacha	4	10.1	16.3
									Bata	3	4.3	7.9
									Lachu	1		10.3
									Mola	13	4.6	6.8
									Shing	1		9.7
									Chanda	27	3.7	5.3
									Sub total	49		
									Icha	9	3.2	5.4
									Total	58		
252	96.08.06	219	8.63	8.38	2.00	6.00	4.00	X	Chapila	16	4	5.9
									Dhela	7	4.3	6.2
									Bailla	1		6.2
									Chanda	14	3.9	5.9
									Sub total	38		
									Icha	13	3.7	4.7
									Total	51		
253	96.08.07	220	8.59	8.38	9.00	13.00	4.00	X	Chela	13	5	6.1
									Mola	12	4.6	4.8
									Puti	2	4	4.2
									Dhela	3	4.3	5.6
									Total	30		
254	96.08.08	221	8.46	8.36	17.00	20.00	3.00	X	Bacha	4	14.7	16.5
									Chela	4	6.7	9.3
									Mola	6	4.3	6.4
									Dhela	3	4	5.1
									Chanda	15	3.4	5.2
									Bailla	1		6.8
									Gutum	1		7.2
									Sub total	34		
									Icha	7	3.3	5.7
									Total	41		
255	96.08.09	222	8.4	8.35	18.00	22.00	4.00	X	Chela	3	6	7.6
									Dhela	5	3.8	5.2
									Mola	12	4.3	6.3
									Chanda	16	3.7	5.7
									Sub total	36		
									Icha	6	3.5	5.8
									Total	42		
256	96.08.11	224	8.33	8.31	17.00	20.30	3.50	X	Kazoli	16	7.6	11.4

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									Gulsha	1		13.7
									Chela	6	4.7	12
									Mola	25	4.7	8.1
									Dhela	3	5	5.5
									Lachu	1		6.9
									Baim	1		11.7
									Bailla	2	4.9	10.6
									Bheda	1		5.1
									Chanda	47	2.1	7.4
									Taki	1		10.7
									Sub total	104		
									Icha	5	2.7	6.7
									Total	109		
257	96.08.12	225	8.34	8.31	2.30	6.30	4.00	X	Bailla	3	5.4	13.2
									Taki	1		16.1
									Kazoli	15	7.3	12
									Mola	13	4.5	7.8
									Tengra	4	4.9	6.2
									Sub total	36		
									Icha	13	3	6.2
									Total	49		
258	96.08.13	226	8.44	8.31	23.30	2.00	3.50	X	Bacha	4	17.3	21.9
									Gutum	1		7.3
									Dhela	5	4	5.8
									Chanda	15	3.2	5.3
									Sub total	25		
									Icha	19	3	5.6
									Total	44		
259	96.08.14	227	8.46	8.31	11.00	13.00	2.00	X	Bacha	1		21.9
									Chapila	3	4.2	7
									Chela	11	7.8	8.4
									Gutum	1		7.2
									Puti	18	4	5
									Rani	1		6.1
									Chanda	14	3.4	5.8
									Baim	1		13.7
									Total	50		
260	96.08.16	229	8.51	8.32	3.00	6.30	3.50	X	Bacha	2	15.6	19.1
									Bailla	1		9.1
									Dhela	5	4	6.1
									Chanda	19	3.1	5.7
									Sub total	27		
									Icha	40	3	5.3
									Total	67		
261	96.08.16 a	229	8.53	8.33	16.30	20.00	3.50	X	Chela	15	6	8.1
									Dhela	2	4	4.3
									Mola	5	4.1	5.9
									Bailla	1		7.1
									Gutum	1		6.7
									Puti	3	4.6	7.8
									Chanda	19	3.8	5.7
									Total	46		
262	96.08.18	231	8.76	8.45	21.00	24.00	3.00	X	Bacha	4	18.6	22.1
									Mola	4	4.7	7
									Dhela	4	3.6	6
									Golda	2	9.3	11.1
									Bailla	1		5.9
									Gutum	1		7
									Chanda	18	3.1	5.8
									Sub total	34		
									Icha	25	3	6
									Total	59		
263	96.08.20	233	8.8	8.48	16.30	20.30	4.00	X	Bacha	4	19.2	21.6
									Bailla	1		7.2
									Gutum	2	6.4	7.3
									Dhela	7	3.9	4.9
									Chanda	41	3	6.2
									Sub total	55		
									Icha	70	3	5.8



264	96.08.21	234	8.81	8.5	2.30	5.00	2.50	X	Total	125		
									Golda	1		11.6
									Chela	13	6.4	7.8
									Chanda	15	3.7	6.2
									Chapila	1		8.1
									Sub total	30		
									Icha	7	2.9	5.8
									Total	37		
265	96.08.21 a	234	8.82	8.51	9.00	12.00	3.00	X	Golda	1		13.6
									Puti	12	5.7	8.3
									Chanda	12	4.7	5.4
									Dhela	6	4.5	6.1
									Total	31		
266	96.08.22	235	8.82	8.52	11.00	14.30	3.50	X	Bacha	1		19.4
									Chapila	1		7.1
									Puti	2	4.7	6.2
									Chanda	15	4.9	5.2
									Ketchki	3	4.3	4.9
									Total	22		
267	96.08.24	237	8.87	8.49	20.00	23.00	3.00	X	Golda	1		16.5
									Kazoli	12	6.5	7.8
									Mola	11	4.5	5.7
									Puti	3	4.8	5.6
									Chanda	19	5.1	6.2
									Sub total	46		
									Icha	6	5	8.3
									Total	52		
268	96.08.25	238	8.87	8.48	3.00	5.30	2.50	X	Bheda	1		11.3
									Bailla	2	8.1	10
									Chapila	2	6.6	7.2
									Gutum	1		7.3
									Puti	3	4.8	7
									Total	9		
269	96.08.27	240	8.81	8.45	19.00	22.30	3.00	X	Bacha	4	18.6	19.3
									Chapila	3	6.1	6.4
									Puti	3	5.7	6.1
									Mola	14	6.5	7.2
									Gutum	2	8	8.4
									Sub total	26		
									Icha	17	5.9	8.2
									Total	43		
270	96.08.28	241	8.77	8.43	17.00	20.00	3.00	X	Bacha	4	18.1	23.6
									Kazoli	18	7.3	8.2
									Mola	12	6.2	6.8
									Chanda	17	5.2	5.9
									Total	51		
271	96.08.30	243	8.73	8.48	13.00	16.30	3.50	X	Bacha	4	16.4	17.7
									Golda	1		13.6
									Kazoli	3	6.8	7.3
									Puti	2	4.7	5.4
									Chela	14	5.2	6.7
									Chanda	17	6	6.8
									Total	41		
272	96.08.31	244	8.69	8.49	9.00	12.00	3.00	X	Golda	1		18.6
									Bacha	2	16.4	21.3
									Chanda	16	4.6	5.8
									Chela	12	5.1	6.5
									Total	31		
273	96.09.01	245	8.66	8.48	21.00	24.00	3.00	X	Bacha	4	15.4	16.2
									Chela	6	5.1	6.2
									Gutum	2	5.5	5.7
									Bailla	2	9	11.2
									Chanda	19	4.4	5.3
									Sub total	33		
									Icha	17	7.1	9.2
									Total	50		
274	96.09.03	247	8.63	8.44	19.00	22.00	3.00	X	Bacha	2	12.8	13.2
									Chanda	17	4.3	5.6
									Mola	14	5.8	7.1

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										Dhela	3	4.6	5.4
										Sub total	36		
										Icha	4	5.2	7.7
										Total	40		
275	96.09.04	248	8.62	8.43	3.00	6.00	3.00	X		Bacha	1		13.8
										Mola	4	6.4	7.3
										Chela	3	6	6.4
										Dhela	2	5.1	5.5
										Chanda	16	5.1	6.2
										Total	26		
276	96.09.05	249	8.57	8.43	3.00	6.00	3.00	X		Bacha	1		18.7
										Dhela	4	4	5.6
										Chanda	15	3.7	5.8
										Sub total	20		
										Icha	16	3.4	5.9
										Total	36		
277	96.09.05 a	249	8.56	8.42	13.00	16.00	3.00	X		Shing	1		8.3
										Dhela	11	3.8	4.6
										Chanda	23	4	5.3
										Total	35		
278	96.09.07	251	8.57	8.45	3.30	6.30	3.00	X		Bacha	7		18
										Dhela	3	4	5.1
										Chanda	12	4	4.6
										Sub total	22		
										Icha	13	3.8	5.1
										Total	35		
279	96.09.07 a	251	8.57	8.45	18.30	21.30	3.00	X		Shing	1		8
										Dhela	3	4	5
										Chanda	23	4	4.6
										Total	27		
280	96.09.09	253	8.5	8.44	9.00	12.30	3.50	X		Bacha	1		17.6
										Puti	3	4.3	6.7
										Chela	9	6.4	9.8
										Mola	10	4.6	6.9
										Taki	1		7.1
										Chanda	18	4.1	5.6
										Dhela	3	3.9	5.6
										Total	45		
281	96.09.10	254	8.4	8.44	18.00	22.30	4.50	X		Chirka Baim	7	10.7	12.5
										Chela	31	8	11.7
										Mola	29	4.2	6.4
										Shing	1		10.4
										Gutum	1		8.1
										Bailla	1		6.3
										Dhela	1		4.4
										Potka	1		5.8
										Sub total	72		
										Icha	19	3.9	6
										Total	91		
282	96.09.11	255	8.34	8.43	15.00	18.30	3.50	X		Mola	11	4.2	7.1
										Rani	2	6.1	6.5
										Bacha	1		16.7
										Bailla	1		6.3
										Dhela	1		4.3
										Chirka Baim	1		10.1
										Chanda	19	4.3	4.6
										Total	36		
283	96.09.12	256	8.27	8.43	11.30	14.30	3.00	X		Bacha	4	17.2	18.3
										Puti	2	5	6.7
										Mola	19	4	6.8
										Dhela	2	4.3	5.1
										Chirka Baim	1		9.1
										Potka	2	5.4	5.6
										Total	30		
284	96.09.13	257	8.17	8.41	2.30	5.30	3.00	X		Bailla	1		6.2
										Taki	2	7.3	7.6
										Mola	19	3.4	5.7
										Chirka Baim	5	8	10.9
										Chanda	23	4.1	6.1

									Dhela	4	4.6	5.9
									Sub total	54		
									Icha	19	4	5.5
									Total	73		
285	96.09.14	258	8.08	8.38	18.30	21.30	2.50	X	Bacha	4	13.9	14.1
									Mola	21	4.5	6.8
									Puti	13	4.2	5.5
									Baim	7	8.9	11.6
									Rani	9	4.2	8.6
									Potka	11	2.8	6.1
									Dhela	8	5.7	6.3
									Chanda	29	5.1	6.2
									Total	102		
286	96.09.16	260	7.89	8.33	15.30	18.00	2.50	X	Bacha	1		18.2
									Mola	23	5.1	8.2
									Chanda	26	4.2	6.1
									Taki	1		14.7
									Puti	19	4.8	6.7
									Baim	9	10.2	17.7
									Rani	3	5.8	6.8
									Potka	8	4.3	6.2
									Chapila	13	8.3	16.6
									Kaikka	2	11.1	13.5
									Dhela	4	5.1	7.3
									Total	109		
287	96.09.17	261	7.84	8.32	4.00	7.30	3.50	X	Puti	7	6.8	8.3
									Mola	18	5.2	8.1
									Chanda	16	4.3	5.6
									Potka	8	3.2	5.7
									Chapila	3	8.2	11.3
									Dhela	7	5.8	6.2
									Darkina	2	8.2	10.1
									Shing	4	10.2	16.3
									Baim	8	12.4	12.6
									Sub total	73		
									Icha	4	6.1	6.8
									Total	77		
288	96.09.19	263	7.8	8.35	17.00	21.00	4.00	X	Puti	7	4.8	6.2
									Mola	23	5.1	7.7
									Dhela	8	6.5	6.9
									Rani	6	4.8	8.3
									Baim	9	11.9	17.6
									Potka	3	5.6	6.4
									Kholisha	4	7.7	8.9
									Taki	2	12.3	14.1
									Shing	8	10.3	17.2
									Chanda	21	5.2	5.8
									Gutum	2	7.6	7.8
									Total	93		
289	96.09.20	264	7.76	8.86	3.00	7.00	4.00	X	Golda	1		16.8
									Mola	41	7.1	8.6
									Shing	6	11.2	14.3
									Baim	7	10.5	15.5
									Darkina	3	6.6	7.8
									Puti	9	5.9	7.5
									Rani	3	4.7	6.8
									Chanda	21	4.5	5.9
									Total	91		
290	96.09.21	265	7.78	8.36	1.00	5.00	4.00	X	Puti	12	4.8	6.2
									Mola	23	5.2	9.3
									Chanda	25	4.2	6.9
									Bailla	2	4.1	5.3
									Rani	6	5.5	7.6
									Baim	3	10.4	14.3
									Shing	7	12.3	15.6
									Gutum	2	8.9	10.6
									Dhela	4	5.3	7.2
									Potka	3	6.6	6.8
									Total	87		

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291	96.09.22	266	7.97	8.43	5.00	7.30	2.50	X	Kholisha	7	6.2	10.8
									Mola	55	5.2	8.5
									Puti	14	6.6	6.9
									Baim	8	8.8	14.7
									Shing	9	11.4	17.8
									Gutum	7	6.8	8.8
									Chanda	14	5.2	6.9
									Potka	3	4.1	9.1
									Dhela	5	6.2	8.4
									Chapila	5	4.1	11.3
									Darkina	4	6	10.2
									Total	131		
292	96.09.23	267	8.08	8.48	18.3	21.3	3	X	Bacha	1		14.6
									Chela	1		7.8
									Dhela	2	4.7	5.1
									Chirka baim	1		9.1
									Mola	2	4.2	7.6
									Sub total	7		
									Icha	3	3.1	5.3
									Total	10		
293	96.09.24	268	8.08	8.46	11	14	3	X	Chela	1		12.1
									Bheda	2	9.2	10.1
									Kaikka	22	10	17.3
									Puti	1		4.3
									Mola	33	4.5	7.1
									Rani	1		4.6
									Total	60		
294	96.09.25	269	8.05	8.47	0.3	4.3	4	X	Bacha	1		14.9
									Rani	1		8.1
									Shing	1		9.3
									Baim	1		14.2
									Chela	2	7.7	9.1
									chanda	105	3.5	6.2
									Sub total	111		
									Icha	3	3.4	5.9
									Total	114		
295	96.09.25 a	269	8.02	8.46	15	18	3	X	Lachu	1		12.8
									Chela	1		11.1
									Mola	9	4.1	7.1
									Tengra	1		8.1
									Kaikka	3	10.7	17.8
									Potka	3	4.5	6.8
									Total	18		
296	96.09.27	271	7.96	8.43	10.3	13.3	3	X	Bacha	1		14.6
									Chela	1		9.9
									Rani	2	4.8	6.2
									Puti	1		5.1
									Chanda	185	2.8	7.9
									Potka	3	4.7	6.8
									Total	193		
297	96.09.27 a	271	7.97	8.43	20	23	3	X	Chela	1		10.1
									Mola	2	5	5.6
									Chirkabaim	1		10.7
									kaikka	1		12.8
									Shing	1		12.3
									Bailla	2	6	6.4
									Dhela	3	4	4.3
									Chanda	96	3.6	6.2
									Sub total	107		
									Icha	7	4	5.9
									Total	114		
298	96.09.29	273	7.98	8.41	4	7	3	X	Chela	1		12.6
									Bacha	1		15.1
									Rani	2	5.7	6.1
									Tengra	1		7.7
									Chanda	147	2.9	6.9
									Sub total	152		
									Icha	11	3.4	6.3
									Total	163		

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299	96.09.29 a	273	7.96	8.39	15	18	3	X		Lachu	1		13.1
										Puti	4	4.9	8.1
										Shing	1		9.8
										Taki	2	6.8	9.2
										Chanda	78	3.1	6.3
										Potka	2	5	5.8
										Total	88		
300	96.10.01	275	7.95	8.35	9	11	2	X		Bacha	2	18.2	22.7
										Mola	29	6.2	7.5
										Puti	7	5.1	6.2
										Dhela	11	5.6	9.1
										Chanda	45	4.3	5.7
										Total	94		
301	96.10.03	277	7.79	8.26	19	21.3	2.5	X		Shing	4	11.3	17.2
										Mola	7	5.5	6.8
										Chela	2	6.1	6.3
										Tengra	1		10.2
										Puti	6	5.6	8.4
										Baim	4	8.8	12.6
										Chanda	22	4.8	5.5
										Total	46		
302	96.10.05	279	7.76	8.23	3	6	3	X		Puti	5	6.3	8.5
										Shing	5	11.3	15.2
										Chela	4	3.8	5.7
										Dhela	7	5.7	6.2
										Mola	17	6.3	7.7
										Baim	2	11.6	13.2
										Chanda	14	3.8	5.7
										Sub total	54		
										Icha	18	6.1	7.5
										Total	72		
303	96.10.06	280	7.94	8.27	7	9	2	X		Mola	2	4.9	6.2
										Chanda	11	3.7	6.5
										Sub total	13		
										Icha	3	4.2	5
										Total	16		
304	96.10.08	282	8.03	8.28	15	17	2	X		Bacha	1		16.4
										Mola	4	4.2	6.1
										Chanda	12	3.1	5.3
										Total	17		
305	96.10.09	283	7.95	8.25	17.3	19.3	2	X		Rani	1		7.8
										Chanda	4	4	5.4
										Sub total	5		
										Icha	2	4	4.2
										Total	7		
306	96.10.11	285	7.85	8.2	9	11	2	X		Mola	3	4	6.2
										Rani	1		5.9
										Dhela	1		4.7
										Chanda	7	3.9	5.7
										Total	12		
307	96.10.13	287	7.62	8.1	22	24	2	X		Dhela	2	4.1	4.3
										Taki	1		6.9
										Chanda	7	4	5.2
										Sub total	10		
										Icha	9	4	6.2
										Total	19		
308	96.10.15	289	7.51	8.07	0.3	2.3	2	X		Dhela	1		4.7
										Chirkabaim	1		7.6
										Chanda	3	3.9	5.8
										Sub total	5		
										Icha	7	3	5.8
										Total	12		
309	96.10.18	292	7.08	7.9	10	12.3	2.5	X		Puti	12	4.9	7.6
										Mola	7	4.1	5.5
										Chanda	23	3.8	5.7
										Total	42		
310	96.10.20	294	6.97	7.85	8	10	2	X		Mola	8	4	6.9
										Rani	2	6.7	7.2
										Chapila	3	5.2	6.9

										Chanda	19	4	5.7
										Total	32		
311	96.10.21	295	6.88	7.76	17.3	20	2.5		X	Taki	1		11.2
										Bailla	2	7.8	10.1
										Chanda	18	3.8	5.2
										Sub total	21		
										Icha	7	4	5.9
										Total	28		
312	96.10.23	297	6.54	7.63	7	9	2		X	Gutum	3	7	8.6
										Puti	5	5	7.1
										Chanda	14	4.2	6.3
										Total	22		
313	96.10.31	305	6.64	7.35	9.3	12	3		X	Puti	5	4.3	7.6
										Foli	1		19.7
										Mola	4	4.6	7.2
										Chanda	15	4	6.6
										Total	25		
314	96.11.02	307	6.72	7.24	18	20.3	2.5		X	Puti	1		6.7
										Chanda	18	3.2	6.5
										Chela	7	5.5	7.8
										Mola	8	4.2	8
										Gutum	2	8	9.1
										Sub total	36		
										Icha	4	4	11.2
										Total	40		
315	96.11.04	309	6.7	7.16	17.3	22.3	5		X	Mrigel	1		23
										Chapila	12	6.3	11.2
										Chanda	58	5.2	3.8
										Chela	13	10.8	11.6
										Dhela	1		10.2
										Puti	17	3.7	9.3
										Rani	1		4.2
										Gutum	1		6.5
										Shing	1		10.8
										Sub total	105		
										Icha	36	3.1	5.8
										Total	141		
316	96.11.05	310	6.62	7.11	17.3	22.15	4.75		X	Lachu	1		10.6
										Chapila	2	9	9.5
										Chela	2	10.1	10.6
										Chanda	58	4.7	6.5
										Puti	17	3.2	3.5
										Dhela	3	4.7	7.8
										Sub total	83		
										Icha	25	2.5	4.7
										Total	108		
(Sampling done in riverside chamber to observe migration from river to haor, due to flooding of country-side chamber)													
177s	96.06.22s	174	7.45	6.72	8.30	18.00	9.50		X	Bacha	22	13.2	18.7
										Chanda	49	4.8	5.6
										Gutum	1		7.4
										Total	72		
254s	96.08.08s	221	8.46	8.36	17.00	20.00	3.00		X	Boal	1		48.7
										Bacha	1		16.5
										Chela	4	6.7	9.3
										Mola	16	4.3	6.4
										Dhela	13	4	5.1
										Chanda	23	3.4	5.2
										Bailla	1		6.8
										Gutum	1		7.2
										Sub total	60		
										Icha	57	3.3	5.7
										Total	117		
255s	96.08.10s	223	8.37	8.34	11.00	14.00	3.00		X	Bacha	11	14.1	14.7
										Boal	1		56.2
										Kazoli	22	9	12.3
										Mola	46	4.3	6.9
										Puti	11	4.2	8
										Rani	23	4	5.6

									Bheda	1		7.8
									Shing	1		11.9
									Chela	13	7.2	11.6
									Chanda	40	3.1	6.1
									Total	158		
255ss	96.08.10ss	223	8.35	8.32	17.00	20.00	3.00	X	Bacha	12	9	12.3
									Chela	17	5.5	11
									Chapila	12	4.2	7.9
									Mola	77	4.9	7.8
									Chanda	45	2.9	5.9
									Sub total	163		
									Icha	46	3	6
									Total	209		
257s	96.08.12s	225	8.36	8.3	21.30	24.00	2.50	X	Kalibaush	2	17.4	19.5
									Kazoli	13	7.6	12.1
									Chapila	29	4.3	7.9
									Mola	21	4.4	7.4
									Rani	13	4	5.3
									Shing	1		11.6
									Bheda	14	5	6.2
									Bailla	1		11.2
									Gulsha	13	9.8	10.5
									Chela	18	6.9	11.3
									Chanda	77	3	6.2
									Puti	17	3.6	8
									Sub total	219		
									Icha	144	3.1	5.8
									Total	363		
258s	96.08.13s	226	8.4	8.31	6.00	9.00	3.00	X	Bacha	11	20.7	20.9
									Puti	77	4.1	5.9
									Chela	15	6.2	8.1
									Gutum	1		7.9
									Dhela	16	4.3	6.1
									Chanda	47	3.6	6.1
									Total	167		
259s	96.08.14s	227	8.48	8.3	17.00	22.00	5.00	X	Kalibaush	1		19.3
									Golda	1		13
									Bacha	12	17	20.7
									Bheda	1		8.2
									Shing	12	11.1	13.2
									Mola	77	5	6.7
									Dhela	15	3.7	5.1
									Gutum	1		8.2
									Chela	24	7.2	9.9
									Rani	1		6.1
									Chanda	37	3.3	5.8
									Sub total	182		
									Icha	77	3	6
									Total	259		
259ss	96.08.15ss	228	8.49	8.31	9.00	11.00	2.00	X	Bacha	1		18.9
									Chela	30	7.3	10
									Gulsha	1		11.7
									Puti	22	4.2	4.3
									Chanda	84	3	5.2
									Gutum	1		7
									Dhela	12	4	4.3
									Mola	43	4.1	5.5
									Total	194		
261s	96.08.17s	230	8.59	8.34	2.00	5.00	3.00	X	Kalibaush	7	12.4	12.9
									Bacha	1		19.2
									Bheda	1		7.8
									Shing	1		11.9
									Chela	42	7.5	8.1
									Mola	43	4.2	5.6
									Sub total	95		
									Icha	72	3.7	4.4
									Total	167		
261ss	96.08.17ss	230	8.67	8.42	23.00	5.00	6.00	X	Bacha	17	18.8	20.6
									Golda	1		13.2

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									Chapila	16	4	7.9
									Shing	2	11.5	11.6
									Bheda	1		8.1
									Dhela	45	3.7	5.8
									Bailla	1		8.3
									Gutum	12	6.2	7.1
									Chanda	72	3.4	5.7
									Sub total	167		
									Icha	23	3	5.4
262s	96.08.19s	232	8.78	8.47	17.00	20.30	3.50	X	Total	190		
									Kalibaush	1		12.9
									Bacha	13	17	21.5
									Golda	13	15	16.6
									Chapila	17	5	7.8
									Mola	48	4.2	6.8
									Dhela	13	3.6	5.1
									Bailla	1		8.2
									Bheda	1		7.3
									Gutum	13	6.9	8.3
									Shing	1		13.4
									Chela	60	7	12.1
									Ketchki	20	4.5	4.6
									Chanda	190	3.1	5.6
									Sub total	391		
									Icha	145	3	6
									Total	536		
266s	96.08.23s	236	8.87	8.51	8.00	10.30	2.50	X	Bacha	15	17.6	19.3
									Chela	13	6	6.7
									Chapila	11	5.3	5.4
									Gutum	1		5.9
									Puti	10	4.8	5.5
									Chanda	144	4.6	5.8
									Kazoli	12	6.7	7.2
									Total	206		
266ss	96.08.23ss	236	8.87	8.51	13.30	16.00	2.50	X	Boal	1		53.7
									Puti	23	5.6	7.2
									Chela	42	6	6.7
									Mola	83	5.7	6.3
									Bailla	1		6.2
									Total	150		
268s	96.08.26s	239	8.85	8.46	18.30	21.30	3.00	X	Chela	17	4.8	6.7
									Rani	1		8.8
									Chapila	43	4.7	5.5
									Chirka Baim	1		8.9
									Puti	32	5.1	5.3
									Chanda	36	5.4	6
									Total	130		
270s	96.08.29s	242	8.73	8.43	7.00	11.00	4.00	X	Rui	2	28.3	28.7
									Puti	43	4.8	6.1
									Mola	25	6.3	6.7
									Chanda	40	4.8	5
									Chela	16	4.2	7.2
									Total	126		
273s	96.09.02s	246	8.64	8.46	9.00	12.30	3.50	X	Puti	12	4.3	6
									Chela	14	5.1	6.3
									Bailla	2	9	13.2
									Dhela	13	6.1	6.3
									Chanda	88	4.7	5.8
									Total	129		
275s	96.09.04s	248	8.6	8.43	15.00	18.00	3.00	X	Puti	11	5.6	6.8
									Dhela	43	4.3	5.4
									Chanda	42	3.6	5.2
									Total	96		
277s	96.09.06s	250	8.56	8.42	3.00	6.00	3.00	X	Kalibaush	1		23.5
									Bacha	1		17.9
									Golda	4	13.8	14.3
									Gutum	1		7.2
									Dhela	13	4.1	5.3
									Chanda	85	3.9	5.4

									Sub total	105		
									Icha	72	3.6	4.9
									Total	177		
277ss	96.09.06ss	250	8.57	8.41	17.00	20.00	3.00	X	Chela	11	7.2	7.8
									Dhela	14	4.3	5.7
									Bailla	1		6.4
									Chanda	83	3.7	4.9
									Total	109		
279s	96.09.08s	252	8.57	8.45	2.00	5.00	3.00	X	Dhela	4	4.2	5.3
									Chanda	43	4	4.7
									Sub total	47		
									Icha	75	3.5	4.6
									Total	122		
282s	96.09.11s	255	8.37	8.43	4.00	7.30	3.50	X	Foli	4	17.3	19.2
									Bheda	11	5.7	6.9
									Mola	29	4	6.6
									Dhela	1		4.7
									Shing	1		12.3
									Kaikka	1		15.2
									Chirka Baim	17	8	11.4
									Chanda	82	3.8	6.1
									Napitkoi	1		4.5
									Sub total	147		
									Icha	177	4	6.2
									Total	324		
284s	96.09.13s	257	8.18	8.41	12.30	15.30	3.00	X	Rani	14	4.7	
									Mola	27	4.6	
									Chela	1		8.3
									Dhela	12	4.3	5.1
									Puti	43	4.3	6.9
									Chirka Baim	1		8.1
									Shing	1		7.9
									Total	99		
285s	96.09.15s	259	8.04	8.37	10.00	12.30	2.50	X	Mrigel	1		44
									Mola	143	3.8	6.4
									Bailla	13	6	9.2
									Taki	1		13.4
									Baim	18	6.8	14.4
									Gutum	13	6.6	8.6
									Shing	12	7.6	12.9
									Chapila	13	6.8	15
									Kaikka	2	15.6	20.1
									Dhela	11	5.8	8.1
									Puti	46	4.7	5.6
									Rani	14	6.3	7.7
									Total	287		
236s	96.09.16s	260	7.94	8.34	3.00	7.00	4.00	X	Mola	83	3.1	8.3
									Chanda	156	4.8	7.2
									Bailla	12	5.7	8.7
									Puti	19	4.3	6.6
									Baim	15	11.3	16.4
									Gutum	12	6.8	7.8
									Shing	3	10.8	15.2
									Darkina	14	5.5	11.1
									Chapila	33	6.8	10.3
									Kaikka	1		13.2
									Dhela	12	6.9	8.2
									Cheka	1		21.4
									Potka	6	3.3	5.6
									Sub total	367		
									Icha	110	4.2	7.2
									Total	477		
287s	96.09.18s	262	7.77	8.29	6.00	8.00	2.00	X	Rui	1		51.2
									Puti	26	5.8	6.5
									Mola	74	4.8	9.9
									Dhela	17	4.7	5.4
									Rani	13	6.1	7.8
									Baim	14	8.2	10.9
									Chanda	77	4.3	5.8

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										Shing	5	11.2	16.4
										Gutum	2	7.7	8.2
										Potka	6	5.2	8.9
										Sub total	235		
										Icha	52	4.1	9.3
										Total	287		
289s	96.09.20s	264	7.76	8.33	18.00	21.00	3.00	X		Lachu	7	14.3	16.6
										Mola	73	5.7	9.5
										Puti	26	6.2	7.3
										Baim	12	12.2	16.2
										Chanda	89	6.8	9.7
										Rani	14	5.8	10.2
										Total	221		
293s	96.09.24s	268	8.08	8.48	8.00	11.00	3.00	X		Kalibaush	1		17.40
										Puti	12	4.00	8.30
										Bheda	3	9.30	10.70
										Rani	3	6.50	7.80
										Bailla	5	6.00	8.80
										Napitkoi	1		3.10
										Potka	3	5.50	6.20
										Chanda	220	3.20	6.20
										Total	248		
293ss	96.09.24ss	268	8.07	8.47	14.30	17.30	3.00	X		Bacha	3	13.50	16.10
										Puti	9	4.40	7.10
										Taki	1		8.70
										Chapila	3	5.60	7.90
										Rani	2	7.00	7.20
										Bheda	4	5.30	8.80
										Mola	7	4.60	6.60
										Gutum	2	8.10	9.20
										Kaikka	3	13.10	15.40
										Bailla	1		6.90
										Potka	2	5.00	5.60
										Chanda	210	4.30	5.80
										Total	247		
295s	96.09.26s	270	8.01	8.46	1.00	5.00	4.00	X		Chapila	3	9.00	11.00
										Mola	18	5.50	7.20
										Rani	4	5.70	6.60
										Kaikka	3	8.90	13.30
										Shing	2	8.60	9.10
										Puti	14	4.60	8.40
										Bailla	4	4.80	6.30
										Chela	3	5.00	7.80
										Chanda	160	4.50	7.10
										Total	211		
295ss	96.09.26ss	270	7.97	8.44	18.30	21.30	3.00	X		Puti	11	4.70	7.70
										Mola	19	5.20	7.30
										Chela	4	5.40	8.10
										Chapila	4	6.10	9.50
										Kaikka	3	11.90	15.10
										Gutum	1		8.30
										Rani	3	5.40	7.90
										Dhela	4	4.00	6.20
										Chanda	150	4.20	6.70
										Sub total	199		
										Icha	17	4.80	6.50
										Total	216		
297s	96.09.28s	272	8.02	8.42	7.00	10.00	3.00	X		Mrigel	1		24.60
										Rani	2	6.40	6.70
										Bailla	1		7.10
										Bheda	3	9.00	9.40
										Puti	13	4.10	8.20
										Potka	3	5.00	6.70
										Chanda	206	4.00	6.40
										Total	229		
297ss	96.09.28ss	272	8.02	8.42	18.30	21.30	3.00	X		Mola	17	5.60	7.60
										Chapila	1		9.80
										Rani	1		8.10
										Shing	3	8.20	9.20

									Chela	5	5.30	8.10
									Bailla	2	4.70	6.50
									Gutum	2	7.70	8.10
									Potka	1		6.10
									Sub total	32		
									Icha	5	4.00	5.80
									Total	37		
299s	96.09.30s	274	7.93	8.37	7.00	10.00	3.00	X	Kalibaush	1		27.40
									Chapila	11	6.00	7.20
									Mola	21	4.00	7.30
									Puti	13	4.30	7.50
									Chela	8	6.00	9.60
									Rani	2	7.10	8.20
									Bailla	3	6.10	7.90
									Potka	3	5.20	6.90
									Chanda	265	3.00	6.70
									Total	327		
299ss	96.09.30ss	274	7.94	8.36	18.00	20.00	2.00	X	Chapila	5	5.00	7.90
									Mola	23	4.20	7.10
									Chela	7	6.30	10.20
									Rani	1		9.10
									Bailla	1		8.30
									Gutum	2	7.40	8.10
									Bheda	3	4.10	7.20
									Puti	12	4.30	8.00
									Potka	1		6.00
									Chanda	107	3.70	6.40
									Total	162		
300s	96.10.02s	276	7.87	8.30	14.00	16.00	2.00	X	Baim	2	10.60	15.10
									Chela	8	9.00	10.30
									Mola	14	6.80	7.50
									Dhela	3	4.90	5.60
									Puti	4	5.20	5.50
									Chanda	28	4.50	4.80
									Total	59		
301s	96.10.04s	278	7.74	8.23	22.00	24.00	2.00	X	Kalibaush	1		22.30
									Puti	6	7.40	8.50
									Batashi	1		8.70
									Dhela	5	5.50	6.40
									Chanda	18	4.10	5.20
									Sub total	31		
									Icha	9	6.10	8.20
									Total	40		
302s	96.10.05s	279	7.84	8.24	15.00	16.30	1.50	X	Puti	8	5.80	7.30
									Chela	2	8.30	9.10
									Mola	10	6.50	7.70
									Chanda	18	5.30	6.60
									Total	38		
303s	96.10.07s	281	8.06	8.28	11.00	13.00	2.00	X	Puti	2	4.60	7.30
									Chela	3	6.40	9.20
									Chanda	13	4.00	6.30
									Gutum	3	6.30	12.00
									Total	21		
305s	96.10.09s	283	7.97	8.27	1.00	3.30	2.50	X	Chapila	6	5.80	7.30
									Mola	9	4.00	6.30
									Sub total	15		
									Icha	17	3.90	6.30
									Total	32		
305ss	96.10.10ss	284	7.93	8.24	4.30	6.30	2.00	X	Mola	6	4.00	6.50
									Chirkabaim	2	7.30	11.10
									Gutum	2	5.90	7.20
									Puti	9	5.40	7.60
									Chanda	11	4.00	6.20
									Sub total	30		
									Icha	13	3.90	5.70
									Total	43		
306s	96.10.12s	286	7.77	8.19	13.00	15.00	2.00	X	Chela	9	7.20	12.20
									Puti	5	4.10	7.60
									Mola	5	4.20	7.20

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										Chanda	13	4.00	5.80
										Total	32		
307s	96.10.14s	288	7.59	8.10	11.30	13.30	2.00	X		Chapila	3	6.00	7.40
										Puti	7	4.10	6.70
										Mola	1		4.90
										Chanda	11	3.80	6.10
										Total	22		
(Sampling done in the countryside chamber to observe migration from haor to river)													
309s	96.10.19s	293	7.00	7.87	15.00	17.30	2.50		X	Gutum	2	6.70	8.10
										Mola	3	4.30	5.10
										Chanda	13	3.60	5.20
										Total	18		
311s	96.10.21s	295	6.95	7.83	2.30	5.00	2.50		X	Kazoli	1		10.30
										Tengra	6	5.00	6.20
										Chanda	15	4.10	5.70
										Sub total	22		
										Icha	4	3.80	6.00
										Total	26		
311ss	96.10.22ss	296	6.62	7.70	6.00	8.00	2.00		X	Chanda	14	4.10	6.10
										Potka	1		6.20
										Sub total	15		
										Icha	3	3.80	5.90
										Total	18		
313s	96.11.01s	306	6.77	7.32	6.00	8.30	2.50		X	Mola	4	4.00	7.10
										Chapila	1		8.40
										Gutum	2	8.10	9.00
										Chanda	17	4.10	6.70
										Sub total	24		
										Icha	7	3.90	6.10
										Total	31		
314s	96.11.03s	308	6.72	7.21	4.00	6.30	2.50		X	Chapila	2	6.00	7.10
										Tengra	3	5.60	6.90
										Sub total	5		
										Icha	3	4.00	5.30
										Total	8		
316s	96.11.05s	310	6.66	7.14	7.30	10.30	3.00		X	Chanda	66	4.60	5.60
										Puti	1		4.10
										Total	67		

D.2 Sampling Results - Sorted by Species

SAMPLING RESULTS - Sorted by Species

Set no.	Day no.	Date	Water		Sampling Time	Duration	Chamber	Species	No	Lengths (cm)	
			Water Level	velocity	begin	hrs	r/s			minimum	maximum
			r/s	m/s							
126	132	96.05.11	6.43	1.87	17.00	20.30		Air	10	8.4	11.9
127	133	96.05.12	6.47	1.98	1.00	5.00		Air	25	8.0	11.8
129	134	96.05.13	6.85	2.12	12.45	14.00		Air	3	8.5	13.2
130	136	96.05.15	7.23	2.34	18.00	21.00		Air	179	8.2	13.4
132	138	96.05.17	8.26	2.38	18.00	21.00		Air	13	7.3	11.4
133	139	96.05.18	8.24	2.39	18.00	21.00		Air	37	8.1	13.3
133	139	96.05.18	8.24	2.39	18.00	21.00		Air	1	6.5	6.5
135	141	96.05.20a	8.16	2.31	18.15	22.00		Air	9	4.3	5.1
140	146	96.05.25	7.53	2.01	18.00	24.00		Air	3	8.1	10.3
141	147	96.05.26	7.56	2.04	18.30	22.30		Air	7	12.1	16.2
143	149	96.05.28a	7.57	1.97	19.00	23.00		Air	10	12.7	14.0
146	151	96.05.30a	8.04	1.97	19.00	23.00		Air	1	8.0	8.0
150	154	96.06.02	8.5	2.14	19.00	23.00		Air	8	11.6	13.4
154	158	96.06.06	8.68	1.96	17.00	22.30		Air	3	10.3	13.6
157	161	96.06.09	8.51	1.76	18.30	23.30		Air	9	10.2	13.1
171	172	96.06.20 b	7.62	1.25	18.30	23.30		Air	49	6.4	6.6
172	173	96.06.21	7.62	1.18	0.45	7.45		Air	2	11.0	21.2
175	173	96.06.21 c	7.52	1.18	19.00	23.30		Air	2	6.9	7.1
176	174	96.06.22	7.48	1.13	0.30	8.00		Air	1	7.0	7.0
191	181	96.06.29 a	7.4	0.91	20.00	7.00(+1)		Air	1	18.3	18.3
195	183	96.07.01 a	8.05	0.72	19.00	7.00(+1)		Air	127	10.1	30.3
196	184	96.07.02	8.09	1.04	10.00	14.00		Air	71	19.7	20.9
199	185	96.07.03 a	8.73	1.23	23.00	5.00(+1)		Air	18	9.2	11.7
203	187	96.07.05 a	9.02	1.30	22.00	6.00(+1)		Air	89	9.3	26.5
204	188	96.07.06	9.02	1.24	11.00	17.00		Air	73	12.0	16.7
206	189	96.07.08	9.02	1.23	2.00	6.00		Air	12	15.0	15.4
211	193	96.07.11	9.01	1.20	3.00	7.00		Air	13	27.2	29.8
213	193	96.07.11 b	9.02	1.20	22.00	1.00(+1)		Air	12	17.6	23.5
214	195	96.07.13	9	1.19	3.00	7.00		Air	44	12.1	26.7
215	195	96.07.13 a	9	1.19	10.00	13.00		Air	26	27.0	28.3
216	196	96.07.14	9	1.18	0.30	5.00		Air	45	26.2	30.0
205	188	96.07.06 a	9.02	1.24	23.00	5.00(+1)	X	Air	53	12.5	17.7
207	189	96.07.08 a	9.02	1.23	21.00	1.00(+1)	X	Air	11	9.5	10.4
126	132	96.05.11	6.43	1.87	17.00	20.30		Bacha	1	10.9	10.9
127	133	96.05.12	6.47	1.98	1.00	5.00		Bacha	13	9.9	10.4

128	133	96.05.12a	6.6	4.72	1.98	12.00	14.00	2.00		X	Bacha	2	10.5	11.9	11.2
129	134	96.05.13	6.85	4.61	2.12	12.45	14.00	1.25		X	Bacha	5	3.0	10.5	6.8
130	136	96.05.15	7.23	4.61	2.34	18.00	21.00	3.00		X	Bacha	4	13.5	15.7	14.6
131	137	96.05.16	8.03	4.98	2.40	13.30	14.30	1.00		X	Bacha	13	10.9	13.1	12.0
132	138	96.05.17	8.26	5.16	2.38	18.00	21.00	3.00		X	Bacha	2	11.0	13.2	12.1
133	139	96.05.18	8.24	5.12	2.39	18.00	21.00	3.00		X	Bacha	18	9.5	11.5	10.5
134	141	96.05.20	8.18	5.34	2.31	13.30	15.30	2.00		X	Bacha	6	10.2	14.1	12.2
135	141	96.05.20a	8.16	5.35	2.31	18.15	22.00	3.75		X	Bacha	3	4.7	9.7	7.2
141	147	96.05.26	7.56	5.46	2.04	18.30	22.30	2.00		X	Bacha	3	3.0	11.0	7.0
143	149	96.05.28a	7.57	5.53	1.97	19.00	23.00	4.00		X	Bacha	3	6.7	10.1	8.4
144	150	96.05.29	7.7	5.75	2.01	11.30	13.45	2.25		X	Bacha	1	9.8	9.8	9.8
145	151	96.05.30	7.84	5.82	1.97	9.00	12.00	3.00		X	Bacha	1	10.8	10.8	10.8
146	151	96.05.30a	8.04	5.88	1.97	19.00	23.00	4.00		X	Bacha	2	10.9	13.3	12.1
147	152	96.05.31	8.02	5.85	2.11	15.00	19.30	4.50		X	Bacha	1	11.2	11.2	11.2
148	153	96.06.01	8.12	6	2.05	12.30	14.00	1.50		X	Bacha	1	12.7	12.7	12.7
154	158	96.06.06	8.68	6.78	1.96	17.00	22.30	5.50		X	Bacha	5	11.3	14.4	12.9
155	159	96.06.07	8.63	6.84	1.89	18.00	22.30	4.50		X	Bacha	3	12.7	18.5	15.6
163	166	96.06.14 a	7.96	6.76	1.47	18.00	23.00	5.00		X	Bacha	2	8.0	12.1	10.1
166	169	96.06.17	7.68	6.65	1.35	13.00	19.00	6.00		X	Bacha	1	18.0	18.0	18.0
168	171	96.06.19	7.57	6.69	1.17	18.00	22.00	4.00		X	Bacha	1	14.3	14.3	14.3
171	172	96.06.20 b	7.62	6.61	1.25	18.30	23.30	5.00		X	Bacha	1	13.0	13.0	13.0
172	173	96.06.21	7.62	6.63	1.18	0.45	7.45	7.00		X	Bacha	1	12.1	12.1	12.1
175	173	96.06.21 c	7.52	6.72	1.18	19.00	23.30	4.50		X	Bacha	2	7.7	8.2	8.0
176	174	96.06.22	7.48	6.7	1.13	0.30	8.00	7.50		X	Bacha	1	14.6	14.6	14.6
177s	174	96.06.22s	7.45	6.72	1.13	8.30	18.00	9.50		X	Bacha	22	13.2	18.7	16.0
183	177	96.06.25 a	7.54	6.83	1.09	21.00	8.00	11.00		X	Bacha	1	12.3	12.3	12.3
184	178	96.06.26	7.52	6.84	1.05	12.00	17.00	5.00		X	Bacha	12	9.2	11.9	10.6
187	179	96.06.27 a	7.44	6.85	1.02	19.00	8.00(+1)	13.00		X	Bacha	4	8.6	11.2	9.9
188	180	96.06.28	7.44	6.85	0.95	12.00	15.00	3.00		X	Bacha	2	13.3	13.6	13.5
191	181	96.06.29 a	7.4	6.87	0.91	20.00	7.00(+1)	11.00		X	Bacha	9	10.8	20.2	15.5
192	182	96.06.30	7.38	6.89	0.86	11.00	16.00	5.00		X	Bacha	1	15.7	15.7	15.7
196	184	96.07.02	8.09	7.39	1.04	10.00	14.00	4.00		X	Bacha	12	10.3	20.0	15.2
200	186	96.07.04	8.87	7.83	1.34	13.00	18.00	5.00		X	Bacha	18	9.2	11.4	10.3
203	187	96.07.05 a	9.02	8.08	1.30	22.00	6.00(+1)	8.00		X	Bacha	15	11.6	17.1	14.4
204	188	96.07.06	9.02	8.1	1.24	11.00	17.00	6.00		X	Bacha	23	13.2	14.0	13.6
206	189	96.07.08	9.02	8.15	1.23	2.00	6.00	4.00		X	Bacha	11	11.9	17.6	14.8
211	193	96.07.11	9.01	8.15	1.20	3.00	7.00	4.00		X	Bacha	7	11.8	12.2	12.0
213	193	96.07.11 b	9.02	8.15	1.20	22.00	1.00(+1)	3.00		X	Bacha	3	11.7	17.6	14.7
214	195	96.07.13	9	8.15	1.19	3.00	7.00	4.00		X	Bacha	13	16.3	17.8	17.1
215	195	96.07.13 a	9	8.15	1.19	10.00	13.00	3.00		X	Bacha	12	8.1	19.2	13.7
216	196	96.07.14	9	8.45	1.18	0.30	5.00	4.50		X	Bacha	11	18.6	20.0	19.3
223	200	96.07.18	8.94	8.2	1.09	18.00	22.00	4.00		X	Bacha	2	13.1	15.0	14.1
227	202	96.07.20	8.95	8.2	1.08	2.00	5.00	3.00		X	Bacha	18	12.1	14.7	13.4
231	205	96.07.23	8.91	8.22	1.06	5.00	8.00	3.00		X	Bacha	13	14.0	15.1	14.6

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232	206	96.07.24	8.92	8.22	1.05	21.00	24.00	3.00		X	Bacha	12	14.0	15.2	14.6
234	207	96.07.25	8.91	8.22	1.05	7.00	10.00	3.00		X	Bacha	7	14.3	16.0	15.2
235	207	96.07.25 a	8.94	8.23	1.05	17.30	20.30	3.00		X	Bacha	4	14.0	16.1	15.1
237	209	96.07.27	8.89	8.22	1.02	3.00	7.00	4.00		X	Bacha	13	14.5	18.9	16.7
238	210	96.07.28	8.78	8.21	0.94	9.00	12.00	3.00		X	Bacha	11	13.6	15.8	14.7
242	212	96.07.30	8.69	8.21	0.84	11.00	13.00	2.00		X	Bacha	14	13.0	16.1	14.6
243	213	96.07.31	8.78	8.23	0.91	20.00	24.00	4.00		X	Bacha	11	19.7	21.2	20.5
246	215	96.08.02	8.75	8.25	0.85	3.00	7.00	4.00		X	Bacha	7	16.5	18.0	17.3
254s	221	96.08.08s	8.46	8.36	0.38	17.00	20.00	3.00		X	Bacha	1	16.5	16.5	16.5
255s	223	96.08.10s	8.37	8.34	0.19	11.00	14.00	3.00		X	Bacha	11	14.1	14.7	14.4
255ss	223	96.08.10ss	8.35	8.32	0.19	17.00	20.00	3.00		X	Bacha	12	9.0	12.3	10.7
258s	226	96.08.13s	8.4	8.31	0.31	6.00	9.00	3.00		X	Bacha	11	20.7	20.9	20.8
259s	227	96.08.14s	8.48	8.3	0.42	17.00	22.00	5.00		X	Bacha	12	17.0	20.7	18.9
259ss	228	96.08.15ss	8.49	8.31	0.47	9.00	11.00	2.00		X	Bacha	1	18.9	18.9	18.9
261s	230	96.08.17s	8.59	8.34	0.58	2.00	5.00	3.00		X	Bacha	1	19.2	19.2	19.2
261ss	230	96.08.17ss	8.67	8.42	0.58	23.00	5.00	6.00		X	Bacha	17	18.8	20.6	19.7
262s	232	96.08.19s	8.78	8.47	0.61	17.00	20.30	3.50		X	Bacha	13	17.0	21.5	19.3
266s	236	96.08.23s	8.87	8.51	0.71	8.00	10.30	2.50		X	Bacha	15	17.6	19.3	18.5
277s	250	96.09.06s	8.56	8.42	0.40	3.00	6.00	3.00		X	Bacha	1	17.9	17.9	17.9
293ss	268	96.09.24ss	8.07	8.47	-1.21	14.3	17.30	3.00		X	Bacha	3	13.5	16.1	14.8
137	143	96.05.22	8.03	5.52	2.25	18.20	19.50	1.50	X		Bacha	7	9.8	19.0	14.4
138	144	96.05.23	7.89	5.44	2.18	9.00	12.30	3.50	X		Bacha	9	13.0	19.8	16.4
151	155	96.06.03	8.66	6.63	2.09	18.30	22.30	4.00	X		Bacha	2	4.2	4.5	4.4
152	156	96.06.04	8.61	6.51	2.05	13.00	16.00	3.00	X		Bacha	3	6.9	12.9	9.9
153	157	96.06.05	8.65	6.48	1.98	9.00	11.00	2.00	X		Bacha	5	7.2	13.1	10.2
158	162	96.06.10	8.42	6.81	1.73	12.30	15.30	3.00	X		Bacha	6	11.3	18.2	14.8
162	166	96.06.14	7.96	6.76	1.47	15.00	18.00	3.00	X		Bacha	2	13.8	16.3	15.1
165	168	96.06.16	7.76	6.66	1.40	18.00	23.00	5.00	X		Bacha	4	14.1	18.2	16.2
167	170	96.06.18	7.61	6.66	1.27	8.00	12.00	4.00	X		Bacha	4	14.8	19.0	16.9
169	172	96.06.20	7.57	6.69	1.25	0.00	7.00	7.00	X		Bacha	4	14.0	17.2	15.6
170	172	96.06.20 a	7.62	6.61	1.25	13.00	18.00	5.00	X		Bacha	3	16.3	19.7	18.0
177	174	96.06.22 a	7.45	6.72	1.13	19.00	8.00(+1)	13.00	X		Bacha	2	10.5	22.0	16.3
181	176	96.06.24 a	7.55	6.8	1.11	21.00	7.00(+1)	10.00	X		Bacha	2	9.0	13.3	11.2
182	177	96.06.25	7.56	6.82	1.09	9.00	15.00	6.00	X		Bacha	13	13.1	16.5	14.8
185	178	96.06.26 a	7.49	6.83	1.05	11.00	7.00	8.00	X		Bacha	1	9.8	9.8	9.8
189	180	96.06.28 a	7.42	6.85	0.95	20.00	6.00	10.00	X		Bacha	3	12.6	16.8	14.7
190	181	96.06.29	7.41	6.86	0.91	10.00	16.00	6.00	X		Bacha	1	11.2	11.2	11.2
193	182	96.06.30 a	7.39	6.93	0.86	20.00	7.00(+1)	11.00	X		Bacha	4	11.3	19.6	15.5
194	183	96.07.01	7.48	7.11	0.72	12.00	17.00	5.00	X		Bacha	12	14.1	14.8	14.5
197	184	96.07.02 a	8.38	7.54	1.04	23.00	7.00(+1)	8.00	X		Bacha	22	11.2	13.9	12.6
198	185	96.07.03	8.52	7.62	1.23	9.00	17.00	8.00	X		Bacha	21	14.7	15.2	15.0
201	186	96.07.04 a	8.93	7.9	1.34	22.00	5.00(+1)	7.00	X		Bacha	23	9.8	18.6	14.2
202	187	96.07.05	8.99	8	1.30	10.00	16.00	6.00	X		Bacha	13	12.3	16.7	14.5
205	188	96.07.06 a	9.02	8.11	1.24	23.00	5.00(+1)	6.00	X		Bacha	21	15.6	18.8	17.2

207	189	96.07.08 a	9.02	8.15	1.23	21.00	1.00(+1)	4.00	X	Bacha	12	20.3	21.0	20.7
208	191	96.07.09	9.01	8.15	1.19	13.00	15.00	2.00	X	Bacha	2	17.0	22.5	19.8
209	192	96.07.10	9.01	8.15	1.19	4.00	7.00	3.00	X	Bacha	12	13.1	21.3	17.2
212	193	96.07.11 a	9.02	8.15	1.20	11.00	14.00	3.00	X	Bacha	12	14.6	19.3	17.0
217	196	96.07.14 a	8.96	8.18	1.18	18.00	22.00	4.00	X	Bacha	14	18.7	22.1	20.4
218	197	96.07.15	8.96	8.19	1.14	10.00	12.00	2.00	X	Bacha	8	19.0	21.7	20.4
222	199	96.07.17 a	8.95	8.22	1.08	12.30	15.30	3.00	X	Bacha	1	11.3	11.3	11.3
225	201	96.07.19	8.93	8.2	1.08	4.00	7.00	3.00	X	Bacha	11	12.5	13.5	13.0
226	201	96.07.19 a	8.93	8.2	1.08	13.00	16.00	3.00	X	Bacha	4	11.9	13.0	12.5
229	203	96.07.21	8.95	8.22	1.07	19.00	22.30	3.50	X	Bacha	12	13.5	15.1	14.3
230	204	96.07.22	8.93	8.22	1.07	3.00	6.00	3.00	X	Bacha	12	13.0	14.6	13.8
233	206	96.07.24 a	8.91	8.22	1.05	10.00	12.00	2.00	X	Bacha	1	14.6	14.6	14.6
236	208	96.07.26	8.96	8.22	1.10	14.00	17.00	3.00	X	Bacha	4	17.3	22.4	19.9
239	210	96.07.28 a	8.74	8.21	0.94	22.00	1.00	3.00	X	Bacha	11	14.7	15.2	15.0
240	211	96.07.29	8.72	8.21	0.88	12.00	15.30	3.50	X	Bacha	10	13.6	14.9	14.3
241	211	96.07.29 a	8.71	8.21	0.88	22.00	0.30	2.50	X	Bacha	1	13.2	13.2	13.2
244	214	96.08.01	8.78	8.23	0.91	10.00	12.00	2.00	X	Bacha	7	18.6	22.0	20.3
245	214	96.08.01 a	8.78	8.24	0.91	20.00	22.30	2.50	X	Bacha	4	17.2	18.7	18.0
247	215	96.08.02 a	8.74	8.25	0.85	14.00	16.00	2.00	X	Bacha	9	19.0	23.1	21.1
248	216	96.08.03	8.72	8.27	0.81	7.00	10.30	3.50	X	Bacha	2	15.0	19.3	17.2
249	216	96.08.03 a	8.65	8.27	0.81	19.00	22.00	3.00	X	Bacha	3	17.0	21.1	19.1
250	217	96.08.04	8.62	8.29	0.67	2.00	5.30	3.50	X	Bacha	7	18.1	21.3	19.7
251	218	96.08.05	8.63	8.38	0.56	18.30	22.00	3.50	X	Bacha	4	10.1	16.3	13.2
254	221	96.08.08	8.46	8.36	0.38	17.00	20.00	3.00	X	Bacha	4	14.7	16.5	15.6
258	226	96.08.13	8.44	8.31	0.31	23.30	2.00	3.50	X	Bacha	4	17.3	21.9	19.6
259	227	96.08.14	8.46	8.31	0.42	11.00	13.00	2.00	X	Bacha	1	21.9	21.9	21.9
260	229	96.08.16	8.51	8.32	0.50	3.00	6.30	3.50	X	Bacha	2	15.6	19.1	17.4
262	231	96.08.18	8.76	8.45	0.58	21.00	24.00	3.00	X	Bacha	4	18.6	22.1	20.4
263	233	96.08.20	8.8	8.48	0.65	16.30	20.30	4.00	X	Bacha	4	19.2	21.6	20.4
266	235	96.08.22	8.82	8.52	0.70	11.00	14.30	3.50	X	Bacha	1	19.4	19.4	19.4
269	240	96.08.27	8.81	8.45	0.71	19.00	22.30	3.00	X	Bacha	4	18.6	19.3	19.0
270	241	96.08.28	8.77	8.43	0.68	17.00	20.00	3.00	X	Bacha	4	18.1	23.6	20.9
271	243	96.08.30	8.73	8.48	0.57	13.00	16.30	3.50	X	Bacha	4	16.4	17.7	17.1
272	244	96.08.31	8.69	8.49	0.50	9.00	12.00	3.00	X	Bacha	2	16.4	21.3	18.9
273	245	96.09.01	8.66	8.48	0.47	21.00	24.00	3.00	X	Bacha	4	15.4	16.2	15.8
274	247	96.09.03	8.63	8.44	0.48	19.00	22.00	3.00	X	Bacha	2	12.8	13.2	13.0
275	248	96.09.04	8.62	8.43	0.48	3.00	6.00	3.00	X	Bacha	1	13.8	13.8	13.8
276	249	96.09.05	8.57	8.43	0.40	3.00	6.00	3.00	X	Bacha	1	18.7	18.7	18.7
278	251	96.09.07	8.57	8.45	0.37	3.30	6.30	3.00	X	Bacha	7	16.5	18.0	17.3
280	253	96.09.09	8.5	8.44	0.24	9.00	12.30	3.50	X	Bacha	1	17.6	17.6	17.6
282	255	96.09.11	8.34	8.43	-0.42	15.00	18.30	3.50	X	Bacha	1	16.7	16.7	16.7
283	256	96.09.12	8.27	8.43	-0.63	11.30	14.30	3.00	X	Bacha	4	17.2	18.3	17.8
285	258	96.09.14	8.08	8.38	-0.99	18.30	21.30	2.50	X	Bacha	4	13.9	14.1	14.0
286	260	96.09.16	7.89	8.33	-1.30	15.30	18.00	2.50	X	Bacha	1	18.2	18.2	18.2

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292	267	96.09.23	8.08	8.48	-1.21	18.30	21.30	3.00	X		Bacha	1	14.6	14.6	14.6
294	269	96.09.25	8.05	8.47	-1.26	0.30	4.30	4.00	X		Bacha	1	14.9	14.9	14.9
296	271	96.09.27	7.96	8.43	-1.36	10.30	13.30	3.00	X		Bacha	1	14.6	14.6	14.6
298	273	96.09.29	7.98	8.41	-1.28	4.00	7.00	3.00	X		Bacha	1	15.1	15.1	15.1
300	275	96.10.01	7.95	8.35	-1.21	9.00	11.00	2.00	X		Bacha	2	18.2	22.7	20.5
304	282	96.10.08	8.03	8.28	-0.82	15.00	17.00	2.00	X		Bacha	1	16.4	16.4	16.4
150	154	96.06.02	8.5	5.8	2.14	19.00	23.00	4.00		X	Bagair	1	6.3	6.3	6.3
195	183	96.07.01 a	8.05	7.76	0.72	19.00	7.00(+1)	12.00		X	Bagair	42	5.1	5.6	5.4
199	185	96.07.03 a	8.73	7.77	1.23	23.00	5.00(+1)	6.00		X	Bagair	12	5.0	5.3	5.2
126	132	96.05.11	6.43	4.05	1.87	17.00	20.30	3.50		X	Balla	50	5.1	10.3	7.7
127	133	96.05.12	6.47	4.04	1.98	1.00	5.00	4.00		X	Balla	8	6.3	8.2	7.3
129	134	96.05.13	6.85	4.61	2.12	12.45	14.00	1.25		X	Balla	12	8.0	19.2	13.6
130	136	96.05.15	7.23	4.61	2.34	18.00	21.00	3.00		X	Balla	24	9.2	10.7	10.0
132	138	96.05.17	8.26	5.16	2.38	18.00	21.00	3.00		X	Balla	43	5.0	6.2	5.6
133	139	96.05.18	8.24	5.12	2.39	18.00	21.00	3.00		X	Balla	37	6.0	10.1	8.1
134	141	96.05.20	8.18	5.34	2.31	13.30	15.30	2.00		X	Balla	3	10.3	16.2	13.3
135	141	96.05.20a	8.16	5.35	2.31	18.15	22.00	3.75		X	Balla	47	4.8	10.3	7.6
136	142	96.05.21	8.1	5.37	2.28	18.30	22.30	4.00		X	Balla	4	7.6	8.3	8.0
140	146	96.05.25	7.53	5.48	2.01	18.00	24.00	6.00		X	Balla	3	6.3	7.6	7.0
141	147	96.05.26	7.56	5.46	2.04	18.30	22.30	2.00		X	Balla	7	6.8	7.2	7.0
142	149	96.05.28	7.47	5.51	1.97	7.00	9.00	2.00		X	Balla	7	8.6	9.0	8.8
143	149	96.05.28a	7.57	5.53	1.97	19.00	23.00	4.00		X	Balla	4	5.3	7.8	6.6
147	152	96.05.31	8.02	5.85	2.11	15.00	19.30	4.50		X	Balla	8	6.2	8.2	7.2
148	153	96.06.01	8.12	6	2.05	12.30	14.00	1.50		X	Balla	1	10.0	10.0	10.0
159	163	96.06.11	8.32	6.77	1.69	12.30	15.30	3.00		X	Balla	2	6.8	7.2	7.0
161	165	96.06.13	8.07	6.78	1.53	12.00	14.30	2.50		X	Balla	1	7.2	7.2	7.2
164	167	96.06.15	7.83	6.72	1.41	10.00	14.00	4.00		X	Balla	3	4.5	5.1	4.8
166	169	96.06.17	7.68	6.65	1.35	13.00	19.00	6.00		X	Balla	2	8.2	11.6	9.9
168	171	96.06.19	7.57	6.69	1.17	18.00	22.00	4.00		X	Balla	7	4.6	5.0	4.8
171	172	96.06.20 b	7.62	6.61	1.25	18.30	23.30	5.00		X	Balla	6	4.8	5.7	5.3
172	173	96.06.21	7.62	6.63	1.18	0.45	7.45	7.00		X	Balla	2	5.1	9.0	7.1
175	173	96.06.21 c	7.52	6.72	1.18	19.00	23.30	4.50		X	Balla	1	8.2	8.2	8.2
180	176	96.06.24	7.55	6.79	1.11	9.00	17.00	8.00		X	Balla	2	6.3	7.4	6.9
183	177	96.06.25 a	7.54	6.83	1.09	21.00	8.00	11.00		X	Balla	1	6.4	6.4	6.4
184	178	96.06.26	7.52	6.84	1.05	12.00	17.00	5.00		X	Balla	2	5.1	6.2	5.7
188	180	96.06.28	7.44	6.85	0.95	12.00	15.00	3.00		X	Balla	1	6.1	6.1	6.1
191	181	96.06.29 a	7.4	6.87	0.91	20.00	7.00(+1)	11.00		X	Balla	1	4.9	4.9	4.9
192	182	96.06.30	7.38	6.89	0.86	11.00	16.00	5.00		X	Balla	2	6.2	7.9	7.1
195	183	96.07.01 a	8.05	7.76	0.72	19.00	7.00(+1)	12.00		X	Balla	71	4.4	22.9	13.7
196	184	96.07.02	8.09	7.39	1.04	10.00	14.00	4.00		X	Balla	41	5.2	18.8	12.0
200	186	96.07.04	8.87	7.83	1.34	13.00	18.00	5.00		X	Balla	17	5.6	6.7	6.2
203	187	96.07.05 a	9.02	8.08	1.30	22.00	6.00(+1)	8.00		X	Balla	63	6.2	7.8	7.0
204	188	96.07.06	9.02	8.1	1.24	11.00	17.00	6.00		X	Balla	42	5.9	7.3	6.6
206	189	96.07.08	9.02	8.15	1.23	2.00	6.00	4.00		X	Balla	25	5.8	9.8	7.8

211	193	96.07.11	9.01	8.15	1.20	3.00	7.00	4.00		X	Baila	21	7.6	8.0	7.8
215	195	96.07.13 a	9	8.15	1.19	10.00	13.00	3.00		X	Baila	42	7.1	11.1	9.1
216	196	96.07.14	9	8.45	1.18	0.30	5.00	4.50		X	Baila	43	5.5	10.4	8.0
219	198	96.07.16	8.96	8.2	1.14	1.00	5.00	4.00		X	Baila	15	6.2	10.0	8.1
221	199	96.07.17	9.02	8.23	1.08	3.00	6.00	3.00		X	Baila	13	8.1	16.3	12.2
237	209	96.07.27	8.89	8.22	1.02	3.00	7.00	4.00		X	Baila	1	7.4	7.4	7.4
242	212	96.07.30	8.69	8.21	0.84	11.00	13.00	2.00		X	Baila	1	7.4	7.4	7.4
243	213	96.07.31	8.78	8.23	0.91...	20.00	24.00	4.00		X	Baila	2	14.1	15.0	14.6
246	215	96.08.02	8.75	8.25	0.85	3.00	7.00	4.00		X	Baila	12	9.0	16.4	12.7
254s	221	96.08.08s	8.46	8.36	0.38	17.00	20.00	3.00		X	Baila	1	6.8	6.8	6.8
257s	225	96.08.12s	8.36	8.3	0.19	21.30	24.00	2.50		X	Baila	1	11.2	11.2	11.2
261ss	230	96.08.17ss	8.67	8.42	0.58	23.00	5.00	6.00		X	Baila	1	8.3	8.3	8.3
262s	232	96.08.19s	8.78	8.47	0.61	17.00	20.30	3.50		X	Baila	1	8.2	8.2	8.2
266ss	236	96.08.23ss	8.87	8.51	0.71	13.30	16.00	2.50		X	Baila	1	6.2	6.2	6.2
273s	246	96.09.02s	8.64	8.46	0.48	9.00	12.30	3.50		X	Baila	2	9.0	13.2	11.1
277ss	250	96.09.06ss	8.57	8.41	0.40	17.00	20.00	3.00		X	Baila	1	6.4	6.4	6.4
285s	259	96.09.15s	8.04	8.37	-1.10	10.00	12.30	2.50		X	Baila	13	6.0	9.2	7.6
286s	260	96.09.16s	7.94	8.34	-1.30	3.00	7.00	4.00		X	Baila	12	5.7	8.7	7.2
293s	268	96.09.24s	8.08	8.48	-1.21	8	11.00	3.00		X	Baila	5	6.0	8.8	7.4
293ss	268	96.09.24ss	8.07	8.47	-1.21	14.3	17.30	3.00		X	Baila	1	6.9	6.9	6.9
295s	270	96.09.26s	8.01	8.46	-1.32	1	5.00	4.00		X	Baila	4	4.8	6.3	5.6
297s	272	96.09.28s	8.02	8.42	-1.21	7	10.00	3.00		X	Baila	1	7.1	7.1	7.1
297ss	272	96.09.28ss	8.02	8.42	-1.21	18.3	21.30	3.00		X	Baila	2	4.7	6.5	5.6
299s	274	96.09.30s	7.93	8.37	-1.3	7	10.00	3.00		X	Baila	3	6.1	7.9	7.0
299ss	274	96.09.30ss	7.94	8.36	-1.3	18	20.00	2.00		X	Baila	1	8.3	8.3	8.3
311	295	96.10.21	6.88	7.76	-2.14	17.3	20.00	2.50		X	Baila	2	7.8	10.1	9.0
186	179	96.06.27	7.44	6.85	1.02	9.00	17.00	8.00	X		Baila	1	5.8	5.8	5.8
190	181	96.06.29	7.41	6.86	0.91	10.00	16.00	6.00	X		Baila	1	4.1	4.1	4.1
207	189	96.07.08 a	9.02	8.15	1.23	21.00	1.00(+1)	4.00	X		Baila	14	5.1	10.0	7.6
241	211	96.07.29 a	8.71	8.21	0.88	22.00	0.30	2.50	X		Baila	1	7.3	7.3	7.3
252	219	96.08.06	8.63	8.38	0.56	2.00	6.00	4.00	X		Baila	1	6.2	6.2	6.2
254	221	96.08.08	8.46	8.36	0.38	17.00	20.00	3.00	X		Baila	1	6.8	6.8	6.8
256	224	96.08.11	8.33	8.31	-0.01	17.00	20.30	3.50	X		Baila	2	4.9	10.6	7.8
257	225	96.08.12	8.34	8.31	0.19	2.30	6.30	4.00	X		Baila	3	5.4	13.2	9.3
260	229	96.08.16	8.51	8.32	0.50	3.00	6.30	3.50	X		Baila	1	9.1	9.1	9.1
261	229	96.08.16 a	8.53	8.33	0.50	16.30	20.00	3.50	X		Baila	1	7.1	7.1	7.1
262	231	96.08.18	8.76	8.45	0.58	21.00	24.00	3.00	X		Baila	1	5.9	5.9	5.9
263	233	96.08.20	8.8	8.48	0.65	16.30	20.30	4.00	X		Baila	1	7.2	7.2	7.2
268	238	96.08.25	8.87	8.48	0.74	3.00	5.30	2.50	X		Baila	2	8.1	10.0	9.1
273	245	96.09.01	8.66	8.48	0.47	21.00	24.00	3.00	X		Baila	2	9.0	11.2	10.1
281	254	96.09.10	8.4	8.44	-0.23	18.00	22.30	4.50	X		Baila	1	6.3	6.3	6.3
282	255	96.09.11	8.34	8.43	-0.42	15.00	18.30	3.50	X		Baila	1	6.3	6.3	6.3
284	257	96.09.13	8.17	8.41	-0.84	2.30	5.30	3.00	X		Baila	1	6.2	6.2	6.2
290	265	96.09.21	7.78	8.36	-1.58	1.00	5.00	4.00	X		Baila	2	4.1	5.3	4.7

297	271	96.09.27 a	7.97	8.43	-1.36	20.00	23.00	3.00	X	Baila	2	6.0	6.4	6.2
130	136	96.05.15	7.23	4.61	2.34	18.00	21.00	3.00		Baim	7	9.7	11.0	10.4
132	138	96.05.17	8.26	5.16	2.38	18.00	21.00	3.00	X	Baim	1	55.0	55.0	55.0
133	139	96.05.18	8.24	5.12	2.39	18.00	21.00	3.00	X	Baim	2	17.6	23.6	20.6
134	141	96.05.20	8.18	5.34	2.31	13.30	15.30	2.00	X	Baim	35	10.0	14.1	12.1
136	142	96.05.21	8.1	5.37	2.28	18.30	22.30	4.00	X	Baim	2	20.3	46.0	33.2
142	149	96.05.28	7.47	5.51	1.97	7.00	9.00	2.00	X	Baim	1	9.5	9.5	9.5
144	150	96.05.29	7.7	5.75	2.01	11.30	13.45	2.25	X	Baim	7	10.7	11.5	11.1
145	151	96.05.30	7.84	5.82	1.97	9.00	12.00	3.00	X	Baim	7	7.9	11.2	9.6
146	151	96.05.30a	8.04	5.88	1.97	19.00	23.00	4.00	X	Baim	8	7.3	8.2	7.8
149	153	96.06.01a	8.4	6.1	2.05	18.45	22.45	4.00	X	Baim	2	17.6	30.0	23.8
150	154	96.06.02	8.5	5.8	2.14	19.00	23.00	4.00	X	Baim	1	39.2	39.2	39.2
154	158	96.06.06	8.68	6.78	1.96	17.00	22.30	5.50	X	Baim	1	34.3	34.3	34.3
155	159	96.06.07	8.63	6.84	1.89	18.00	22.30	4.50	X	Baim	1	36.8	36.8	36.8
160	164	96.06.12	8.2	6.77	1.65	12.00	14.00	2.00	X	Baim	12	11.6	19.5	15.6
168	171	96.06.19	7.57	6.69	1.17	18.00	22.00	4.00	X	Baim	2	6.9	11.3	9.1
179	175	96.06.23 a	7.45	6.77	1.11	19.00	6.30(+1)	11.50	X	Baim	2	7.1	8.3	7.7
191	181	96.06.29 a	7.4	6.87	0.91	20.00	7.00(+1)	11.00	X	Baim	1	9.9	9.9	9.9
204	188	96.07.06	9.02	8.1	1.24	11.00	17.00	6.00	X	Baim	23	11.0	14.3	12.7
206	189	96.07.08	9.02	8.15	1.23	2.00	6.00	4.00	X	Baim	4	9.1	14.1	11.6
211	193	96.07.11	9.01	8.15	1.20	3.00	7.00	4.00	X	Baim	12	9.3	10.7	10.0
214	195	96.07.13	9	8.15	1.19	3.00	7.00	4.00	X	Baim	11	15.5	32.4	24.0
285s	259	96.09.15s	8.04	8.37	-1.10	10.00	12.30	2.50	X	Baim	18	6.8	14.4	10.6
286s	260	96.09.16s	7.94	8.34	-1.30	3.00	7.00	4.00	X	Baim	15	11.3	16.4	13.9
287s	262	96.09.18s	7.77	8.29	-1.53	6.00	8.00	2.00	X	Baim	14	8.2	10.9	9.6
289s	264	96.09.20s	7.76	8.33	-1.58	18.00	21.00	3.00	X	Baim	12	12.2	16.2	14.2
300s	276	96.10.02s	7.87	8.3	-1.24	14	16.00	2.00	X	Baim	2	10.6	15.1	12.9
167	170	96.06.18	7.61	6.66	1.27	8.00	12.00	4.00	X	Baim	2	12.2	13.8	13.0
197	184	96.07.02 a	8.38	7.54	1.04	23.00	7.00(+1)	8.00	X	Baim	28	7.0	11.3	9.2
218	197	96.07.15	8.96	8.19	1.14	10.00	12.00	2.00	X	Baim	9	13.8	28.6	21.2
256	224	96.08.11	8.33	8.31	-0.01	17.00	20.30	3.50	X	Baim	1	11.7	11.7	11.7
259	227	96.08.14	8.46	8.31	0.42	11.00	13.00	2.00	X	Baim	1	13.7	13.7	13.7
285	258	96.09.14	8.08	8.38	-0.99	18.30	21.30	2.50	X	Baim	7	8.9	11.6	10.3
286	260	96.09.16	7.89	8.33	-1.30	15.30	18.00	2.50	X	Baim	9	10.2	17.7	14.0
287	261	96.09.17	7.84	8.32	-1.38	4.00	7.30	3.50	X	Baim	8	12.4	12.6	12.5
288	263	96.09.19	7.8	8.35	-1.62	17.00	21.00	4.00	X	Baim	9	11.9	17.6	14.8
289	264	96.09.20	7.76	8.86	-1.58	3.00	7.00	4.00	X	Baim	7	10.5	15.5	13.0
290	265	96.09.21	7.78	8.36	-1.58	1.00	5.00	4.00	X	Baim	3	10.4	14.3	12.4
291	266	96.09.22	7.97	8.43	-1.34	5.00	7.30	2.50	X	Baim	8	8.8	14.7	11.8
294	269	96.09.25	8.05	8.47	-1.26	0.30	4.30	4.00	X	Baim	1	14.2	14.2	14.2
301	277	96.10.03	7.79	8.26	-1.36	19.00	21.30	2.50	X	Baim	4	8.8	12.6	10.7
302	279	96.10.05	7.76	8.23	-1.32	3.00	6.00	3.00	X	Baim	2	11.6	13.2	12.4
140	146	96.05.25	7.53	5.48	2.01	18.00	24.00	6.00	X	Bamosh	4	32.1	36.3	34.2
141	147	96.05.26	7.56	5.46	2.04	18.30	22.30	2.00	X	Bamosh	5	28.8	32.2	30.5

143	149	96.05.28a	7.57	5.53	1.97	19.00	23.00	4.00		X	Bamosh	3	27.6	31.0	29.3
147	152	96.05.31	8.02	5.85	2.11	15.00	19.30	4.50		X	Bamosh	4	24.1	31.3	27.7
154	158	96.06.06	8.68	6.78	1.96	17.00	22.30	5.50		X	Bamosh	1	32.6	32.6	32.6
191	181	96.06.29 a	7.4	6.87	0.91	20.00	7.00(+1)	11.00		X	Bamosh	1	38.0	38.0	38.0
203	187	96.07.05 a	9.02	8.08	1.30	22.00	6.00(+1)	8.00		X	Bamosh	12	26.6	29.7	28.2
206	189	96.07.08	9.02	8.15	1.23	2.00	6.00	4.00		X	Bamosh	11	21.3	27.6	24.5
151	155	96.06.03	8.66	6.63	2.09	18.30	22.30	4.00	X		Bamosh	1	28.8	28.8	28.8
244	214	96.08.01	8.78	8.23	0.91	10.00	12.00	2.00	X		Bata	1	13.4	13.4	13.4
247	215	96.08.02 a	8.74	8.25	0.85	14.00	16.00	2.00	X		Bata	1	16.2	16.2	16.2
251	218	96.08.05	8.63	8.38	0.56	18.30	22.00	3.50	X		Bata	3	4.3	7.9	6.1
126	132	96.05.11	6.43	4.05	1.87	17.00	20.30	3.50		X	Batashi	35	8.7	10.0	9.4
127	133	96.05.12	6.47	4.04	1.98	1.00	5.00	4.00		X	Batashi	79	7.2	9.1	8.2
128	133	96.05.12a	6.6	4.72	1.98	12.00	14.00	2.00		X	Batashi	146	8.5	10.5	9.5
129	134	96.05.13	6.85	4.61	2.12	12.45	14.00	1.25		X	Batashi	128	7.2	8.8	8.0
130	136	96.05.15	7.23	4.61	2.34	18.00	21.00	3.00		X	Batashi	280	8.0	8.5	8.3
131	137	96.05.16	8.03	4.98	2.40	13.30	14.30	1.00		X	Batashi	26	8.5	9.7	9.1
132	138	96.05.17	8.26	5.16	2.38	18.00	21.00	3.00		X	Batashi	155	7.9	11.3	9.6
133	139	96.05.18	8.24	5.12	2.39	18.00	21.00	3.00		X	Batashi	70	6.7	8.4	7.6
134	141	96.05.20	8.18	5.34	2.31	13.30	15.30	2.00		X	Batashi	58	7.9	8.0	8.0
135	141	96.05.20a	8.16	5.35	2.31	18.15	22.00	3.75		X	Batashi	184	8.2	11.1	9.7
136	142	96.05.21	8.1	5.37	2.28	18.30	22.30	4.00		X	Batashi	105	7.6	9.3	8.5
140	146	96.05.25	7.53	5.48	2.01	18.00	24.00	6.00		X	Batashi	2	8.3	8.6	8.5
143	149	96.05.28a	7.57	5.53	1.97	19.00	23.00	4.00		X	Batashi	16	8.3	9.4	8.9
145	151	96.05.30	7.84	5.82	1.97	9.00	12.00	3.00		X	Batashi	17	8.6	9.1	8.9
146	151	96.05.30a	8.04	5.88	1.97	19.00	23.00	4.00		X	Batashi	22	7.9	9.3	8.6
147	152	96.05.31	8.02	5.85	2.11	15.00	19.30	4.50		X	Batashi	18	8.0	8.4	8.2
149	153	96.06.01a	8.4	6.1	2.05	18.45	22.45	4.00		X	Batashi	21	7.7	8.6	8.2
150	154	96.06.02	8.5	5.8	2.14	19.00	23.00	4.00		X	Batashi	32	8.4	9.3	8.9
154	158	96.06.06	8.68	6.78	1.96	17.00	22.30	5.50		X	Batashi	48	8.1	9.6	8.9
155	159	96.06.07	8.63	6.84	1.89	18.00	22.30	4.50		X	Batashi	19	7.5	9.4	8.5
157	161	96.06.09	8.51	6.86	1.76	18.30	23.30	5.00		X	Batashi	11	8.2	9.3	8.8
163	166	96.06.14 a	7.96	6.76	1.47	18.00	23.00	5.00		X	Batashi	5	7.4	8.5	8.0
171	172	96.06.20 b	7.62	6.61	1.25	18.30	23.30	5.00		X	Batashi	2	7.2	7.4	7.3
195	183	96.07.01 a	8.05	7.76	0.72	19.00	7.00(+1)	12.00		X	Batashi	229	5.8	8.8	7.3
199	185	96.07.03 a	8.73	7.77	1.23	23.00	5.00(+1)	6.00		X	Batashi	219	7.7	8.8	8.3
200	186	96.07.04	8.87	7.83	1.34	13.00	18.00	5.00		X	Batashi	225	8.3	10.2	9.3
204	188	96.07.06	9.02	8.1	1.24	11.00	17.00	6.00		X	Batashi	239	7.2	9.2	8.2
206	189	96.07.08	9.02	8.15	1.23	2.00	6.00	4.00		X	Batashi	137	7.8	10.4	9.1
211	193	96.07.11	9.01	8.15	1.20	3.00	7.00	4.00		X	Batashi	122	7.3	10.5	8.9
215	195	96.07.13 a	9	8.15	1.19	10.00	13.00	3.00		X	Batashi	129	7.6	10.3	9.0
216	196	96.07.14	9	8.45	1.18	0.30	5.00	4.50		X	Batashi	144	7.6	10.5	9.1
219	198	96.07.16	8.96	8.2	1.14	1.00	5.00	4.00		X	Batashi	24	7.3	10.2	8.8
301s	278	96.10.04s	7.74	8.23	-1.42	22	24.00	2.00		X	Batashi	1	8.7	8.7	8.7
151	155	96.06.03	8.66	6.63	2.09	18.30	22.30	4.00	X		Batashi	14	7.8	8.6	8.2

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197	184	96.07.02 a	8.38	7.54	1.04	23.00	7.00(+1)	8.00	X	Batashi	79	6.3	8.9	7.6
205	188	96.07.06 a	9.02	8.11	1.24	23.00	5.00(+1)	6.00	X	Batashi	171	7.3	10.2	8.8
207	189	96.07.08 a	9.02	8.15	1.23	21.00	1.00(+1)	4.00	X	Batashi	86	7.5	10.5	9.0
241	211	96.07.29 a	8.71	8.21	0.88	22.00	0.30	2.50	X	Batashi	4	6.8	8.1	7.5
126	132	96.05.11	6.43	4.05	1.87	17.00	20.30	3.50	X	Bheda	6	6.8	10.5	8.7
127	133	96.05.12	6.47	4.04	1.98	1.00	5.00	4.00	X	Bheda	4	6.6	10.6	8.6
128	133	96.05.12a	6.6	4.72	1.98	12.00	14.00	2.00	X	Bheda	17	4.9	6.3	5.6
129	134	96.05.13	6.85	4.61	2.12	12.45	14.00	1.25	X	Bheda	25	6.7	9.8	8.3
130	136	96.05.15	7.23	4.61	2.34	18.00	21.00	3.00	X	Bheda	36	8.0	12.1	10.1
131	137	96.05.16	8.03	4.98	2.40	13.30	14.30	1.00	X	Bheda	95	11.0	13.5	12.3
132	138	96.05.17	8.26	5.16	2.38	18.00	21.00	3.00	X	Bheda	3	9.2	11.3	10.3
133	139	96.05.18	8.24	5.12	2.39	18.00	21.00	3.00	X	Bheda	13	6.5	11.2	8.9
134	141	96.05.20	8.18	5.34	2.31	13.30	15.30	2.00	X	Bheda	51	8.0	12.1	10.1
135	141	96.05.20a	8.16	5.35	2.31	18.15	22.00	3.75	X	Bheda	8	10.5	12.7	11.6
136	142	96.05.21	8.1	5.37	2.28	18.30	22.30	4.00	X	Bheda	5	6.1	9.1	7.6
140	146	96.05.25	7.53	5.48	2.01	18.00	24.00	6.00	X	Bheda	2	6.2	6.8	6.5
141	147	96.05.26	7.56	5.46	2.04	18.30	22.30	2.00	X	Bheda	1	6.5	6.5	6.5
142	149	96.05.28	7.47	5.51	1.97	7.00	9.00	2.00	X	Bheda	3	7.6	13.7	10.7
143	149	96.05.28a	7.57	5.53	1.97	19.00	23.00	4.00	X	Bheda	2	10.1	14.0	12.1
144	150	96.05.29	7.7	5.75	2.01	11.30	13.45	2.25	X	Bheda	1	12.5	12.5	12.5
145	151	96.05.30	7.84	5.82	1.97	9.00	12.00	3.00	X	Bheda	21	6.7	13.3	10.0
146	151	96.05.30a	8.04	5.88	1.97	19.00	23.00	4.00	X	Bheda	1	7.6	7.6	7.6
147	152	96.05.31	8.02	5.85	2.11	15.00	19.30	4.50	X	Bheda	2	8.3	10.1	9.2
148	153	96.06.01	8.12	6	2.05	12.30	14.00	1.50	X	Bheda	6	5.8	12.5	9.2
149	153	96.06.01a	8.4	6.1	2.05	18.45	22.45	4.00	X	Bheda	6	7.0	8.2	7.6
150	154	96.06.02	8.5	5.8	2.14	19.00	23.00	4.00	X	Bheda	2	10.2	14.4	12.3
154	158	96.06.06	8.68	6.78	1.96	17.00	22.30	5.50	X	Bheda	12	16.9	16.9	16.9
155	159	96.06.07	8.63	6.84	1.89	18.00	22.30	4.50	X	Bheda	3	7.9	11.2	9.6
156	160	96.06.08	8.53	6.85	1.82	8.00	11.00	3.00	X	Bheda	7	10.4	14.8	12.6
157	161	96.06.09	8.51	6.86	1.76	18.30	23.30	5.00	X	Bheda	2	9.6	12.1	10.9
159	163	96.06.11	8.32	6.77	1.69	12.30	15.30	3.00	X	Bheda	4	6.1	7.3	6.7
160	164	96.06.12	8.2	6.77	1.65	12.00	14.00	2.00	X	Bheda	6	4.2	7.6	5.9
161	165	96.06.13	8.07	6.78	1.53	12.00	14.30	2.50	X	Bheda	5	6.0	8.5	7.3
172	173	96.06.21	7.62	6.63	1.18	0.45	7.45	7.00	X	Bheda	1	6.5	6.5	6.5
173	173	96.06.21 a	7.59	6.71	1.18	8.30	13.30	5.00	X	Bheda	1	10.5	10.5	10.5
187	179	96.06.27 a	7.44	6.85	1.02	19.00	8.00(+1)	13.00	X	Bheda	9	4.8	11.6	8.2
192	182	96.06.30	7.38	6.89	0.86	11.00	16.00	5.00	X	Bheda	6	6.4	10.1	8.3
195	183	96.07.01 a	8.05	7.76	0.72	19.00	7.00(+1)	12.00	X	Bheda	27	4.9	8.1	6.5
196	184	96.07.02	8.09	7.39	1.04	10.00	14.00	4.00	X	Bheda	38	5.6	8.9	7.3
200	186	96.07.04	8.87	7.83	1.34	13.00	18.00	5.00	X	Bheda	73	6.8	10.9	8.9
203	187	96.07.05 a	9.02	8.08	1.30	22.00	6.00(+1)	8.00	X	Bheda	14	5.1	8.7	6.9
204	188	96.07.06	9.02	8.1	1.24	11.00	17.00	6.00	X	Bheda	27	9.0	15.1	12.1
211	193	96.07.11	9.01	8.15	1.20	3.00	7.00	4.00	X	Bheda	4	6.2	10.1	8.2
238	210	96.07.28	8.78	8.21	0.94	9.00	12.00	3.00	X	Bheda	7	4.9	5.6	5.3

255s	223	96.08.10s	8.37	8.34	0.19	11.00	14.00	3.00		X	Bheda	1	7.8	7.8	7.8
257s	225	96.08.12s	8.36	8.3	0.19	21.30	24.00	2.50		X	Bheda	14	5.0	6.2	5.6
259s	227	96.08.14s	8.48	8.3	0.42	17.00	22.00	5.00		X	Bheda	1	8.2	8.2	8.2
261s	230	96.08.17s	8.59	8.34	0.58	2.00	5.00	3.00		X	Bheda	1	7.8	7.8	7.8
261ss	230	96.08.17ss	8.67	8.42	0.58	23.00	5.00	6.00		X	Bheda	1	8.1	8.1	8.1
262s	232	96.08.19s	8.78	8.47	0.61	17.00	20.30	3.50		X	Bheda	1	7.3	7.3	7.3
282s	255	96.09.11s	8.37	8.43	-0.42	4.00	7.30	3.50		X	Bheda	11	5.7	6.9	6.3
293s	268	96.09.24s	8.08	8.48	-1.21	8	11.00	3.00		X	Bheda	3	9.3	10.7	10.0
293ss	268	96.09.24ss	8.07	8.47	-1.21	14.3	17.30	3.00		X	Bheda	4	5.3	8.8	7.1
297s	272	96.09.28s	8.02	8.42	-1.21	7	10.00	3.00		X	Bheda	3	9.0	9.4	9.2
299ss	274	96.09.30ss	7.94	8.36	-1.3	18	20.00	2.00		X	Bheda	3	4.1	7.2	5.7
256	224	96.08.11	8.33	8.31	-0.01	17.00	20.30	3.50		X	Bheda	1	5.1	5.1	5.1
268	238	96.08.25	8.87	8.48	0.74	3.00	5.30	2.50		X	Bheda	1	11.3	11.3	11.3
293	268	96.09.24	8.08	8.46	-1.21	11.00	14.00	3.00		X	Bheda	2	9.2	10.1	9.7
127	133	96.05.12	6.47	4.04	1.98	1.00	5.00	4.00		X	Boal	1	25.2	25.2	25.2
130	136	96.05.15	7.23	4.61	2.34	18.00	21.00	3.00		X	Boal	45	8.7	11.0	9.9
135	141	96.05.20a	8.16	5.35	2.31	18.15	22.00	3.75		X	Boal	1	22.7	22.7	22.7
196	184	96.07.02	8.09	7.39	1.04	10.00	14.00	4.00		X	Boal	4	34.3	38.9	36.6
221	199	96.07.17	9.02	8.23	1.08	3.00	6.00	3.00		X	Boal	2	37.4	39.2	38.3
223	200	96.07.18	8.94	8.2	1.09	18.00	22.00	4.00		X	Boal	2	28.6	31.7	30.2
235	207	96.07.25 a	8.94	8.23	1.05	17.30	20.30	3.00		X	Boal	2	35.4	37.8	36.6
254s	221	96.08.08s	8.46	8.36	0.38	17.00	20.00	3.00		X	Boal	1	48.7	48.7	48.7
255s	223	96.08.10s	8.37	8.34	0.19	11.00	14.00	3.00		X	Boal	1	56.2	56.2	56.2
268ss	236	96.08.23ss	8.87	8.51	0.71	13.30	16.00	2.50		X	Boal	1	53.7	53.7	53.7
205	188	96.07.06 a	9.02	8.11	1.24	23.00	5.00(+1)	6.00		X	Boal	2	34.3	35.6	35.0
207	189	96.07.08 a	9.02	8.15	1.23	21.00	1.00(+1)	4.00		X	Boal	2	38.9	41.5	40.2
212	193	96.07.11 a	9.02	8.15	1.20	11.00	14.00	3.00		X	Boal	1	39.3	39.3	39.3
126	132	96.05.11	6.43	4.05	1.87	17.00	20.30	3.50		X	Boicha	1	3.8	3.8	3.8
131	137	96.05.16	8.03	4.98	2.40	13.30	14.30	1.00		X	Boicha	23	4.3	4.8	4.6
132	138	96.05.17	8.26	5.16	2.38	18.00	21.00	3.00		X	Boicha	36	3.8	4.3	4.1
133	139	96.05.18	8.24	5.12	2.39	18.00	21.00	3.00		X	Boicha	17	4.6	5.2	4.9
134	141	96.05.20	8.18	5.34	2.31	13.30	15.30	2.00		X	Boicha	15	5.0	5.5	5.3
135	141	96.05.20a	8.16	5.35	2.31	18.15	22.00	3.75		X	Boicha	13	5.2	6.8	6.0
136	142	96.05.21	8.1	5.37	2.28	18.30	22.30	4.00		X	Boicha	3	4.2	4.4	4.3
140	146	96.05.25	7.53	5.48	2.01	18.00	24.00	6.00		X	Boicha	1	3.8	3.8	3.8
146	151	96.05.30a	8.04	5.88	1.97	19.00	23.00	4.00		X	Boicha	11	3.6	4.1	3.9
148	153	96.06.01	8.12	6	2.05	12.30	14.00	1.50		X	Boicha	7	4.9	5.2	5.1
149	153	96.06.01a	8.4	6.1	2.05	18.45	22.45	4.00		X	Boicha	7	5.0	5.3	5.2
150	154	96.06.02	8.5	5.8	2.14	19.00	23.00	4.00		X	Boicha	16	4.8	6.2	5.5
154	158	96.06.06	8.68	6.78	1.96	17.00	22.30	5.50		X	Boicha	3	6.1	6.8	6.5
155	159	96.06.07	8.63	6.84	1.89	18.00	22.30	4.50		X	Boicha	3	5.3	5.8	5.6
157	161	96.06.09	8.51	6.86	1.76	18.30	23.30	5.00		X	Boicha	3	4.8	5.4	5.1
163	166	96.06.14 a	7.96	6.76	1.47	18.00	23.00	5.00		X	Boicha	3	4.5	5.1	4.8
125	94	96.04.03	7.22	4.42	2.39	10.30	10.40	0.17		X	Chanda	28	4.1	5.4	4.8

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126	132	96.05.11	6.43	4.05	1.87	17.00	20.30	3.50	X	Chanda	210	3.5	4.7	4.1
127	133	96.05.12	6.47	4.04	1.98	1.00	5.00	4.00	X	Chanda	462	3.6	4.6	4.1
128	133	96.05.12a	6.6	4.72	1.98	12.00	14.00	2.00	X	Chanda	353	3.7	4.8	4.3
129	134	96.05.13	6.85	4.61	2.12	12.45	14.00	1.25	X	Chanda	325	4.7	5.7	5.2
130	136	96.05.15	7.23	4.61	2.34	18.00	21.00	3.00	X	Chanda	1680	5.0	5.6	5.3
131	137	96.05.16	8.03	4.98	2.40	13.30	14.30	1.00	X	Chanda	217	4.5	5.7	5.1
132	138	96.05.17	8.26	5.16	2.38	18.00	21.00	3.00	X	Chanda	915	3.8	4.9	4.4
133	139	96.05.18	8.24	5.12	2.39	18.00	21.00	3.00	X	Chanda	788	3.9	5.3	4.6
134	141	96.05.20	8.18	5.34	2.31	13.30	15.30	2.00	X	Chanda	185	5.1	6.2	5.7
135	141	96.05.20a	8.16	5.35	2.31	18.15	22.00	3.75	X	Chanda	502	3.5	4.9	4.2
136	142	96.05.21	8.1	5.37	2.28	18.30	22.30	4.00	X	Chanda	312	4.5	5.2	4.9
140	146	96.05.25	7.53	5.48	2.01	18.00	24.00	6.00	X	Chanda	65	4.1	5.4	4.8
141	147	96.05.26	7.56	5.46	2.04	18.30	22.30	2.00	X	Chanda	44	4.5	6.5	5.5
142	149	96.05.28	7.47	5.51	1.97	7.00	9.00	2.00	X	Chanda	36	4.5	7.8	6.2
143	149	96.05.28a	7.57	5.53	1.97	19.00	23.00	4.00	X	Chanda	89	4.2	6.3	5.3
144	150	96.05.29	7.7	5.75	2.01	11.30	13.45	2.25	X	Chanda	31	4.8	7.5	6.2
145	151	96.05.30	7.84	5.82	1.97	9.00	12.00	3.00	X	Chanda	169	4.3	5.6	5.0
146	151	96.05.30a	8.04	5.88	1.97	19.00	23.00	4.00	X	Chanda	85	3.8	4.9	4.4
147	152	96.05.31	8.02	5.85	2.11	15.00	19.30	4.50	X	Chanda	204	3.7	5.9	4.8
148	153	96.06.01	8.12	6	2.05	12.30	14.00	1.50	X	Chanda	58	3.4	5.9	4.7
149	153	96.06.01a	8.4	6.1	2.05	18.45	22.45	4.00	X	Chanda	125	4.2	6.1	5.2
150	154	96.06.02	8.5	5.8	2.14	19.00	23.00	4.00	X	Chanda	207	4.5	6.8	5.7
154	158	96.06.06	8.68	6.78	1.96	17.00	22.30	5.50	X	Chanda	150	4.2	5.3	4.8
155	159	96.06.07	8.63	6.84	1.89	18.00	22.30	4.50	X	Chanda	78	4.6	5.2	4.9
156	160	96.06.08	8.53	6.85	1.82	8.00	11.00	3.00	X	Chanda	97	5.1	6.3	5.7
157	161	96.06.09	8.51	6.86	1.76	18.30	23.30	5.00	X	Chanda	106	4.4	6.1	5.3
159	163	96.06.11	8.32	6.77	1.69	12.30	15.30	3.00	X	Chanda	28	3.7	5.1	4.4
160	164	96.06.12	8.2	6.77	1.65	12.00	14.00	2.00	X	Chanda	38	3.3	5.7	4.5
161	165	96.06.13	8.07	6.78	1.53	12.00	14.30	2.50	X	Chanda	44	3.6	5.1	4.4
163	166	96.06.14 a	7.96	6.76	1.47	18.00	23.00	5.00	X	Chanda	78	4.0	6.5	5.3
164	167	96.06.15	7.83	6.72	1.41	10.00	14.00	4.00	X	Chanda	48	2.5	5.9	4.2
166	169	96.06.17	7.68	6.65	1.35	13.00	19.00	6.00	X	Chanda	21	5.3	6.1	5.7
168	171	96.06.19	7.57	6.69	1.17	18.00	22.00	4.00	X	Chanda	28	2.7	6.1	4.4
171	172	96.06.20 b	7.62	6.61	1.25	18.30	23.30	5.00	X	Chanda	69	4.9	6.6	5.8
172	173	96.06.21	7.62	6.63	1.18	0.45	7.45	7.00	X	Chanda	66	4.3	6.2	5.3
173	173	96.06.21 a	7.59	6.71	1.18	8.30	13.30	5.00	X	Chanda	18	3.2	6.1	4.7
174	173	96.06.21 b	7.56	6.71	1.18	14.00	18.30	4.50	x	Chanda	12	4.7	5.6	5.2
175	173	96.06.21 c	7.52	6.72	1.18	19.00	23.30	4.50	X	Chanda	38	2.6	6.1	4.4
176	174	96.06.22	7.48	6.7	1.13	0.30	8.00	7.50	X	Chanda	62	5.3	5.7	5.5
177s	174	96.06.22s	7.45	6.72	1.13	8.30	18.00	9.50	X	Chanda	49	4.8	5.6	5.2
179	175	96.06.23 a	7.45	6.77	1.11	19.00	6.30(+1)	11.50	X	Chanda	47	4.1	6.2	5.2
180	176	96.06.24	7.55	6.79	1.11	9.00	17.00	8.00	X	Chanda	30	3.5	5.9	4.7
183	177	96.06.25 a	7.54	6.83	1.09	21.00	8.00	11.00	X	Chanda	11	3.2	5.3	4.3
184	178	96.06.26	7.52	6.84	1.05	12.00	17.00	5.00	X	Chanda	44	3.9	5.8	4.9

187	179	96.06.27 a	7.44	6.85	1.02	19.00	8.00(+1)	13.00	X	Chanda	78	3.1	5.8	4.5
188	180	96.06.28	7.44	6.85	0.95	12.00	15.00	3.00	X	Chanda	17	3.1	5.8	4.5
191	181	96.06.29 a	7.4	6.87	0.91	20.00	7.00(+1)	11.00	X	Chanda	153	2.9	7.1	5.0
192	182	96.06.30	7.38	6.89	0.86	11.00	16.00	5.00	X	Chanda	29	3.9	6.2	5.1
195	183	96.07.01 a	8.05	7.76	0.72	19.00	7.00(+1)	12.00	X	Chanda	4260	3.1	5.8	4.5
196	184	96.07.02	8.09	7.39	1.04	10.00	14.00	4.00	X	Chanda	1245	3.2	5.9	4.6
199	185	96.07.03 a	8.73	7.77	1.23	23.00	5.00(+1)	6.00	X	Chanda	3520	2.9	5.6	4.3
200	186	96.07.04	8.87	7.83	1.34	13.00	18.00	5.00	X	Chanda	1064	3.1	6.2	4.7
203	187	96.07.05 a	9.02	8.08	1.30	22.00	6.00(+1)	8.00	X	Chanda	2750	4.0	5.8	4.9
204	188	96.07.06	9.02	8.1	1.24	11.00	17.00	6.00	X	Chanda	1171	4.0	6.8	5.4
210	192	96.07.10 a	9	8.15	1.19	10.30	13.00	2.50	X	Chanda	212	4.8	6.3	5.6
211	193	96.07.11	9.01	8.15	1.20	3.00	7.00	4.00	X	Chanda	741	2.8	5.9	4.4
213	193	96.07.11 b	9.02	8.15	1.20	22.00	1.00(+1)	3.00	X	Chanda	821	4.1	6.4	5.3
214	195	96.07.13	9	8.15	1.19	3.00	7.00	4.00	X	Chanda	831	3.0	6.1	4.6
215	195	96.07.13 a	9	8.15	1.19	10.00	13.00	3.00	X	Chanda	874	4.6	5.7	5.2
216	196	96.07.14	9	8.45	1.18	0.30	5.00	4.50	X	Chanda	1290	3.7	6.8	5.3
220	198	96.07.16 a	9	8.22	1.14	13.00	16.00	3.00	X	Chanda	74	5.2	6.2	5.7
221	199	96.07.17	9.02	8.23	1.08	3.00	6.00	3.00	X	Chanda	247	5.2	6.1	5.7
223	200	96.07.18	8.94	8.2	1.09	18.00	22.00	4.00	X	Chanda	172	3.5	5.1	4.3
224	200	96.07.18 a	8.94	8.19	1.09	10.00	12.00	2.00	X	Chanda	140	3.7	5.2	4.5
227	202	96.07.20	8.95	8.2	1.08	2.00	5.00	3.00	X	Chanda	171	3.2	5.2	4.2
228	202	96.07.20 a	8.95	8.2	1.08	12.00	14.00	2.00	X	Chanda	141	3.4	5.2	4.3
231	205	96.07.23	8.91	8.22	1.06	5.00	8.00	3.00	X	Chanda	73	3.6	5.3	4.5
232	206	96.07.24	8.92	8.22	1.05	21.00	24.00	3.00	X	Chanda	74	3.9	5.5	4.7
234	207	96.07.25	8.91	8.22	1.05	7.00	10.00	3.00	X	Chanda	78	3.7	5.6	4.7
235	207	96.07.25 a	8.94	8.23	1.05	17.30	20.30	3.00	X	Chanda	145	3.7	5.5	4.6
237	209	96.07.27	8.89	8.22	1.02	3.00	7.00	4.00	X	Chanda	170	3.6	5.9	4.8
238	210	96.07.28	8.78	8.21	0.94	9.00	12.00	3.00	X	Chanda	172	4.1	5.4	4.8
242	212	96.07.30	8.69	8.21	0.84	11.00	13.00	2.00	X	Chanda	45	3.8	6.1	5.0
243	213	96.07.31	8.78	8.23	0.91	20.00	24.00	4.00	X	Chanda	78	6.2	6.8	6.5
246	215	96.08.02	8.75	8.25	0.85	3.00	7.00	4.00	X	Chanda	83	4.7	6.3	5.5
254s	221	96.08.08s	8.46	8.36	0.38	17.00	20.00	3.00	X	Chanda	23	3.4	5.2	4.3
255s	223	96.08.10s	8.37	8.34	0.19	11.00	14.00	3.00	X	Chanda	40	3.1	6.1	4.6
255ss	223	96.08.10ss	8.35	8.32	0.19	17.00	20.00	3.00	X	Chanda	45	2.9	5.9	4.4
257s	225	96.08.12s	8.36	8.3	0.19	21.30	24.00	2.50	X	Chanda	77	3.0	6.2	4.6
258s	226	96.08.13s	8.4	8.31	0.31	6.00	9.00	3.00	X	Chanda	47	3.6	6.1	4.9
259s	227	96.08.14s	8.48	8.3	0.42	17.00	22.00	5.00	X	Chanda	37	3.3	5.8	4.6
259ss	228	96.08.15ss	8.49	8.31	0.47	9.00	11.00	2.00	X	Chanda	84	3.0	5.2	4.1
261ss	230	96.08.17ss	8.67	8.42	0.58	23.00	5.00	6.00	X	Chanda	72	3.4	5.7	4.6
262s	232	96.08.19s	8.78	8.47	0.61	17.00	20.30	3.50	X	Chanda	190	3.1	5.6	4.4
266s	236	96.08.23s	8.87	8.51	0.71	8.00	10.30	2.50	X	Chanda	144	4.6	5.8	5.2
268s	239	96.08.26s	8.85	8.46	0.74	18.30	21.30	3.00	X	Chanda	36	5.4	6.0	5.7
270s	242	96.08.29s	8.73	8.43	0.64	7.00	11.00	4.00	X	Chanda	40	4.8	5.0	4.9
273s	246	96.09.02s	8.64	8.46	0.48	9.00	12.30	3.50	X	Chanda	88	4.7	5.8	5.3

272

275s	248	96.09.04s	8.6	8.43	0.48	15.00	18.00	3.00		X	Chanda	42	3.6	5.2	4.4
277s	250	96.09.06s	8.56	8.42	0.40	3.00	6.00	3.00		X	Chanda	85	3.9	5.4	4.7
277ss	250	96.09.06ss	8.57	8.41	0.40	17.00	20.00	3.00		X	Chanda	83	3.7	4.9	4.3
279s	252	96.09.08s	8.57	8.45	0.37	2.00	5.00	3.00		X	Chanda	43	4.0	4.7	4.4
282s	255	96.09.11s	8.37	8.43	-0.42	4.00	7.30	3.50		X	Chanda	82	3.8	6.1	5.0
286s	260	96.09.16s	7.94	8.34	-1.30	3.00	7.00	4.00		X	Chanda	156	4.8	7.2	6.0
287s	262	96.09.18s	7.77	8.29	-1.53	6.00	8.00	2.00		X	Chanda	77	4.3	5.8	5.1
289s	264	96.09.20s	7.76	8.33	-1.58	18.00	21.00	3.00		X	Chanda	89	6.8	9.7	8.3
293s	268	96.09.24s	8.08	8.48	-1.21	8	11.00	3.00		X	Chanda	220	3.2	6.2	4.7
293ss	268	96.09.24ss	8.07	8.47	-1.21	14.3	17.30	3.00		X	Chanda	210	4.3	5.8	5.1
295s	270	96.09.26s	8.01	8.46	-1.32	1	5.00	4.00		X	Chanda	160	4.5	7.1	5.8
295ss	270	96.09.26ss	7.97	8.44	-1.32	18.3	21.30	3.00		X	Chanda	150	4.2	6.7	5.5
297s	272	96.09.28s	8.02	8.42	-1.21	7	10.00	3.00		X	Chanda	206	4.0	6.4	5.2
299s	274	96.09.30s	7.93	8.37	-1.3	7	10.00	3.00		X	Chanda	265	3.0	6.7	4.9
299ss	274	96.09.30ss	7.94	8.36	-1.3	18	20.00	2.00		X	Chanda	107	3.7	6.4	5.1
300s	276	96.10.02s	7.87	8.3	-1.24	14	16.00	2.00		X	Chanda	28	4.5	4.8	4.7
301s	278	96.10.04s	7.74	8.23	-1.42	22	24.00	2.00		X	Chanda	18	4.1	5.2	4.7
302s	279	96.10.05s	7.84	8.24	-1.32	15	16.30	1.50		X	Chanda	18	5.3	6.6	6.0
303s	281	96.10.07s	8.06	8.28	-0.82	11	13.00	2.00		X	Chanda	13	4.0	6.3	5.2
305ss	284	96.10.10ss	7.93	8.24	-1.01	4.3	6.30	2.00		X	Chanda	11	4.0	6.2	5.1
306s	286	96.10.12s	7.77	8.19	-1.26	13	15.00	2.00		X	Chanda	13	4.0	5.8	4.9
307s	288	96.10.14s	7.59	8.1	-1.4	11.3	13.30	2.00		X	Chanda	11	3.8	6.1	5.0
309	292	96.10.18	7.08	7.9	-2.03	10	12.30	2.50		X	Chanda	23	3.8	5.7	4.8
310	294	96.10.20	6.97	7.85	-2.14	8	10.00	2.00		X	Chanda	19	4.0	5.7	4.9
311	295	96.10.21	6.88	7.76	-2.14	17.3	20.00	2.50		X	Chanda	18	3.8	5.2	4.5
312	297	96.10.23	6.54	7.63	-2.49	7	9.00	2.00		X	Chanda	14	4.2	6.3	5.3
313	305	96.10.31	6.64	7.35	-1.83	9.3	12.00	3.00		X	Chanda	15	4.0	6.6	5.3
314	307	96.11.02	6.72	7.24	-1.49	18	20.30	2.50		X	Chanda	18	3.2	6.5	4.9
315	309	96.11.04	6.7	7.16	-1.28	17.3	22.30	5.00		X	Chanda	58	5.2	3.8	4.5
316	310	96.11.05	6.62	7.11	-1.38	17.3	22.15	4.75		X	Chanda	58	4.7	6.5	5.6
151	155	96.06.03	8.66	6.63	2.09	18.30	22.30	4.00	X		Chanda	8	4.6	5.4	5.0
152	156	96.06.04	8.61	6.51	2.05	13.00	16.00	3.00	X		Chanda	23	4.2	5.8	5.0
158	162	96.06.10	8.42	6.81	1.73	12.30	15.30	3.00	X		Chanda	11	3.7	5.4	4.6
162	166	96.06.14	7.96	6.76	1.47	15.00	18.00	3.00	X		Chanda	12	4.2	5.6	4.9
169	172	96.06.20	7.57	6.69	1.25	0.00	7.00	7.00	X		Chanda	8	5.5	6.2	5.8
170	172	96.06.20 a	7.62	6.61	1.25	13.00	18.00	5.00	X		Chanda	7	5.0	5.9	5.5
178	175	96.06.23	7.47	6.75	1.11	10.00	18.00	8.00	X		Chanda	13	5.4	6.2	5.8
181	176	96.06.24 a	7.55	6.8	1.11	21.00	7.00(+1)	10.00	X		Chanda	10	3.4	5.6	4.5
182	177	96.06.25	7.56	6.82	1.09	9.00	15.00	6.00	X		Chanda	12	3.2	5.6	4.4
186	179	96.06.27	7.44	6.85	1.02	9.00	17.00	8.00	X		Chanda	19	4.1	6.1	5.1
189	180	96.06.28 a	7.42	6.85	0.95	20.00	6.00	10.00	X		Chanda	18	3.5	5.9	4.7
190	181	96.06.29	7.41	6.86	0.91	10.00	16.00	6.00	X		Chanda	16	3.5	5.3	4.4
193	182	96.06.30 a	7.39	6.93	0.86	20.00	7.00(+1)	11.00	X		Chanda	18	3.2	5.9	4.6
194	183	96.07.01	7.48	7.11	0.72	12.00	17.00	5.00	X		Chanda	970	3.9	6.2	5.1

197	184	96.07.02 a	8.38	7.54	1.04	23.00	7.00(+1)	8.00	X	Chanda	1223	4.1	6.2	5.2
198	185	96.07.03	8.52	7.62	1.23	9.00	17.00	8.00	X	Chanda	587	4.1	6.2	5.2
201	186	96.07.04 a	8.93	7.9	1.34	22.00	5.00(+1)	7.00	X	Chanda	726	4.3	6.2	5.3
202	187	96.07.05	8.99	8	1.30	10.00	16.00	6.00	X	Chanda	479	3.8	5.9	4.9
205	188	96.07.06 a	9.02	8.11	1.24	23.00	5.00(+1)	6.00	X	Chanda	816	4.0	5.9	5.0
207	189	96.07.08 a	9.02	8.15	1.23	21.00	1.00(+1)	4.00	X	Chanda	810	6.4	6.7	6.6
208	191	96.07.09	9.01	8.15	1.19	13.00	15.00	2.00	X	Chanda	183	5.2	5.7	5.5
209	192	96.07.10	9.01	8.15	1.19	4.00	7.00	3.00	X	Chanda	128	5.1	6.3	5.7
212	193	96.07.11 a	9.02	8.15	1.20	11.00	14.00	3.00	X	Chanda	177	4.5	6.3	5.4
217	196	96.07.14 a	8.96	8.18	1.18	18.00	22.00	4.00	X	Chanda	78	4.8	6.3	5.6
218	197	96.07.15	8.96	8.19	1.14	10.00	12.00	2.00	X	Chanda	76	4.7	6.5	5.6
222	199	96.07.17 a	8.95	8.22	1.08	12.30	15.30	3.00	X	Chanda	9	3.8	5.1	4.5
225	201	96.07.19	8.93	8.2	1.08	4.00	7.00	3.00	X	Chanda	16	3.7	5.3	4.5
226	201	96.07.19 a	8.93	8.2	1.08	13.00	16.00	3.00	X	Chanda	24	3.8	5.1	4.5
229	203	96.07.21	8.95	8.22	1.07	19.00	22.30	3.50	X	Chanda	72	3.7	5.0	4.4
230	204	96.07.22	8.93	8.22	1.07	3.00	6.00	3.00	X	Chanda	73	3.5	5.5	4.5
233	206	96.07.24 a	8.91	8.22	1.05	10.00	12.00	2.00	X	Chanda	8	3.7	5.0	4.4
240	211	96.07.29	8.72	8.21	0.88	12.00	15.30	3.50	X	Chanda	33	3.6	5.1	4.4
241	211	96.07.29 a	8.71	8.21	0.88	22.00	0.30	2.50	X	Chanda	4	3.6	5.3	4.5
244	214	96.08.01	8.78	8.23	0.91	10.00	12.00	2.00	X	Chanda	36	4.8	6.6	5.7
248	216	96.08.03	8.72	8.27	0.81	7.00	10.30	3.50	X	Chanda	12	6.0	6.5	6.3
250	217	96.08.04	8.62	8.29	0.67	2.00	5.30	3.50	X	Chanda	26	5.5	6.2	5.9
251	218	96.08.05	8.63	8.38	0.56	18.30	22.00	3.50	X	Chanda	27	3.7	5.3	4.5
252	219	96.08.06	8.63	8.38	0.56	2.00	6.00	4.00	X	Chanda	14	3.9	5.9	4.9
254	221	96.08.08	8.46	8.36	0.38	17.00	20.00	3.00	X	Chanda	15	3.4	5.2	4.3
255	222	96.08.09	8.4	8.35	0.27	18.00	22.00	4.00	X	Chanda	16	3.7	5.7	4.7
256	224	96.08.11	8.33	8.31	-0.01	17.00	20.30	3.50	X	Chanda	47	2.1	7.4	4.8
258	226	96.08.13	8.44	8.31	0.31	23.30	2.00	3.50	X	Chanda	15	3.2	5.3	4.3
259	227	96.08.14	8.46	8.31	0.42	11.00	13.00	2.00	X	Chanda	14	3.4	5.8	4.6
260	229	96.08.16	8.51	8.32	0.50	3.00	6.30	3.50	X	Chanda	19	3.1	5.7	4.4
261	229	96.08.16 a	8.53	8.33	0.50	16.30	20.00	3.50	X	Chanda	19	3.8	5.7	4.8
262	231	96.08.18	8.76	8.45	0.58	21.00	24.00	3.00	X	Chanda	18	3.1	5.8	4.5
263	233	96.08.20	8.8	8.48	0.65	16.30	20.30	4.00	X	Chanda	41	3.0	6.2	4.6
264	234	96.08.21	8.81	8.5	0.65	2.30	5.00	2.50	X	Chanda	15	3.7	6.2	5.0
265	234	96.08.21 a	8.82	8.51	0.65	9.00	12.00	3.00	X	Chanda	12	4.7	5.4	5.1
266	235	96.08.22	8.82	8.52	0.70	11.00	14.30	3.50	X	Chanda	15	4.9	5.2	5.1
267	237	96.08.24	8.87	8.49	0.73	20.00	23.00	3.00	X	Chanda	19	5.1	6.2	5.7
270	241	96.08.28	8.77	8.43	0.68	17.00	20.00	3.00	X	Chanda	17	5.2	5.9	5.6
271	243	96.08.30	8.73	8.48	0.57	13.00	16.30	3.50	X	Chanda	17	6.0	6.8	6.4
272	244	96.08.31	8.69	8.49	0.50	9.00	12.00	3.00	X	Chanda	16	4.6	5.8	5.2
273	245	96.09.01	8.66	8.48	0.47	21.00	24.00	3.00	X	Chanda	19	4.4	5.3	4.9
274	247	96.09.03	8.63	8.44	0.48	19.00	22.00	3.00	X	Chanda	17	4.3	5.6	5.0
275	248	96.09.04	8.62	8.43	0.48	3.00	6.00	3.00	X	Chanda	16	5.1	6.2	5.7
276	249	96.09.05	8.57	8.43	0.40	3.00	6.00	3.00	X	Chanda	15	3.7	5.8	4.8

832

277	249	96.09.05 a	8.56	8.42	0.40	13.00	16.00	3.00	X		Chanda	23	4.0	5.3	4.7
278	251	96.09.07	8.57	8.45	0.37	3.30	6.30	3.00	X		Chanda	12	4.0	4.6	4.3
279	251	96.09.07 a	8.57	8.45	0.37	18.30	21.30	3.00	X		Chanda	23	4.0	4.6	4.3
280	253	96.09.09	8.5	8.44	0.24	9.00	12.30	3.50	X		Chanda	18	4.1	5.6	4.9
282	255	96.09.11	8.34	8.43	-0.42	15.00	18.30	3.50	X		Chanda	19	4.3	4.6	4.5
284	257	96.09.13	8.17	8.41	-0.84	2.30	5.30	3.00	X		Chanda	23	4.1	6.1	5.1
285	258	96.09.14	8.08	8.38	-0.99	18.30	21.30	2.50	X		Chanda	29	5.1	6.2	5.7
286	260	96.09.16	7.89	8.33	-1.30	15.30	18.00	2.50	X		Chanda	26	4.2	6.1	5.2
287	261	96.09.17	7.84	8.32	-1.38	4.00	7.30	3.50	X		Chanda	16	4.3	5.6	5.0
288	263	96.09.19	7.8	8.35	-1.62	17.00	21.00	4.00	X		Chanda	21	5.2	5.8	5.5
289	264	96.09.20	7.76	8.86	-1.58	3.00	7.00	4.00	X		Chanda	21	4.5	5.9	5.2
290	265	96.09.21	7.78	8.36	-1.58	1.00	5.00	4.00	X		Chanda	25	4.2	6.9	5.6
291	266	96.09.22	7.97	8.43	-1.34	5.00	7.30	2.50	X		Chanda	14	5.2	6.9	6.1
294	269	96.09.25	8.05	8.47	-1.26	0.30	4.30	4.00	X		Chanda	105	3.5	6.2	4.9
296	271	96.09.27	7.96	8.43	-1.36	10.30	13.30	3.00	X		Chanda	185	2.8	7.9	5.4
297	271	96.09.27 a	7.97	8.43	-1.36	20.00	23.00	3.00	X		Chanda	96	3.6	6.2	4.9
298	273	96.09.29	7.98	8.41	-1.28	4.00	7.00	3.00	X		Chanda	147	2.9	6.9	4.9
299	273	96.09.29 a	7.96	8.39	-1.28	15.00	18.00	3.00	X		Chanda	78	3.1	6.3	4.7
300	275	96.10.01	7.95	8.35	-1.21	9.00	11.00	2.00	X		Chanda	45	4.3	5.7	5.0
301	277	96.10.03	7.79	8.26	-1.36	19.00	21.30	2.50	X		Chanda	22	4.8	5.5	5.2
302	279	96.10.05	7.76	8.23	-1.32	3.00	6.00	3.00	X		Chanda	14	3.8	5.7	4.8
303	280	96.10.06	7.94	8.27	-0.94	7.00	9.00	2.00	X		Chanda	11	3.7	6.5	5.1
304	282	96.10.08	8.03	8.28	-0.82	15.00	17.00	2.00	X		Chanda	12	3.1	5.3	4.2
305	283	96.10.09	7.95	8.25	-0.94	17.30	19.30	2.00	X		Chanda	4	4.0	5.4	4.7
306	285	96.10.11	7.85	8.2	-1.1	9	11.00	2.00	X		Chanda	7	3.9	5.7	4.8
307	287	96.10.13	7.62	8.1	-1.36	22	24.00	2.00	X		Chanda	7	4.0	5.2	4.6
308	289	96.10.15	7.51	8.07	-1.58	0.3	2.30	2.00	X		Chanda	3	3.9	5.8	4.9
309s	293	96.10.19s	7	7.87	-2.12	15	17.30	2.50	X		Chanda	13	3.6	5.2	4.4
311s	295	96.10.21s	6.95	7.83	-2.14	2.3	5.00	2.50	X		Chanda	15	4.1	5.7	4.9
311ss	296	96.10.22ss	6.62	7.7	-2.47	6	8.00	2.00	X		Chanda	14	4.1	6.1	5.1
313s	306	96.11.01s	6.77	7.32	-1.53	6	8.30	2.50	X		Chanda	17	4.1	6.7	5.4
316s	310	96.11.05s	6.66	7.14	-1.38	7.3	10.30	3.00	X		Chanda	66	4.6	5.6	5.1
126	132	96.05.11	6.43	4.05	1.87	17.00	20.30	3.50		X	Chapla	15	6.8	11.8	9.3
127	133	96.05.12	6.47	4.04	1.98	1.00	5.00	4.00		X	Chapla	33	6.5	11.6	9.1
128	133	96.05.12a	6.6	4.72	1.98	12.00	14.00	2.00		X	Chapla	65	5.3	6.5	5.9
129	134	96.05.13	6.85	4.61	2.12	12.45	14.00	1.25		X	Chapla	7	6.2	11.0	8.6
132	138	96.05.17	8.26	5.16	2.38	18.00	21.00	3.00		X	Chapla	1	7.3	7.3	7.3
133	139	96.05.18	8.24	5.12	2.39	18.00	21.00	3.00		X	Chapla	47	5.2	9.1	7.2
134	141	96.05.20	8.18	5.34	2.31	13.30	15.30	2.00		X	Chapla	4	6.8	8.2	7.5
135	141	96.05.20a	8.16	5.35	2.31	18.15	22.00	3.75		X	Chapla	39	5.7	7.9	6.8
136	142	96.05.21	8.1	5.37	2.28	18.30	22.30	4.00		X	Chapla	3	5.2	6.1	5.7
140	146	96.05.25	7.53	5.48	2.01	18.00	24.00	6.00		X	Chapla	2	3.7	3.9	3.8
141	147	96.05.26	7.56	5.46	2.04	18.30	22.30	2.00		X	Chapla	6	4.0	7.0	5.5
142	149	96.05.28	7.47	5.51	1.97	7.00	9.00	2.00		X	Chapla	7	9.9	12.0	11.0

143	149	96.05.28a	7.57	5.53	1.97	19.00	23.00	4.00		X	Chapila		9	8.3	13.2	10.8
145	151	96.05.30	7.84	5.82	1.97	9.00	12.00	3.00		X	Chapila		10	4.8	5.7	5.3
146	151	96.05.30a	8.04	5.88	1.97	19.00	23.00	4.00		X	Chapila		3	4.2	6.3	5.3
147	152	96.05.31	8.02	5.85	2.11	15.00	19.30	4.50		X	Chapila		14	7.2	8.5	7.9
154	158	96.06.06	8.68	6.78	1.96	17.00	22.30	5.50		X	Chapila		13	6.0	14.1	10.1
155	159	96.06.07	8.63	6.84	1.89	18.00	22.30	4.50		X	Chapila		7	4.3	14.7	9.5
157	161	96.06.09	8.51	6.86	1.76	18.30	23.30	5.00		X	Chapila		6	6.3	15.0	10.7
163	166	96.06.14 a	7.96	6.76	1.47	18.00	23.00	5.00		X	Chapila		40	4.5	9.5	7.0
164	167	96.06.15	7.83	6.72	1.41	10.00	14.00	4.00		X	Chapila		36	4.1	12.2	8.2
166	169	96.06.17	7.68	6.65	1.35	13.00	19.00	6.00		X	Chapila		2	4.8	5.6	5.2
168	171	96.06.19	7.57	6.69	1.17	18.00	22.00	4.00		X	Chapila		16	4.5	13.6	9.1
171	172	96.06.20 b	7.62	6.61	1.25	18.30	23.30	5.00		X	Chapila		4	6.6	9.0	7.8
172	173	96.06.21	7.62	6.63	1.18	0.45	7.45	7.00		X	Chapila		1	9.1	9.1	9.1
175	173	96.06.21 c	7.52	6.72	1.18	19.00	23.30	4.50		X	Chapila		9	3.9	10.2	7.1
176	174	96.06.22	7.48	6.7	1.13	0.30	8.00	7.50		X	Chapila		8	5.7	8.3	7.0
179	175	96.06.23 a	7.45	6.77	1.11	19.00	6.30(+1)	11.50		X	Chapila		62	5.1	10.2	7.7
180	176	96.06.24	7.55	6.79	1.11	9.00	17.00	8.00		X	Chapila		40	3.7	8.6	6.2
183	177	96.06.25 a	7.54	6.83	1.09	21.00	8.00	11.00		X	Chapila		8	4.1	7.7	5.9
184	178	96.06.26	7.52	6.84	1.05	12.00	17.00	5.00		X	Chapila		13	5.2	9.5	7.4
187	179	96.06.27 a	7.44	6.85	1.02	19.00	8.00(+1)	13.00		X	Chapila		18	6.8	8.9	7.9
188	180	96.06.28	7.44	6.85	0.95	12.00	15.00	3.00		X	Chapila		8	4.3	9.2	6.8
191	181	96.06.29 a	7.4	6.87	0.91	20.00	7.00(+1)	11.00		X	Chapila		51	5.8	11.5	8.7
192	182	96.06.30	7.38	6.89	0.86	11.00	16.00	5.00		X	Chapila		9	4.4	9.3	6.9
195	183	96.07.01 a	8.05	7.76	0.72	19.00	7.00(+1)	12.00		X	Chapila		880	3.2	9.6	6.4
196	184	96.07.02	8.09	7.39	1.04	10.00	14.00	4.00		X	Chapila		146	3.7	10.9	7.3
199	185	96.07.03 a	8.73	7.77	1.23	23.00	5.00(+1)	6.00		X	Chapila		227	6.5	9.8	8.2
203	187	96.07.05 a	9.02	8.08	1.30	22.00	6.00(+1)	8.00		X	Chapila		121	4.2	9.6	6.9
204	188	96.07.06	9.02	8.1	1.24	11.00	17.00	6.00		X	Chapila		213	5.0	9.1	7.1
206	189	96.07.08	9.02	8.15	1.23	2.00	6.00	4.00		X	Chapila		85	8.8	10.7	9.8
211	193	96.07.11	9.01	8.15	1.20	3.00	7.00	4.00		X	Chapila		125	6.1	10.8	8.5
213	193	96.07.11 b	9.02	8.15	1.20	22.00	1.00(+1)	3.00		X	Chapila		37	5.2	10.1	7.7
214	195	96.07.13	9	8.15	1.19	3.00	7.00	4.00		X	Chapila		73	6.2	10.1	8.2
215	195	96.07.13 a	9	8.15	1.19	10.00	13.00	3.00		X	Chapila		144	6.1	16.2	11.2
216	196	96.07.14	9	8.45	1.18	0.30	5.00	4.50		X	Chapila		170	4.8	7.6	6.2
219	198	96.07.16	8.96	8.2	1.14	1.00	5.00	4.00		X	Chapila		12	3.0	7.6	5.3
221	199	96.07.17	9.02	8.23	1.08	3.00	6.00	3.00		X	Chapila		23	7.1	10.3	8.7
237	209	96.07.27	8.89	8.22	1.02	3.00	7.00	4.00		X	Chapila		47	4.3	8.1	6.2
238	210	96.07.28	8.78	8.21	0.94	9.00	12.00	3.00		X	Chapila		43	4.4	8.0	6.2
242	212	96.07.30	8.69	8.21	0.84	11.00	13.00	2.00		X	Chapila		12	3.7	4.3	4.0
243	213	96.07.31	8.78	8.23	0.91	20.00	24.00	4.00		X	Chapila		13	8.3	12.2	10.3
255ss	223	96.08.10ss	8.35	8.32	0.19	17.00	20.00	3.00		X	Chapila		12	4.2	7.9	6.1
257s	225	96.08.12s	8.36	8.3	0.19	21.30	24.00	2.50		X	Chapila		29	4.3	7.9	6.1
261ss	230	96.08.17ss	8.67	8.42	0.58	23.00	5.00	6.00		X	Chapila		16	4.0	7.9	6.0
262s	232	96.08.19s	8.78	8.47	0.61	17.00	20.30	3.50		X	Chapila		17	5.0	7.8	6.4

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266s	236	96.08.23s	8.87	8.51	0.71	8.00	10.30	2.50		X	Chapila	11	5.3	5.4	5.4
268s	239	96.08.26s	8.85	8.46	0.74	18.30	21.30	3.00		X	Chapila	43	4.7	5.5	5.1
285s	259	96.09.15s	8.04	8.37	-1.10	10.00	12.30	2.50		X	Chapila	13	6.8	15.0	10.9
286s	260	96.09.16s	7.94	8.34	-1.30	3.00	7.00	4.00		X	Chapila	33	6.8	10.3	8.6
293ss	268	96.09.24ss	8.07	8.47	-1.21	14.3	17.30	3.00		X	Chapila	3	5.6	7.9	6.8
295s	270	96.09.26s	8.01	8.46	-1.32	1	5.00	4.00		X	Chapila	3	9.0	11.0	10.0
295ss	270	96.09.26ss	7.97	8.44	-1.32	18.3	21.30	3.00		X	Chapila	4	6.1	9.5	7.8
297ss	272	96.09.28ss	8.02	8.42	-1.21	18.3	21.30	3.00		X	Chapila	1	9.8	9.8	9.8
299s	274	96.09.30s	7.93	8.37	-1.3	7	10.00	3.00		X	Chapila	11	6.0	7.2	6.6
299ss	274	96.09.30ss	7.94	8.36	-1.3	18	20.00	2.00		X	Chapila	5	5.0	7.9	6.5
305s	283	96.10.09s	7.97	8.27	-0.94	1	3.30	2.50		X	Chapila	6	5.8	7.3	6.6
307s	288	96.10.14s	7.59	8.1	-1.4	11.3	13.30	2.00		X	Chapila	3	6.0	7.4	6.7
310	294	96.10.20	6.97	7.85	-2.14	8	10.00	2.00		X	Chapila	3	5.2	6.9	6.1
315	309	96.11.04	6.7	7.16	-1.28	17.3	22.30	5.00		X	Chapila	12	6.3	11.2	8.8
316	310	96.11.05	6.62	7.11	-1.38	17.3	22.15	4.75		X	Chapila	2	9.0	9.5	9.3
181	176	96.06.24 a	7.55	6.8	1.11	21.00	7.00(+1)	10.00	X		Chapila	1	5.9	5.9	5.9
185	178	96.06.26 a	7.49	6.83	1.05	11.00	7.00	8.00	X		Chapila	15	4.9	7.2	6.1
186	179	96.06.27	7.44	6.85	1.02	9.00	17.00	8.00	X		Chapila	1	6.3	6.3	6.3
189	180	96.06.28 a	7.42	6.85	0.95	20.00	6.00	10.00	X		Chapila	5	4.8	9.7	7.3
193	182	96.06.30 a	7.39	6.93	0.86	20.00	7.00(+1)	11.00	X		Chapila	3	3.6	12.1	7.9
194	183	96.07.01	7.48	7.11	0.72	12.00	17.00	5.00	X		Chapila	122	5.1	6.2	5.7
197	184	96.07.02 a	8.38	7.54	1.04	23.00	7.00(+1)	8.00	X		Chapila	142	6.5	9.2	7.9
198	185	96.07.03	8.52	7.62	1.23	9.00	17.00	8.00	X		Chapila	221	6.2	6.5	6.4
201	186	96.07.04 a	8.93	7.9	1.34	22.00	5.00(+1)	7.00	X		Chapila	116	7.0	12.5	9.8
205	188	96.07.06 a	9.02	8.11	1.24	23.00	5.00(+1)	6.00	X		Chapila	143	4.6	7.2	5.9
207	189	96.07.08 a	9.02	8.15	1.23	21.00	1.00(+1)	4.00	X		Chapila	143	4.2	10.5	7.4
209	192	96.07.10	9.01	8.15	1.19	4.00	7.00	3.00	X		Chapila	23	7.8	14.2	11.0
241	211	96.07.29 a	8.71	8.21	0.88	22.00	0.30	2.50	X		Chapila	13	4.3	7.2	5.8
252	219	96.08.06	8.63	8.38	0.56	2.00	6.00	4.00	X		Chapila	16	4.0	5.9	5.0
259	227	96.08.14	8.46	8.31	0.42	11.00	13.00	2.00	X		Chapila	3	4.2	7.0	5.6
264	234	96.08.21	8.81	8.5	0.65	2.30	5.00	2.50	X		Chapila	1	8.1	8.1	8.1
266	235	96.08.22	8.82	8.52	0.70	11.00	14.30	3.50	X		Chapila	1	7.1	7.1	7.1
268	238	96.08.25	8.87	8.48	0.74	3.00	5.30	2.50	X		Chapila	2	6.6	7.2	6.9
269	240	96.08.27	8.81	8.45	0.71	19.00	22.30	3.00	X		Chapila	3	6.1	6.4	6.3
286	260	96.09.16	7.89	8.33	-1.30	15.30	18.00	2.50	X		Chapila	13	8.3	16.6	12.5
287	261	96.09.17	7.84	8.32	-1.38	4.00	7.30	3.50	X		Chapila	3	8.2	11.3	9.8
291	266	96.09.22	7.97	8.43	-1.34	5.00	7.30	2.50	X		Chapila	5	4.1	11.3	7.7
313s	306	96.11.01s	6.77	7.32	-1.53	6	8.30	2.50	X		Chapila	1	8.4	8.4	8.4
314s	308	96.11.03s	6.72	7.21	-1.42	4	6.30	2.50	X		Chapila	2	6.0	7.1	6.6
131	137	96.05.16	8.03	4.98	2.40	13.30	14.30	1.00		X	Cheka	4	3.5	4.0	3.8
132	138	96.05.17	8.26	5.16	2.38	18.00	21.00	3.00		X	Cheka	1	11.3	11.3	11.3
135	141	96.05.20a	8.16	5.35	2.31	18.15	22.00	3.75		X	Cheka	1	29.1	29.1	29.1
140	146	96.05.25	7.53	5.48	2.01	18.00	24.00	6.00		X	Cheka	2	13.9	18.0	16.0
146	151	96.05.30a	8.04	5.88	1.97	19.00	23.00	4.00		X	Cheka	3	18.1	24.3	21.2

206	189	96.07.08	9.02	8.15	1.23	2.00	6.00	4.00	X	Chela	5	5.7	5.9	5.8
286s	260	96.09.16s	7.94	8.34	-1.30	3.00	7.00	4.00	X	Chela	1	21.4	21.4	21.4
207	189	96.07.08 a	9.02	8.15	1.23	21.00	1.00(+1)	4.00	X	Chela	2	3.3	5.2	4.3
125	94	96.04.03	7.22	4.42	2.39	10.30	10.40	0.17	X	Chela	1	6.8	6.8	6.8
127	133	96.05.12	6.47	4.04	1.98	1.00	5.00	4.00	X	Chela	28	6.1	8.7	7.4
128	133	96.05.12a	6.6	4.72	1.98	12.00	14.00	2.00	X	Chela	17	6.2	8.3	7.3
129	134	96.05.13	6.85	4.61	2.12	12.45	14.00	1.25	X	Chela	6	6.5	10.4	8.5
130	136	96.05.15	7.23	4.61	2.34	18.00	21.00	3.00	X	Chela	68	5.3	6.7	6.0
131	137	96.05.16	8.03	4.98	2.40	13.30	14.30	1.00	X	Chela	28	10.1	13.9	12.0
132	138	96.05.17	8.26	5.16	2.38	18.00	21.00	3.00	X	Chela	38	5.8	10.7	8.3
133	139	96.05.18	8.24	5.12	2.39	18.00	21.00	3.00	X	Chela	22	6.3	7.1	6.7
134	141	96.05.20	8.18	5.34	2.31	13.30	15.30	2.00	X	Chela	10	12.0	12.5	12.3
135	141	96.05.20a	8.16	5.35	2.31	18.15	22.00	3.75	X	Chela	15	6.3	8.2	7.3
136	142	96.05.21	8.1	5.37	2.28	18.30	22.30	4.00	X	Chela	4	5.1	11.6	8.4
142	149	96.05.28	7.47	5.51	1.97	7.00	9.00	2.00	X	Chela	1	12.0	12.0	12.0
145	151	96.05.30	7.84	5.82	1.97	9.00	12.00	3.00	X	Chela	30	4.8	12.9	8.9
146	151	96.05.30a	8.04	5.88	1.97	19.00	23.00	4.00	X	Chela	21	8.1	9.3	8.7
148	153	96.06.01	8.12	6	2.05	12.30	14.00	1.50	X	Chela	25	10.0	10.7	10.4
149	153	96.06.01a	8.4	6.1	2.05	18.45	22.45	4.00	X	Chela	27	10.0	11.3	10.7
150	154	96.06.02	8.5	5.8	2.14	19.00	23.00	4.00	X	Chela	26	6.9	11.1	9.0
154	158	96.06.06	8.68	6.78	1.96	17.00	22.30	5.50	X	Chela	11	8.0	11.6	9.8
156	160	96.06.08	8.53	6.85	1.82	8.00	11.00	3.00	X	Chela	23	8.3	11.1	9.7
160	164	96.06.12	8.2	6.77	1.65	12.00	14.00	2.00	X	Chela	3	6.1	6.8	6.5
164	167	96.06.15	7.83	6.72	1.41	10.00	14.00	4.00	X	Chela	5	6.5	6.8	6.7
168	171	96.06.19	7.57	6.69	1.17	18.00	22.00	4.00	X	Chela	9	5.1	8.2	6.7
187	179	96.06.27 a	7.44	6.85	1.02	19.00	8.00(+1)	13.00	X	Chela	5	5.1	10.2	7.7
188	180	96.06.28	7.44	6.85	0.95	12.00	15.00	3.00	X	Chela	3	5.1	10.2	7.7
191	181	96.06.29 a	7.4	6.87	0.91	20.00	7.00(+1)	11.00	X	Chela	3	5.4	10.7	8.1
192	182	96.06.30	7.38	6.89	0.86	11.00	16.00	5.00	X	Chela	5	9.2	12.1	10.7
195	183	96.07.01 a	8.05	7.76	0.72	19.00	7.00(+1)	12.00	X	Chela	169	4.3	9.9	7.1
196	184	96.07.02	8.09	7.39	1.04	10.00	14.00	4.00	X	Chela	78	4.5	10.1	7.3
199	185	96.07.03 a	8.73	7.77	1.23	23.00	5.00(+1)	6.00	X	Chela	123	4.7	10.7	7.7
203	187	96.07.05 a	9.02	8.08	1.30	22.00	6.00(+1)	8.00	X	Chela	77	6.8	9.9	8.4
204	188	96.07.06	9.02	8.1	1.24	11.00	17.00	6.00	X	Chela	118	5.0	11.1	8.1
214	195	96.07.13	9	8.15	1.19	3.00	7.00	4.00	X	Chela	43	9.0	12.6	10.8
215	195	96.07.13 a	9	8.15	1.19	10.00	13.00	3.00	X	Chela	138	5.7	9.9	7.8
238	210	96.07.28	8.78	8.21	0.94	9.00	12.00	3.00	X	Chela	22	9.9	10.3	10.1
254s	221	96.08.08s	8.46	8.36	0.38	17.00	20.00	3.00	X	Chela	4	6.7	9.3	8.0
255s	223	96.08.10s	8.37	8.34	0.19	11.00	14.00	3.00	X	Chela	13	7.2	11.6	9.4
255ss	223	96.08.10ss	8.35	8.32	0.19	17.00	20.00	3.00	X	Chela	17	5.5	11.0	8.3
257s	225	96.08.12s	8.36	8.3	0.19	21.30	24.00	2.50	X	Chela	18	6.9	11.3	9.1
258s	226	96.08.13s	8.4	8.31	0.31	6.00	9.00	3.00	X	Chela	15	6.2	8.1	7.2
259s	227	96.08.14s	8.48	8.3	0.42	17.00	22.00	5.00	X	Chela	24	7.2	9.9	8.6
259ss	228	96.08.15ss	8.49	8.31	0.47	9.00	11.00	2.00	X	Chela	30	7.3	10.0	8.7

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261s	230	96.08.17s	8.59	8.34	0.58	2.00	5.00	3.00	X	Chela	42	7.5	8.1	7.8
262s	232	96.08.19s	8.78	8.47	0.61	17.00	20.30	3.50	X	Chela	60	7.0	12.1	9.6
266s	236	96.08.23s	8.87	8.51	0.71	8.00	10.30	2.50	X	Chela	13	6.0	6.7	6.4
266ss	236	96.08.23ss	8.87	8.51	0.71	13.30	16.00	2.50	X	Chela	42	6.0	6.7	6.4
268s	239	96.08.26s	8.85	8.46	0.74	18.30	21.30	3.00	X	Chela	17	4.8	6.7	5.8
270s	242	96.08.29s	8.73	8.43	0.64	7.00	11.00	4.00	X	Chela	16	4.2	7.2	5.7
273s	246	96.09.02s	8.64	8.46	0.48	9.00	12.30	3.50	X	Chela	14	5.1	6.3	5.7
277ss	250	96.09.06ss	8.57	8.41	0.40	17.00	20.00	3.00	X	Chela	11	7.2	7.8	7.5
284s	257	96.09.13s	8.18	8.41	-0.84	12.30	15.30	3.00	X	Chela	1	8.3	8.3	8.3
295s	270	96.09.26s	8.01	8.46	-1.32	1	5.00	4.00	X	Chela	3	5.0	7.8	6.4
295ss	270	96.09.26ss	7.97	8.44	-1.32	18.3	21.30	3.00	X	Chela	4	5.4	8.1	6.8
297ss	272	96.09.28ss	8.02	8.42	-1.21	18.3	21.30	3.00	X	Chela	5	5.3	8.1	6.7
299s	274	96.09.30s	7.93	8.37	-1.3	7	10.00	3.00	X	Chela	8	6.0	9.6	7.8
299ss	274	96.09.30ss	7.94	8.36	-1.3	18	20.00	2.00	X	Chela	7	6.3	10.2	8.3
300s	276	96.10.02s	7.87	8.3	-1.24	14	16.00	2.00	X	Chela	8	9.0	10.3	9.7
302s	279	96.10.05s	7.84	8.24	-1.32	15	16.30	1.50	X	Chela	2	8.3	9.1	8.7
303s	281	96.10.07s	8.06	8.28	-0.82	11	13.00	2.00	X	Chela	3	6.4	9.2	7.8
306s	286	96.10.12s	7.77	8.19	-1.26	13	15.00	2.00	X	Chela	9	7.2	12.2	9.7
314	307	96.11.02	6.72	7.24	-1.49	18	20.30	2.50	X	Chela	7	5.5	7.8	6.7
315	309	96.11.04	6.7	7.16	-1.28	17.3	22.30	5.00	X	Chela	13	10.8	11.6	11.2
316	310	96.11.05	6.62	7.11	-1.38	17.3	22.15	4.75	X	Chela	2	10.1	10.6	10.4
139	145	96.05.24	7.74	5.46	2.14	18.00	22.00	4.00	X	Chela	1	9.1	9.1	9.1
170	172	96.06.20 a	7.62	6.61	1.25	13.00	18.00	5.00	X	Chela	14	5.5	9.0	7.3
182	177	96.06.25	7.56	6.82	1.09	9.00	15.00	6.00	X	Chela	1	8.1	8.1	8.1
186	179	96.06.27	7.44	6.85	1.02	9.00	17.00	8.00	X	Chela	12	5.3	9.2	7.3
194	183	96.07.01	7.48	7.11	0.72	12.00	17.00	5.00	X	Chela	42	9.7	10.3	10.0
197	184	96.07.02 a	8.38	7.54	1.04	23.00	7.00(+1)	8.00	X	Chela	76	6.5	9.9	8.2
198	185	96.07.03	8.52	7.62	1.23	9.00	17.00	8.00	X	Chela	138	5.4	9.2	7.3
202	187	96.07.05	8.99	8	1.30	10.00	16.00	6.00	X	Chela	72	9.2	10.1	9.7
207	189	96.07.08 a	9.02	8.15	1.23	21.00	1.00(+1)	4.00	X	Chela	22	9.2	9.5	9.4
212	193	96.07.11 a	9.02	8.15	1.20	11.00	14.00	3.00	X	Chela	22	8.7	11.7	10.2
253	220	96.08.07	8.59	8.38	0.53	9.00	13.00	4.00	X	Chela	13	5.0	6.1	5.6
254	221	96.08.08	8.46	8.36	0.38	17.00	20.00	3.00	X	Chela	4	6.7	9.3	8.0
255	222	96.08.09	8.4	8.35	0.27	18.00	22.00	4.00	X	Chela	3	6.0	7.6	6.8
256	224	96.08.11	8.33	8.31	-0.01	17.00	20.30	3.50	X	Chela	6	4.7	12.0	8.4
259	227	96.08.14	8.46	8.31	0.42	11.00	13.00	2.00	X	Chela	11	7.8	8.4	8.1
261	229	96.08.16 a	8.53	8.33	0.50	16.30	20.00	3.50	X	Chela	15	6.0	8.1	7.1
264	234	96.08.21	8.81	8.5	0.65	2.30	5.00	2.50	X	Chela	13	6.4	7.8	7.1
271	243	96.08.30	8.73	8.48	0.57	13.00	16.30	3.50	X	Chela	14	5.2	6.7	6.0
272	244	96.08.31	8.69	8.49	0.50	9.00	12.00	3.00	X	Chela	12	5.1	6.5	5.8
273	245	96.09.01	8.66	8.48	0.47	21.00	24.00	3.00	X	Chela	6	5.1	6.2	5.7
275	248	96.09.04	8.62	8.43	0.48	3.00	6.00	3.00	X	Chela	3	6.0	6.4	6.2
280	253	96.09.09	8.5	8.44	0.24	9.00	12.30	3.50	X	Chela	9	6.4	9.8	8.1
281	254	96.09.10	8.4	8.44	-0.23	18.00	22.30	4.50	X	Chela	31	8.0	11.7	9.9

297	271	96.09.27 a	7.97	8.43	-1.36	20.00	23.00	3.00	X		Chirka balm	1	10.7	10.7	10.7
308	289	96.10.15	7.51	8.07	-1.58	0.3	2.30	2.00	X		Chirka balm	1	7.6	7.6	7.6
126	132	96.05.11	6.43	4.05	1.87	17.00	20.30	3.50		X	Darkina	1	3.7	3.7	3.7
127	133	96.05.12	6.47	4.04	1.98	1.00	5.00	4.00		X	Darkina	17	4.5	4.9	4.7
131	137	96.05.16	8.03	4.98	2.40	13.30	14.30	1.00		X	Darkina	15	5.2	6.0	5.6
133	139	96.05.18	8.24	5.12	2.39	18.00	21.00	3.00		X	Darkina	12	4.3	4.8	4.6
134	141	96.05.20	8.18	5.34	2.31	13.30	15.30	2.00		X	Darkina	20	5.0	5.3	5.2
135	141	96.05.20a	8.16	5.35	2.31	18.15	22.00	3.75		X	Darkina	19	3.2	4.2	3.7
136	142	96.05.21	8.1	5.37	2.28	18.30	22.30	4.00		X	Darkina	6	4.6	5.1	4.9
154	158	96.06.06	8.68	6.78	1.96	17.00	22.30	5.50		X	Darkina	7	5.6	7.8	6.7
196	184	96.07.02	8.09	7.39	1.04	10.00	14.00	4.00		X	Darkina	13	4.2	6.1	5.2
199	185	96.07.03 a	8.73	7.77	1.23	23.00	5.00(+1)	6.00		X	Darkina	19	5.7	5.9	5.8
204	188	96.07.06	9.02	8.1	1.24	11.00	17.00	6.00		X	Darkina	16	5.2	5.7	5.5
213	193	96.07.11 b	9.02	8.15	1.20	22.00	1.00(+1)	3.00		X	Darkina	6	4.2	4.8	4.5
214	195	96.07.13	9	8.15	1.19	3.00	7.00	4.00		X	Darkina	5	4.2	5.4	4.8
286s	260	96.09.16s	7.94	8.34	-1.30	3.00	7.00	4.00		X	Darkina	14	5.5	11.1	8.3
137	143	96.05.22	8.03	5.52	2.25	18.20	19.50	1.50	X		Darkina	1	4.3	4.3	4.3
151	155	96.06.03	8.66	6.63	2.09	18.30	22.30	4.00	X		Darkina	2	6.3	6.4	6.4
287	261	96.09.17	7.84	8.32	-1.38	4.00	7.30	3.50	X		Darkina	2	8.2	10.1	9.2
289	264	96.09.20	7.76	8.86	-1.58	3.00	7.00	4.00	X		Darkina	3	6.6	7.8	7.2
291	266	96.09.22	7.97	8.43	-1.34	5.00	7.30	2.50	X		Darkina	4	6.0	10.2	8.1
126	132	96.05.11	6.43	4.05	1.87	17.00	20.30	3.50		X	Dhela	1	6.3	6.3	6.3
127	133	96.05.12	6.47	4.04	1.98	1.00	5.00	4.00		X	Dhela	9	4.1	5.0	4.6
129	134	96.05.13	6.85	4.61	2.12	12.45	14.00	1.25		X	Dhela	15	5.0	5.5	5.3
130	136	96.05.15	7.23	4.61	2.34	18.00	21.00	3.00		X	Dhela	43	4.1	6.9	5.5
131	137	96.05.16	8.03	4.98	2.40	13.30	14.30	1.00		X	Dhela	19	4.5	7.0	5.8
133	139	96.05.18	8.24	5.12	2.39	18.00	21.00	3.00		X	Dhela	5	3.7	4.6	4.2
140	146	96.05.25	7.53	5.48	2.01	18.00	24.00	6.00		X	Dhela	4	7.1	5.5	6.3
144	150	96.05.29	7.7	5.75	2.01	11.30	13.45	2.25		X	Dhela	8	5.5	6.5	6.0
150	154	96.06.02	8.5	5.8	2.14	19.00	23.00	4.00		X	Dhela	6	4.7	6.0	5.4
154	158	96.06.06	8.68	6.78	1.96	17.00	22.30	5.50		X	Dhela	2	4.7	6.2	5.5
157	161	96.06.09	8.51	6.86	1.76	18.30	23.30	5.00		X	Dhela	1	5.2	5.2	5.2
159	163	96.06.11	8.32	6.77	1.69	12.30	15.30	3.00		X	Dhela	1	5.2	5.2	5.2
160	164	96.06.12	8.2	6.77	1.65	12.00	14.00	2.00		X	Dhela	3	4.8	5.2	5.0
161	165	96.06.13	8.07	6.78	1.53	12.00	14.30	2.50		X	Dhela	1	5.3	5.3	5.3
172	173	96.06.21	7.62	6.63	1.18	0.45	7.45	7.00		X	Dhela	3	6.7	7.5	7.1
179	175	96.06.23 a	7.45	6.77	1.11	19.00	6.30(+1)	11.50		X	Dhela	7	5.8	6.9	6.4
180	176	96.06.24	7.55	6.79	1.11	9.00	17.00	8.00		X	Dhela	1	4.1	4.1	4.1
183	177	96.06.25 a	7.54	6.83	1.09	21.00	8.00	11.00		X	Dhela	1	3.9	3.9	3.9
187	179	96.06.27 a	7.44	6.85	1.02	19.00	8.00(+1)	13.00		X	Dhela	12	4.9	6.1	5.5
191	181	96.06.29 a	7.4	6.87	0.91	20.00	7.00(+1)	11.00		X	Dhela	1	4.6	4.6	4.6
192	182	96.06.30	7.38	6.89	0.86	11.00	16.00	5.00		X	Dhela	3	4.0	4.6	4.3
195	183	96.07.01 a	8.05	7.76	0.72	19.00	7.00(+1)	12.00		X	Dhela	41	3.7	4.7	4.2
196	184	96.07.02	8.09	7.39	1.04	10.00	14.00	4.00		X	Dhela	75	3.4	5.8	4.6

199	185	96.07.03 a	8.73	7.77	1.23	23.00	5.00(+1)	6.00		X	Dhea	48	5.0	5.6	5.3
203	187	96.07.05 a	9.02	8.08	1.30	22.00	6.00(+1)	8.00		X	Dhea	73	4.2	5.3	4.8
204	188	96.07.06	9.02	8.1	1.24	11.00	17.00	6.00		X	Dhea	36	3.4	5.1	4.3
206	189	96.07.08	9.02	8.15	1.23	2.00	6.00	4.00		X	Dhea	21	8.2	8.4	8.3
211	193	96.07.11	9.01	8.15	1.20	3.00	7.00	4.00		X	Dhea	41	3.6	5.7	4.7
213	193	96.07.11 b	9.02	8.15	1.20	22.00	1.00(+1)	3.00		X	Dhea	43	3.7	5.2	4.5
214	195	96.07.13	9	8.15	1.19	3.00	7.00	4.00		X	Dhea	19	4.4	5.0	4.7
215	195	96.07.13 a	9	8.15	1.19	10.00	13.00	3.00		X	Dhea	86	4.8	9.0	6.9
216	196	96.07.14	9	8.45	1.18	0.30	5.00	4.50		X	Dhea	15	5.0	8.9	7.0
219	198	96.07.16	8.96	8.2	1.14	1.00	5.00	4.00		X	Dhea	7	5.0	6.4	5.7
221	199	96.07.17	9.02	8.23	1.08	3.00	6.00	3.00		X	Dhea	12	5.2	5.8	5.5
228	202	96.07.20 a	8.95	8.2	1.08	12.00	14.00	2.00		X	Dhea	12	3.1	4.1	3.6
232	206	96.07.24	8.92	8.22	1.05	21.00	24.00	3.00		X	Dhea	12	5.1	5.2	5.2
235	207	96.07.25 a	8.94	8.23	1.05	17.30	20.30	3.00		X	Dhea	13	5.0	5.6	5.3
237	209	96.07.27	8.89	8.22	1.02	3.00	7.00	4.00		X	Dhea	10	4.1	4.2	4.2
242	212	96.07.30	8.69	8.21	0.84	11.00	13.00	2.00		X	Dhea	18	3.9	5.1	4.5
254s	221	96.08.08s	8.46	8.36	0.38	17.00	20.00	3.00		X	Dhea	13	4.0	5.1	4.6
258s	226	96.08.13s	8.4	8.31	0.31	6.00	9.00	3.00		X	Dhea	16	4.3	6.1	5.2
259s	227	96.08.14s	8.48	8.3	0.42	17.00	22.00	5.00		X	Dhea	15	3.7	5.1	4.4
259ss	228	96.08.15ss	8.49	8.31	0.47	9.00	11.00	2.00		X	Dhea	12	4.0	4.3	4.2
261ss	230	96.08.17ss	8.67	8.42	0.58	23.00	5.00	6.00		X	Dhea	45	3.7	5.8	4.8
262s	232	96.08.19s	8.78	8.47	0.61	17.00	20.30	3.50		X	Dhea	13	3.6	5.1	4.4
273s	246	96.09.02s	8.64	8.46	0.48	9.00	12.30	3.50		X	Dhea	13	6.1	6.3	6.2
275s	248	96.09.04s	8.6	8.43	0.48	15.00	18.00	3.00		X	Dhea	43	4.3	5.4	4.9
277s	250	96.09.06s	8.56	8.42	0.40	3.00	6.00	3.00		X	Dhea	13	4.1	5.3	4.7
277ss	250	96.09.06ss	8.57	8.41	0.40	17.00	20.00	3.00		X	Dhea	14	4.3	5.7	5.0
279s	252	96.09.08s	8.57	8.45	0.37	2.00	5.00	3.00		X	Dhea	4	4.2	5.3	4.8
282s	255	96.09.11s	8.37	8.43	-0.42	4.00	7.30	3.50		X	Dhea	1	4.7	4.7	4.7
284s	257	96.09.13s	8.18	8.41	-0.84	12.30	15.30	3.00		X	Dhea	12	4.3	5.1	4.7
285s	259	96.09.15s	8.04	8.37	-1.10	10.00	12.30	2.50		X	Dhea	11	5.8	8.1	7.0
286s	260	96.09.16s	7.94	8.34	-1.30	3.00	7.00	4.00		X	Dhea	12	6.9	8.2	7.6
287s	262	96.09.18s	7.77	8.29	-1.53	6.00	8.00	2.00		X	Dhea	17	4.7	5.4	5.1
295ss	270	96.09.26ss	7.97	8.44	-1.32	18.3	21.30	3.00		X	Dhea	4	4.0	6.2	5.1
300s	276	96.10.02s	7.87	8.3	-1.24	14	16.00	2.00		X	Dhea	3	4.9	5.6	5.3
301s	278	96.10.04s	7.74	8.23	-1.42	22	24.00	2.00		X	Dhea	5	5.5	6.4	6.0
315	309	96.11.04	6.7	7.16	-1.28	17.3	22.30	5.00		X	Dhea	1	10.2	10.2	10.2
316	310	96.11.05	6.62	7.11	-1.38	17.3	22.15	4.75		X	Dhea	3	4.7	7.8	6.3
151	155	96.06.03	8.66	6.63	2.09	18.30	22.30	4.00		X	Dhea	4	5.8	7.2	6.5
186	179	96.06.27	7.44	6.85	1.02	9.00	17.00	8.00		X	Dhea	1	4.2	4.2	4.2
194	183	96.07.01	7.48	7.11	0.72	12.00	17.00	5.00		X	Dhea	71	4.2	4.5	4.4
197	184	96.07.02 a	8.38	7.54	1.04	23.00	7.00(+1)	8.00		X	Dhea	21	4.7	5.8	5.3
198	185	96.07.03	8.52	7.62	1.23	9.00	17.00	8.00		X	Dhea	71	4.3	4.7	4.5
207	189	96.07.08 a	9.02	8.15	1.23	21.00	1.00(+1)	4.00		X	Dhea	17	5.5	7.1	6.3
252	219	96.08.06	8.63	8.38	0.56	2.00	6.00	4.00		X	Dhea	7	4.3	6.2	5.3

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253	220	96.08.07	8.59	8.38	0.53	9.00	13.00	4.00	X		Dhela	3	4.3	5.6	5.0
254	221	96.08.08	8.46	8.36	0.38	17.00	20.00	3.00	X		Dhela	3	4.0	5.1	4.6
255	222	96.08.09	8.4	8.35	0.27	18.00	22.00	4.00	X		Dhela	5	3.8	5.2	4.5
256	224	96.08.11	8.33	8.31	-0.01	17.00	20.30	3.50	X		Dhela	3	5.0	5.5	5.3
258	226	96.08.13	8.44	8.31	0.31	23.30	2.00	3.50	X		Dhela	5	4.0	5.8	4.9
260	229	96.08.16	8.51	8.32	0.50	3.00	6.30	3.50	X		Dhela	5	4.0	6.1	5.1
261	229	96.08.16 a	8.53	8.33	0.50	16.30	20.00	3.50	X		Dhela	2	4.0	4.3	4.2
262	231	96.08.18	8.76	8.45	0.58	21.00	24.00	3.00	X		Dhela	4	3.6	6.0	4.8
263	233	96.08.20	8.8	8.48	0.65	16.30	20.30	4.00	X		Dhela	7	3.9	4.9	4.4
265	234	96.08.21 a	8.82	8.51	0.65	9.00	12.00	3.00	X		Dhela	6	4.5	6.1	5.3
274	247	96.09.03	8.63	8.44	0.48	19.00	22.00	3.00	X		Dhela	3	4.6	5.4	5.0
275	248	96.09.04	8.62	8.43	0.48	3.00	6.00	3.00	X		Dhela	2	5.1	5.5	5.3
276	249	96.09.05	8.57	8.43	0.40	3.00	6.00	3.00	X		Dhela	4	4.0	5.6	4.8
277	249	96.09.05 a	8.56	8.42	0.40	13.00	16.00	3.00	X		Dhela	11	3.8	4.6	4.2
278	251	96.09.07	8.57	8.45	0.37	3.30	6.30	3.00	X		Dhela	3	4.0	5.1	4.6
279	251	96.09.07 a	8.57	8.45	0.37	18.30	21.30	3.00	X		Dhela	3	4.0	5.0	4.5
280	253	96.09.09	8.5	8.44	0.24	9.00	12.30	3.50	X		Dhela	3	3.9	5.6	4.8
281	254	96.09.10	8.4	8.44	-0.23	18.00	22.30	4.50	X		Dhela	1	4.4	4.4	4.4
282	255	96.09.11	8.34	8.43	-0.42	15.00	18.30	3.50	X		Dhela	1	4.3	4.3	4.3
283	256	96.09.12	8.27	8.43	-0.63	11.30	14.30	3.00	X		Dhela	2	4.3	5.1	4.7
284	257	96.09.13	8.17	8.41	-0.84	2.30	5.30	3.00	X		Dhela	4	4.6	5.9	5.3
285	258	96.09.14	8.08	8.38	-0.99	18.30	21.30	2.50	X		Dhela	8	5.7	6.3	6.0
286	260	96.09.16	7.89	8.33	-1.30	15.30	18.00	2.50	X		Dhela	4	5.1	7.3	6.2
287	261	96.09.17	7.84	8.32	-1.38	4.00	7.30	3.50	X		Dhela	7	5.8	6.2	6.0
288	263	96.09.19	7.8	8.35	-1.62	17.00	21.00	4.00	X		Dhela	8	6.5	6.9	6.7
290	265	96.09.21	7.78	8.36	-1.58	1.00	5.00	4.00	X		Dhela	4	5.3	7.2	6.3
291	266	96.09.22	7.97	8.43	-1.34	5.00	7.30	2.50	X		Dhela	5	6.2	8.4	7.3
292	267	96.09.23	8.08	8.48	-1.21	18.30	21.30	3.00	X		Dhela	2	4.7	5.1	4.9
297	271	96.09.27 a	7.97	8.43	-1.36	20.00	23.00	3.00	X		Dhela	3	4.0	4.3	4.2
300	275	96.10.01	7.95	8.35	-1.21	9.00	11.00	2.00	X		Dhela	11	5.6	9.1	7.4
302	279	96.10.05	7.76	8.23	-1.32	3.00	6.00	3.00	X		Dhela	7	5.7	6.2	6.0
306	285	96.10.11	7.85	8.2	-1.1	9	11.00	2.00	X		Dhela	1	4.7	4.7	4.7
307	287	96.10.13	7.62	8.1	-1.36	22	24.00	2.00	X		Dhela	2	4.1	4.3	4.2
308	289	96.10.15	7.51	8.07	-1.58	0.3	2.30	2.00	X		Dhela	1	4.7	4.7	4.7
132	138	96.05.17	8.26	5.16	2.38	18.00	21.00	3.00	X		Foli	11	13.9	15.2	14.6
135	141	96.05.20a	8.16	5.35	2.31	18.15	22.00	3.75	X		Foli	1	27.8	27.8	27.8
140	146	96.05.25	7.53	5.48	2.01	18.00	24.00	6.00	X		Foli	1	21.0	21.0	21.0
143	149	96.05.28a	7.57	5.53	1.97	19.00	23.00	4.00	X		Foli	1	15.9	15.9	15.9
150	154	96.06.02	8.5	5.8	2.14	19.00	23.00	4.00	X		Foli	2	14.1	17.2	15.7
156	160	96.06.08	8.53	6.85	1.82	8.00	11.00	3.00	X		Foli	2	16.2	18.0	17.1
163	166	96.06.14 a	7.96	6.76	1.47	18.00	23.00	5.00	X		Foli	1	5.0	5.0	5.0
199	185	96.07.03 a	8.73	7.77	1.23	23.00	5.00(+1)	6.00	X		Foli	11	5.8	6.9	6.4
282s	255	96.09.11s	8.37	8.43	-0.42	4.00	7.30	3.50	X		Foli	4	17.3	19.2	18.3
313	305	96.10.31	6.64	7.35	-1.83	9.3	12.00	3.00	X		Foli	1	19.7	19.7	19.7

230	204	96.07.22	8.93	8.22	1.07	3.00	6.00	3.00	X		Foli	4	16.2	17.5	16.9
249	216	96.08.03 a	8.65	8.27	0.81	19.00	22.00	3.00	X		Foli	1	21.3	21.3	21.3
132	138	96.05.17	8.26	5.16	2.38	18.00	21.00	3.00		X	Garua	1	11.0	11.0	11.0
183	177	96.06.25 a	7.54	6.83	1.09	21.00	8.00	11.00		X	Garua	2	11.5	12.4	12.0
127	133	96.05.12	6.47	4.04	1.98	1.00	5.00	4.00		X	Golda chingri	19	9.3	15.7	12.5
128	133	96.05.12a	6.6	4.72	1.98	12.00	14.00	2.00		X	Golda chingri	29	9.3	14.1	11.7
130	136	96.05.15	7.23	4.61	2.34	18.00	21.00	3.00		X	Golda chingri	12	9.8	15.2	12.5
131	137	96.05.16	8.03	4.98	2.40	13.30	14.30	1.00		X	Golda chingri	10	11.2	5.0	8.1
132	138	96.05.17	8.26	5.16	2.38	18.00	21.00	3.00		X	Golda chingri	62	12.7	18.1	15.4
133	139	96.05.18	8.24	5.12	2.39	18.00	21.00	3.00		X	Golda chingri	74	11.9	15.5	13.7
135	141	96.05.20a	8.16	5.35	2.31	18.15	22.00	3.75		X	Golda chingri	38	17.3	7.1	12.2
136	142	96.05.21	8.1	5.37	2.28	18.30	22.30	4.00		X	Golda chingri	26	7.2	16.2	11.7
140	146	96.05.25	7.53	5.48	2.01	18.00	24.00	6.00		X	Golda chingri	25	9.2	10.1	9.7
141	147	96.05.26	7.56	5.46	2.04	18.30	22.30	2.00		X	Golda chingri	4	10.0	11.1	10.6
143	149	96.05.28a	7.57	5.53	1.97	19.00	23.00	4.00		X	Golda chingri	9	10.6	12.8	11.7
146	151	96.05.30a	8.04	5.88	1.97	19.00	23.00	4.00		X	Golda chingri	14	7.6	11.9	9.8
147	152	96.05.31	8.02	5.85	2.11	15.00	19.30	4.50		X	Golda chingri	12	8.1	15.2	11.7
149	153	96.06.01a	8.4	6.1	2.05	18.45	22.45	4.00		X	Golda chingri	19	9.2	18.6	13.9
150	154	96.06.02	8.5	5.8	2.14	19.00	23.00	4.00		X	Golda chingri	16	11.2	17.6	14.4
154	158	96.06.06	8.68	6.78	1.96	17.00	22.30	5.50		X	Golda chingri	11	8.0	19.3	13.7
155	159	96.06.07	8.63	6.84	1.89	18.00	22.30	4.50		X	Golda chingri	23	7.3	18.9	13.1
157	161	96.06.09	8.51	6.86	1.76	18.30	23.30	5.00		X	Golda chingri	21	6.0	18.0	12.0
163	166	96.06.14 a	7.96	6.76	1.47	18.00	23.00	5.00		X	Golda chingri	3	8.5	18.5	13.5
187	179	96.06.27 a	7.44	6.85	1.02	19.00	8.00(+1)	13.00		X	Golda chingri	1	16.4	16.4	16.4
191	181	96.06.29 a	7.4	6.87	0.91	20.00	7.00(+1)	11.00		X	Golda chingri	1	18.6	18.6	18.6
195	183	96.07.01 a	8.05	7.76	0.72	19.00	7.00(+1)	12.00		X	Golda chingri	71	12.6	16.9	14.8
199	185	96.07.03 a	8.73	7.77	1.23	23.00	5.00(+1)	6.00		X	Golda chingri	71	9.7	15.8	12.8
203	187	96.07.05 a	9.02	8.08	1.30	22.00	6.00(+1)	8.00		X	Golda chingri	77	10.2	16.9	13.6
206	189	96.07.08	9.02	8.15	1.23	2.00	6.00	4.00		X	Golda chingri	27	8.8	11.3	10.1
211	193	96.07.11	9.01	8.15	1.20	3.00	7.00	4.00		X	Golda chingri	14	9.1	13.5	11.3
213	193	96.07.11 b	9.02	8.15	1.20	22.00	1.00(+1)	3.00		X	Golda chingri	17	12.6	16.1	14.4
214	195	96.07.13	9	8.15	1.19	3.00	7.00	4.00		X	Golda chingri	41	11.0	16.7	13.9
216	196	96.07.14	9	8.45	1.18	0.30	5.00	4.50		X	Golda chingri	42	10.9	16.7	13.8
219	198	96.07.16	8.96	8.2	1.14	1.00	5.00	4.00		X	Golda chingri	16	8.0	12.9	10.5
221	199	96.07.17	9.02	8.23	1.08	3.00	6.00	3.00		X	Golda chingri	11	15.6	16.1	15.9
237	209	96.07.27	8.89	8.22	1.02	3.00	7.00	4.00		X	Golda chingri	21	13.8	14.6	14.2
242	212	96.07.30	8.69	8.21	0.84	11.00	13.00	2.00		X	Golda chingri	1	15.1	15.1	15.1
246	215	96.08.02	8.75	8.25	0.85	3.00	7.00	4.00		X	Golda chingri	43	8.0	11.6	9.8
259s	227	96.08.14s	8.48	8.3	0.42	17.00	22.00	5.00		X	Golda chingri	1	13.0	13.0	13.0
261ss	230	96.08.17ss	8.67	8.42	0.58	23.00	5.00	6.00		X	Golda chingri	1	13.2	13.2	13.2
262s	232	96.08.19s	8.78	8.47	0.61	17.00	20.30	3.50		X	Golda chingri	13	15.0	16.6	15.8
277s	250	96.09.06s	8.56	8.42	0.40	3.00	6.00	3.00		X	Golda chingri	4	13.8	14.3	14.1
197	184	96.07.02 a	8.38	7.54	1.04	23.00	7.00(+1)	8.00	X		Golda chingri	21	12.5	17.3	14.9
207	189	96.07.08 a	9.02	8.15	1.23	21.00	1.00(+1)	4.00	X		Golda chingri	74	7.2	10.8	9.0

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259ss	228	96.08.15ss	8.49	8.31	0.47	9.00	11.00	2.00	X	Gulsha	1	11.7	11.7
207	189	96.07.08 a	9.02	8.15	1.23	21.00	1.00(+1)	4.00	X	Gulsha	1	9.0	9.0
256	224	96.08.11	8.33	8.31	-0.01	17.00	20.30	3.50	X	Gulsha	1	13.7	13.7
126	132	96.05.11	6.43	4.05	1.87	17.00	20.30	3.50	X	Gutum	9	6.2	10.3
127	133	96.05.12	6.47	4.04	1.98	1.00	5.00	4.00	X	Gutum	13	6.3	10.2
128	133	96.05.12a	6.6	4.72	1.98	12.00	14.00	2.00	X	Gutum	7	6.3	5.1
129	134	96.05.13	6.85	4.61	2.12	12.45	14.00	1.25	X	Gutum	7	6.8	9.2
130	136	96.05.15	7.23	4.61	2.34	18.00	21.00	3.00	X	Gutum	31	7.1	8.3
131	137	96.05.16	8.03	4.98	2.40	13.30	14.30	1.00	X	Gutum	36	7.0	8.8
132	138	96.05.17	8.26	5.16	2.38	18.00	21.00	3.00	X	Gutum	8	6.5	11.2
133	139	96.05.18	8.24	5.12	2.39	18.00	21.00	3.00	X	Gutum	7	8.2	9.1
135	141	96.05.20a	8.16	5.35	2.31	18.15	22.00	3.75	X	Gutum	13	5.2	8.3
136	142	96.05.21	8.1	5.37	2.28	18.30	22.30	4.00	X	Gutum	4	6.4	7.9
140	146	96.05.25	7.53	5.48	2.01	18.00	24.00	6.00	X	Gutum	1	8.1	8.1
141	147	96.05.26	7.56	5.46	2.04	18.30	22.30	2.00	X	Gutum	11	6.1	7.3
142	149	96.05.28	7.47	5.51	1.97	7.00	9.00	2.00	X	Gutum	1	6.5	6.5
144	150	96.05.29	7.7	5.75	2.01	11.30	13.45	2.25	X	Gutum	2	5.2	6.9
145	151	96.05.30	7.84	5.82	1.97	9.00	12.00	3.00	X	Gutum	1	6.3	6.3
146	151	96.05.30a	8.04	5.88	1.97	19.00	23.00	4.00	X	Gutum	2	8.1	8.6
147	152	96.05.31	8.02	5.85	2.11	15.00	19.30	4.50	X	Gutum	11	6.0	7.3
148	153	96.06.01	8.12	6	2.05	12.30	14.00	1.50	X	Gutum	1	6.5	6.5
149	153	96.06.01a	8.4	6.1	2.05	18.45	22.45	4.00	X	Gutum	5	8.1	8.6
150	154	96.06.02	8.5	5.8	2.14	19.00	23.00	4.00	X	Gutum	3	6.2	7.3
154	158	96.06.06	8.68	6.78	1.96	17.00	22.30	5.50	X	Gutum	29	6.2	7.8
155	159	96.06.07	8.63	6.84	1.89	18.00	22.30	4.50	X	Gutum	7	6.9	2.6
157	161	96.06.09	8.51	6.86	1.76	18.30	23.30	5.00	X	Gutum	2	6.9	10.3
159	163	96.06.11	8.32	6.77	1.69	12.30	15.30	3.00	X	Gutum	7	5.0	6.9
160	164	96.06.12	8.2	6.77	1.65	12.00	14.00	2.00	X	Gutum	5	4.8	6.3
161	165	96.06.13	8.07	6.78	1.53	12.00	14.30	2.50	X	Gutum	7	5.0	7.2
164	167	96.06.15	7.83	6.72	1.41	10.00	14.00	4.00	X	Gutum	3	5.2	6.1
171	172	96.06.20 b	7.62	6.61	1.25	18.30	23.30	5.00	X	Gutum	8	6.4	6.7
172	173	96.06.21	7.62	6.63	1.18	0.45	7.45	7.00	X	Gutum	11	6.2	7.6
175	173	96.06.21 c	7.52	6.72	1.18	19.00	23.30	4.50	X	Gutum	3	6.9	7.9
176	174	96.06.22	7.48	6.7	1.13	0.30	8.00	7.50	X	Gutum	1	5.7	5.7
177s	174	96.06.22s	7.45	6.72	1.13	8.30	18.00	9.50	X	Gutum	1	7.4	7.4
179	175	96.06.23 a	7.45	6.77	1.11	19.00	6.30(+1)	11.50	X	Gutum	3	7.5	8.1
180	176	96.06.24	7.55	6.79	1.11	9.00	17.00	8.00	X	Gutum	2	6.4	6.8
183	177	96.06.25 a	7.54	6.83	1.09	21.00	8.00	11.00	X	Gutum	3	5.5	7.8
184	178	96.06.26	7.52	6.84	1.05	12.00	17.00	5.00	X	Gutum	1	9.7	9.7
191	181	96.06.29 a	7.4	6.87	0.91	20.00	7.00(+1)	11.00	X	Gutum	2	6.5	11.1
192	182	96.06.30	7.38	6.89	0.86	11.00	16.00	5.00	X	Gutum	1	7.2	7.2
195	183	96.07.01 a	8.05	7.76	0.72	19.00	7.00(+1)	12.00	X	Gutum	38	5.3	9.9
199	185	96.07.03 a	8.73	7.77	1.23	23.00	5.00(+1)	6.00	X	Gutum	37	6.3	7.8
203	187	96.07.05 a	9.02	8.08	1.30	22.00	6.00(+1)	8.00	X	Gutum	38	8.1	10.3

254s	221	96.08.08s	8.46	8.36	0.38	17.00	20.00	3.00		X	Gutum	1	7.2	7.2	7.2	7.2
258s	226	96.08.13s	8.4	8.31	0.31	6.00	9.00	3.00		X	Gutum	1	7.9	7.9	7.9	7.9
259s	227	96.08.14s	8.48	8.3	0.42	17.00	22.00	5.00		X	Gutum	1	8.2	8.2	8.2	8.2
259ss	228	96.08.15ss	8.49	8.31	0.47	9.00	11.00	2.00		X	Gutum	1	7.0	7.0	7.0	7.0
261ss	230	96.08.17ss	8.67	8.42	0.58	23.00	5.00	6.00		X	Gutum	12	6.2	7.1	6.7	6.7
262s	232	96.08.19s	8.78	8.47	0.61	17.00	20.30	3.50		X	Gutum	13	6.9	8.3	7.6	7.6
266s	236	96.08.23s	8.87	8.51	0.71	8.00	10.30	2.50		X	Gutum	1	5.9	5.9	5.9	5.9
277s	250	96.09.06s	8.56	8.42	0.40	3.00	6.00	3.00		X	Gutum	1	7.2	7.2	7.2	7.2
285s	259	96.09.15s	8.04	8.37	-1.10	10.00	12.30	2.50		X	Gutum	13	6.6	8.6	7.6	7.6
286s	260	96.09.16s	7.94	8.34	-1.30	3.00	7.00	4.00		X	Gutum	12	6.8	7.8	7.3	7.3
287s	262	96.09.18s	7.77	8.29	-1.53	6.00	8.00	2.00		X	Gutum	2	7.7	8.2	8.0	8.0
293ss	268	96.09.24ss	8.07	8.47	-1.21	14.3	17.30	3.00		X	Gutum	2	8.1	9.2	8.7	8.7
295ss	270	96.09.26ss	7.97	8.44	-1.32	18.3	21.30	3.00		X	Gutum	1	8.3	8.3	8.3	8.3
297ss	272	96.09.28ss	8.02	8.42	-1.21	18.3	21.30	3.00		X	Gutum	2	7.7	8.1	7.9	7.9
299ss	274	96.09.30ss	7.94	8.36	-1.3	18	20.00	2.00		X	Gutum	2	7.4	8.1	7.8	7.8
303s	281	96.10.07s	8.06	8.28	-0.82	11	13.00	2.00		X	Gutum	3	6.3	12.0	9.2	9.2
305ss	284	96.10.10ss	7.93	8.24	-1.01	4.3	6.30	2.00		X	Gutum	2	5.9	7.2	6.6	6.6
312	297	96.10.23	6.54	7.63	-2.49	7	9.00	2.00		X	Gutum	3	7.0	8.6	7.8	7.8
314	307	96.11.02	6.72	7.24	-1.49	18	20.30	2.50		X	Gutum	2	8.0	9.1	8.6	8.6
315	309	96.11.04	6.7	7.16	-1.28	17.3	22.30	5.00		X	Gutum	1	6.5	6.5	6.5	6.5
151	155	96.06.03	8.66	6.63	2.09	18.30	22.30	4.00	X		Gutum	1	6.3	6.3	6.3	6.3
177	174	96.06.22 a	7.45	6.72	1.13	19.00	8.00(+1)	13.00	X		Gutum	2	7.0	7.2	7.1	7.1
178	175	96.06.23	7.47	6.75	1.11	10.00	18.00	8.00	X		Gutum	1	7.8	7.8	7.8	7.8
186	179	96.06.27	7.44	6.85	1.02	9.00	17.00	8.00	X		Gutum	2	5.9	6.7	6.3	6.3
190	181	96.06.29	7.41	6.86	0.91	10.00	16.00	6.00	X		Gutum	4	4.7	6.1	5.4	5.4
193	182	96.06.30 a	7.39	6.93	0.86	20.00	7.00(+1)	11.00	X		Gutum	5	6.8	11.3	9.1	9.1
198	185	96.07.03	8.52	7.62	1.23	9.00	17.00	8.00	X		Gutum	11	6.1	6.3	6.2	6.2
208	191	96.07.09	9.01	8.15	1.19	13.00	15.00	2.00	X		Gutum	12	6.2	6.3	6.3	6.3
254	221	96.08.08	8.46	8.36	0.38	17.00	20.00	3.00	X		Gutum	1	7.2	7.2	7.2	7.2
258	226	96.08.13	8.44	8.31	0.31	6.00	9.00	3.00	X		Gutum	1	7.3	7.3	7.3	7.3
259	227	96.08.14	8.48	8.3	0.42	17.00	22.00	5.00	X		Gutum	1	7.2	7.2	7.2	7.2
261	228	96.08.15	8.49	8.31	0.47	9.00	11.00	2.00	X		Gutum	1	7.2	7.2	7.2	7.2
262	230	96.08.17	8.67	8.42	0.58	23.00	5.00	6.00	X		Gutum	1	6.7	6.7	6.7	6.7
263	232	96.08.19	8.78	8.47	0.61	17.00	20.30	3.50	X		Gutum	1	5.9	5.9	5.9	5.9
266	236	96.08.23	8.87	8.51	0.71	8.00	10.30	2.50	X		Gutum	1	7.2	7.2	7.2	7.2
269	240	96.08.27	8.81	8.45	0.71	19.00	22.30	3.00	X		Gutum	2	8.0	8.4	8.2	8.2
273	245	96.09.01	8.66	8.48	0.47	21.00	24.00	3.00	X		Gutum	2	5.5	5.7	5.6	5.6
281	254	96.09.10	8.4	8.44	-0.23	18.00	22.30	4.50	X		Gutum	1	8.1	8.1	8.1	8.1
288	263	96.09.19	7.8	8.35	-1.62	17.00	21.00	4.00	X		Gutum	2	7.6	7.8	7.7	7.7
290	265	96.09.21	7.78	8.36	-1.58	1.00	5.00	4.00	X		Gutum	2	8.9	10.6	9.8	9.8
291	266	96.09.22	7.97	8.43	-1.34	5.00	7.30	2.50	X		Gutum	7	6.8	8.8	7.8	7.8
309s	293	96.10.19s	7	7.87	-2.12	15	17.30	2.50	X		Gutum	2	6.7	8.1	7.4	7.4
313s	306	96.11.01s	6.77	7.32	-1.53	6	8.30	2.50	X		Gutum	2	8.1	9.0	8.6	8.6
126	132	96.05.11	6.43	4.05	1.87	17.00	20.30	3.50		X	icha	1750	3.2	6.1	4.7	4.7

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128	133	96.05.12a	6.6	4.72	1.98	12.00	14.00	2.00		X	lcha	230	3.8	5.1	4.5
130	136	96.05.15	7.23	4.61	2.34	18.00	21.00	3.00		X	lcha	14000	3.3	5.2	4.3
131	137	96.05.16	8.03	4.98	2.40	13.30	14.30	1.00		X	lcha	185	3.5	13.9	8.7
133	139	96.05.18	8.24	5.12	2.39	18.00	21.00	3.00		X	lcha	6340	4.1	6.2	5.2
135	141	96.05.20a	8.16	5.35	2.31	18.15	22.00	3.75		X	lcha	3850	3.7	6.3	5.0
136	142	96.05.21	8.1	5.37	2.28	18.30	22.30	4.00		X	lcha	2755	5.0	5.4	5.2
140	146	96.05.25	7.53	5.48	2.01	18.00	24.00	6.00		X	lcha	128	4.9	6.5	5.7
141	147	96.05.26	7.56	5.46	2.04	18.30	22.30	2.00		X	lcha	168	3.9	5.1	4.5
143	149	96.05.28a	7.57	5.53	1.97	19.00	23.00	4.00		X	lcha	265	4.6	8.2	6.4
144	150	96.05.29	7.7	5.75	2.01	11.30	13.45	2.25		X	lcha	14	4.5	5.2	4.9
146	151	96.05.30a	8.04	5.88	1.97	19.00	23.00	4.00		X	lcha	190	4.3	5.8	5.1
147	152	96.05.31	8.02	5.85	2.11	15.00	19.30	4.50		X	lcha	54	4.8	7.7	6.3
149	153	96.06.01a	8.4	6.1	2.05	18.45	22.45	4.00		X	lcha	1800	4.8	6.9	5.9
150	154	96.06.02	8.5	5.8	2.14	19.00	23.00	4.00		X	lcha	2320	4.2	5.8	5.0
154	158	96.06.06	8.68	6.78	1.96	17.00	22.30	5.50		X	lcha	720	4.5	8.3	6.4
155	159	96.06.07	8.63	6.84	1.89	18.00	22.30	4.50		X	lcha	314	4.8	6.4	5.6
157	161	96.06.09	8.51	6.86	1.76	18.30	23.30	5.00		X	lcha	268	4.8	6.2	5.5
163	166	96.06.14 a	7.96	6.76	1.47	18.00	23.00	5.00		X	lcha	158	4.0	7.3	5.7
164	167	96.06.15	7.83	6.72	1.41	10.00	14.00	4.00		X	lcha	4	4.3	4.7	4.5
168	171	96.06.19	7.57	6.69	1.17	18.00	22.00	4.00		X	lcha	103	4.2	4.5	4.4
171	172	96.06.20 b	7.62	6.61	1.25	18.30	23.30	5.00		X	lcha	51	5.2	6.2	5.7
172	173	96.06.21	7.62	6.63	1.18	0.45	7.45	7.00		X	lcha	28	5.5	6.6	6.1
173	173	96.06.21 a	7.59	6.71	1.18	8.30	13.30	5.00		X	lcha	11	4.9	6.3	5.6
175	173	96.06.21 c	7.52	6.72	1.18	19.00	23.30	4.50		X	lcha	120	4.3	5.8	5.1
176	174	96.06.22	7.48	6.7	1.13	0.30	8.00	7.50		X	lcha	40	2.9	6.0	4.5
179	175	96.06.23 a	7.45	6.77	1.11	19.00	6.30(+1)	11.50		X	lcha	108	4.8	6.9	5.9
180	176	96.06.24	7.55	6.79	1.11	9.00	17.00	8.00		X	lcha	20	3.0	6.4	4.7
183	177	96.06.25 a	7.54	6.83	1.09	21.00	8.00	11.00		X	lcha	22	3.1	6.2	4.7
187	179	96.06.27 a	7.44	6.85	1.02	19.00	8.00(+1)	13.00		X	lcha	35	4.8	11.6	8.2
191	181	96.06.29 a	7.4	6.87	0.91	20.00	7.00(+1)	11.00		X	lcha	73	2.6	5.5	4.1
195	183	96.07.01 a	8.05	7.76	0.72	19.00	7.00(+1)	12.00		X	lcha	1455	3.2	6.1	4.7
196	184	96.07.02	8.09	7.39	1.04	10.00	14.00	4.00		X	lcha	859	3.1	5.6	4.4
199	185	96.07.03 a	8.73	7.77	1.23	23.00	5.00(+1)	6.00		X	lcha	1216	3.3	6.7	5.0
200	186	96.07.04	8.87	7.83	1.34	13.00	18.00	5.00		X	lcha	1222	3.1	6.2	4.7
203	187	96.07.05 a	9.02	8.08	1.30	22.00	6.00(+1)	8.00		X	lcha	1226	3.7	6.2	5.0
206	189	96.07.08	9.02	8.15	1.23	2.00	6.00	4.00		X	lcha	217	3.4	6.2	4.8
211	193	96.07.11	9.01	8.15	1.20	3.00	7.00	4.00		X	lcha	243	3.2	6.3	4.8
213	193	96.07.11 b	9.02	8.15	1.20	22.00	1.00(+1)	3.00		X	lcha	829	3.8	6.2	5.0
214	195	96.07.13	9	8.15	1.19	3.00	7.00	4.00		X	lcha	750	3.1	6.2	4.7
215	195	96.07.13 a	9	8.15	1.19	10.00	13.00	3.00		X	lcha	324	4.3	6.4	5.4
216	196	96.07.14	* 9	8.45	1.18	0.30	5.00	4.50		X	lcha	1444	4.7	6.8	5.8
219	198	96.07.16	8.96	8.2	1.14	1.00	5.00	4.00		X	lcha	857	4.5	6.2	5.4
220	198	96.07.16 a	9	8.22	1.14	13.00	16.00	3.00		X	lcha	122	6.1	7.0	6.6
223	200	96.07.18	8.94	8.2	1.09	18.00	22.00	4.00		X	lcha	177	4.3	4.7	4.5

231	205	96.07.23	8.91	8.22	1.06	5.00	8.00	3.00			X	lcha	117	3.7	5.2	4.5
232	206	96.07.24	8.92	8.22	1.05	21.00	24.00	3.00			X	lcha	179	3.5	5.2	4.4
234	207	96.07.25	8.91	8.22	1.05	7.00	10.00	3.00			X	lcha	11	3.6	5.2	4.4
235	207	96.07.25 a	8.94	8.23	1.05	17.30	20.30	3.00			X	lcha	169	3.6	5.2	4.4
237	209	96.07.27	8.89	8.22	1.02	3.00	7.00	4.00			X	lcha	475	3.3	5.9	4.6
243	213	96.07.31	8.78	8.23	0.91	20.00	24.00	4.00			X	lcha	177	4.6	5.3	5.0
246	215	96.08.02	8.75	8.25	0.85	3.00	7.00	4.00			X	lcha	119	4.8	6.6	5.7
254s	221	96.08.08s	8.46	8.36	0.38	17.00	20.00	3.00			X	lcha	57	3.3	5.7	4.5
255ss	223	96.08.10ss	8.35	8.32	0.19	17.00	20.00	3.00			X	lcha	46	3.0	6.0	4.5
257s	225	96.08.12s	8.36	8.3	0.19	21.30	24.00	2.50			X	lcha	144	3.1	5.8	4.5
259s	227	96.08.14s	8.48	8.3	0.42	17.00	22.00	5.00			X	lcha	77	3.0	6.0	4.5
261s	230	96.08.17s	8.59	8.34	0.58	2.00	5.00	3.00			X	lcha	72	3.7	4.4	4.1
261ss	230	96.08.17ss	8.67	8.42	0.58	23.00	5.00	6.00			X	lcha	23	3.0	5.4	4.2
262s	232	96.08.19s	8.78	8.47	0.61	17.00	20.30	3.50			X	lcha	145	3.0	6.0	4.5
277s	250	96.09.06s	8.56	8.42	0.40	3.00	6.00	3.00			X	lcha	72	3.6	4.9	4.3
279s	252	96.09.08s	8.57	8.45	0.37	2.00	5.00	3.00			X	lcha	75	3.5	4.6	4.1
282s	255	96.09.11s	8.37	8.43	-0.42	4.00	7.30	3.50			X	lcha	177	4.0	6.2	5.1
286s	260	96.09.16s	7.94	8.34	-1.30	3.00	7.00	4.00			X	lcha	110	4.2	7.2	5.7
287s	262	96.09.18s	7.77	8.29	-1.53	6.00	8.00	2.00			X	lcha	52	4.1	9.3	6.7
295ss	270	96.09.26ss	7.97	8.44	-1.32	18.3	21.30	3.00			X	lcha	17	4.8	6.5	5.7
297ss	272	96.09.28ss	8.02	8.42	-1.21	18.3	21.30	3.00			X	lcha	5	4.0	5.8	4.9
301s	278	96.10.04s	7.74	8.23	-1.42	22	24.00	2.00			X	lcha	9	6.1	8.2	7.2
305s	283	96.10.09s	7.97	8.27	-0.94	1	3.30	2.50			X	lcha	17	3.9	6.3	5.1
305ss	284	96.10.10ss	7.93	8.24	-1.01	4.3	6.30	2.00			X	lcha	13	3.9	5.7	4.8
311	295	96.10.21	6.88	7.76	-2.14	17.3	20.00	2.50			X	lcha	7	4.0	5.9	5.0
314	307	96.11.02	6.72	7.24	-1.49	18	20.30	2.50			X	lcha	4	4.0	11.2	7.6
315	309	96.11.04	6.7	7.16	-1.28	17.3	22.30	5.00			X	lcha	36	3.1	5.8	4.5
316	310	96.11.05	6.62	7.11	-1.38	17.3	22.15	4.75			X	lcha	25	2.5	4.7	3.6
137	143	96.05.22	8.03	5.52	2.25	18.20	19.50	1.50	X			lcha	13	3.0	5.2	4.1
177	174	96.06.22 a	7.45	6.72	1.13	19.00	8.00(+1)	13.00	X			lcha	206	4.8	6.0	5.4
181	176	96.06.24 a	7.55	6.8	1.11	21.00	7.00(+1)	10.00	X			lcha	70	3.6	5.8	4.7
185	178	96.06.26 a	7.49	6.83	1.05	11.00	7.00	8.00	X			lcha	10	3.1	5.6	4.4
189	180	96.06.28 a	7.42	6.85	0.95	20.00	6.00	10.00	X			lcha	33	3.8	6.1	5.0
193	182	96.06.30 a	7.39	6.93	0.86	20.00	7.00(+1)	11.00	X			lcha	19	3.0	5.8	4.4
197	184	96.07.02 a	8.38	7.54	1.04	23.00	7.00(+1)	8.00	X			lcha	1826	3.6	5.6	4.6
201	186	96.07.04 a	8.93	7.9	1.34	22.00	5.00(+1)	7.00	X			lcha	949	3.5	6.9	5.2
205	188	96.07.06 a	9.02	8.11	1.24	23.00	5.00(+1)	6.00	X			lcha	1250	4.7	7.8	6.3
207	189	96.07.08 a	9.02	8.15	1.23	21.00	1.00(+1)	4.00	X			lcha	842	3.9	6.7	5.3
209	192	96.07.10	9.01	8.15	1.19	4.00	7.00	3.00	X			lcha	223	3.8	6.1	5.0
225	201	96.07.19	8.93	8.2	1.08	4.00	7.00	3.00	X			lcha	25	2.7	5.3	4.0
226	201	96.07.19 a	8.93	8.2	1.08	13.00	16.00	3.00	X			lcha	12	4.0	4.1	4.1
229	203	96.07.21	8.95	8.22	1.07	19.00	22.30	3.50	X			lcha	77	3.6	5.2	4.4
230	204	96.07.22	8.93	8.22	1.07	3.00	6.00	3.00	X			lcha	189	3.8	5.3	4.6
233	206	96.07.24 a	8.91	8.22	1.05	10.00	12.00	2.00	X			lcha	5	3.5	5.1	4.3

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239	210	96.07.28 a	8.74	8.21	0.94	22.00	1.00	3.00	X	lcha	47	3.3	5.4	4.4
241	211	96.07.29 a	8.71	8.21	0.88	22.00	0.30	2.50	X	lcha	15	3.2	5.9	4.6
251	218	96.08.05	8.63	8.38	0.56	18.30	22.00	3.50	X	lcha	9	3.2	5.4	4.3
252	219	96.08.06	8.63	8.38	0.56	2.00	6.00	4.00	X	lcha	13	3.7	4.7	4.2
254	221	96.08.08	8.46	8.36	0.38	17.00	20.00	3.00	X	lcha	7	3.3	5.7	4.5
255	222	96.08.09	8.4	8.35	0.27	18.00	22.00	4.00	X	lcha	6	3.5	5.8	4.7
256	224	96.08.11	8.33	8.31	-0.01	17.00	20.30	3.50	X	lcha	5	2.7	6.7	4.7
257	225	96.08.12	8.34	8.31	0.19	2.30	6.30	4.00	X	lcha	13	3.0	6.2	4.6
258	226	96.08.13	8.44	8.31	0.31	23.30	2.00	3.50	X	lcha	19	3.0	5.6	4.3
260	229	96.08.16	8.51	8.32	0.50	3.00	6.30	3.50	X	lcha	40	3.0	5.3	4.2
262	231	96.08.18	8.76	8.45	0.58	21.00	24.00	3.00	X	lcha	25	3.0	6.0	4.5
263	233	96.08.20	8.8	8.48	0.65	16.30	20.30	4.00	X	lcha	70	3.0	5.8	4.4
264	234	96.08.21	8.81	8.5	0.65	2.30	5.00	2.50	X	lcha	7	2.9	5.8	4.4
267	237	96.08.24	8.87	8.49	0.73	20.00	23.00	3.00	X	lcha	6	5.0	8.3	6.7
269	240	96.08.27	8.81	8.45	0.71	19.00	22.30	3.00	X	lcha	17	5.9	8.2	7.1
273	245	96.09.01	8.66	8.48	0.47	21.00	24.00	3.00	X	lcha	17	7.1	9.2	8.2
274	247	96.09.03	8.63	8.44	0.48	19.00	22.00	3.00	X	lcha	4	5.2	7.7	6.5
276	249	96.09.05	8.57	8.43	0.40	3.00	6.00	3.00	X	lcha	16	3.4	5.9	4.7
278	251	96.09.07	8.57	8.45	0.37	3.30	6.30	3.00	X	lcha	13	3.8	5.1	4.5
281	254	96.09.10	8.4	8.44	-0.23	18.00	22.30	4.50	X	lcha	19	3.9	6.0	5.0
284	257	96.09.13	8.17	8.41	-0.84	2.30	5.30	3.00	X	lcha	19	4.0	5.5	4.8
287	261	96.09.17	7.84	8.32	-1.38	4.00	7.30	3.50	X	lcha	4	6.1	6.8	6.5
292	267	96.09.23	8.08	8.48	-1.21	18.30	21.30	3.00	X	lcha	3	3.1	5.3	4.2
294	269	96.09.25	8.05	8.47	-1.26	0.30	4.30	4.00	X	lcha	3	3.4	5.9	4.7
297	271	96.09.27 a	7.97	8.43	-1.36	20.00	23.00	3.00	X	lcha	7	4.0	5.9	5.0
298	273	96.09.29	7.98	8.41	-1.28	4.00	7.00	3.00	X	lcha	11	3.4	6.3	4.9
302	279	96.10.05	7.76	8.23	-1.32	3.00	6.00	3.00	X	lcha	18	6.1	7.5	6.8
303	280	96.10.06	7.94	8.27	-0.94	7.00	9.00	2.00	X	lcha	3	4.2	5.0	4.6
305	283	96.10.09	7.95	8.25	-0.94	17.30	19.30	2.00	X	lcha	2	4.0	4.2	4.1
307	287	96.10.13	7.62	8.1	-1.36	22	24.00	2.00	X	lcha	9	4.0	6.2	5.1
308	289	96.10.15	7.51	8.07	-1.58	0.3	2.30	2.00	X	lcha	7	3.0	5.8	4.4
311s	295	96.10.21s	6.95	7.83	-2.14	2.3	5.00	2.50	X	lcha	4	3.8	6.0	4.9
311ss	296	96.10.22ss	6.62	7.7	-2.47	6	8.00	2.00	X	lcha	3	3.8	5.9	4.9
313s	306	96.11.01s	6.77	7.32	-1.53	6	8.30	2.50	X	lcha	7	3.9	6.1	5.0
314s	308	96.11.03s	6.72	7.21	-1.42	4	6.30	2.50	X	lcha	3	4.0	5.3	4.7
206	189	96.07.08	9.02	8.15	1.23	2.00	6.00	4.00	X	llich	1	22.4	22.4	22.4
215	195	96.07.13 a	9	8.15	1.19	10.00	13.00	3.00	X	llich	2	19.3	22.1	20.7
216	196	96.07.14	9	8.45	1.18	0.30	5.00	4.50	X	llich	1	19.2	19.2	19.2
219	198	96.07.16	8.96	8.2	1.14	1.00	5.00	4.00	X	llich	1	22.3	22.3	22.3
227	202	96.07.20	8.95	8.2	1.08	2.00	5.00	3.00	X	llich	1	21.1	21.1	21.1
231	205	96.07.23	8.91	8.22	1.06	5.00	8.00	3.00	X	llich	1	20.1	20.1	20.1
130	136	96.05.15	7.23	4.61	2.34	18.00	21.00	3.00	X	Jainzza	4	3.5	4.1	3.8
136	142	96.05.21	8.1	5.37	2.28	18.30	22.30	4.00	X	Jainzza	1	7.6	7.6	7.6
140	146	96.05.25	7.53	5.48	2.01	18.00	24.00	6.00	X	Jainzza	1	7.3	7.3	7.3

143	149	96.05.28a	7.57	5.53	1.97	19.00	23.00	4.00			X	Jainzza	2	4.3	5.0	4.7
146	151	96.05.30a	8.04	5.88	1.97	19.00	23.00	4.00			X	Jainzza	1	4.6	4.6	4.6
150	154	96.06.02	8.5	5.8	2.14	19.00	23.00	4.00			X	Jainzza	3	5.1	5.7	5.4
156	160	96.06.08	8.53	6.85	1.82	8.00	11.00	3.00			X	Jainzza	3	6.2	6.6	6.4
191	181	96.06.29 a	7.4	6.87	0.91	20.00	7.00(+1)	11.00			X	Jainzza	11	6.4	9.1	7.8
200	186	96.07.04	8.87	7.83	1.34	13.00	18.00	5.00			X	Jainzza	18	7.6	8.8	8.2
203	187	96.07.05 a	9.02	8.08	1.30	22.00	6.00(+1)	8.00			X	Jainzza	45	4.9	6.2	5.6
238	210	96.07.28	8.78	8.21	0.94	9.00	12.00	3.00			X	Jainzza	14	4.7	7.1	5.9
139	145	96.05.24	7.74	5.46	2.14	18.00	22.00	4.00	X			Jainzza	1	4.2	4.2	4.2
177	174	96.06.22 a	7.45	6.72	1.13	19.00	8.00(+1)	13.00	X			Jainzza	2	6.8	6.9	6.9
197	184	96.07.02 a	8.38	7.54	1.04	23.00	7.00(+1)	8.00	X			Jainzza	70	6.8	6.9	6.9
239	210	96.07.28 a	8.74	8.21	0.94	22.00	1.00	3.00	X			Jainzza	13	4.7	5.4	5.1
126	132	96.05.11	6.43	4.05	1.87	17.00	20.30	3.50			X	Kaikka	2	14.0	15.3	14.7
127	133	96.05.12	6.47	4.04	1.98	1.00	5.00	4.00			X	Kaikka	6	6.9	8.2	7.6
128	133	96.05.12a	6.6	4.72	1.98	12.00	14.00	2.00			X	Kaikka	13	10.5	15.2	12.9
129	134	96.05.13	6.85	4.61	2.12	12.45	14.00	1.25			X	Kaikka	5	8.3	11.6	10.0
130	136	96.05.15	7.23	4.61	2.34	18.00	21.00	3.00			X	Kaikka	16	10.9	18.7	14.8
133	139	96.05.18	8.24	5.12	2.39	18.00	21.00	3.00			X	Kaikka	9	10.0	14.1	12.1
135	141	96.05.20a	8.16	5.35	2.31	18.15	22.00	3.75			X	Kaikka	9	13.2	19.1	16.2
136	142	96.05.21	8.1	5.37	2.28	18.30	22.30	4.00			X	Kaikka	5	12.4	17.4	14.9
140	146	96.05.26	7.56	5.48	2.04	18.00	24.00	6.00			X	Kaikka	2	5.5	6.0	5.8
141	147	96.05.26	7.56	5.46	2.04	18.30	22.30	2.00			X	Kaikka	1	10.2	10.2	10.2
142	149	96.05.28	7.47	5.51	1.97	7.00	9.00	2.00			X	Kaikka	2	18.7	19.8	19.3
145	151	96.05.30	7.84	5.82	1.97	9.00	12.00	3.00			X	Kaikka	2	14.4	17.0	15.7
147	152	96.05.31	8.02	5.85	2.11	15.00	19.30	4.50			X	Kaikka	7	8.3	13.7	11.0
148	153	96.06.01	8.12	6	2.05	12.30	14.00	1.50			X	Kaikka	1	12.0	12.0	12.0
154	158	96.06.06	8.68	6.78	1.96	17.00	22.30	5.50			X	Kaikka	2	16.1	18.9	17.5
155	159	96.06.07	8.63	6.84	1.89	18.00	22.30	4.50			X	Kaikka	2	17.1	18.3	17.7
164	167	96.06.15	7.83	6.72	1.41	10.00	14.00	4.00			X	Kaikka	3	5.0	5.2	5.1
172	173	96.06.21	7.62	6.63	1.18	0.45	7.45	7.00			X	Kaikka	1	19.6	19.6	19.6
184	178	96.06.26	7.52	6.84	1.05	12.00	17.00	5.00			X	Kaikka	1	14.7	14.7	14.7
187	179	96.06.27 a	7.44	6.85	1.02	19.00	8.00(+1)	13.00			X	Kaikka	1	14.6	14.6	14.6
188	180	96.06.28	7.44	6.85	0.95	12.00	15.00	3.00			X	Kaikka	1	13.6	13.6	13.6
192	182	96.06.30	7.38	6.89	0.86	11.00	16.00	5.00			X	Kaikka	1	17.6	17.6	17.6
195	183	96.07.01 a	8.05	7.76	0.72	19.00	7.00(+1)	12.00			X	Kaikka	43	7.8	15.8	11.8
199	185	96.07.03 a	8.73	7.77	1.23	23.00	5.00(+1)	6.00			X	Kaikka	6	12.2	17.2	14.7
200	186	96.07.04	8.87	7.83	1.34	13.00	18.00	5.00			X	Kaikka	17	19.3	22.0	20.7
203	187	96.07.05 a	9.02	8.08	1.30	22.00	6.00(+1)	8.00			X	Kaikka	14	13.6	17.6	15.6
204	188	96.07.06	9.02	8.1	1.24	11.00	17.00	6.00			X	Kaikka	13	14.0	18.3	16.2
214	195	96.07.13	9	8.15	1.19	3.00	7.00	4.00			X	Kaikka	12	13.3	19.0	16.2
242	212	96.07.30	8.69	8.21	0.84	11.00	13.00	2.00			X	Kaikka	2	5.9	7.6	6.8
282s	255	96.09.11s	8.37	8.43	-0.42	4.00	7.30	3.50			X	Kaikka	1	15.2	15.2	15.2
285s	259	96.09.15s	8.04	8.37	-1.10	10.00	12.30	2.50			X	Kaikka	2	15.6	20.1	17.9
286s	260	96.09.16s	7.94	8.34	-1.30	3.00	7.00	4.00			X	Kaikka	1	13.2	13.2	13.2

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293ss	268	96.09.24ss	8.07	8.47	-1.21	14.3	17.30	3.00		X	Kaikka	3	13.1	15.4	14.3
295s	270	96.09.26s	8.01	8.46	-1.32	1	5.00	4.00		X	Kaikka	3	8.9	13.3	11.1
295ss	270	96.09.26ss	7.97	8.44	-1.32	18.3	21.30	3.00		X	Kaikka	3	11.9	15.1	13.5
207	189	96.07.08 a	9.02	8.15	1.23	21.00	1.00(+1)	4.00	X		Kaikka	1	22.0	22.0	22.0
286	260	96.09.16	7.89	8.33	-1.30	15.30	18.00	2.50	X		Kaikka	2	11.1	13.5	12.3
293	268	96.09.24	8.08	8.46	-1.21	11.00	14.00	3.00	X		Kaikka	22	10.0	17.3	13.7
295	269	96.09.25 a	8.02	8.46	-1.26	15.00	18.00	3.00	X		Kaikka	3	10.7	17.8	14.3
297	271	96.09.27 a	7.97	8.43	-1.36	20.00	23.00	3.00	X		Kaikka	1	12.8	12.8	12.8
132	138	96.05.17	8.26	5.16	2.38	18.00	21.00	3.00		X	Kalibaush	21	25.0	26.8	25.9
133	139	96.05.18	8.24	5.12	2.39	18.00	21.00	3.00		X	Kalibaush	14	25.3	29.0	27.2
143	149	96.05.28a	7.57	5.53	1.97	19.00	23.00	4.00		X	Kalibaush	1	3.8	3.8	3.8
156	160	96.06.08	8.53	6.85	1.82	8.00	11.00	3.00		X	Kalibaush	1	4.2	4.2	4.2
204	188	96.07.06	9.02	8.1	1.24	11.00	17.00	6.00		X	Kalibaush	22	13.2	16.5	14.9
211	193	96.07.11	9.01	8.15	1.20	3.00	7.00	4.00		X	Kalibaush	1	51.0	51.0	51.0
232	206	96.07.24	8.92	8.22	1.05	21.00	24.00	3.00		X	Kalibaush	1	15.2	15.2	15.2
246	215	96.08.02	8.75	8.25	0.85	3.00	7.00	4.00		X	Kalibaush	2	17.3	18.1	17.7
257s	225	96.08.12s	8.36	8.3	0.19	21.30	24.00	2.50		X	Kalibaush	2	17.4	19.5	18.5
259s	227	96.08.14s	8.48	8.3	0.42	17.00	22.00	5.00		X	Kalibaush	1	19.3	19.3	19.3
261s	230	96.08.17s	8.59	8.34	0.58	2.00	5.00	3.00		X	Kalibaush	7	12.4	12.9	12.7
262s	232	96.08.19s	8.78	8.47	0.61	17.00	20.30	3.50		X	Kalibaush	1	12.9	12.9	12.9
277s	250	96.09.06s	8.56	8.42	0.40	3.00	6.00	3.00		X	Kalibaush	1	23.5	23.5	23.5
293s	268	96.09.24s	8.08	8.48	-1.21	8	11.00	3.00		X	Kalibaush	1	17.4	17.4	17.4
299s	274	96.09.30s	7.93	8.37	-1.3	7	10.00	3.00		X	Kalibaush	1	27.4	27.4	27.4
301s	278	96.10.04s	7.74	8.23	-1.42	22	24.00	2.00		X	Kalibaush	1	22.3	22.3	22.3
197	184	96.07.02 a	8.38	7.54	1.04	23.00	7.00(+1)	8.00	X		Kalibaush	2	15.5	16.2	15.9
198	185	96.07.03	8.52	7.62	1.23	9.00	17.00	8.00	X		Kalibaush	3	19.5	22.3	20.9
201	186	96.07.04 a	8.93	7.9	1.34	22.00	5.00(+1)	7.00	X		Kalibaush	7	13.5	16.2	14.9
208	191	96.07.09	9.01	8.15	1.19	13.00	15.00	2.00	X		Kalibaush	1	12.5	12.5	12.5
229	203	96.07.21	8.95	8.22	1.07	19.00	22.30	3.50	X		Kalibaush	2	17.5	18.8	18.2
248	216	96.08.03	8.72	8.27	0.81	7.00	10.30	3.50	X		Kalibaush	1	16.2	16.2	16.2
136	142	96.05.21	8.1	5.37	2.28	18.30	22.30	4.00	X		Kalibaush	1	11.5	11.5	11.5
183	177	96.06.25 a	7.54	6.83	1.09	21.00	8.00	11.00		X	Kazoli	2	9.3	11.3	10.3
191	181	96.06.29 a	7.4	6.87	0.91	20.00	7.00(+1)	11.00		X	Kazoli	17	5.6	8.1	6.9
195	183	96.07.01 a	8.05	7.76	0.72	19.00	7.00(+1)	12.00		X	Kazoli	117	5.2	11.7	8.5
196	184	96.07.02	8.09	7.39	1.04	10.00	14.00	4.00		X	Kazoli	77	5.1	10.8	8.0
203	187	96.07.05 a	9.02	8.08	1.30	22.00	6.00(+1)	8.00		X	Kazoli	83	10.0	12.1	11.1
213	193	96.07.11 b	9.02	8.15	1.20	22.00	1.00(+1)	3.00		X	Kazoli	23	11.3	12.7	12.0
215	195	96.07.13 a	9	8.15	1.19	10.00	13.00	3.00		X	Kazoli	128	5.3	8.4	6.9
216	196	96.07.14	9	8.45	1.18	0.30	5.00	4.50		X	Kazoli	81	7.5	8.6	8.1
237	209	96.07.27	8.89	8.22	1.02	3.00	7.00	4.00		X	Kazoli	22	9.3	11.4	10.4
238	210	96.07.28	8.78	8.21	0.94	9.00	12.00	3.00		X	Kazoli	23	9.6	11.1	10.4
242	212	96.07.30	8.69	8.21	0.84	11.00	13.00	2.00		X	Kazoli	1	12.0	12.0	12.0
246	215	96.08.02	8.75	8.25	0.85	3.00	7.00	4.00		X	Kazoli	21	6.7	7.8	7.3
255s	223	96.08.10s	8.37	8.34	0.19	11.00	14.00	3.00		X	Kazoli	22	9.0	12.3	10.7

257s	225	96.08.12s	8.36	8.3	0.19	21.30	24.00	2.50		X	Kazoli	13	7.6	12.1	9.9
266s	236	96.08.23s	8.87	8.51	0.71	8.00	10.30	2.50		X	Kazoli	12	6.7	7.2	7.0
197	184	96.07.02 a	8.38	7.54	1.04	23.00	7.00(+1)	8.00	X		Kazoli	79	5.3	11.6	8.5
236	208	96.07.26	8.96	8.22	1.10	14.00	17.00	3.00	X		Kazoli	13	9.4	10.1	9.8
240	211	96.07.29	8.72	8.21	0.88	12.00	15.30	3.50	X		Kazoli	7	9.8	11.2	10.5
245	214	96.08.01 a	8.78	8.24	0.91	20.00	22.30	2.50	X		Kazoli	14	9.7	10.2	10.0
249	216	96.08.03 a	8.65	8.27	0.81	19.00	22.00	3.00	X		Kazoli	15	7.2	8.1	7.7
250	217	96.08.04	8.62	8.29	0.67	2.00	5.30	3.50	X		Kazoli	15	10.1	10.4	10.3
256	224	96.08.11	8.33	8.31	-0.01	17.00	20.30	3.50	X		Kazoli	16	7.6	11.4	9.5
257	225	96.08.12	8.34	8.31	0.19	2.30	6.30	4.00	X		Kazoli	15	7.3	12.0	9.7
267	237	96.08.24	8.87	8.49	0.73	20.00	23.00	3.00	X		Kazoli	12	6.5	7.8	7.2
270	241	96.08.28	8.77	8.43	0.68	17.00	20.00	3.00	X		Kazoli	18	7.3	8.2	7.8
271	243	96.08.30	8.73	8.48	0.57	13.00	16.30	3.50	X		Kazoli	3	6.8	7.3	7.1
311s	295	96.10.21s	6.95	7.83	-2.14	2.3	5.00	2.50	X		Kazoli	1	10.3	10.3	10.3
126	132	96.05.11	6.43	4.05	1.87	17.00	20.30	3.50		X	Ketchki	2	3.3	4.1	3.7
128	133	96.05.12a	6.6	4.72	1.98	12.00	14.00	2.00		X	Ketchki	3	4.2	4.6	4.4
129	134	96.05.13	6.85	4.61	2.12	12.45	14.00	1.25		X	Ketchki	53	4.5	4.9	4.7
130	136	96.05.15	7.23	4.61	2.34	18.00	21.00	3.00		X	Ketchki	84	4.4	4.5	4.5
131	137	96.05.16	8.03	4.98	2.40	13.30	14.30	1.00		X	Ketchki	38	4.3	5.0	4.7
134	141	96.05.20	8.18	5.34	2.31	13.30	15.30	2.00		X	Ketchki	18	4.0	5.6	4.8
135	141	96.05.20a	8.16	5.35	2.31	18.15	22.00	3.75		X	Ketchki	5	3.8	4.4	4.1
142	149	96.05.28	7.47	5.51	1.97	7.00	9.00	2.00		X	Ketchki	17	2.9	3.4	3.2
163	166	96.06.14 a	7.96	6.76	1.47	18.00	23.00	5.00		X	Ketchki	2	3.5	3.6	3.6
164	167	96.06.15	7.83	6.72	1.41	10.00	14.00	4.00		X	Ketchki	5	3.5	3.7	3.6
171	172	96.06.20 b	7.62	6.61	1.25	18.30	23.30	5.00		X	Ketchki	3	4.1	4.5	4.3
172	173	96.06.21	7.62	6.63	1.18	0.45	7.45	7.00		X	Ketchki	4	4.1	4.5	4.3
173	173	96.06.21 a	7.59	6.71	1.18	8.30	13.30	5.00		X	Ketchki	3	4.0	5.0	4.5
175	173	96.06.21 c	7.52	6.72	1.18	19.00	23.30	4.50		X	Ketchki	4	3.9	4.0	4.0
176	174	96.06.22	7.48	6.7	1.13	0.30	8.00	7.50		X	Ketchki	1	4.0	4.0	4.0
195	193	96.07.01 a	8.05	7.76	0.72	19.00	7.00(+1)	12.00		X	Ketchki	70	3.7	4.2	4.0
200	186	96.07.04	8.87	7.83	1.34	13.00	18.00	5.00		X	Ketchki	277	3.8	5.8	4.8
211	193	96.07.11	9.01	8.15	1.20	3.00	7.00	4.00		X	Ketchki	47	3.6	5.1	4.4
213	193	96.07.11 b	9.02	8.15	1.20	22.00	1.00(+1)	3.00		X	Ketchki	45	4.1	5.1	4.6
262s	232	96.08.19s	8.78	8.47	0.61	17.00	20.30	3.50		X	Ketchki	20	4.5	4.6	4.6
186	179	96.06.27	7.44	6.85	1.02	9.00	17.00	8.00	X		Ketchki	1	4.8	4.8	4.8
197	184	96.07.02 a	8.38	7.54	1.04	23.00	7.00(+1)	8.00	X		Ketchki	73	3.2	4.1	3.7
266	235	96.08.22	8.82	8.52	0.70	11.00	14.30	3.50	X		Ketchki	3	4.3	4.9	4.6
126	132	96.05.11	6.43	4.05	1.87	17.00	20.30	3.50		X	Kholisha	1	6.9	6.9	6.9
132	138	96.05.17	8.26	5.16	2.38	18.00	21.00	3.00		X	Kholisha	19	3.3	5.6	4.5
134	141	96.05.20	8.18	5.34	2.31	13.30	15.30	2.00		X	Kholisha	1	6.5	6.5	6.5
135	141	96.05.20a	8.16	5.35	2.31	18.15	22.00	3.75		X	Kholisha	21	5.7	7.0	6.4
136	142	96.05.21	8.1	5.37	2.28	18.30	22.30	4.00		X	Kholisha	5	4.3	5.5	4.9
150	154	96.06.02	8.5	5.8	2.14	19.00	23.00	4.00		X	Kholisha	13	7.1	8.1	7.6
155	159	96.06.07	8.63	6.84	1.89	18.00	22.30	4.50		X	Kholisha	4	5.9	6.6	6.3

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157	161	96.05.09	8.51	6.86	1.76	18.30	23.30	5.00		X	X	Kholisha	2	5.7	6.3	6.0
288	263	96.09.19	7.8	8.35	-1.62	17.00	21.00	4.00	X			Kholisha	4	7.7	8.9	8.3
291	266	96.09.22	7.97	8.43	-1.34	5.00	7.30	2.50	X			Kholisha	7	6.2	10.8	8.5
296	151	96.05.30a	8.04	5.88	1.97	19.00	23.00	4.00		X		Kol	2	4.1	4.7	4.4
136	142	96.05.21	8.1	5.37	2.28	18.30	22.30	4.00		X		Kotibacha	2	7.1	7.2	7.2
149	153	96.06.01a	8.4	6.1	2.05	18.45	22.45	4.00		X		Kotibacha	2	6.0	7.5	6.8
150	154	96.06.02	8.5	5.8	2.14	19.00	23.00	4.00		X		Kotibacha	1	8.7	8.7	8.7
179	175	96.06.23a	7.45	6.77	1.11	19.00	6.30(+1)	11.50		X		Kotibacha	4	8.0	12.7	10.4
130	136	96.05.15	7.23	4.61	2.34	18.00	21.00	3.00		X		Lachu	2	15.2	16.1	15.7
131	137	96.05.16	8.03	4.98	2.40	13.30	14.30	1.00		X		Lachu	1	16.0	16.0	16.0
132	138	96.05.17	8.26	5.16	2.38	18.00	21.00	3.00		X		Lachu	9	11.0	13.1	12.1
148	153	96.06.01	8.12	6	2.05	12.30	14.00	1.50		X		Lachu	1	16.5	16.5	16.5
156	160	96.06.08	8.53	6.85	1.82	8.00	11.00	3.00		X		Lachu	2	17.2	19.2	18.2
200	186	96.07.04	8.87	7.83	1.34	13.00	18.00	5.00		X		Lachu	14	11.3	14.4	12.9
211	193	96.07.11	9.01	8.15	1.20	3.00	7.00	4.00		X		Lachu	12	4.5	5.2	4.9
227	202	96.07.20	8.95	8.2	1.08	2.00	5.00	3.00		X		Lachu	3	14.5	18.6	16.6
246	215	96.08.02	8.75	8.25	0.85	3.00	7.00	4.00		X		Lachu	9	13.5	14.7	14.1
289s	264	96.09.20s	7.76	8.33	-1.58	18.00	21.00	3.00		X		Lachu	7	14.3	16.6	15.5
316	310	96.11.05	6.62	7.11	-1.38	17.3	22.15	4.75		X		Lachu	1	10.6	10.6	10.6
137	143	96.05.22	8.03	5.52	2.25	18.20	19.50	1.50		X		Lachu	1	17.7	17.7	17.7
158	162	96.06.10	8.42	6.81	1.73	12.30	15.30	3.00		X		Lachu	1	18.1	18.1	18.1
169	172	96.06.20	7.57	6.69	1.25	0.00	7.00	7.00		X		Lachu	2	12.0	13.2	12.6
177	174	96.06.22a	7.45	6.72	1.13	19.00	8.00(+1)	13.00		X		Lachu	2	4.1	4.2	4.2
212	193	96.07.11a	9.02	8.15	1.20	11.00	14.00	3.00		X		Lachu	7	10.5	12.5	11.5
241	211	96.07.29a	8.71	8.21	0.88	22.00	0.30	2.50		X		Lachu	7	12.2	14.2	13.2
245	214	96.08.01a	8.78	8.24	0.91	20.00	22.30	2.50		X		Lachu	3	17.0	21.9	19.5
247	215	96.08.02a	8.74	8.25	0.85	14.00	16.00	2.00		X		Lachu	2	8.0	11.2	9.6
248	216	96.08.03	8.72	8.27	0.81	7.00	10.30	3.50		X		Lachu	1	20.1	20.1	20.1
251	218	96.08.05	8.63	8.38	0.56	18.30	22.00	3.50		X		Lachu	1	10.3	10.3	10.3
256	224	96.08.11	8.33	8.31	-0.01	17.00	20.30	3.50		X		Lachu	1	6.9	6.9	6.9
295	269	96.09.25a	8.02	8.46	-1.26	15.00	18.00	3.00		X		Lachu	1	12.8	12.8	12.8
299	273	96.09.29a	7.96	8.39	-1.28	15.00	18.00	3.00		X		Lachu	1	13.1	13.1	13.1
163	166	96.06.14a	7.96	6.76	1.47	18.00	23.00	5.00		X		Magur	2	12.1	20.5	16.3
211	193	96.07.11	9.01	8.15	1.20	3.00	7.00	4.00		X		Magur	1	14.4	14.4	14.4
165	168	96.06.16	7.76	6.66	1.40	18.00	23.00	5.00		X		Matibangra	2	6.3	6.6	6.5
169	172	96.06.20	7.57	6.69	1.25	0.00	7.00	7.00		X		Matibangra	2	6.1	7.3	6.7
186	179	96.06.27	7.44	6.85	1.02	9.00	17.00	8.00		X		Matibangra	1	5.4	5.4	5.4
198	185	96.07.03	8.52	7.62	1.23	9.00	17.00	8.00		X		Matibangra	1	5.3	5.3	5.3
125	94	96.04.03	7.22	4.42	2.39	10.30	10.40	0.17		X		Mola	2	3.8	5.1	4.5
126	132	96.05.11	6.43	4.05	1.87	17.00	20.30	3.50		X		Mola	11	4.0	4.7	4.4
127	133	96.05.12	6.47	4.04	1.98	1.00	5.00	4.00		X		Mola	32	4.1	4.9	4.5
128	133	96.05.12a	6.6	4.72	1.98	12.00	14.00	2.00		X		Mola	23	4.1	4.8	4.5
129	134	96.05.13	6.85	4.61	2.12	12.45	14.00	1.25		X		Mola	63	5.1	6.0	5.6
130	136	96.05.15	7.23	4.61	2.34	18.00	21.00	3.00		X		Mola	110	8.3	9.2	8.8

131	137	96.05.16	8.03	4.98	2.40	13.30	14.30	1.00		X	Mola		28	5.9	8.8	7.4
132	138	96.05.17	8.26	5.16	2.38	18.00	21.00	3.00		X	Mola		49	4.1	5.3	4.7
133	139	96.05.18	8.24	5.12	2.39	18.00	21.00	3.00		X	Mola		45	4.8	9.0	6.9
134	141	96.05.20	8.18	5.34	2.31	13.30	15.30	2.00		X	Mola		44	8.9	9.9	9.4
135	141	96.05.20a	8.16	5.35	2.31	18.15	22.00	3.75		X	Mola		37	3.8	5.1	4.5
136	142	96.05.21	8.1	5.37	2.28	18.30	22.30	4.00		X	Mola		24	6.9	8.9	7.9
140	146	96.05.25	7.53	5.48	2.01	18.00	24.00	6.00		X	Mola		21	5.6	9.3	7.5
141	147	96.05.26	7.56	5.46	2.04	18.30	22.30	2.00		X	Mola		18	5.8	9.7	7.8
143	149	96.05.28a	7.57	5.53	1.97	19.00	23.00	4.00		X	Mola		52	6.7	8.8	7.8
145	151	96.05.30	7.84	5.82	1.97	9.00	12.00	3.00		X	Mola		13	8.7	6.9	7.8
146	151	96.05.30a	8.04	5.88	1.97	19.00	23.00	4.00		X	Mola		28	8.3	9.9	9.1
147	152	96.05.31	8.02	5.85	2.11	15.00	19.30	4.50		X	Mola		29	6.9	8.8	7.9
149	153	96.06.01a	8.4	6.1	2.05	18.45	22.45	4.00		X	Mola		17	7.8	8.8	8.3
150	154	96.06.02	8.5	5.8	2.14	19.00	23.00	4.00		X	Mola		38	7.6	8.9	8.3
154	158	96.06.06	8.68	6.78	1.96	17.00	22.30	5.50		X	Mola		32	7.3	8.2	7.8
155	159	96.06.07	8.63	6.84	1.89	18.00	22.30	4.50		X	Mola		24	7.1	8.5	7.8
156	160	96.06.08	8.53	6.85	1.82	8.00	11.00	3.00		X	Mola		29	7.2	8.3	7.8
157	161	96.06.09	8.51	6.86	1.76	18.30	23.30	5.00		X	Mola		7	8.0	9.3	8.7
175	173	96.06.21 c	7.52	6.72	1.18	19.00	23.30	4.50		X	Mola		3	6.7	7.8	7.3
176	174	96.06.22	7.48	6.7	1.13	0.30	8.00	7.50		X	Mola		1	6.6	6.6	6.6
179	175	96.06.23 a	7.45	6.77	1.11	19.00	6.30(+1)	11.50		X	Mola		6	6.5	7.8	7.2
183	177	96.06.25 a	7.54	6.83	1.09	21.00	8.00	11.00		X	Mola		7	3.6	7.1	5.4
187	179	96.06.27 a	7.44	6.85	1.02	19.00	8.00(+1)	13.00		X	Mola		53	4.8	7.6	6.2
188	180	96.06.28	7.44	6.85	0.95	12.00	15.00	3.00		X	Mola		3	3.9	7.8	5.9
191	181	96.06.29 a	7.4	6.87	0.91	20.00	7.00(+1)	11.00		X	Mola		5	5.7	8.5	7.1
192	182	96.06.30	7.38	6.89	0.86	11.00	16.00	5.00		X	Mola		17	4.3	7.4	5.9
195	183	96.07.01 a	8.05	7.76	0.72	19.00	7.00(+1)	12.00		X	Mola		780	3.8	8.7	6.3
196	184	96.07.02	8.09	7.39	1.04	10.00	14.00	4.00		X	Mola		248	4.3	6.8	5.6
199	185	96.07.03 a	8.73	7.77	1.23	23.00	5.00(+1)	6.00		X	Mola		1805	5.9	8.7	7.3
200	186	96.07.04	8.87	7.83	1.34	13.00	18.00	5.00		X	Mola		183	4.4	7.1	5.8
203	187	96.07.05 a	9.02	8.08	1.30	22.00	6.00(+1)	8.00		X	Mola		1812	4.0	7.5	5.8
204	188	96.07.06	9.02	8.1	1.24	11.00	17.00	6.00		X	Mola		583	4.0	7.6	5.8
206	189	96.07.08	9.02	8.15	1.23	2.00	6.00	4.00		X	Mola		183	6.3	7.4	6.9
210	192	96.07.10 a	9	8.15	1.19	10.30	13.00	2.50		X	Mola		77	4.3	6.9	5.6
211	193	96.07.11	9.01	8.15	1.20	3.00	7.00	4.00		X	Mola		39	4.3	7.9	6.1
213	193	96.07.11 b	9.02	8.15	1.20	22.00	1.00(+1)	3.00		X	Mola		29	4.3	7.1	5.7
214	195	96.07.13	9	8.15	1.19	3.00	7.00	4.00		X	Mola		177	4.3	7.8	6.1
215	195	96.07.13 a	9	8.15	1.19	10.00	13.00	3.00		X	Mola		410	6.3	7.9	7.1
216	196	96.07.14	9	8.45	1.18	0.30	5.00	4.50		X	Mola		148	6.5	8.2	7.4
219	198	96.07.16	8.96	8.2	1.14	1.00	5.00	4.00		X	Mola		45	6.2	7.8	7.0
221	199	96.07.17	9.02	8.23	1.08	3.00	6.00	3.00		X	Mola		47	6.1	7.7	6.9
237	209	96.07.27	8.89	8.22	1.02	3.00	7.00	4.00		X	Mola		49	4.4	6.8	5.6
254s	221	96.08.08s	8.46	8.36	0.38	17.00	20.00	3.00		X	Mola		16	4.3	6.4	5.4
255s	223	96.08.10s	8.37	8.34	0.19	11.00	14.00	3.00		X	Mola		46	4.3	6.9	5.6

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255ss	223	96.08.10ss	8.35	8.32	0.19	17.00	20.00	3.00		X	Mola		77	4.9	7.8	6.4
257s	225	96.08.12s	8.36	8.3	0.19	21.30	24.00	2.50		X	Mola		21	4.4	7.4	5.9
259s	227	96.08.14s	8.48	8.3	0.42	17.00	22.00	5.00		X	Mola		77	5.0	6.7	5.9
259ss	228	96.08.15ss	8.49	8.31	0.47	9.00	11.00	2.00		X	Mola		43	4.1	5.5	4.8
261s	230	96.08.17s	8.59	8.34	0.58	2.00	5.00	3.00		X	Mola		43	4.2	5.6	4.9
262s	232	96.08.19s	8.78	8.47	0.61	17.00	20.30	3.50		X	Mola		48	4.2	6.8	5.5
266ss	236	96.08.23ss	8.87	8.51	0.71	13.30	16.00	2.50		X	Mola		83	5.7	6.3	6.0
270s	242	96.08.29s	8.73	8.43	0.64	7.00	11.00	4.00		X	Mola		25	6.3	6.7	6.5
282s	255	96.09.11s	8.37	8.43	-0.42	4.00	7.30	3.50		X	Mola		29	4.0	6.6	5.3
284s	257	96.09.13s	8.18	8.41	-0.84	12.30	15.30	3.00		X	Mola		27	4.6	7.0	5.8
285s	259	96.09.15s	8.04	8.37	-1.10	10.00	12.30	2.50		X	Mola		143	3.8	6.4	5.1
286s	260	96.09.16s	7.94	8.34	-1.30	3.00	7.00	4.00		X	Mola		83	3.1	8.3	5.7
287s	262	96.09.18s	7.77	8.29	-1.53	6.00	8.00	2.00		X	Mola		74	4.8	9.9	7.4
289s	264	96.09.20s	7.76	8.33	-1.58	18.00	21.00	3.00		X	Mola		73	5.7	9.5	7.6
293ss	268	96.09.24ss	8.07	8.47	-1.21	14.3	17.30	3.00		X	Mola		7	4.6	6.6	5.6
295s	270	96.09.26s	8.01	8.46	-1.32	1	5.00	4.00		X	Mola		18	5.5	7.2	6.4
295ss	270	96.09.26ss	7.97	8.44	-1.32	18.3	21.30	3.00		X	Mola		19	5.2	7.3	6.3
297ss	272	96.09.28ss	8.02	8.42	-1.21	18.3	21.30	3.00		X	Mola		17	5.6	7.6	6.6
299s	274	96.09.30s	7.93	8.37	-1.3	7	10.00	3.00		X	Mola		21	4.0	7.3	5.7
299ss	274	96.09.30ss	7.94	8.36	-1.3	18	20.00	2.00		X	Mola		23	4.2	7.1	5.7
300s	276	96.10.02s	7.87	8.3	-1.24	14	16.00	2.00		X	Mola		14	6.8	7.5	7.2
302s	279	96.10.05s	7.84	8.24	-1.32	15	16.30	1.50		X	Mola		10	6.5	7.7	7.1
305s	283	96.10.09s	7.97	8.27	-0.94	1	3.30	2.50		X	Mola		9	4.0	6.3	5.2
305ss	284	96.10.10ss	7.93	8.24	-1.01	4.3	6.30	2.00		X	Mola		6	4.0	6.5	5.3
306s	286	96.10.12s	7.77	8.19	-1.26	13	15.00	2.00		X	Mola		5	4.2	7.2	5.7
307s	288	96.10.14s	7.59	8.1	-1.4	11.3	13.30	2.00		X	Mola		1	4.9	4.9	4.9
309	292	96.10.18	7.08	7.9	-2.03	10	12.30	2.50		X	Mola		7	4.1	5.5	4.8
310	294	96.10.20	6.97	7.85	-2.14	8	10.00	2.00		X	Mola		8	4.0	6.9	5.5
313	305	96.10.31	6.64	7.35	-1.83	9.3	12.00	3.00		X	Mola		4	4.6	7.2	5.9
314	307	96.11.02	6.72	7.24	-1.49	18	20.30	2.50		X	Mola		8	4.2	8.0	6.1
151	155	96.06.03	8.66	6.63	2.09	18.30	22.30	4.00	X		Mola		15	8.1	8.9	8.5
177	174	96.06.22 a	7.45	6.72	1.13	19.00	8.00(+1)	13.00	X		Mola		1	7.3	7.3	7.3
178	175	96.06.23	7.47	6.75	1.11	10.00	18.00	8.00	X		Mola		2	7.1	7.3	7.2
185	178	96.06.26 a	7.49	6.83	1.05	11.00	7.00	8.00	X		Mola		1	7.2	7.2	7.2
194	183	96.07.01	7.48	7.11	0.72	12.00	17.00	5.00	X		Mola		235	4.2	7.2	5.7
197	184	96.07.02 a	8.38	7.54	1.04	23.00	7.00(+1)	8.00	X		Mola		344	4.6	7.2	5.9
202	187	96.07.05	8.99	8	1.30	10.00	16.00	6.00	X		Mola		116	4.3	7.3	5.8
205	188	96.07.06 a	9.02	8.11	1.24	23.00	5.00(+1)	6.00	X		Mola		143	5.2	7.9	6.6
207	189	96.07.08 a	9.02	8.15	1.23	21.00	1.00(+1)	4.00	X		Mola		187	6.2	9.2	7.7
209	192	96.07.10	9.01	8.15	1.19	4.00	7.00	3.00	X		Mola		42	6.2	7.3	6.8
251	218	96.08.05	8.63	8.38	0.56	18.30	22.00	3.50	X		Mola		13	4.6	6.8	5.7
253	220	96.08.07	8.59	8.38	0.53	9.00	13.00	4.00	X		Mola		12	4.6	4.8	4.7
254	221	96.08.08	8.46	8.36	0.38	17.00	20.00	3.00	X		Mola		6	4.3	6.4	5.4
255	222	96.08.09	8.4	8.35	0.27	18.00	22.00	4.00	X		Mola		12	4.3	6.3	5.3

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256	224	96.08.11	8.33	8.31	-0.01	17.00	20.30	3.50	X	Mola	25	4.7	8.1	6.4
257	225	96.08.12	8.34	8.31	0.19	2.30	6.30	4.00	X	Mola	13	4.5	7.8	6.2
261	229	96.08.16 a	8.53	8.33	0.50	16.30	20.00	3.50	X	Mola	5	4.1	5.9	5.0
262	231	96.08.18	8.76	8.45	0.58	21.00	24.00	3.00	X	Mola	4	4.7	7.0	5.9
267	237	96.08.24	8.87	8.49	0.73	20.00	23.00	3.00	X	Mola	11	4.5	5.7	5.1
269	240	96.08.27	8.81	8.45	0.71	19.00	22.30	3.00	X	Mola	14	6.5	7.2	6.9
270	241	96.08.28	8.77	8.43	0.68	17.00	20.00	3.00	X	Mola	12	6.2	6.8	6.5
274	247	96.09.03	8.63	8.44	0.48	19.00	22.00	3.00	X	Mola	14	5.8	7.1	6.5
275	248	96.09.04	8.62	8.43	0.48	3.00	6.00	3.00	X	Mola	4	6.4	7.3	6.9
280	253	96.09.09	8.5	8.44	0.24	9.00	12.30	3.50	X	Mola	10	4.6	6.9	5.8
281	254	96.09.10	8.4	8.44	-0.23	18.00	22.30	4.50	X	Mola	29	4.2	6.4	5.3
282	255	96.09.11	8.34	8.43	-0.42	15.00	18.30	3.50	X	Mola	11	4.2	7.1	5.7
283	256	96.09.12	8.27	8.43	-0.63	11.30	14.30	3.00	X	Mola	19	4.0	6.8	5.4
284	257	96.09.13	8.17	8.41	-0.84	2.30	5.30	3.00	X	Mola	19	3.4	5.7	4.6
285	258	96.09.14	8.08	8.38	-0.99	18.30	21.30	2.50	X	Mola	21	4.5	6.8	5.7
286	260	96.09.16	7.89	8.33	-1.30	15.30	18.00	2.50	X	Mola	23	5.1	8.2	6.7
287	261	96.09.17	7.84	8.32	-1.38	4.00	7.30	3.50	X	Mola	18	5.2	8.1	6.7
288	263	96.09.19	7.8	8.35	-1.62	17.00	21.00	4.00	X	Mola	23	5.1	7.7	6.4
289	264	96.09.20	7.76	8.86	-1.58	3.00	7.00	4.00	X	Mola	41	7.1	8.6	7.9
290	265	96.09.21	7.78	8.36	-1.58	1.00	5.00	4.00	X	Mola	23	5.2	9.3	7.3
291	266	96.09.22	7.97	8.43	-1.34	5.00	7.30	2.50	X	Mola	55	5.2	8.5	6.9
292	267	96.09.23	8.08	8.48	-1.21	18.30	21.30	3.00	X	Mola	2	4.2	7.6	5.9
293	268	96.09.24	8.08	8.46	-1.21	11.00	14.00	3.00	X	Mola	33	4.5	7.1	5.8
295	269	96.09.25 a	8.02	8.46	-1.26	15.00	18.00	3.00	X	Mola	9	4.1	7.1	5.6
297	271	96.09.27 a	7.97	8.43	-1.36	20.00	23.00	3.00	X	Mola	2	5.0	5.6	5.3
300	275	96.10.01	7.95	8.35	-1.21	9.00	11.00	2.00	X	Mola	29	6.2	7.5	6.9
301	277	96.10.03	7.79	8.26	-1.36	19.00	21.30	2.50	X	Mola	7	5.5	6.8	6.2
302	279	96.10.05	7.76	8.23	-1.32	3.00	6.00	3.00	X	Mola	17	6.3	7.7	7.0
303	280	96.10.06	7.94	8.27	-0.94	7.00	9.00	2.00	X	Mola	2	4.9	6.2	5.6
304	282	96.10.08	8.03	8.28	-0.82	15.00	17.00	2.00	X	Mola	4	4.2	6.1	5.2
306	285	96.10.11	7.85	8.2	-1.1	9	11.00	2.00	X	Mola	3	4.0	6.2	5.1
309s	293	96.10.19s	7	7.87	-2.12	15	17.30	2.50	X	Mola	3	4.3	5.1	4.7
313s	306	96.11.01s	6.77	7.32	-1.53	6	8.30	2.50	X	Mola	4	4.0	7.1	5.6
199	185	96.07.03 a	8.73	7.77	1.23	23.00	5.00(+1)	6.00	X	Mrigel	11	27.5	29.5	28.5
285s	259	96.09.15s	8.04	8.37	-1.10	10.00	12.30	2.50	X	Mrigel	1	44.0	44.0	44.0
297s	272	96.09.28s	8.02	8.42	-1.21	7	10.00	3.00	X	Mrigel	1	24.6	24.6	24.6
315	309	96.11.04	6.7	7.16	-1.28	17.3	22.30	5.00	X	Mrigel	1	23.0	23.0	23.0
157	161	96.06.09	8.51	6.86	1.76	18.30	23.30	5.00	X	Napit kol	1	6.1	6.1	6.1
196	184	96.07.02	8.09	7.39	1.04	10.00	14.00	4.00	X	Napit kol	10	3.2	3.8	3.5
206	189	96.07.08	9.02	8.15	1.23	2.00	6.00	4.00	X	Napit kol	13	3.3	3.9	3.6
282s	255	96.09.11s	8.37	8.43	-0.42	4.00	7.30	3.50	X	Napit kol	1	4.5	4.5	4.5
293s	268	96.09.24s	8.08	8.48	-1.21	8	11.00	3.00	X	Napit kol	1	3.1	3.1	3.1
207	189	96.07.08 a	9.02	8.15	1.23	21.00	1.00(+1)	4.00	X	Napit kol	3	4.3	4.5	4.4
126	132	96.05.11	6.43	4.05	1.87	17.00	20.30	3.50	X	Napit kol	1	6.3	6.3	6.3

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135	141	96.05.20a	8.16	5.35	2.31	18.15	22.00	3.75		X	Naptani	7	6.1	6.8	6.5
141	147	96.05.26	7.56	5.46	2.04	18.30	22.30	2.00		X	Naptani	1	6.9	6.9	6.9
143	149	96.05.28a	7.57	5.53	1.97	19.00	23.00	4.00		X	Naptani	2	5.8	6.2	6.0
146	151	96.05.30a	8.04	5.88	1.97	19.00	23.00	4.00		X	Naptani	1	5.2	5.2	5.2
147	152	96.05.31	8.02	5.85	2.11	15.00	19.30	4.50		X	Naptani	2	4.3	5.2	4.8
171	172	96.06.20 b	7.62	6.61	1.25	18.30	23.30	5.00		X	Naptani	1	5.6	5.6	5.6
195	183	96.07.01 a	8.05	7.76	0.72	19.00	7.00(+1)	12.00		X	Naptani	14	3.0	4.5	3.8
199	185	96.07.03 a	8.73	7.77	1.23	23.00	5.00(+1)	6.00		X	Naptani	29	5.5	6.5	6.0
204	188	96.07.06	9.02	8.1	1.24	11.00	17.00	6.00		X	Naptani	22	7.0	7.2	7.1
206	189	96.07.08	9.02	8.15	1.23	2.00	6.00	4.00		X	Naptani	15	6.2	6.8	6.5
177	174	96.06.22 a	7.45	6.72	1.13	19.00	8.00(+1)	13.00	X		Naptani	1	5.8	5.8	5.8
127	133	96.05.12	6.47	4.04	1.98	1.00	5.00	4.00		X	Pabda	3	8.3	9.2	8.8
130	136	96.05.15	7.23	4.61	2.34	18.00	21.00	3.00		X	Pabda	2	7.6	8.0	7.8
132	138	96.05.17	8.26	5.16	2.38	18.00	21.00	3.00		X	Pabda	1	11.7	11.7	11.7
146	151	96.05.30a	8.04	5.88	1.97	19.00	23.00	4.00		X	Pabda	1	24.7	24.7	24.7
149	153	96.06.01a	8.4	6.1	2.05	18.45	22.45	4.00		X	Pabda	5	10.7	13.2	12.0
150	154	96.06.02	8.5	5.8	2.14	19.00	23.00	4.00		X	Pabda	2	8.7	13.2	11.0
156	160	96.06.08	8.53	6.85	1.82	8.00	11.00	3.00		X	Pabda	5	6.2	8.9	7.6
211	193	96.07.11	9.01	8.15	1.20	3.00	7.00	4.00		X	Pabda	10	10.8	11.2	11.0
219	198	96.07.16	8.96	8.2	1.14	1.00	5.00	4.00		X	Pabda	7	9.7	10.1	9.9
132	138	96.05.17	8.26	5.16	2.38	18.00	21.00	3.00		X	Poa	1	9.9	9.9	9.9
126	132	96.05.11	6.43	4.05	1.87	17.00	20.30	3.50		X	Potka	1	4.5	4.5	4.5
128	133	96.05.12a	6.6	4.72	1.98	12.00	14.00	2.00		X	Potka	28	4.5	6.7	5.6
129	134	96.05.13	6.85	4.61	2.12	12.45	14.00	1.25		X	Potka	20	4.7	6.1	5.4
130	136	96.05.15	7.23	4.61	2.34	18.00	21.00	3.00		X	Potka	10	4.5	6.2	5.4
131	137	96.05.16	8.03	4.98	2.40	13.30	14.30	1.00		X	Potka	1	4.5	4.5	4.5
132	138	96.05.17	8.26	5.16	2.38	18.00	21.00	3.00		X	Potka	3	4.5	4.8	4.7
133	139	96.05.18	8.24	5.12	2.39	18.00	21.00	3.00		X	Potka	7	4.6	5.8	5.2
134	141	96.05.20	8.18	5.34	2.31	13.30	15.30	2.00		X	Potka	1	6.5	6.5	6.5
140	146	96.05.25	7.53	5.48	2.01	18.00	24.00	6.00		X	Potka	1	5.9	5.9	5.9
141	147	96.05.26	7.56	5.46	2.04	18.30	22.30	2.00		X	Potka	5	6.1	7.8	7.0
142	149	96.05.28	7.47	5.51	1.97	7.00	9.00	2.00		X	Potka	1	8.3	8.3	8.3
143	149	96.05.28a	7.57	5.53	1.97	19.00	23.00	4.00		X	Potka	1	6.1	6.1	6.1
144	150	96.05.29	7.7	5.75	2.01	11.30	13.45	2.25		X	Potka	1	6.2	6.2	6.2
145	151	96.05.30	7.84	5.82	1.97	9.00	12.00	3.00		X	Potka	3	7.1	7.8	7.5
146	151	96.05.30a	8.04	5.88	1.97	19.00	23.00	4.00		X	Potka	2	6.1	6.8	6.5
147	152	96.05.31	8.02	5.85	2.11	15.00	19.30	4.50		X	Potka	3	6.2	9.3	7.8
148	153	96.06.01	8.12	6	2.05	12.30	14.00	1.50		X	Potka	27	4.2	6.8	5.5
154	158	96.06.06	8.68	6.78	1.96	17.00	22.30	5.50		X	Potka	9	6.2	7.1	6.7
156	160	96.06.08	8.53	6.85	1.82	8.00	11.00	3.00		X	Potka	6	6.0	7.2	6.6
157	161	96.06.09	8.51	6.86	1.76	18.30	23.30	5.00		X	Potka	1	4.8	4.8	4.8
159	163	96.06.11	8.32	6.77	1.69	12.30	15.30	3.00		X	Potka	14	6.7	6.8	6.8
163	166	96.06.14 a	7.96	6.76	1.47	18.00	23.00	5.00		X	Potka	5	6.1	6.7	6.4
164	167	96.06.15	7.83	6.72	1.41	10.00	14.00	4.00		X	Potka	11	5.6	6.2	5.9

166	169	96.06.17	7.68	6.65	1.35	13.00	19.00	6.00		X	Polka	16	6.6	6.8	6.7
174	173	96.06.21 b	7.56	6.71	1.18	14.00	18.30	4.50		x	Polka	4	5.7	6.1	5.9
180	176	96.06.24	7.55	6.79	1.11	9.00	17.00	8.00		X	Polka	5	4.8	6.6	5.7
183	177	96.06.25 a	7.54	6.83	1.09	21.00	8.00	11.00		X	Polka	3	5.2	6.3	5.8
184	178	96.06.26	7.52	6.84	1.05	12.00	17.00	5.00		X	Polka	3	6.1	6.5	6.3
191	181	96.06.29 a	7.4	6.87	0.91	20.00	7.00(+1)	11.00		X	Polka	2	6.1	6.3	6.2
192	182	96.06.30	7.38	6.89	0.86	11.00	16.00	5.00		X	Polka	3	5.9	6.3	6.1
195	183	96.07.01 a	8.05	7.76	0.72	19.00	7.00(+1)	12.00		X	Polka	27	6.2	6.4	6.3
204	188	96.07.06	9.02	8.1	1.24	11.00	17.00	6.00		X	Polka	74	6.3	7.1	6.7
206	189	96.07.08	9.02	8.15	1.23	2.00	6.00	4.00		X	Polka	5	5.3	5.9	5.6
210	192	96.07.10 a	9	8.15	1.19	10.30	13.00	2.50		X	Polka	11	5.9	6.1	6.0
215	195	96.07.13 a	9	8.15	1.19	10.00	13.00	3.00		X	Polka	19	6.2	7.1	6.7
216	196	96.07.14	9	8.45	1.18	0.30	5.00	4.50		X	Polka	9	6.2	7.7	7.0
220	198	96.07.16 a	9	8.22	1.14	13.00	16.00	3.00		X	Polka	4	4.1	5.3	4.7
286s	260	96.09.16s	7.94	8.34	-1.30	3.00	7.00	4.00		X	Polka	6	3.3	5.6	4.5
287s	262	96.09.18s	7.77	8.29	-1.53	6.00	8.00	2.00		X	Polka	6	5.2	8.9	7.1
293s	268	96.09.24s	8.08	8.48	-1.21	8	11.00	3.00		X	Polka	3	5.5	6.2	5.9
293ss	268	96.09.24ss	8.07	8.47	-1.21	14.3	17.30	3.00		X	Polka	2	5.0	5.6	5.3
297s	272	96.09.28s	8.02	8.42	-1.21	7	10.00	3.00		X	Polka	3	5.0	6.7	5.9
297ss	272	96.09.28ss	8.02	8.42	-1.21	18.3	21.30	3.00		X	Polka	1	6.1	6.1	6.1
299s	274	96.09.30s	7.93	8.37	-1.3	7	10.00	3.00		X	Polka	3	5.2	6.9	6.1
299ss	274	96.09.30ss	7.94	8.36	-1.3	18	20.00	2.00		X	Polka	1	6.0	6.0	6.0
189	180	96.06.28 a	7.42	6.85	0.95	20.00	6.00	10.00	X		Polka	2	5.2	6.1	5.7
194	183	96.07.01	7.48	7.11	0.72	12.00	17.00	5.00	X		Polka	12	5.8	6.2	6.0
197	184	96.07.02 a	8.38	7.54	1.04	23.00	7.00(+1)	8.00	X		Polka	21	5.5	5.9	5.7
202	187	96.07.05	8.99	8	1.30	10.00	16.00	6.00	X		Polka	41	5.8	6.2	6.0
207	189	96.07.08 a	9.02	8.15	1.23	21.00	1.00(+1)	4.00	X		Polka	16	5.7	6.1	5.9
281	254	96.09.10	8.4	8.44	-0.23	18.00	22.30	4.50	X		Polka	1	5.8	5.8	5.8
283	256	96.09.12	8.27	8.43	-0.63	11.30	14.30	3.00	X		Polka	2	5.4	5.6	5.5
285	258	96.09.14	8.08	8.38	-0.99	18.30	21.30	2.50	X		Polka	11	2.8	6.1	4.5
286	260	96.09.16	7.89	8.33	-1.30	15.30	18.00	2.50	X		Polka	8	4.3	6.2	5.3
287	261	96.09.17	7.84	8.32	-1.38	4.00	7.30	3.50	X		Polka	8	3.2	5.7	4.5
288	263	96.09.19	7.8	8.35	-1.62	17.00	21.00	4.00	X		Polka	3	5.6	6.4	6.0
290	265	96.09.21	7.78	8.36	-1.58	1.00	5.00	4.00	X		Polka	3	6.6	6.8	6.7
291	266	96.09.22	7.97	8.43	-1.34	5.00	7.30	2.50	X		Polka	3	4.1	9.1	6.6
295	269	96.09.25 a	8.02	8.46	-1.26	15.00	18.00	3.00	X		Polka	3	4.5	6.8	5.7
296	271	96.09.27	7.96	8.43	-1.36	10.30	13.30	3.00	X		Polka	3	4.7	6.8	5.8
299	273	96.09.29 a	7.96	8.39	-1.28	15.00	18.00	3.00	X		Polka	2	5.0	5.8	5.4
311ss	296	96.10.22ss	6.62	7.7	-2.47	6	8.00	2.00	X		Polka	1	6.2	6.2	6.2
126	132	96.05.11	6.43	4.05	1.87	17.00	20.30	3.50		X	Puti	133	4.0	10.3	7.2
127	133	96.05.12	6.47	4.04	1.98	1.00	5.00	4.00		X	Puti	69	4.2	9.8	7.0
128	133	96.05.12a	6.6	4.72	1.98	12.00	14.00	2.00		X	Puti	22	4.1	8.3	6.2
129	134	96.05.13	6.85	4.61	2.12	12.45	14.00	1.25		X	Puti	9	7.1	8.6	7.9
130	136	96.05.15	7.23	4.61	2.34	18.00	21.00	3.00		X	Puti	20	3.3	4.0	3.7

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131	137	96.05.16	8.03	4.98	2.40	13.30	14.30	1.00		X	Putl	10	7.5	8.0	7.8
133	139	96.05.18	8.24	5.12	2.39	18.00	21.00	3.00		X	Putl	28	4.5	8.0	6.3
134	141	96.05.20	8.18	5.34	2.31	13.30	15.30	2.00		X	Putl	18	3.5	6.0	4.8
135	141	96.05.20a	8.16	5.35	2.31	18.15	22.00	3.75		X	Putl	38	4.1	9.3	6.7
136	142	96.05.21	8.1	5.37	2.28	18.30	22.30	4.00		X	Putl	17	3.4	6.3	4.9
140	146	96.05.25	7.53	5.48	2.01	18.00	24.00	6.00		X	Putl	17	4.8	7.9	6.4
141	147	96.05.26	7.56	5.46	2.04	18.30	22.30	2.00		X	Putl	9	4.5	8.5	6.5
142	149	96.05.28	7.47	5.51	1.97	7.00	9.00	2.00		X	Putl	3	3.8	4.6	4.2
143	149	96.05.28a	7.57	5.53	1.97	19.00	23.00	4.00		X	Putl	6	3.3	4.5	3.9
144	150	96.05.29	7.7	5.75	2.01	11.30	13.45	2.25		X	Putl	6	4.8	9.3	7.1
145	151	96.05.30	7.84	5.82	1.97	9.00	12.00	3.00		X	Putl	2	7.8	9.9	8.9
145	151	96.05.30	7.84	5.82	1.97	9.00	12.00	3.00		X	Putl	5	5.2	5.9	5.6
146	151	96.05.30a	8.04	5.88	1.97	19.00	23.00	4.00		X	Putl	13	3.8	4.7	4.3
147	152	96.05.31	8.02	5.85	2.11	15.00	19.30	4.50		X	Putl	17	4.2	5.3	4.8
148	153	96.06.01	8.12	6	2.05	12.30	14.00	1.50		X	Putl	8	5.9	8.3	7.1
149	153	96.06.01a	8.4	6.1	2.05	18.45	22.45	4.00		X	Putl	17	6.0	8.8	7.4
150	154	96.06.02	8.5	5.8	2.14	19.00	23.00	4.00		X	Putl	6	4.7	8.2	6.5
154	158	96.06.06	8.68	6.78	1.96	17.00	22.30	5.50		X	Putl	17	5.2	7.8	6.5
155	159	96.06.07	8.63	6.84	1.89	18.00	22.30	4.50		X	Putl	7	4.2	8.1	6.2
156	160	96.06.08	8.53	6.85	1.82	8.00	11.00	3.00		X	Putl	9	6.1	7.3	6.7
157	161	96.06.09	8.51	6.86	1.76	18.30	23.30	5.00		X	Putl	5	4.2	8.6	6.4
159	163	96.06.11	8.32	6.77	1.69	12.30	15.30	3.00		X	Putl	8	4.9	5.8	5.4
160	164	96.06.12	8.2	6.77	1.65	12.00	14.00	2.00		X	Putl	10	4.8	5.8	5.3
161	165	96.06.13	8.07	6.78	1.53	12.00	14.30	2.50		X	Putl	10	4.3	5.8	5.1
163	166	96.06.14 a	7.96	6.76	1.47	18.00	23.00	5.00		X	Putl	12	3.1	5.5	4.3
164	167	96.06.15	7.83	6.72	1.41	10.00	14.00	4.00		X	Putl	15	4.6	6.0	5.3
168	171	96.06.19	7.57	6.69	1.17	18.00	22.00	4.00		X	Putl	6	3.7	6.3	5.0
171	172	96.06.20 b	7.62	6.61	1.25	18.30	23.30	5.00		X	Putl	13	5.1	8.1	6.6
172	173	96.06.21	7.62	6.63	1.18	0.45	7.45	7.00		X	Putl	3	5.2	5.9	5.6
175	173	96.06.21 c	7.52	6.72	1.18	19.00	23.30	4.50		X	Putl	3	5.2	5.3	5.3
176	174	96.06.22	7.48	6.7	1.13	0.30	8.00	7.50		X	Putl	1	3.8	3.8	3.8
179	175	96.06.23 a	7.45	6.77	1.11	19.00	6.30(+1)	11.50		X	Putl	5	4.3	8.0	6.2
183	177	96.06.25 a	7.54	6.83	1.09	21.00	8.00	11.00		X	Putl	3	4.3	8.3	6.3
184	178	96.06.26	7.52	6.84	1.05	12.00	17.00	5.00		X	Putl	5	3.8	8.2	6.0
187	179	96.06.27 a	7.44	6.85	1.02	19.00	8.00(+1)	13.00		X	Putl	7	4.6	5.1	4.9
188	180	96.06.28	7.44	6.85	0.95	12.00	15.00	3.00		X	Putl	7	4.2	6.6	5.4
191	181	96.06.29 a	7.4	6.87	0.91	20.00	7.00(+1)	11.00		X	Putl	1	4.1	4.1	4.1
192	182	96.06.30	7.38	6.89	0.86	11.00	16.00	5.00		X	Putl	13	4.4	8.1	6.3
195	183	96.07.01 a	8.05	7.76	0.72	19.00	7.00(+1)	12.00		X	Putl	267	3.8	9.3	6.6
196	184	96.07.02	8.09	7.39	1.04	10.00	14.00	4.00		X	Putl	129	3.3	8.2	5.8
199	185	96.07.03 a	8.73	7.77	1.23	23.00	5.00(+1)	6.00		X	Putl	298	3.2	9.6	6.4
200	186	96.07.04	8.87	7.83	1.34	13.00	18.00	5.00		X	Putl	144	3.4	8.7	6.1
203	187	96.07.05 a	9.02	8.08	1.30	22.00	6.00(+1)	8.00		X	Putl	267	3.2	8.2	5.7
204	188	96.07.06	9.02	8.1	1.24	11.00	17.00	6.00		X	Putl	147	4.3	6.7	5.5

211	193	96.07.11	9.01	8.15	1.20	3.00	7.00	4.00			X	Pull	84	3.6	7.6	5.6
213	193	96.07.11 b	9.02	8.15	1.20	22.00	1.00(+1)	3.00			X	Pull	41	4.8	8.2	6.5
214	195	96.07.13	9	8.15	1.19	3.00	7.00	4.00			X	Pull	129	4.1	8.6	6.4
221	199	96.07.17	9.02	8.23	1.08	3.00	6.00	3.00			X	Pull	25	4.2	8.2	6.2
223	200	96.07.18	8.94	8.2	1.09	18.00	22.00	4.00			X	Pull	14	3.0	3.5	3.3
224	200	96.07.18 a	8.94	8.19	1.09	10.00	12.00	2.00			X	Pull	17	2.3	3.5	2.9
227	202	96.07.20	8.95	8.2	1.08	2.00	5.00	3.00			X	Pull	23	3.5	4.0	3.8
228	202	96.07.20 a	8.95	8.2	1.08	12.00	14.00	2.00			X	Pull	15	3.5	4.7	4.1
231	205	96.07.23	8.91	8.22	1.06	5.00	8.00	3.00			X	Pull	25	4.0	5.1	4.6
232	206	96.07.24	8.92	8.22	1.05	21.00	24.00	3.00			X	Pull	23	4.0	6.1	5.1
234	207	96.07.25	8.91	8.22	1.05	7.00	10.00	3.00			X	Pull	13	4.1	5.0	4.6
235	207	96.07.25 a	8.94	8.23	1.05	17.30	20.30	3.00			X	Pull	73	4.0	5.2	4.6
242	212	96.07.30	8.69	8.21	0.84	11.00	13.00	2.00			X	Pull	1	6.2	6.2	6.2
255s	223	96.08.10s	8.37	8.34	0.19	11.00	14.00	3.00			X	Pull	11	4.2	8.0	6.1
257s	225	96.08.12s	8.36	8.3	0.19	21.30	24.00	2.50			X	Pull	17	3.6	8.0	5.8
258s	226	96.08.13s	8.4	8.31	0.31	6.00	9.00	3.00			X	Pull	77	4.1	5.9	5.0
259ss	228	96.08.15ss	8.49	8.31	0.47	9.00	11.00	2.00			X	Pull	22	4.2	4.3	4.3
266s	236	96.08.23s	8.87	8.51	0.71	8.00	10.30	2.50			X	Pull	10	4.8	5.5	5.2
266ss	236	96.08.23ss	8.87	8.51	0.71	13.30	16.00	2.50			X	Pull	23	5.6	7.2	6.4
268s	239	96.08.26s	8.85	8.46	0.74	18.30	21.30	3.00			X	Pull	32	5.1	5.3	5.2
270s	242	96.08.29s	8.73	8.43	0.64	7.00	11.00	4.00			X	Pull	43	4.8	6.1	5.5
273s	246	96.09.02s	8.64	8.46	0.48	9.00	12.30	3.50			X	Pull	12	4.3	6.0	5.2
275s	248	96.09.04s	8.6	8.43	0.48	15.00	18.00	3.00			X	Pull	11	5.6	6.8	6.2
284s	257	96.09.13s	8.18	8.41	-0.84	12.30	15.30	3.00			X	Pull	43	4.3	6.9	5.6
285s	259	96.09.15s	8.04	8.37	-1.10	10.00	12.30	2.50			X	Pull	46	4.7	5.6	5.2
286s	260	96.09.16s	7.94	8.34	-1.30	3.00	7.00	4.00			X	Pull	19	4.3	6.6	5.5
287s	262	96.09.18s	7.77	8.29	-1.53	6.00	8.00	2.00			X	Pull	26	5.8	6.5	6.2
289s	264	96.09.20s	7.76	8.33	-1.58	18.00	21.00	3.00			X	Pull	26	6.2	7.3	6.8
293s	268	96.09.24s	8.08	8.48	-1.21	8	11.00	3.00			X	Pull	12	4.0	8.3	6.2
293ss	268	96.09.24ss	8.07	8.47	-1.21	14.3	17.30	3.00			X	Pull	9	4.4	7.1	5.8
295s	270	96.09.26s	8.01	8.46	-1.32	1	5.00	4.00			X	Pull	14	4.6	8.4	6.5
295ss	270	96.09.26ss	7.97	8.44	-1.32	18.3	21.30	3.00			X	Pull	11	4.7	7.7	6.2
297s	272	96.09.28s	8.02	8.42	-1.21	7	10.00	3.00			X	Pull	13	4.1	8.2	6.2
299s	274	96.09.30s	7.93	8.37	-1.3	7	10.00	3.00			X	Pull	13	4.3	7.5	5.9
299ss	274	96.09.30ss	7.94	8.36	-1.3	18	20.00	2.00			X	Pull	12	4.3	8.0	6.2
300s	276	96.10.02s	7.87	8.3	-1.24	14	16.00	2.00			X	Pull	4	5.2	5.5	5.4
301s	278	96.10.04s	7.74	8.23	-1.42	22	24.00	2.00			X	Pull	6	7.4	8.5	8.0
302s	279	96.10.05s	7.84	8.24	-1.32	15	16.30	1.50			X	Pull	8	5.8	7.3	6.6
303s	281	96.10.07s	8.06	8.28	-0.82	11	13.00	2.00			X	Pull	2	4.6	7.3	6.0
305ss	284	96.10.10ss	7.93	8.24	-1.01	4.3	6.30	2.00			X	Pull	9	5.4	7.6	6.5
306s	286	96.10.12s	7.77	8.19	-1.26	13	15.00	2.00			X	Pull	5	4.1	7.6	5.9
307s	288	96.10.14s	7.59	8.1	-1.4	11.3	13.30	2.00			X	Pull	7	4.1	6.7	5.4
309	292	96.10.18	7.08	7.9	-2.03	10	12.30	2.50			X	Pull	12	4.9	7.6	6.3
312	297	96.10.23	6.54	7.63	-2.49	7	9.00	2.00			X	Pull	5	5.0	7.1	6.1

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313	305	96.10.31	6.64	7.35	-1.83	9.3	12.00	3.00		X	Putl		5	4.3	7.6	6.0
314	307	96.11.02	6.72	7.24	-1.49	18	20.30	2.50		X	Putl		1	6.7	6.7	6.7
315	309	96.11.04	6.7	7.16	-1.28	17.3	22.30	5.00		X	Putl		17	3.7	9.3	6.5
316	310	96.11.05	6.62	7.11	-1.38	17.3	22.15	4.75		X	Putl		17	3.2	3.5	3.4
137	143	96.05.22	8.03	5.52	2.25	18.20	19.50	1.50	X		Putl		1	3.3	3.3	3.3
139	145	96.05.24	7.74	5.46	2.14	18.00	22.00	4.00	X		Putl		1	4.0	4.0	4.0
152	156	96.06.04	8.61	6.51	2.05	13.00	16.00	3.00	X		Putl		1	4.1	4.1	4.1
153	157	96.06.05	8.65	6.48	1.98	9.00	11.00	2.00	X		Putl		2	4.1	4.8	4.5
158	162	96.06.10	8.42	6.81	1.73	12.30	15.30	3.00	X		Putl		4	6.2	7.8	7.0
162	166	96.06.14	7.96	6.76	1.47	15.00	18.00	3.00	X		Putl		11	4.8	8.3	6.6
167	170	96.06.18	7.61	6.66	1.27	8.00	12.00	4.00	X		Putl		3	7.7	8.1	7.9
170	172	96.06.20 a	7.62	6.61	1.25	13.00	18.00	5.00	X		Putl		8	4.5	7.5	6.0
177	174	96.06.22 a	7.45	6.72	1.13	19.00	8.00(+1)	13.00	X		Putl		3	3.9	7.6	5.8
178	175	96.06.23	7.47	6.75	1.11	10.00	18.00	8.00	X		Putl		2	4.9	5.6	5.3
181	176	96.06.24 a	7.55	6.8	1.11	21.00	7.00(+1)	10.00	X		Putl		1	5.5	5.5	5.5
182	177	96.06.25	7.56	6.82	1.09	9.00	15.00	6.00	X		Putl		4	4.3	7.2	5.8
185	178	96.06.26 a	7.49	6.83	1.05	11.00	7.00	8.00	X		Putl		12	5.1	6.8	6.0
186	179	96.06.27	7.44	6.85	1.02	9.00	17.00	8.00	X		Putl		2	4.3	8.1	6.2
190	181	96.06.29	7.41	6.86	0.91	10.00	16.00	6.00	X		Putl		6	4.7	5.5	5.1
193	182	96.06.30 a	7.39	6.93	0.86	20.00	7.00(+1)	11.00	X		Putl		8	3.3	8.2	5.8
194	183	96.07.01	7.48	7.11	0.72	12.00	17.00	5.00	X		Putl		35	3.6	6.1	4.9
198	185	96.07.03	8.52	7.62	1.23	9.00	17.00	8.00	X		Putl		71	7.2	7.5	7.4
201	186	96.07.04 a	8.93	7.9	1.34	22.00	5.00(+1)	7.00	X		Putl		127	4.5	6.5	5.5
202	187	96.07.05	8.99	8	1.30	10.00	16.00	6.00	X		Putl		75	4.6	7.9	6.3
205	188	96.07.06 a	9.02	8.11	1.24	23.00	5.00(+1)	6.00	X		Putl		26	4.1	7.8	6.0
207	189	96.07.08 a	9.02	8.15	1.23	21.00	1.00(+1)	4.00	X		Putl		23	5.1	5.2	5.2
208	191	96.07.09	9.01	8.15	1.19	13.00	15.00	2.00	X		Putl		77	4.5	6.8	5.7
209	192	96.07.10	9.01	8.15	1.19	4.00	7.00	3.00	X		Putl		12	4.1	6.6	5.4
212	193	96.07.11 a	9.02	8.15	1.20	11.00	14.00	3.00	X		Putl		47	4.3	9.1	6.7
218	197	96.07.15	8.96	8.19	1.14	10.00	12.00	2.00	X		Putl		17	4.1	6.8	5.5
222	199	96.07.17 a	8.95	8.22	1.08	12.30	15.30	3.00	X		Putl		3	2.5	3.0	2.8
229	203	96.07.21	8.95	8.22	1.07	19.00	22.30	3.50	X		Putl		15	4.0	5.1	4.6
240	211	96.07.29	8.72	8.21	0.88	12.00	15.30	3.50	X		Putl		11	4.7	5.8	5.3
253	220	96.08.07	8.59	8.38	0.53	9.00	13.00	4.00	X		Putl		2	4.0	4.2	4.1
259	227	96.08.14	8.46	8.31	0.42	11.00	13.00	2.00	X		Putl		18	4.0	5.0	4.5
261	229	96.08.16 a	8.53	8.33	0.50	16.30	20.00	3.50	X		Putl		3	4.6	7.8	6.2
265	234	96.08.21 a	8.82	8.51	0.65	9.00	12.00	3.00	X		Putl		12	5.7	8.3	7.0
266	235	96.08.22	8.82	8.52	0.70	11.00	14.30	3.50	X		Putl		2	4.7	6.2	5.5
267	237	96.08.24	8.87	8.49	0.73	20.00	23.00	3.00	X		Putl		3	4.8	5.6	5.2
268	238	96.08.25	8.87	8.48	0.74	3.00	5.30	2.50	X		Putl		3	4.8	7.0	5.9
269	240	96.08.27	8.81	8.45	0.71	19.00	22.30	3.00	X		Putl		3	5.7	6.1	5.9
271	243	96.08.30	8.73	8.48	0.57	13.00	16.30	3.50	X		Putl		2	4.7	5.4	5.1
280	253	96.09.09	8.5	8.44	0.24	9.00	12.30	3.50	X		Putl		3	4.3	6.7	5.5
283	256	96.09.12	8.27	8.43	-0.63	11.30	14.30	3.00	X		Putl		2	5.0	6.7	5.9

285	258	96.09.14	8.08	8.38	-0.99	18.30	21.30	2.50	X		Puti	13	4.2	5.5	4.9
286	260	96.09.16	7.89	8.33	-1.30	15.30	18.00	2.50	X		Puti	19	4.8	6.7	5.8
287	261	96.09.17	7.84	8.32	-1.38	4.00	7.30	3.50	X		Puti	7	6.8	8.3	7.6
288	263	96.09.19	7.8	8.35	-1.62	17.00	21.00	4.00	X		Puti	7	4.8	6.2	5.5
289	264	96.09.20	7.76	8.86	-1.58	3.00	7.00	4.00	X		Puti	9	5.9	7.5	6.7
290	265	96.09.21	7.78	8.36	-1.58	1.00	5.00	4.00	X		Puti	12	4.8	6.2	5.5
291	266	96.09.22	7.97	8.43	-1.34	5.00	7.30	2.50	X		Puti	14	6.6	6.9	6.8
293	268	96.09.24	8.08	8.46	-1.21	11.00	14.00	3.00	X		Puti	1	4.3	4.3	4.3
296	271	96.09.27	7.96	8.43	-1.36	10.30	13.30	3.00	X		Puti	1	5.1	5.1	5.1
299	273	96.09.29 a	7.96	8.39	-1.28	15.00	18.00	3.00	X		Puti	4	4.9	8.1	6.5
300	275	96.10.01	7.95	8.35	-1.21	9.00	11.00	2.00	X		Puti	7	5.1	6.2	5.7
301	277	96.10.03	7.79	8.26	-1.36	19.00	21.30	2.50	X		Puti	6	5.6	8.4	7.0
302	279	96.10.05	7.76	8.23	-1.32	3.00	6.00	3.00	X		Puti	5	6.3	8.5	7.4
316s	310	96.11.05s	6.66	7.14	-1.38	7.3	10.30	3.00	X		Puti	1	4.1	4.1	4.1
129	134	96.05.13	6.85	4.61	2.12	12.45	14.00	1.25		X	Rani	1	6.9	6.9	6.9
130	136	96.05.15	7.23	4.61	2.34	18.00	21.00	3.00		X	Rani	5	6.3	7.0	6.7
133	139	96.05.18	8.24	5.12	2.39	18.00	21.00	3.00		X	Rani	17	5.1	7.1	6.1
134	141	96.05.20	8.18	5.34	2.31	13.30	15.30	2.00		X	Rani	4	7.3	8.1	7.7
140	146	96.05.25	7.53	5.48	2.01	18.00	24.00	6.00		X	Rani	1	7.6	7.6	7.6
141	147	96.05.26	7.56	5.46	2.04	18.30	22.30	2.00		X	Rani	1	8.0	8.0	8.0
144	150	96.05.29	7.7	5.75	2.01	11.30	13.45	2.25			Rani	3	6.5	9.0	7.8
147	152	96.05.31	8.02	5.85	2.11	15.00	19.30	4.50		X	Rani	3	4.2	6.8	5.5
156	160	96.06.08	8.53	6.85	1.82	8.00	11.00	3.00		X	Rani	2	7.2	8.1	7.7
160	164	96.06.12	8.2	6.77	1.65	12.00	14.00	2.00		X	Rani	1	6.6	6.6	6.6
172	173	96.06.21	7.62	6.63	1.18	0.45	7.45	7.00		X	Rani	1	10.9	10.9	10.9
184	178	96.06.26	7.52	6.84	1.05	12.00	17.00	5.00		X	Rani	2	7.2	7.8	7.5
188	180	96.06.28	7.44	6.85	0.95	12.00	15.00	3.00		X	Rani	1	9.1	9.1	9.1
192	182	96.06.30	7.38	6.89	0.86	11.00	16.00	5.00		X	Rani	2	4.3	5.4	4.9
199	185	96.07.03 a	8.73	7.77	1.23	23.00	5.00(+1)	6.00		X	Rani	11	6.6	8.5	7.6
200	186	96.07.04	8.87	7.83	1.34	13.00	18.00	5.00		X	Rani	24	6.9	8.0	7.5
203	187	96.07.05 a	9.02	8.08	1.30	22.00	6.00(+1)	8.00		X	Rani	24	4.7	7.9	6.3
204	188	96.07.06	9.02	8.1	1.24	11.00	17.00	6.00		X	Rani	74	6.2	6.8	6.5
206	189	96.07.08	9.02	8.15	1.23	2.00	6.00	4.00		X	Rani	16	4.1	6.3	5.2
210	192	96.07.10 a	9	8.15	1.19	10.30	13.00	2.50		X	Rani	14	3.8	4.9	4.4
214	195	96.07.13	9	8.15	1.19	3.00	7.00	4.00		X	Rani	15	4.0	7.3	5.7
215	195	96.07.13 a	9	8.15	1.19	10.00	13.00	3.00		X	Rani	44	6.0	6.9	6.5
216	196	96.07.14	9	8.45	1.18	0.30	5.00	4.50		X	Rani	21	4.8	5.2	5.0
219	198	96.07.16	8.96	8.2	1.14	1.00	5.00	4.00		X	Rani	12	3.2	4.8	4.0
220	198	96.07.16 a	9	8.22	1.14	13.00	16.00	3.00		X	Rani	17	6.1	6.8	6.5
224	200	96.07.18 a	8.94	8.19	1.09	10.00	12.00	2.00		X	Rani	12	4.0	5.3	4.7
227	202	96.07.20	8.95	8.2	1.08	2.00	5.00	3.00		X	Rani	12	4.7	5.1	4.9
228	202	96.07.20 a	8.95	8.2	1.08	12.00	14.00	2.00		X	Rani	1	4.5	4.5	4.5
231	205	96.07.23	8.91	8.22	1.06	5.00	8.00	3.00		X	Rani	11	4.5	4.9	4.7
234	207	96.07.25	8.91	8.22	1.05	7.00	10.00	3.00		X	Rani	12	4.5	5.0	4.8

820

237	209	96.07.27	8.89	8.22	1.02	3.00	7.00	4.00		X	Rani	11	5.8	6.4	6.1
243	213	96.07.31	8.78	8.23	0.91	20.00	24.00	4.00		X	Rani	14	6.3	7.1	6.7
246	215	96.08.02	8.75	8.25	0.85	3.00	7.00	4.00		X	Rani	16	5.7	7.3	6.5
255s	223	96.08.10s	8.37	8.34	0.19	11.00	14.00	3.00		X	Rani	23	4.0	5.6	4.8
257s	225	96.08.12s	8.36	8.3	0.19	21.30	24.00	2.50		X	Rani	13	4.0	5.3	4.7
259s	227	96.08.14s	8.48	8.3	0.42	17.00	22.00	5.00		X	Rani	1	6.1	6.1	6.1
268s	239	96.08.26s	8.85	8.46	0.74	18.30	21.30	3.00		X	Rani	1	8.8	8.8	8.8
284s	257	96.09.13s	8.18	8.41	-0.84	12.30	15.30	3.00		X	Rani	14	4.7	5.9	5.3
285s	259	96.09.15s	8.04	8.37	-1.10	10.00	12.30	2.50		X	Rani	14	6.3	7.7	7.0
287s	262	96.09.18s	7.77	8.29	-1.53	6.00	8.00	2.00		X	Rani	13	6.1	7.8	7.0
289s	264	96.09.20s	7.76	8.33	-1.58	18.00	21.00	3.00		X	Rani	14	5.8	10.2	8.0
293s	268	96.09.24s	8.08	8.48	-1.21	8	11.00	3.00		X	Rani	3	6.5	7.8	7.2
293ss	268	96.09.24ss	8.07	8.47	-1.21	14.3	17.30	3.00		X	Rani	2	7.0	7.2	7.1
295s	270	96.09.26s	8.01	8.46	-1.32	1	5.00	4.00		X	Rani	4	5.7	6.6	6.2
295ss	270	96.09.26ss	7.97	8.44	-1.32	18.3	21.30	3.00		X	Rani	3	5.4	7.9	6.7
297s	272	96.09.28s	8.02	8.42	-1.21	7	10.00	3.00		X	Rani	2	6.4	8.7	6.6
297ss	272	96.09.28ss	8.02	8.42	-1.21	18.3	21.30	3.00		X	Rani	1	8.1	8.1	8.1
299s	274	96.09.30s	7.93	8.37	-1.3	7	10.00	3.00		X	Rani	2	7.1	8.2	7.7
299ss	274	96.09.30ss	7.94	8.36	-1.3	18	20.00	2.00		X	Rani	1	9.1	9.1	9.1
310	294	96.10.20	6.97	7.85	-2.14	8	10.00	2.00		X	Rani	2	6.7	7.2	7.0
315	309	96.11.04	6.7	7.16	-1.28	17.3	22.30	5.00		X	Rani	1	4.2	4.2	4.2
137	143	96.05.22	8.03	5.52	2.25	18.20	19.50	1.50	X		Rani	1	6.5	6.5	6.5
152	156	96.06.04	8.61	6.51	2.05	13.00	16.00	3.00	X		Rani	1	5.9	5.9	5.9
153	157	96.06.05	8.65	6.48	1.98	9.00	11.00	2.00	X		Rani	3	5.8	6.2	6.0
167	170	96.06.18	7.61	6.66	1.27	8.00	12.00	4.00	X		Rani	1	6.8	6.8	6.8
193	182	96.06.30 a	7.39	6.93	0.86	20.00	7.00(+1)	11.00	X		Rani	1	8.5	8.5	8.5
201	186	96.07.04 a	8.93	7.9	1.34	22.00	5.00(+1)	7.00	X		Rani	40	7.5	7.7	7.6
205	188	96.07.06 a	9.02	8.11	1.24	23.00	5.00(+1)	6.00	X		Rani	21	4.8	5.1	5.0
207	189	96.07.08 a	9.02	8.15	1.23	21.00	1.00(+1)	4.00	X		Rani	12	6.1	6.2	6.2
208	191	96.07.09	9.01	8.15	1.19	13.00	15.00	2.00	X		Rani	11	5.8	6.0	5.9
217	196	96.07.14 a	8.96	8.18	1.18	18.00	22.00	4.00	X		Rani	12	6.8	7.2	7.0
222	199	96.07.17 a	8.95	8.22	1.08	12.30	15.30	3.00	X		Rani	2	4.2	5.0	4.6
225	201	96.07.19	8.93	8.2	1.08	4.00	7.00	3.00	X		Rani	2	4.5	5.1	4.8
229	203	96.07.21	8.95	8.22	1.07	19.00	22.30	3.50	X		Rani	1	4.7	4.7	4.7
241	211	96.07.29 a	8.71	8.21	0.88	22.00	0.30	2.50	X		Rani	1	7.1	7.1	7.1
244	214	96.08.01	8.78	8.23	0.91	10.00	12.00	2.00	X		Rani	11	6.6	7.6	7.1
249	216	96.08.03 a	8.65	8.27	0.81	19.00	22.00	3.00	X		Rani	1	6.8	6.8	6.8
259	227	96.08.14	8.46	8.31	0.42	11.00	13.00	2.00	X		Rani	1	6.1	6.1	6.1
282	255	96.09.11	8.34	8.43	-0.42	15.00	18.30	3.50	X		Rani	2	6.1	6.5	6.3
285	258	96.09.14	8.08	8.38	-0.99	18.30	21.30	2.50	X		Rani	9	4.2	8.6	6.4
286	260	96.09.16	7.89	8.33	-1.30	15.30	18.00	2.50	X		Rani	3	5.8	6.8	6.3
288	263	96.09.19	7.8	8.35	-1.62	17.00	21.00	4.00	X		Rani	6	4.8	8.3	6.6
289	264	96.09.20	7.76	8.86	-1.58	3.00	7.00	4.00	X		Rani	3	4.7	6.8	5.8
290	265	96.09.21	7.78	8.36	-1.58	1.00	5.00	4.00	X		Rani	6	5.5	7.6	6.6

293	268	96.09.24	8.08	8.46	-1.21	11.00	14.00	3.00	X	Rani	1	4.6	4.6	4.6
294	269	96.09.25	8.05	8.47	-1.26	0.30	4.30	4.00	X	Rani	1	8.1	8.1	8.1
296	271	96.09.27	7.96	8.43	-1.36	10.30	13.30	3.00	X	Rani	2	4.8	6.2	5.5
298	273	96.09.29	7.98	8.41	-1.28	4.00	7.00	3.00	X	Rani	2	5.7	6.1	5.9
305	283	96.10.09	7.95	8.25	-0.94	17.30	19.30	2.00	X	Rani	1	7.8	7.8	7.8
306	285	96.10.11	7.85	8.2	-1.1	9	11.00	2.00	X	Rani	1	5.9	5.9	5.9
136	142	96.05.21	8.1	5.37	2.28	18.30	22.30	4.00		Rui	1	3.5	3.5	3.5
187	179	96.06.27 a	7.44	6.85	1.02	19.00	8.00(+1)	13.00		Rui	1	5.8	5.8	5.8
188	180	96.06.28	7.44	6.85	0.95	12.00	15.00	3.00		Rui	1	4.7	4.7	4.7
196	184	96.07.02	8.09	7.39	1.04	10.00	14.00	4.00		Rui	7	14.7	16.8	15.8
203	187	96.07.05 a	9.02	8.08	1.30	22.00	6.00(+1)	8.00		Rui	13	6.3	9.2	7.8
206	189	96.07.08	9.02	8.15	1.23	2.00	6.00	4.00		Rui	11	4.6	7.2	5.9
216	196	96.07.14	9	8.45	1.18	0.30	5.00	4.50		Rui	4	5.6	5.8	5.7
223	200	96.07.18	8.94	8.2	1.09	18.00	22.00	4.00		Rui	1	17.5	17.5	17.5
270s	242	96.08.29s	8.73	8.43	0.64	7.00	11.00	4.00		Rui	2	28.3	28.7	28.5
287s	262	96.09.18s	7.77	8.29	-1.53	6.00	8.00	2.00		Rui	1	51.2	51.2	51.2
197	184	96.07.02 a	8.38	7.54	1.04	23.00	7.00(+1)	8.00	X	Rui	9	11.5	13.2	12.4
126	132	96.05.11	6.43	4.05	1.87	17.00	20.30	3.50		Shing	1	9.0	9.0	9.0
130	136	96.05.15	7.23	4.61	2.34	18.00	21.00	3.00		Shing	11	6.3	7.8	7.1
132	138	96.05.17	8.26	5.16	2.38	18.00	21.00	3.00		Shing	5	5.9	7.2	6.6
133	139	96.05.18	8.24	5.12	2.39	18.00	21.00	3.00		Shing	11	5.6	7.1	6.4
135	141	96.05.20a	8.16	5.35	2.31	18.15	22.00	3.75		Shing	17	6.1	7.2	6.7
136	142	96.05.21	8.1	5.37	2.28	18.30	22.30	4.00		Shing	5	6.1	7.9	7.0
140	146	96.05.25	7.53	5.48	2.01	18.00	24.00	6.00		Shing	5	6.0	8.5	7.3
141	147	96.05.26	7.56	5.46	2.04	18.30	22.30	2.00		Shing	7	6.5	8.1	7.3
143	149	96.05.28a	7.57	5.53	1.97	19.00	23.00	4.00		Shing	7	5.8	11.2	8.5
147	152	96.05.31	8.02	5.85	2.11	15.00	19.30	4.50		Shing	8	5.7	6.9	6.3
150	154	96.06.02	8.5	5.8	2.14	19.00	23.00	4.00		Shing	8	5.7	6.6	6.2
154	158	96.06.06	8.68	6.78	1.96	17.00	22.30	5.50		Shing	3	6.9	10.3	8.6
155	159	96.06.07	8.63	6.84	1.89	18.00	22.30	4.50		Shing	16	5.1	7.3	6.2
156	160	96.06.08	8.53	6.85	1.82	8.00	11.00	3.00		Shing	5	4.5	5.7	5.1
157	161	96.06.09	8.51	6.86	1.76	18.30	23.30	5.00		Shing	12	5.8	10.4	8.1
163	166	96.06.14 a	7.96	6.76	1.47	18.00	23.00	5.00		Shing	3	7.5	8.9	8.2
168	171	96.06.19	7.57	6.69	1.17	18.00	22.00	4.00		Shing	8	7.2	8.2	7.7
171	172	96.06.20 b	7.62	6.61	1.25	18.30	23.30	5.00		Shing	7	9.2	10.3	9.8
183	177	96.06.25 a	7.54	6.83	1.09	21.00	8.00	11.00		Shing	1	6.7	6.7	6.7
191	181	96.06.29 a	7.4	6.87	0.91	20.00	7.00(+1)	11.00		Shing	1	9.3	9.3	9.3
195	183	96.07.01 a	8.05	7.76	0.72	19.00	7.00(+1)	12.00		Shing	3	8.8	12.4	10.6
199	185	96.07.03 a	8.73	7.77	1.23	23.00	5.00(+1)	6.00		Shing	17	7.3	18.6	13.0
203	187	96.07.05 a	9.02	8.08	1.30	22.00	6.00(+1)	8.00		Shing	14	10.5	23.6	17.1
204	188	96.07.06	9.02	8.1	1.24	11.00	17.00	6.00		Shing	27	11.0	21.3	16.2
206	189	96.07.08	9.02	8.15	1.23	2.00	6.00	4.00		Shing	4	9.3	12.4	10.9
211	193	96.07.11	9.01	8.15	1.20	3.00	7.00	4.00		Shing	11	5.7	5.8	5.8
213	193	96.07.11 b	9.02	8.15	1.20	22.00	1.00(+1)	3.00		Shing	5	9.7	12.7	11.2

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214	195	96.07.13	9	8.15	1.19	3.00	7.00	4.00		X	Shing		13	13.1	14.6	13.9
215	195	96.07.13 a	9	8.15	1.19	10.00	13.00	3.00		X	Shing		12	13.0	15.2	14.1
216	196	96.07.14	9	8.45	1.18	0.30	5.00	4.50		X	Shing		1	12.5	12.5	12.5
227	202	96.07.20	8.95	8.2	1.08	2.00	5.00	3.00		X	Shing		11	5.4	5.7	5.6
232	206	96.07.24	8.92	8.22	1.05	21.00	24.00	3.00		X	Shing		2	5.7	6.1	5.9
235	207	96.07.25 a	8.94	8.23	1.05	17.30	20.30	3.00		X	Shing		2	5.9	6.0	6.0
238	210	96.07.28	8.78	8.21	0.94	9.00	12.00	3.00		X	Shing		7	9.7	11.4	10.6
242	212	96.07.30	8.69	8.21	0.84	11.00	13.00	2.00		X	Shing		1	12.3	12.3	12.3
255s	223	96.08.10s	8.37	8.34	0.19	11.00	14.00	3.00		X	Shing		1	11.9	11.9	11.9
257s	225	96.08.12s	8.36	8.3	0.19	21.30	24.00	2.50		X	Shing		1	11.6	11.6	11.6
259s	227	96.08.14s	8.48	8.3	0.42	17.00	22.00	5.00		X	Shing		12	11.1	13.2	12.2
261s	230	96.08.17s	8.59	8.34	0.58	2.00	5.00	3.00		X	Shing		1	11.9	11.9	11.9
261ss	230	96.08.17ss	8.67	8.42	0.58	23.00	5.00	6.00		X	Shing		2	11.5	11.6	11.6
262s	232	96.08.19s	8.78	8.47	0.61	17.00	20.30	3.50		X	Shing		1	13.4	13.4	13.4
282s	255	96.09.11s	8.37	8.43	-0.42	4.00	7.30	3.50		X	Shing		1	12.3	12.3	12.3
284s	257	96.09.13s	8.18	8.41	-0.84	12.30	15.30	3.00		X	Shing		1	7.9	7.9	7.9
285s	259	96.09.15s	8.04	8.37	-1.10	10.00	12.30	2.50		X	Shing		12	7.6	12.9	10.3
286s	260	96.09.16s	7.94	8.34	-1.30	3.00	7.00	4.00		X	Shing		3	10.8	15.2	13.0
287s	262	96.09.18s	7.77	8.29	-1.53	6.00	8.00	2.00		X	Shing		5	11.2	16.4	13.8
295s	270	96.09.26s	8.01	8.46	-1.32	1	5.00	4.00		X	Shing		2	8.6	9.1	8.9
297ss	272	96.09.28ss	8.02	8.42	-1.21	18.3	21.30	3.00		X	Shing		3	8.2	9.2	8.7
315	309	96.11.04	6.7	7.16	-1.28	17.3	22.30	5.00		X	Shing		1	10.8	10.8	10.8
137	143	96.05.22	8.03	5.52	2.25	18.20	19.50	1.50	X		Shing		2	6.3	6.3	6.3
151	155	96.06.03	8.66	6.63	2.09	18.30	22.30	4.00	X		Shing		1	15.2	15.2	15.2
167	170	96.06.18	7.61	6.66	1.27	8.00	12.00	4.00	X		Shing		2	5.7	16.8	11.3
169	172	96.06.20	7.57	6.69	1.25	0.00	7.00	7.00	X		Shing		5	7.3	9.3	8.3
251	218	96.08.05	8.63	8.38	0.56	18.30	22.00	3.50	X		Shing		1	9.7	9.7	9.7
277	249	96.09.05 a	8.56	8.42	0.40	13.00	16.00	3.00	X		Shing		1	8.3	8.3	8.3
279	251	96.09.07 a	8.57	8.45	0.37	18.30	21.30	3.00	X		Shing		1	8.0	8.0	8.0
281	254	96.09.10	8.4	8.44	-0.23	18.00	22.30	4.50	X		Shing		1	10.4	10.4	10.4
287	261	96.09.17	7.84	8.32	-1.38	4.00	7.30	3.50	X		Shing		4	10.2	16.3	13.3
288	263	96.09.19	7.8	8.35	-1.62	17.00	21.00	4.00	X		Shing		8	10.3	17.2	13.8
289	264	96.09.20	7.76	8.86	-1.58	3.00	7.00	4.00	X		Shing		6	11.2	14.3	12.8
290	265	96.09.21	7.78	8.36	-1.58	1.00	5.00	4.00	X		Shing		7	12.3	15.6	14.0
291	266	96.09.22	7.97	8.43	-1.34	5.00	7.30	2.50	X		Shing		9	11.4	17.8	14.6
294	269	96.09.25	8.05	8.47	-1.26	0.30	4.30	4.00	X		Shing		1	9.3	9.3	9.3
297	271	96.09.27 a	7.97	8.43	-1.36	20.00	23.00	3.00	X		Shing		1	12.3	12.3	12.3
299	273	96.09.29 a	7.96	8.39	-1.28	15.00	18.00	3.00	X		Shing		1	9.8	9.8	9.8
301	277	96.10.03	7.79	8.26	-1.36	19.00	21.30	2.50	X		Shing		4	11.3	17.2	14.3
302	279	96.10.05	7.76	8.23	-1.32	3.00	6.00	3.00	X		Shing		5	11.3	15.2	13.3
128	133	96.05.12a	6.6	4.72	1.98	12.00	14.00	2.00		X	Shole		1	5.1	5.1	5.1
126	132	96.05.11	6.43	4.05	1.87	17.00	20.30	3.50		X	Taki		1	9.0	9.0	9.0
132	138	96.05.17	8.26	5.16	2.38	18.00	21.00	3.00		X	Taki		3	7.8	19.2	13.5
135	141	96.05.20a	8.16	5.35	2.31	18.15	22.00	3.75		X	Taki		8	12.7	7.7	10.2

136	142	96.05.21	8.1	5.37	2.28	18.30	22.30	4.00	X	Taki	3	8.1	8.4	8.3
143	149	96.05.28a	7.57	5.53	1.97	19.00	23.00	4.00	X	Taki	1	13.2	13.2	13.2
147	152	96.05.31	8.02	5.85	2.11	15.00	19.30	4.50	X	Taki	3	18.1	24.7	21.4
150	154	96.06.02	8.5	5.8	2.14	19.00	23.00	4.00	X	Taki	2	7.1	14.3	10.7
155	159	96.06.07	8.63	6.84	1.89	18.00	22.30	4.50	X	Taki	1	13.3	13.3	13.3
163	166	96.06.14 a	7.96	6.76	1.47	18.00	23.00	5.00	X	Taki	2	8.2	11.1	9.7
203	187	96.07.05 a	9.02	8.08	1.30	22.00	6.00(+1)	8.00	X	Taki	12	12.1	13.6	12.9
215	195	96.07.13 a	9	8.15	1.19	10.00	13.00	3.00	X	Taki	7	17.6	18.0	17.8
216	196	96.07.14	9	8.45	1.18	0.30	5.00	4.50	X	Taki	1	10.9	10.9	10.9
285s	259	96.09.15s	8.04	8.37	-1.10	10.00	12.30	2.50	X	Taki	1	13.4	13.4	13.4
293ss	268	96.09.24ss	8.07	8.47	-1.21	14.3	17.30	3.00	X	Taki	1	8.7	8.7	8.7
311	295	96.10.21	6.88	7.76	-2.14	17.3	20.00	2.50	X	Taki	1	11.2	11.2	11.2
256	224	96.08.11	8.33	8.31	-0.01	17.00	20.30	3.50	X	Taki	1	10.7	10.7	10.7
257	225	96.08.12	8.34	8.31	0.19	2.30	6.30	4.00	X	Taki	1	16.1	16.1	16.1
280	253	96.09.09	8.5	8.44	0.24	9.00	12.30	3.50	X	Taki	1	7.1	7.1	7.1
284	257	96.09.13	8.17	8.41	-0.84	2.30	5.30	3.00	X	Taki	2	7.3	7.6	7.5
286	260	96.09.16	7.89	8.33	-1.30	15.30	18.00	2.50	X	Taki	1	14.7	14.7	14.7
288	263	96.09.19	7.8	8.35	-1.62	17.00	21.00	4.00	X	Taki	2	12.3	14.1	13.2
299	273	96.09.29 a	7.96	8.39	-1.28	15.00	18.00	3.00	X	Taki	2	6.8	9.2	8.0
307	287	96.10.13	7.62	8.1	-1.36	22	24.00	2.00	X	Taki	1	6.9	6.9	6.9
125	94	96.04.03	7.22	4.42	2.39	10.30	10.40	0.17	X	Tengra	91	6.8	7.5	7.2
126	132	96.05.11	6.43	4.05	1.87	17.00	20.30	3.50	X	Tengra	39	5.0	6.8	5.9
127	133	96.05.12	6.47	4.04	1.98	1.00	5.00	4.00	X	Tengra	17	5.1	6.4	5.8
128	133	96.05.12a	6.6	4.72	1.98	12.00	14.00	2.00	X	Tengra	13	5.3	6.6	6.0
129	134	96.05.13	6.85	4.61	2.12	12.45	14.00	1.25	X	Tengra	12	4.5	6.2	5.4
130	136	96.05.15	7.23	4.61	2.34	18.00	21.00	3.00	X	Tengra	316	5.2	6.1	5.7
131	137	96.05.16	8.03	4.98	2.40	13.30	14.30	1.00	X	Tengra	13	4.5	6.0	5.3
132	138	96.05.17	8.26	5.16	2.38	18.00	21.00	3.00	X	Tengra	116	4.2	6.1	5.2
133	139	96.05.18	8.24	5.12	2.39	18.00	21.00	3.00	X	Tengra	19	4.2	6.2	5.2
134	141	96.05.20	8.18	5.34	2.31	13.30	15.30	2.00	X	Tengra	12	7.1	9.9	8.5
135	141	96.05.20a	8.16	5.35	2.31	18.15	22.00	3.75	X	Tengra	23	4.6	6.7	5.7
136	142	96.05.21	8.1	5.37	2.28	18.30	22.30	4.00	X	Tengra	6	5.2	6.3	5.8
141	147	96.05.26	7.56	5.46	2.04	18.30	22.30	2.00	X	Tengra	6	5.1	6.7	5.9
143	149	96.05.28a	7.57	5.53	1.97	19.00	23.00	4.00	X	Tengra	4	5.2	6.8	6.0
145	151	96.05.30	7.84	5.82	1.97	9.00	12.00	3.00	X	Tengra	8	5.7	7.2	6.5
146	151	96.05.30a	8.04	5.88	1.97	19.00	23.00	4.00	X	Tengra	7	7.2	10.3	8.8
148	153	96.06.01	8.12	6	2.05	12.30	14.00	1.50	X	Tengra	6	5.3	6.1	5.7
149	153	96.06.01a	8.4	6.1	2.05	18.45	22.45	4.00	X	Tengra	6	5.4	6.5	6.0
150	154	96.06.02	8.5	5.8	2.14	19.00	23.00	4.00	X	Tengra	9	3.9	6.1	5.0
150	154	96.06.02	8.5	5.8	2.14	19.00	23.00	4.00	X	Tengra	13	5.8	7.1	6.5
154	158	96.06.06	8.68	6.78	1.96	17.00	22.30	5.50	X	Tengra	15	4.9	6.1	5.5
155	159	96.06.07	8.63	6.84	1.89	18.00	22.30	4.50	X	Tengra	19	5.2	6.9	6.1
157	161	96.06.09	8.51	6.86	1.76	18.30	23.30	5.00	X	Tengra	1	6.3	6.3	6.3
159	163	96.06.11	8.32	6.77	1.69	12.30	15.30	3.00	X	Tengra	3	4.5	5.1	4.8

160	164	96.06.12	8.2	6.77	1.65	12.00	14.00	2.00	X	Tengra	2	4.6	5.1	4.9
161	165	96.06.13	8.07	6.78	1.53	12.00	14.30	2.50	X	Tengra	3	4.6	5.1	4.9
163	166	96.06.14 a	7.96	6.76	1.47	18.00	23.00	5.00	X	Tengra	6	6.0	8.5	7.3
171	172	96.06.20 b	7.62	6.61	1.25	18.30	23.30	5.00	X	Tengra	17	6.2	7.5	6.9
172	173	96.06.21	7.62	6.63	1.18	0.45	7.45	7.00	X	Tengra	7	9.1	9.8	9.5
195	183	96.07.01 a	8.05	7.76	0.72	19.00	7.00(+1)	12.00	X	Tengra	94	4.4	6.7	5.6
199	185	96.07.03 a	8.73	7.77	1.23	23.00	5.00(+1)	6.00	X	Tengra	218	6.1	8.7	7.4
203	187	96.07.05 a	9.02	8.08	1.30	22.00	6.00(+1)	8.00	X	Tengra	198	4.6	7.1	5.9
206	189	96.07.08	9.02	8.15	1.23	2.00	6.00	4.00	X	Tengra	81	8.7	9.4	9.1
213	193	96.07.11 b	9.02	8.15	1.20	22.00	1.00(+1)	3.00	X	Tengra	27	8.3	8.9	8.6
214	195	96.07.13	9	8.15	1.19	3.00	7.00	4.00	X	Tengra	42	5.5	6.8	6.2
220	198	96.07.16 a	9	8.22	1.14	13.00	16.00	3.00	X	Tengra	7	8.2	9.6	8.9
152	156	96.06.04	8.61	6.51	2.05	13.00	16.00	3.00	X	Tengra	1	4.5	4.5	4.5
207	189	96.07.08 a	9.02	8.15	1.23	21.00	1.00(+1)	4.00	X	Tengra	11	4.9	5.7	5.3
217	196	96.07.14 a	8.96	8.18	1.18	18.00	22.00	4.00	X	Tengra	41	8.8	10.7	9.8
257	225	96.08.12	8.34	8.31	0.19	2.30	6.30	4.00	X	Tengra	4	4.9	6.2	5.6
295	269	96.09.25 a	8.02	8.46	-1.26	15.00	18.00	3.00	X	Tengra	1	8.1	8.1	8.1
298	273	96.09.29	7.98	8.41	-1.28	4.00	7.00	3.00	X	Tengra	1	7.7	7.7	7.7
301	277	96.10.03	7.79	8.26	-1.36	19.00	21.30	2.50	X	Tengra	1	10.2	10.2	10.2
311s	295	96.10.21s	6.95	7.83	-2.14	2.3	5.00	2.50	X	Tengra	6	5.0	6.2	5.6
314s	308	96.11.03s	6.72	7.21	-1.42	4	6.30	2.50	X	Tengra	3	5.6	6.9	6.3

D.3 Sampling Results - Sorted by Swimming Mode

SAMPLING RESULTS - Sorted by Swimming Mode						
Water Velocity range m/s	Set no.	Water velocity at slot m/s	Chamber r/s c/s		Species	Length minimum (cm)
CONCURRENT SWIMMING						
2.25-2.50	133	2.39		X	Air	8.1
	133	2.39		X	Air	6.5
	132	2.38		X	Air	7.3
	130	2.34		X	Air	8.2
	135	2.31		X	Air	4.3
	131	2.40		X	Bacha	10.9
	133	2.39		X	Bacha	9.5
	132	2.38		X	Bacha	11.0
	130	2.34		X	Bacha	13.5
	134	2.31		X	Bacha	10.2
	135	2.31		X	Bacha	4.7
	133	2.39		X	Bailla	6.0
	132	2.38		X	Bailla	5.0
	130	2.34		X	Bailla	9.2
	134	2.31		X	Bailla	10.3
	135	2.31		X	Bailla	4.8
	136	2.28		X	Bailla	7.6
	133	2.39		X	Baim	17.6
	132	2.38		X	Baim	55.0
	130	2.34		X	Baim	9.7
	134	2.31		X	Baim	10.0
	136	2.28		X	Baim	20.3
	131	2.40		X	Batashi	8.5
	133	2.39		X	Batashi	6.7
	132	2.38		X	Batashi	7.9
	130	2.34		X	Batashi	8.0
	134	2.31		X	Batashi	7.9
	135	2.31		X	Batashi	8.2
	136	2.28		X	Batashi	7.6
	131	2.40		X	Bheda	11.0
	133	2.39		X	Bheda	6.5
	132	2.38		X	Bheda	9.2
	130	2.34		X	Bheda	8.0
	134	2.31		X	Bheda	8.0
	135	2.31		X	Bheda	10.5
	136	2.28		X	Bheda	6.1
	130	2.34		X	Boal	8.7
	135	2.31		X	Boal	22.7
	131	2.40		X	Boicha	4.3
	133	2.39		X	Boicha	4.6
	132	2.38		X	Boicha	3.8
	134	2.31		X	Boicha	5.0
	135	2.31		X	Boicha	5.2
	136	2.28		X	Boicha	4.2
	131	2.40		X	Chanda	4.5
	125	2.39		X	Chanda	4.1
	133	2.39		X	Chanda	3.9
	132	2.38		X	Chanda	3.8
	130	2.34		X	Chanda	5.0
	134	2.31		X	Chanda	5.1
	135	2.31		X	Chanda	3.5
	136	2.28		X	Chanda	4.5

133	2.39	X	Chapila	5.2
132	2.38	X	Chapila	7.3
134	2.31	X	Chapila	6.8
135	2.31	X	Chapila	5.7
136	2.28	X	Chapila	5.2
131	2.40	X	Cheka	3.5
132	2.38	X	Cheka	11.3
135	2.31	X	Cheka	29.1
131	2.40	X	Chela	10.1
125	2.39	X	Chela	6.8
133	2.39	X	Chela	6.3
132	2.38	X	Chela	5.8
130	2.34	X	Chela	5.3
134	2.31	X	Chela	12.0
135	2.31	X	Chela	6.3
136	2.28	X	Chela	5.1
131	2.40	X	Chirka baim	12.3
125	2.39	X	Chirka baim	16.8
135	2.31	X	Chirka baim	11.7
136	2.28	X	Chirka baim	7.3
131	2.40	X	Darkina	5.2
133	2.39	X	Darkina	4.3
134	2.31	X	Darkina	5.0
135	2.31	X	Darkina	3.2
136	2.28	X	Darkina	4.6
131	2.40	X	Dhela	4.5
133	2.39	X	Dhela	3.7
130	2.34	X	Dhela	4.1
132	2.38	X	Foli	13.9
135	2.31	X	Foli	27.8
132	2.38	X	Garua	11.0
131	2.40	X	Golda chingri	11.2
133	2.39	X	Golda chingri	11.9
132	2.38	X	Golda chingri	12.7
130	2.34	X	Golda chingri	9.8
135	2.31	X	Golda chingri	17.3
136	2.28	X	Golda chingri	7.2
131	2.40	X	Gonia	22.0
131	2.40	X	Gulsha	13.5
125	2.39	X	Gulsha	7.5
133	2.39	X	Gulsha	10.2
130	2.34	X	Gulsha	12.5
134	2.31	X	Gulsha	10.1
136	2.28	X	Gulsha	13.2
131	2.40	X	Gutum	7.0
133	2.39	X	Gutum	8.2
132	2.38	X	Gutum	6.5
130	2.34	X	Gutum	7.1
135	2.31	X	Gutum	5.2
136	2.28	X	Gutum	6.4
131	2.40	X	Icha	3.5
133	2.39	X	Icha	4.1
130	2.34	X	Icha	3.3
135	2.31	X	Icha	3.7
136	2.28	X	Icha	5.0
130	2.34	X	Jainzza	3.5
136	2.28	X	Jainzza	7.6
133	2.39	X	Kaikka	10.0
130	2.34	X	Kaikka	10.9
135	2.31	X	Kaikka	13.2
136	2.28	X	Kaikka	12.4
133	2.39	X	Kalibaush	25.3

	132	2.38	X	Kalibaush	25.0
	136	2.28	X	Kazoli	11.5
	131	2.40	X	Ketchki	4.3
	130	2.34	X	Ketchki	4.4
	134	2.31	X	Ketchki	4.0
	135	2.31	X	Ketchki	3.8
	132	2.38	X	Kholisha	3.3
	134	2.31	X	Kholisha	6.5
	135	2.31	X	Kholisha	5.7
	136	2.28	X	Kholisha	4.3
	136	2.28	X	Kotibacha	7.1
	131	2.40	X	Lachu	16.0
	132	2.38	X	Lachu	11.0
	130	2.34	X	Lachu	15.2
	131	2.40	X	Mola	5.9
	125	2.39	X	Mola	3.8
	133	2.39	X	Mola	4.8
	132	2.38	X	Mola	4.1
	130	2.34	X	Mola	8.3
	134	2.31	X	Mola	8.9
	135	2.31	X	Mola	3.8
	136	2.28	X	Mola	6.9
	135	2.31	X	Naptani	6.1
	132	2.38	X	Pabda	11.7
	130	2.34	X	Pabda	7.6
	132	2.38	X	Poa	9.9
	131	2.40	X	Potka	4.5
	133	2.39	X	Potka	4.6
	132	2.38	X	Potka	4.5
	130	2.34	X	Potka	4.5
	134	2.31	X	Potka	6.5
	131	2.40	X	Puti	7.5
	133	2.39	X	Puti	4.5
	130	2.34	X	Puti	3.3
	134	2.31	X	Puti	3.5
	135	2.31	X	Puti	4.1
	136	2.28	X	Puti	3.4
	133	2.39	X	Rani	5.1
	130	2.34	X	Rani	6.3
	134	2.31	X	Rani	7.3
	136	2.28	X	Rui	3.5
	133	2.39	X	Shing	5.6
	132	2.38	X	Shing	5.9
	130	2.34	X	Shing	6.3
	135	2.31	X	Shing	6.1
	136	2.28	X	Shing	6.1
	132	2.38	X	Taki	7.8
	135	2.31	X	Taki	12.7
	136	2.28	X	Taki	8.1
	131	2.40	X	Tengra	4.5
	125	2.39	X	Tengra	6.8
	133	2.39	X	Tengra	4.2
	132	2.38	X	Tengra	4.2
	130	2.34	X	Tengra	5.2
	134	2.31	X	Tengra	7.1
	135	2.31	X	Tengra	4.6
	136	2.28	X	Tengra	5.2
2.00-2.24	150	2.14	X	Air	11.6
	129	2.12	X	Air	8.5
	141	2.04	X	Air	12.1
	140	2.01	X	Air	8.1
	129	2.12	X	Bacha	3.0



147	2.11	X	Bacha	11.2
148	2.05	X	Bacha	12.7
141	2.04	X	Bacha	3.0
144	2.01	X	Bacha	9.8
150	2.14	X	Bagair	6.3
129	2.12	X	Bailla	8.0
147	2.11	X	Bailla	6.2
148	2.05	X	Bailla	10.0
141	2.04	X	Bailla	6.8
140	2.01	X	Bailla	6.3
150	2.14	X	Baim	39.2
149	2.05	X	Baim	17.6
144	2.01	X	Baim	10.7
147	2.11	X	Bamosh	24.1
141	2.04	X	Bamosh	28.8
140	2.01	X	Bamosh	32.1
150	2.14	X	Batashi	8.4
129	2.12	X	Batashi	7.2
147	2.11	X	Batashi	8.0
149	2.05	X	Batashi	7.7
140	2.01	X	Batashi	8.3
150	2.14	X	Bheda	10.2
129	2.12	X	Bheda	6.7
147	2.11	X	Bheda	8.3
148	2.05	X	Bheda	5.8
149	2.05	X	Bheda	7.0
141	2.04	X	Bheda	6.5
140	2.01	X	Bheda	6.2
144	2.01	X	Bheda	12.5
150	2.14	X	Boicha	4.8
148	2.05	X	Boicha	4.9
149	2.05	X	Boicha	5.0
140	2.01	X	Boicha	3.8
150	2.14	X	Chanda	4.5
129	2.12	X	Chanda	4.7
147	2.11	X	Chanda	3.7
148	2.05	X	Chanda	3.4
149	2.05	X	Chanda	4.2
141	2.04	X	Chanda	4.5
140	2.01	X	Chanda	4.1
144	2.01	X	Chanda	4.8
129	2.12	X	Chapila	6.2
147	2.11	X	Chapila	7.2
141	2.04	X	Chapila	4.0
140	2.01	X	Chapila	3.7
140	2.01	X	Cheka	13.9
150	2.14	X	Chela	6.9
129	2.12	X	Chela	6.5
148	2.05	X	Chela	10.0
149	2.05	X	Chela	10.0
150	2.14	X	Chirka baim	7.2
129	2.12	X	Chirka baim	9.7
147	2.11	X	Chirka baim	3.1
148	2.05	X	Chirka baim	10.0
149	2.05	X	Chirka baim	6.7
150	2.14	X	Dhela	4.7
129	2.12	X	Dhela	5.0
140	2.01	X	Dhela	7.1
144	2.01	X	Dhela	5.5
150	2.14	X	Foli	14.1
140	2.01	X	Foli	21.0
150	2.14	X	Golda chingri	11.2

147	2.11	X	Golda chingri	8.1
149	2.05	X	Golda chingri	9.2
141	2.04	X	Golda chingri	10.0
140	2.01	X	Golda chingri	9.2
150	2.14	X	Gulsha	8.3
147	2.11	X	Gulsha	4.2
148	2.05	X	Gulsha	14.7
149	2.05	X	Gulsha	6.1
140	2.01	X	Gulsha	6.6
150	2.14	X	Gutum	6.2
129	2.12	X	Gutum	6.8
147	2.11	X	Gutum	6.0
148	2.05	X	Gutum	6.5
149	2.05	X	Gutum	8.1
141	2.04	X	Gutum	6.1
140	2.01	X	Gutum	8.1
144	2.01	X	Gutum	5.2
150	2.14	X	Icha	4.2
147	2.11	X	Icha	4.8
149	2.05	X	Icha	4.8
141	2.04	X	Icha	3.9
140	2.01	X	Icha	4.9
144	2.01	X	Icha	4.5
150	2.14	X	Jainzza	5.1
140	2.01	X	Jainzza	7.3
129	2.12	X	Kaikka	8.3
147	2.11	X	Kaikka	8.3
148	2.05	X	Kaikka	12.0
141	2.04	X	Kaikka	10.2
140	2.01	X	Kaikka	5.5
129	2.12	X	Ketchki	4.5
150	2.14	X	Kholisha	7.1
150	2.14	X	Kotibacha	8.7
149	2.05	X	Kotibacha	6.0
148	2.05	X	Lachu	16.5
150	2.14	X	Mola	7.6
129	2.12	X	Mola	5.1
147	2.11	X	Mola	6.9
149	2.05	X	Mola	7.8
141	2.04	X	Mola	5.8
140	2.01	X	Mola	5.6
147	2.11	X	Naptani	4.3
141	2.04	X	Naptani	6.9
150	2.14	X	Pabda	8.7
149	2.05	X	Pabda	10.7
129	2.12	X	Potka	4.7
147	2.11	X	Potka	6.2
148	2.05	X	Potka	4.2
141	2.04	X	Potka	6.1
140	2.01	X	Potka	5.9
144	2.01	X	Potka	6.2
150	2.14	X	Puti	4.7
129	2.12	X	Puti	7.1
147	2.11	X	Puti	4.2
148	2.05	X	Puti	5.9
149	2.05	X	Puti	6.0
141	2.04	X	Puti	4.5
140	2.01	X	Puti	4.8
144	2.01	X	Puti	4.8
129	2.12	X	Rani	6.9
147	2.11	X	Rani	4.2
141	2.04	X	Rani	8.0

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	140	2.01	X	Rani	7.6
	144	2.01	X	Rani	6.5
	150	2.14	X	Shing	5.7
	147	2.11	X	Shing	5.7
	141	2.04	X	Shing	6.5
	140	2.01	X	Shing	6.0
	150	2.14	X	Taki	7.1
	147	2.11	X	Taki	18.1
	150	2.14	X	Tengra	3.9
	150	2.14	X	Tengra	5.8
	129	2.12	X	Tengra	4.5
	148	2.05	X	Tengra	5.3
	149	2.05	X	Tengra	5.4
	141	2.04	X	Tengra	5.1
1.75-1.99	127	1.98	X	Air	8.0
	143	1.97	X	Air	12.7
	146	1.97	X	Air	8.0
	154	1.96	X	Air	10.3
	126	1.87	X	Air	8.4
	157	1.76	X	Air	10.2
	127	1.98	X	Bacha	9.9
	128	1.98	X	Bacha	10.5
	143	1.97	X	Bacha	6.7
	145	1.97	X	Bacha	10.8
	146	1.97	X	Bacha	10.9
	154	1.96	X	Bacha	11.3
	155	1.89	X	Bacha	12.7
	126	1.87	X	Bacha	10.9
	127	1.98	X	Bailla	6.3
	142	1.97	X	Bailla	8.6
	143	1.97	X	Bailla	5.3
	126	1.87	X	Bailla	5.1
	142	1.97	X	Baim	9.5
	145	1.97	X	Baim	7.9
	146	1.97	X	Baim	7.3
	154	1.96	X	Baim	34.3
	155	1.89	X	Baim	36.8
	143	1.97	X	Bamosh	27.6
	154	1.96	X	Bamosh	32.6
	127	1.98	X	Batashi	7.2
	128	1.98	X	Batashi	8.5
	143	1.97	X	Batashi	8.3
	145	1.97	X	Batashi	8.6
	146	1.97	X	Batashi	7.9
	154	1.96	X	Batashi	8.1
	155	1.89	X	Batashi	7.5
	126	1.87	X	Batashi	8.7
	157	1.76	X	Batashi	8.2
	127	1.98	X	Bheda	6.6
	128	1.98	X	Bheda	4.9
	142	1.97	X	Bheda	7.6
	143	1.97	X	Bheda	10.1
	145	1.97	X	Bheda	6.7
	146	1.97	X	Bheda	7.6
	154	1.96	X	Bheda	16.9
	155	1.89	X	Bheda	7.9
	126	1.87	X	Bheda	6.8
	156	1.82	X	Bheda	10.4
	157	1.76	X	Bheda	9.6
	127	1.98	X	Boal	25.2
	146	1.97	X	Boicha	3.6
	154	1.96	X	Boicha	6.1

155	1.89	X	Boicha	5.3
126	1.87	X	Boicha	3.8
157	1.76	X	Boicha	4.8
127	1.98	X	Chanda	3.6
128	1.98	X	Chanda	3.7
142	1.97	X	Chanda	4.5
143	1.97	X	Chanda	4.2
145	1.97	X	Chanda	4.3
146	1.97	X	Chanda	3.8
154	1.96	X	Chanda	4.2
155	1.89	X	Chanda	4.6
126	1.87	X	Chanda	3.5
156	1.82	X	Chanda	5.1
157	1.76	X	Chanda	4.4
127	1.98	X	Chapila	6.5
128	1.98	X	Chapila	5.3
142	1.97	X	Chapila	9.9
143	1.97	X	Chapila	8.3
145	1.97	X	Chapila	4.8
146	1.97	X	Chapila	4.2
154	1.96	X	Chapila	6.0
155	1.89	X	Chapila	4.3
126	1.87	X	Chapila	6.8
157	1.76	X	Chapila	6.3
146	1.97	X	Cheka	18.1
127	1.98	X	Chela	6.1
128	1.98	X	Chela	6.2
142	1.97	X	Chela	12.0
145	1.97	X	Chela	4.8
146	1.97	X	Chela	8.1
154	1.96	X	Chela	8.0
156	1.82	X	Chela	8.3
127	1.98	X	Chirka baim	10.2
128	1.98	X	Chirka baim	8.7
154	1.96	X	Chirka baim	8.4
127	1.98	X	Darkina	4.5
154	1.96	X	Darkina	5.6
126	1.87	X	Darkina	3.7
127	1.98	X	Dhela	4.1
154	1.96	X	Dhela	4.7
126	1.87	X	Dhela	6.3
157	1.76	X	Dhela	5.2
143	1.97	X	Foli	15.9
156	1.82	X	Foli	16.2
127	1.98	X	Golda chingri	9.3
128	1.98	X	Golda chingri	9.3
143	1.97	X	Golda chingri	10.6
146	1.97	X	Golda chingri	7.6
154	1.96	X	Golda chingri	8.0
155	1.89	X	Golda chingri	7.3
157	1.76	X	Golda chingri	6.0
127	1.98	X	Gulsha	8.2
128	1.98	X	Gulsha	5.8
145	1.97	X	Gulsha	21.0
146	1.97	X	Gulsha	13.3
154	1.96	X	Gulsha	7.2
155	1.89	X	Gulsha	8.2
126	1.87	X	Gulsha	5.4
156	1.82	X	Gulsha	7.2
127	1.98	X	Gutum	6.3
128	1.98	X	Gutum	6.3
142	1.97	X	Gutum	6.5

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145	1.97	X	Gutum	6.3
146	1.97	X	Gutum	8.1
154	1.96	X	Gutum	6.2
155	1.89	X	Gutum	6.9
126	1.87	X	Gutum	6.2
157	1.76	X	Gutum	6.9
128	1.98	X	Icha	3.8
143	1.97	X	Icha	4.6
146	1.97	X	Icha	4.3
154	1.96	X	Icha	4.5
155	1.89	X	Icha	4.8
126	1.87	X	Icha	3.2
157	1.76	X	Icha	4.8
143	1.97	X	Jainzza	4.3
146	1.97	X	Jainzza	4.6
156	1.82	X	Jainzza	6.2
127	1.98	X	Kaikka	6.9
128	1.98	X	Kaikka	10.5
142	1.97	X	Kaikka	18.7
145	1.97	X	Kaikka	14.4
154	1.96	X	Kaikka	16.1
155	1.89	X	Kaikka	17.1
126	1.87	X	Kaikka	14.0
143	1.97	X	Kalibaush	3.8
156	1.82	X	Kalibaush	4.2
128	1.98	X	Ketchki	4.2
142	1.97	X	Ketchki	2.9
126	1.87	X	Ketchki	3.3
155	1.89	X	Kholisha	5.9
126	1.87	X	Kholisha	6.9
157	1.76	X	Kholisha	5.7
146	1.97	X	Koi	4.1
156	1.82	X	Lachu	17.2
127	1.98	X	Mola	4.1
128	1.98	X	Mola	4.1
143	1.97	X	Mola	6.7
145	1.97	X	Mola	8.7
146	1.97	X	Mola	8.3
154	1.96	X	Mola	7.3
155	1.89	X	Mola	7.1
126	1.87	X	Mola	4.0
156	1.82	X	Mola	7.2
157	1.76	X	Mola	8.0
157	1.76	X	Napit koi	6.1
143	1.97	X	Naptani	5.8
146	1.97	X	Naptani	5.2
126	1.87	X	Naptani	6.3
127	1.98	X	Pabda	8.3
146	1.97	X	Pabda	24.7
156	1.82	X	Pabda	6.2
128	1.98	X	Potka	4.5
142	1.97	X	Potka	8.3
143	1.97	X	Potka	6.1
145	1.97	X	Potka	7.1
146	1.97	X	Potka	6.1
154	1.96	X	Potka	6.2
126	1.87	X	Potka	4.5
156	1.82	X	Potka	6.0
157	1.76	X	Potka	4.8
127	1.98	X	Puti	4.2
128	1.98	X	Puti	4.1
142	1.97	X	Puti	3.8

	143	1.97	X	Puti	3.3
	145	1.97	X	Puti	7.8
	145	1.97	X	Puti	5.2
	146	1.97	X	Puti	3.8
	154	1.96	X	Puti	5.2
	155	1.89	X	Puti	4.2
	126	1.87	X	Puti	4.0
	156	1.82	X	Puti	6.1
	157	1.76	X	Puti	4.2
	156	1.82	X	Rani	7.2
	143	1.97	X	Shing	5.8
	154	1.96	X	Shing	6.9
	155	1.89	X	Shing	5.1
	126	1.87	X	Shing	9.0
	156	1.82	X	Shing	4.5
	157	1.76	X	Shing	5.8
	128	1.98	X	Shole	5.1
	143	1.97	X	Taki	13.2
	155	1.89	X	Taki	13.3
	126	1.87	X	Taki	9.0
	127	1.98	X	Tengra	5.1
	128	1.98	X	Tengra	5.3
	143	1.97	X	Tengra	5.2
	145	1.97	X	Tengra	5.7
	146	1.97	X	Tengra	7.2
	154	1.96	X	Tengra	4.9
	155	1.89	X	Tengra	5.2
	126	1.87	X	Tengra	5.0
	157	1.76	X	Tengra	6.3
1.50-1.75	159	1.69	X	Bailla	6.8
	161	1.53	X	Bailla	7.2
	160	1.65	X	Baim	11.6
	159	1.69	X	Bheda	6.1
	160	1.65	X	Bheda	4.2
	161	1.53	X	Bheda	6.0
	159	1.69	X	Chanda	3.7
	160	1.65	X	Chanda	3.3
	161	1.53	X	Chanda	3.6
	160	1.65	X	Chela	6.1
	161	1.53	X	Chirka baim	6.5
	159	1.69	X	Dhela	5.2
	160	1.65	X	Dhela	4.8
	161	1.53	X	Dhela	5.3
	159	1.69	X	Gutum	5.0
	160	1.65	X	Gutum	4.8
	161	1.53	X	Gutum	5.0
	159	1.69	X	Potka	6.7
	159	1.69	X	Puti	4.9
	160	1.65	X	Puti	4.8
	161	1.53	X	Puti	4.3
	160	1.65	X	Rani	6.6
	159	1.69	X	Tengra	4.5
	160	1.65	X	Tengra	4.6
	161	1.53	X	Tengra	4.6
1.25-1.49	203	1.30	X	Air	9.3
	171	1.25	X	Air	6.4
	163	1.47	X	Bacha	8.0
	166	1.35	X	Bacha	18.0
	200	1.34	X	Bacha	9.2
	203	1.30	X	Bacha	11.6
	171	1.25	X	Bacha	13.0
	164	1.41	X	Bailla	4.5

	166	1.35	X	Bailla	8.2
	200	1.34	X	Bailla	5.6
	203	1.30	X	Bailla	6.2
	171	1.25	X	Bailla	4.8
	203	1.30	X	Bamosh	26.6
	163	1.47	X	Batashi	7.4
	200	1.34	X	Batashi	8.3
	171	1.25	X	Batashi	7.2
	200	1.34	X	Bheda	6.8
	203	1.30	X	Bheda	5.1
	163	1.47	X	Boicha	4.5
	163	1.47	X	Chanda	4.0
	164	1.41	X	Chanda	2.5
	166	1.35	X	Chanda	5.3
	200	1.34	X	Chanda	3.1
	203	1.30	X	Chanda	4.0
	171	1.25	X	Chanda	4.9
	163	1.47	X	Chapila	4.5
	164	1.41	X	Chapila	4.1
	166	1.35	X	Chapila	4.8
	203	1.30	X	Chapila	4.2
	171	1.25	X	Chapila	6.6
	164	1.41	X	Chela	6.5
	203	1.30	X	Chela	6.8
	200	1.34	X	Chirka baim	9.7
	203	1.30	X	Dhela	4.2
	163	1.47	X	Foli	5.0
	163	1.47	X	Golda chingri	8.5
	203	1.30	X	Golda chingri	10.2
	203	1.30	X	Gulsha	8.3
	171	1.25	X	Gulsha	7.5
	164	1.41	X	Gutum	5.2
	203	1.30	X	Gutum	8.1
	171	1.25	X	Gutum	6.4
	163	1.47	X	Icha	4.0
	164	1.41	X	Icha	4.3
	200	1.34	X	Icha	3.1
	203	1.30	X	Icha	3.7
	171	1.25	X	Icha	5.2
	200	1.34	X	Jainzza	7.6
	203	1.30	X	Jainzza	4.9
	164	1.41	X	Kaikka	5.0
	200	1.34	X	Kaikka	19.3
	203	1.30	X	Kaikka	13.6
	203	1.30	X	Kazoli	10.0
	163	1.47	X	Ketchki	3.5
	164	1.41	X	Ketchki	3.5
	200	1.34	X	Ketchki	3.8
	171	1.25	X	Ketchki	4.1
	200	1.34	X	Lachu	11.3
	163	1.47	X	Magur	12.1
	200	1.34	X	Mola	4.4
	203	1.30	X	Mola	4.0
	171	1.25	X	Naptani	5.6
	163	1.47	X	Potka	6.1
	164	1.41	X	Potka	5.6
	166	1.35	X	Potka	6.6
	163	1.47	X	Puti	3.1
	164	1.41	X	Puti	4.6
	200	1.34	X	Puti	3.4
	203	1.30	X	Puti	3.2
	171	1.25	X	Puti	5.1

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204	1.24	X	Baim	11.0
206	1.23	X	Baim	9.1
211	1.20	X	Baim	9.3
214	1.19	X	Baim	15.5
168	1.17	X	Baim	6.9
179	1.11	X	Baim	7.1
206	1.23	X	Bamosh	21.3
204	1.24	X	Batashi	7.2
199	1.23	X	Batashi	7.7
206	1.23	X	Batashi	7.8
211	1.20	X	Batashi	7.3
215	1.19	X	Batashi	7.6
216	1.18	X	Batashi	7.6
219	1.14	X	Batashi	7.3
204	1.24	X	Bheda	9.0
211	1.20	X	Bheda	6.2
172	1.18	X	Bheda	6.5
173	1.18	X	Bheda	10.5
196	1.04	X	Bheda	5.6
187	1.02	X	Bheda	4.8
223	1.09	X	Boal	28.6
221	1.08	X	Boal	37.4
235	1.05	X	Boal	35.4
196	1.04	X	Boal	34.3
204	1.24	X	Chanda	4.0
199	1.23	X	Chanda	2.9
211	1.20	X	Chanda	2.8
213	1.20	X	Chanda	4.1
210	1.19	X	Chanda	4.8
214	1.19	X	Chanda	3.0
215	1.19	X	Chanda	4.6
172	1.18	X	Chanda	4.3
173	1.18	X	Chanda	3.2
174	1.18	x	Chanda	4.7
175	1.18	X	Chanda	2.6
216	1.18	X	Chanda	3.7
168	1.17	X	Chanda	2.7
220	1.14	X	Chanda	5.2
176	1.13	X	Chanda	5.3
177s	1.13	X	Chanda	4.8
179	1.11	X	Chanda	4.1
180	1.11	X	Chanda	3.5
183	1.09	X	Chanda	3.2
223	1.09	X	Chanda	3.5
224	1.09	X	Chanda	3.7
221	1.08	X	Chanda	5.2
227	1.08	X	Chanda	3.2
228	1.08	X	Chanda	3.4
231	1.06	X	Chanda	3.6
184	1.05	X	Chanda	3.9
232	1.05	X	Chanda	3.9
234	1.05	X	Chanda	3.7
235	1.05	X	Chanda	3.7
196	1.04	X	Chanda	3.2
187	1.02	X	Chanda	3.1
237	1.02	X	Chanda	3.6
204	1.24	X	Chapila	5.0
199	1.23	X	Chapila	6.5
206	1.23	X	Chapila	8.8
211	1.20	X	Chapila	6.1
213	1.20	X	Chapila	5.2
214	1.19	X	Chapila	6.2

209

	200	1.34		X	Rani	6.9
	203	1.30		X	Rani	4.7
	203	1.30		X	Rui	6.3
	163	1.47		X	Shing	7.5
	203	1.30		X	Shing	10.5
	171	1.25		X	Shing	9.2
	163	1.47		X	Taki	8.2
	203	1.30		X	Taki	12.1
	163	1.47		X	Tengra	6.0
	203	1.30		X	Tengra	4.6
	171	1.25		X	Tengra	6.2
1.00-1.24	204	1.24		X	Air	12.0
	199	1.23		X	Air	9.2
	206	1.23		X	Air	15.0
	211	1.20		X	Air	27.2
	213	1.20		X	Air	17.6
	214	1.19		X	Air	12.1
	215	1.19		X	Air	27.0
	172	1.18		X	Air	11.0
	175	1.18		X	Air	6.9
	216	1.18		X	Air	26.2
	176	1.13		X	Air	7.0
	196	1.04		X	Air	19.7
	204	1.24		X	Bacha	13.2
	206	1.23		X	Bacha	11.9
	211	1.20		X	Bacha	11.8
	213	1.20		X	Bacha	11.7
	214	1.19		X	Bacha	16.3
	215	1.19		X	Bacha	8.1
	172	1.18		X	Bacha	12.1
	175	1.18		X	Bacha	7.7
	216	1.18		X	Bacha	18.6
	168	1.17		X	Bacha	14.3
	176	1.13		X	Bacha	14.6
	177s	1.13		X	Bacha	13.2
	183	1.09		X	Bacha	12.3
	223	1.09		X	Bacha	13.1
	227	1.08		X	Bacha	12.1
	231	1.06		X	Bacha	14.0
	184	1.05		X	Bacha	9.2
	232	1.05		X	Bacha	14.0
	234	1.05		X	Bacha	14.3
	235	1.05		X	Bacha	14.0
	196	1.04		X	Bacha	10.3
	187	1.02		X	Bacha	8.6
	237	1.02		X	Bacha	14.5
	199	1.23		X	Bagair	5.0
	204	1.24		X	Bailla	5.9
	206	1.23		X	Bailla	5.8
	211	1.20		X	Bailla	7.6
	215	1.19		X	Bailla	7.1
	172	1.18		X	Bailla	5.1
	175	1.18		X	Bailla	8.2
	216	1.18		X	Bailla	5.5
	168	1.17		X	Bailla	4.6
	219	1.14		X	Bailla	6.2
	180	1.11		X	Bailla	6.3
	183	1.09		X	Bailla	6.4
	221	1.08		X	Bailla	8.1
	184	1.05		X	Bailla	5.1
	196	1.04		X	Bailla	5.2
	237	1.02		X	Bailla	7.4

215	1.19	X	Chapila	6.1
172	1.18	X	Chapila	9.1
175	1.18	X	Chapila	3.9
216	1.18	X	Chapila	4.8
168	1.17	X	Chapila	4.5
219	1.14	X	Chapila	3.0
176	1.13	X	Chapila	5.7
179	1.11	X	Chapila	5.1
180	1.11	X	Chapila	3.7
183	1.09	X	Chapila	4.1
221	1.08	X	Chapila	7.1
184	1.05	X	Chapila	5.2
196	1.04	X	Chapila	3.7
187	1.02	X	Chapila	6.8
237	1.02	X	Chapila	4.3
206	1.23	X	Cheka	5.7
204	1.24	X	Chela	5.0
199	1.23	X	Chela	4.7
214	1.19	X	Chela	9.0
215	1.19	X	Chela	5.7
168	1.17	X	Chela	5.1
196	1.04	X	Chela	4.5
187	1.02	X	Chela	5.1
213	1.20	X	Chirka baim	8.6
210	1.19	X	Chirka baim	6.7
223	1.09	X	Chirka baim	6.0
224	1.09	X	Chirka baim	6.0
231	1.06	X	Chirka baim	6.0
184	1.05	X	Chirka baim	10.1
204	1.24	X	Darkina	5.2
199	1.23	X	Darkina	5.7
213	1.20	X	Darkina	4.2
214	1.19	X	Darkina	4.2
196	1.04	X	Darkina	4.2
204	1.24	X	Dhela	3.4
199	1.23	X	Dhela	5.0
206	1.23	X	Dhela	8.2
211	1.20	X	Dhela	3.6
213	1.20	X	Dhela	3.7
214	1.19	X	Dhela	4.4
215	1.19	X	Dhela	4.8
172	1.18	X	Dhela	6.7
216	1.18	X	Dhela	5.0
219	1.14	X	Dhela	5.0
179	1.11	X	Dhela	5.8
180	1.11	X	Dhela	4.1
183	1.09	X	Dhela	3.9
221	1.08	X	Dhela	5.2
228	1.08	X	Dhela	3.1
232	1.05	X	Dhela	5.1
235	1.05	X	Dhela	5.0
196	1.04	X	Dhela	3.4
187	1.02	X	Dhela	4.9
237	1.02	X	Dhela	4.1
199	1.23	X	Foli	5.8
183	1.09	X	Garua	11.5
199	1.23	X	Golda chingri	9.7
206	1.23	X	Golda chingri	8.8
211	1.20	X	Golda chingri	9.1
213	1.20	X	Golda chingri	12.6
214	1.19	X	Golda chingri	11.0
216	1.18	X	Golda chingri	10.9

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	219	1.14	X	Golda chingri	8.0
	221	1.08	X	Golda chingri	15.6
	187	1.02	X	Golda chingri	16.4
	237	1.02	X	Golda chingri	13.8
	204	1.24	X	Gonia	17.5
	206	1.23	X	Gonia	6.3
	211	1.20	X	Gonia	3.9
	199	1.23	X	Gulsha	6.0
	206	1.23	X	Gulsha	10.2
	211	1.20	X	Gulsha	10.5
	213	1.20	X	Gulsha	9.0
	214	1.19	X	Gulsha	9.9
	199	1.23	X	Gutum	6.3
	172	1.18	X	Gutum	6.2
	175	1.18	X	Gutum	6.9
	176	1.13	X	Gutum	5.7
	177s	1.13	X	Gutum	7.4
	179	1.11	X	Gutum	7.5
	180	1.11	X	Gutum	6.4
	183	1.09	X	Gutum	5.5
	184	1.05	X	Gutum	9.7
	199	1.23	X	Icha	3.3
	206	1.23	X	Icha	3.4
	211	1.20	X	Icha	3.2
	213	1.20	X	Icha	3.8
	214	1.19	X	Icha	3.1
	215	1.19	X	Icha	4.3
	172	1.18	X	Icha	5.5
	173	1.18	X	Icha	4.9
	175	1.18	X	Icha	4.3
	216	1.18	X	Icha	4.7
	168	1.17	X	Icha	4.2
	219	1.14	X	Icha	4.5
	220	1.14	X	Icha	6.1
	176	1.13	X	Icha	2.9
	179	1.11	X	Icha	4.8
	180	1.11	X	Icha	3.0
	183	1.09	X	Icha	3.1
	223	1.09	X	Icha	4.3
	231	1.06	X	Icha	3.7
	232	1.05	X	Icha	3.5
	234	1.05	X	Icha	3.6
	235	1.05	X	Icha	3.6
	196	1.04	X	Icha	3.1
	187	1.02	X	Icha	4.8
	237	1.02	X	Icha	3.3
	206	1.23	X	Ilish	22.4
	215	1.19	X	Ilish	19.3
	216	1.18	X	Ilish	19.2
	219	1.14	X	Ilish	22.3
	227	1.08	X	Ilish	21.1
	231	1.06	X	Ilish	20.1
	204	1.24	X	Kaikka	14.0
	199	1.23	X	Kaikka	12.2
	214	1.19	X	Kaikka	13.3
	172	1.18	X	Kaikka	19.6
	184	1.05	X	Kaikka	14.7
	187	1.02	X	Kaikka	14.6
	204	1.24	X	Kalibaush	13.2
	211	1.20	X	Kalibaush	51.0
	232	1.05	X	Kalibaush	15.2
	213	1.20	X	Kazoli	11.3

215	1.19	X	Kazoli	5.3
216	1.18	X	Kazoli	7.5
183	1.09	X	Kazoli	9.3
196	1.04	X	Kazoli	5.1
237	1.02	X	Kazoli	9.3
211	1.20	X	Ketchki	3.6
213	1.20	X	Ketchki	4.1
172	1.18	X	Ketchki	4.1
173	1.18	X	Ketchki	4.0
175	1.18	X	Ketchki	3.9
176	1.13	X	Ketchki	4.0
179	1.11	X	Kotibacha	8.0
211	1.20	X	Lachu	4.5
227	1.08	X	Lachu	14.5
211	1.20	X	Magur	14.4
204	1.24	X	Mola	4.0
199	1.23	X	Mola	5.9
206	1.23	X	Mola	6.3
211	1.20	X	Mola	4.3
213	1.20	X	Mola	4.3
210	1.19	X	Mola	4.3
214	1.19	X	Mola	4.3
215	1.19	X	Mola	6.3
175	1.18	X	Mola	6.7
216	1.18	X	Mola	6.5
219	1.14	X	Mola	6.2
176	1.13	X	Mola	6.6
179	1.11	X	Mola	6.5
183	1.09	X	Mola	3.6
221	1.08	X	Mola	6.1
196	1.04	X	Mola	4.3
187	1.02	X	Mola	4.8
237	1.02	X	Mola	4.4
199	1.23	X	Mrigel	27.5
206	1.23	X	Napit koi	3.3
196	1.04	X	Napit koi	3.2
204	1.24	X	Naptani	7.0
199	1.23	X	Naptani	5.5
206	1.23	X	Naptani	6.2
211	1.20	X	Pabda	10.8
219	1.14	X	Pabda	9.7
204	1.24	X	Potka	6.3
206	1.23	X	Potka	5.3
210	1.19	X	Potka	5.9
215	1.19	X	Potka	6.2
174	1.18	x	Potka	5.7
216	1.18	X	Potka	6.2
220	1.14	X	Potka	4.1
180	1.11	X	Potka	4.8
183	1.09	X	Potka	5.2
184	1.05	X	Potka	6.1
204	1.24	X	Puti	4.3
199	1.23	X	Puti	3.2
211	1.20	X	Puti	3.6
213	1.20	X	Puti	4.8
214	1.19	X	Puti	4.1
172	1.18	X	Puti	5.2
175	1.18	X	Puti	5.2
168	1.17	X	Puti	3.7
176	1.13	X	Puti	3.8
179	1.11	X	Puti	4.3
183	1.09	X	Puti	4.3

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	223	1.09		X	Puti	3.0
	224	1.09		X	Puti	2.3
	221	1.08		X	Puti	4.2
	227	1.08		X	Puti	3.5
	228	1.08		X	Puti	3.5
	231	1.06		X	Puti	4.0
	184	1.05		X	Puti	3.8
	232	1.05		X	Puti	4.0
	234	1.05		X	Puti	4.1
	235	1.05		X	Puti	4.0
	196	1.04		X	Puti	3.3
	187	1.02		X	Puti	4.6
	204	1.24		X	Rani	6.2
	199	1.23		X	Rani	6.6
	206	1.23		X	Rani	4.1
	210	1.19		X	Rani	3.8
	214	1.19		X	Rani	4.0
	215	1.19		X	Rani	6.0
	172	1.18		X	Rani	10.9
	216	1.18		X	Rani	4.8
	219	1.14		X	Rani	3.2
	220	1.14		X	Rani	6.1
	224	1.09		X	Rani	4.0
	227	1.08		X	Rani	4.7
	228	1.08		X	Rani	4.5
	231	1.06		X	Rani	4.5
	184	1.05		X	Rani	7.2
	234	1.05		X	Rani	4.5
	237	1.02		X	Rani	5.8
	206	1.23		X	Rui	4.6
	216	1.18		X	Rui	5.6
	223	1.09		X	Rui	17.5
	196	1.04		X	Rui	14.7
	187	1.02		X	Rui	5.8
	204	1.24		X	Shing	11.0
	199	1.23		X	Shing	7.3
	206	1.23		X	Shing	9.3
	211	1.20		X	Shing	5.7
	213	1.20		X	Shing	9.7
	214	1.19		X	Shing	13.1
	215	1.19		X	Shing	13.0
	216	1.18		X	Shing	12.5
	168	1.17		X	Shing	7.2
	183	1.09		X	Shing	6.7
	227	1.08		X	Shing	5.4
	232	1.05		X	Shing	5.7
	235	1.05		X	Shing	5.9
	215	1.19		X	Taki	17.6
	216	1.18		X	Taki	10.9
	199	1.23		X	Tengra	6.1
	206	1.23		X	Tengra	8.7
	213	1.20		X	Tengra	8.3
	214	1.19		X	Tengra	5.5
	172	1.18		X	Tengra	9.1
	220	1.14		X	Tengra	8.2
0.00-0.99	191	0.91		X	Air	18.3
	195	0.72		X	Air	10.1
	188	0.95		X	Bacha	13.3
	238	0.94		X	Bacha	13.6
	191	0.91		X	Bacha	10.8
	243	0.91		X	Bacha	19.7
	192	0.86		X	Bacha	15.7

	246	0.85		X	Bacha	16.5
	242	0.84		X	Bacha	13.0
	266s	0.71		X	Bacha	17.6
	262s	0.61		X	Bacha	17.0
	261s	0.58		X	Bacha	19.2
	261ss	0.58		X	Bacha	18.8
	259ss	0.47		X	Bacha	18.9
	259s	0.42		X	Bacha	17.0
	277s	0.40		X	Bacha	17.9
	254s	0.38		X	Bacha	16.5
	258s	0.31		X	Bacha	20.7
	255s	0.19		X	Bacha	14.1
	255ss	0.19		X	Bacha	9.0
	195	0.72		X	Bagair	5.1
	188	0.95		X	Bailla	6.1
	191	0.91		X	Bailla	4.9
	243	0.91		X	Bailla	14.1
	192	0.86		X	Bailla	6.2
	246	0.85		X	Bailla	9.0
	242	0.84		X	Bailla	7.4
	195	0.72		X	Bailla	4.4
	266ss	0.71		X	Bailla	6.2
	262s	0.61		X	Bailla	8.2
	261ss	0.58		X	Bailla	8.3
	273s	0.48		X	Bailla	9.0
	277ss	0.40		X	Bailla	6.4
	254s	0.38		X	Bailla	6.8
	257s	0.19		X	Bailla	11.2
	191	0.91		X	Baim	9.9
	191	0.91		X	Bamosh	38.0
	195	0.72		X	Batashi	5.8
	238	0.94		X	Bheda	4.9
	192	0.86		X	Bheda	6.4
	195	0.72		X	Bheda	4.9
	262s	0.61		X	Bheda	7.3
	261s	0.58		X	Bheda	7.8
	261ss	0.58		X	Bheda	8.1
	259s	0.42		X	Bheda	8.2
	255s	0.19		X	Bheda	7.8
	257s	0.19		X	Bheda	5.0
	266ss	0.71		X	Boal	53.7
	254s	0.38		X	Boal	48.7
	255s	0.19		X	Boal	56.2
	188	0.95		X	Chanda	3.1
	238	0.94		X	Chanda	4.1
	191	0.91		X	Chanda	2.9
	243	0.91		X	Chanda	6.2
	192	0.86		X	Chanda	3.9
	246	0.85		X	Chanda	4.7
	242	0.84		X	Chanda	3.8
	268s	0.74		X	Chanda	5.4
	195	0.72		X	Chanda	3.1
	266s	0.71		X	Chanda	4.6
	270s	0.64		X	Chanda	4.8
	262s	0.61		X	Chanda	3.1
	261ss	0.58		X	Chanda	3.4
	273s	0.48		X	Chanda	4.7
	275s	0.48		X	Chanda	3.6
	259ss	0.47		X	Chanda	3.0
	259s	0.42		X	Chanda	3.3
	277s	0.40		X	Chanda	3.9
	277ss	0.40		X	Chanda	3.7

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	254s	0.38		X	Chanda	3.4
	279s	0.37		X	Chanda	4.0
	258s	0.31		X	Chanda	3.6
	255s	0.19		X	Chanda	3.1
	255ss	0.19		X	Chanda	2.9
	257s	0.19		X	Chanda	3.0
	188	0.95		X	Chapila	4.3
	238	0.94		X	Chapila	4.4
	191	0.91		X	Chapila	5.8
	243	0.91		X	Chapila	8.3
	192	0.86		X	Chapila	4.4
	242	0.84		X	Chapila	3.7
	268s	0.74		X	Chapila	4.7
	195	0.72		X	Chapila	3.2
	266s	0.71		X	Chapila	5.3
	262s	0.61		X	Chapila	5.0
	261ss	0.58		X	Chapila	4.0
	255ss	0.19		X	Chapila	4.2
	257s	0.19		X	Chapila	4.3
	188	0.95		X	Chela	5.1
	238	0.94		X	Chela	9.9
	191	0.91		X	Chela	5.4
	192	0.86		X	Chela	9.2
	268s	0.74		X	Chela	4.8
	195	0.72		X	Chela	4.3
	266s	0.71		X	Chela	6.0
	266ss	0.71		X	Chela	6.0
	270s	0.64		X	Chela	4.2
	262s	0.61		X	Chela	7.0
	261s	0.58		X	Chela	7.5
	273s	0.48		X	Chela	5.1
	259ss	0.47		X	Chela	7.3
	259s	0.42		X	Chela	7.2
	277ss	0.40		X	Chela	7.2
	254s	0.38		X	Chela	6.7
	258s	0.31		X	Chela	6.2
	255s	0.19		X	Chela	7.2
	255ss	0.19		X	Chela	5.5
	257s	0.19		X	Chela	6.9
	268s	0.74		X	Chirka baim	8.9
	195	0.72		X	Chirka baim	6.9
	191	0.91		X	Dhela	4.6
	192	0.86		X	Dhela	4.0
	242	0.84		X	Dhela	3.9
	195	0.72		X	Dhela	3.7
	262s	0.61		X	Dhela	3.6
	261ss	0.58		X	Dhela	3.7
	273s	0.48		X	Dhela	6.1
	275s	0.48		X	Dhela	4.3
	259ss	0.47		X	Dhela	4.0
	259s	0.42		X	Dhela	3.7
	277s	0.40		X	Dhela	4.1
	277ss	0.40		X	Dhela	4.3
	254s	0.38		X	Dhela	4.0
	279s	0.37		X	Dhela	4.2
	258s	0.31		X	Dhela	4.3
	191	0.91		X	Golda chingri	18.6
	246	0.85		X	Golda chingri	8.0
	242	0.84		X	Golda chingri	15.1
	195	0.72		X	Golda chingri	12.6
	262s	0.61		X	Golda chingri	15.0
	261ss	0.58		X	Golda chingri	13.2

259s	0.42	X	Golda chingri	13.0
277s	0.40	X	Golda chingri	13.8
195	0.72	X	Gulsha	6.5
259ss	0.47	X	Gulsha	11.7
257s	0.19	X	Gulsha	9.8
191	0.91	X	Gutum	6.5
192	0.86	X	Gutum	7.2
195	0.72	X	Gutum	5.3
266s	0.71	X	Gutum	5.9
262s	0.61	X	Gutum	6.9
261ss	0.58	X	Gutum	6.2
259ss	0.47	X	Gutum	7.0
259s	0.42	X	Gutum	8.2
277s	0.40	X	Gutum	7.2
254s	0.38	X	Gutum	7.2
258s	0.31	X	Gutum	7.9
191	0.91	X	Icha	2.6
243	0.91	X	Icha	4.6
246	0.85	X	Icha	4.8
195	0.72	X	Icha	3.2
262s	0.61	X	Icha	3.0
261s	0.58	X	Icha	3.7
261ss	0.58	X	Icha	3.0
259s	0.42	X	Icha	3.0
277s	0.40	X	Icha	3.6
254s	0.38	X	Icha	3.3
279s	0.37	X	Icha	3.5
255ss	0.19	X	Icha	3.0
257s	0.19	X	Icha	3.1
238	0.94	X	Jainzza	4.7
191	0.91	X	Jainzza	6.4
188	0.95	X	Kaikka	13.6
192	0.86	X	Kaikka	17.6
242	0.84	X	Kaikka	5.9
195	0.72	X	Kaikka	7.8
246	0.85	X	Kalibaush	17.3
262s	0.61	X	Kalibaush	12.9
261s	0.58	X	Kalibaush	12.4
259s	0.42	X	Kalibaush	19.3
277s	0.40	X	Kalibaush	23.5
257s	0.19	X	Kalibaush	17.4
238	0.94	X	Kazoli	9.6
191	0.91	X	Kazoli	5.6
246	0.85	X	Kazoli	6.7
242	0.84	X	Kazoli	12.0
195	0.72	X	Kazoli	5.2
266s	0.71	X	Kazoli	6.7
255s	0.19	X	Kazoli	9.0
257s	0.19	X	Kazoli	7.6
195	0.72	X	Ketchki	3.7
262s	0.61	X	Ketchki	4.5
246	0.85	X	Lachu	13.5
188	0.95	X	Mola	3.9
191	0.91	X	Mola	5.7
192	0.86	X	Mola	4.3
195	0.72	X	Mola	3.8
266ss	0.71	X	Mola	5.7
270s	0.64	X	Mola	6.3
262s	0.61	X	Mola	4.2
261s	0.58	X	Mola	4.2
259ss	0.47	X	Mola	4.1
259s	0.42	X	Mola	5.0

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	254s	0.38		X	Mola	4.3
	255s	0.19		X	Mola	4.3
	255ss	0.19		X	Mola	4.9
	257s	0.19		X	Mola	4.4
	195	0.72		X	Naptani	3.0
	191	0.91		X	Potka	6.1
	192	0.86		X	Potka	5.9
	195	0.72		X	Potka	6.2
	188	0.95		X	Puti	4.2
	191	0.91		X	Puti	4.1
	192	0.86		X	Puti	4.4
	242	0.84		X	Puti	6.2
	268s	0.74		X	Puti	5.1
	195	0.72		X	Puti	3.8
	266s	0.71		X	Puti	4.8
	266ss	0.71		X	Puti	5.6
	270s	0.64		X	Puti	4.8
	273s	0.48		X	Puti	4.3
	275s	0.48		X	Puti	5.6
	259ss	0.47		X	Puti	4.2
	258s	0.31		X	Puti	4.1
	255s	0.19		X	Puti	4.2
	257s	0.19		X	Puti	3.6
	188	0.95		X	Rani	9.1
	243	0.91		X	Rani	6.3
	192	0.86		X	Rani	4.3
	246	0.85		X	Rani	5.7
	268s	0.74		X	Rani	8.8
	259s	0.42		X	Rani	6.1
	255s	0.19		X	Rani	4.0
	257s	0.19		X	Rani	4.0
	188	0.95		X	Rui	4.7
	270s	0.64		X	Rui	28.3
	238	0.94		X	Shing	9.7
	191	0.91		X	Shing	9.3
	242	0.84		X	Shing	12.3
	195	0.72		X	Shing	8.8
	262s	0.61		X	Shing	13.4
	261s	0.58		X	Shing	11.9
	261ss	0.58		X	Shing	11.5
	259s	0.42		X	Shing	11.1
	255s	0.19		X	Shing	11.9
	257s	0.19		X	Shing	11.6
	195	0.72		X	Tengra	4.4
CONCURRENT SWIMMING						
0.00-0.99	282	-0.42	X		Bacha	16.7
	283	-0.63	X		Bacha	17.2
	304	-0.82	X		Bacha	16.4
	285	-0.99	X		Bacha	13.9
	256	-0.01	X		Bailla	4.9
	281	-0.23	X		Bailla	6.3
	282	-0.42	X		Bailla	6.3
	284	-0.84	X		Bailla	6.2
	256	-0.01	X		Baim	11.7
	285	-0.99	X		Baim	8.9
	256	-0.01	X		Bheda	5.1
	256	-0.01	X		Chanda	2.1
	282	-0.42	X		Chanda	4.3
	304	-0.82	X		Chanda	3.1
	284	-0.84	X		Chanda	4.1

	303	-0.94	X	Chanda	3.7
	305	-0.94	X	Chanda	4.0
	285	-0.99	X	Chanda	5.1
	256	-0.01	X	Chela	4.7
	281	-0.23	X	Chela	8.0
	281	-0.23	X	Chirka baim	10.7
	282	-0.42	X	Chirka baim	10.1
	283	-0.63	X	Chirka baim	9.1
	284	-0.84	X	Chirka baim	8.0
	256	-0.01	X	Dhela	5.0
	281	-0.23	X	Dhela	4.4
	282	-0.42	X	Dhela	4.3
	283	-0.63	X	Dhela	4.3
	284	-0.84	X	Dhela	4.6
	285	-0.99	X	Dhela	5.7
	256	-0.01	X	Gulsha	13.7
	281	-0.23	X	Gutum	8.1
	256	-0.01	X	Icha	2.7
	281	-0.23	X	Icha	3.9
	284	-0.84	X	Icha	4.0
	303	-0.94	X	Icha	4.2
	305	-0.94	X	Icha	4.0
	256	-0.01	X	Kazoli	7.6
	256	-0.01	X	Lachu	6.9
	256	-0.01	X	Mola	4.7
	281	-0.23	X	Mola	4.2
	282	-0.42	X	Mola	4.2
	283	-0.63	X	Mola	4.0
	304	-0.82	X	Mola	4.2
	284	-0.84	X	Mola	3.4
	303	-0.94	X	Mola	4.9
	285	-0.99	X	Mola	4.5
	281	-0.23	X	Potka	5.8
	283	-0.63	X	Potka	5.4
	285	-0.99	X	Potka	2.8
	283	-0.63	X	Puti	5.0
	285	-0.99	X	Puti	4.2
	282	-0.42	X	Rani	6.1
	305	-0.94	X	Rani	7.8
	285	-0.99	X	Rani	4.2
	281	-0.23	X	Shing	10.4
	256	-0.01	X	Taki	10.7
	284	-0.84	X	Taki	7.3
1.00-1.24	292	-1.21	X	Bacha	14.6
	300	-1.21	X	Bacha	18.2
	293	-1.21	X	Bheda	9.2
	306	-1.1	X	Chanda	3.9
	300	-1.21	X	Chanda	4.3
	292	-1.21	X	Chela	7.8
	293	-1.21	X	Chela	12.1
	292	-1.21	X	Chirka baim	9.1
	306	-1.1	X	Dhela	4.7
	292	-1.21	X	Dhela	4.7
	300	-1.21	X	Dhela	5.6
	292	-1.21	X	Icha	3.1
	293	-1.21	X	Kaikka	10.0
	306	-1.1	X	Mola	4.0
	292	-1.21	X	Mola	4.2
	293	-1.21	X	Mola	4.5
	300	-1.21	X	Mola	6.2
	293	-1.21	X	Puti	4.3
	300	-1.21	X	Puti	5.1

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	306	-1.1	X	Rani	5.9
	293	-1.21	X	Rani	4.6
1.25-1.49	294	-1.26	X	Bacha	14.9
	298	-1.28	X	Bacha	15.1
	286	-1.30	X	Bacha	18.2
	296	-1.36	X	Bacha	14.6
	297	-1.36	X	Bailla	6.0
	294	-1.26	X	Baim	14.2
	286	-1.30	X	Baim	10.2
	302	-1.32	X	Baim	11.6
	291	-1.34	X	Baim	8.8
	301	-1.36	X	Baim	8.8
	287	-1.38	X	Baim	12.4
	294	-1.26	X	Chanda	3.5
	298	-1.28	X	Chanda	2.9
	299	-1.28	X	Chanda	3.1
	286	-1.30	X	Chanda	4.2
	302	-1.32	X	Chanda	3.8
	291	-1.34	X	Chanda	5.2
	296	-1.36	X	Chanda	2.8
	297	-1.36	X	Chanda	3.6
	301	-1.36	X	Chanda	4.8
	307	-1.36	X	Chanda	4.0
	287	-1.38	X	Chanda	4.3
	316s	-1.38	X	Chanda	4.6
	286	-1.30	X	Chapila	8.3
	291	-1.34	X	Chapila	4.1
	287	-1.38	X	Chapila	8.2
	314s	-1.42	X	Chapila	6.0
	294	-1.26	X	Chela	7.7
	295	-1.26	X	Chela	11.1
	298	-1.28	X	Chela	12.6
	302	-1.32	X	Chela	3.8
	296	-1.36	X	Chela	9.9
	297	-1.36	X	Chela	10.1
	301	-1.36	X	Chela	6.1
	297	-1.36	X	Chirka baim	10.7
	291	-1.34	X	Darkina	6.0
	287	-1.38	X	Darkina	8.2
	286	-1.30	X	Dhela	5.1
	302	-1.32	X	Dhela	5.7
	291	-1.34	X	Dhela	6.2
	297	-1.36	X	Dhela	4.0
	307	-1.36	X	Dhela	4.1
	287	-1.38	X	Dhela	5.8
	291	-1.34	X	Gutum	6.8
	294	-1.26	X	Icha	3.4
	298	-1.28	X	Icha	3.4
	302	-1.32	X	Icha	6.1
	297	-1.36	X	Icha	4.0
	307	-1.36	X	Icha	4.0
	287	-1.38	X	Icha	6.1
	314s	-1.42	X	Icha	4.0
	295	-1.26	X	Kaikka	10.7
	286	-1.30	X	Kaikka	11.1
	297	-1.36	X	Kaikka	12.8
	291	-1.34	X	Kholisha	6.2
	295	-1.26	X	Lachu	12.8
	299	-1.28	X	Lachu	13.1
	295	-1.26	X	Mola	4.1
	286	-1.30	X	Mola	5.1
	302	-1.32	X	Mola	6.3

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	291	-1.34	X	Mola	5.2
	297	-1.36	X	Mola	5.0
	301	-1.36	X	Mola	5.5
	287	-1.38	X	Mola	5.2
	295	-1.26	X	Potka	4.5
	299	-1.28	X	Potka	5.0
	286	-1.30	X	Potka	4.3
	291	-1.34	X	Potka	4.1
	296	-1.36	X	Potka	4.7
	287	-1.38	X	Potka	3.2
	299	-1.28	X	Puti	4.9
	286	-1.30	X	Puti	4.8
	302	-1.32	X	Puti	6.3
	291	-1.34	X	Puti	6.6
	296	-1.36	X	Puti	5.1
	301	-1.36	X	Puti	5.6
	287	-1.38	X	Puti	6.8
	316s	-1.38	X	Puti	4.1
	294	-1.26	X	Rani	8.1
	298	-1.28	X	Rani	5.7
	286	-1.30	X	Rani	5.8
	296	-1.36	X	Rani	4.8
	294	-1.26	X	Shing	9.3
	299	-1.28	X	Shing	9.8
	302	-1.32	X	Shing	11.3
	291	-1.34	X	Shing	11.4
	297	-1.36	X	Shing	12.3
	301	-1.36	X	Shing	11.3
	287	-1.38	X	Shing	10.2
	299	-1.28	X	Taki	6.8
	286	-1.30	X	Taki	14.7
	307	-1.36	X	Taki	6.9
	295	-1.26	X	Tengra	8.1
	298	-1.28	X	Tengra	7.7
	301	-1.36	X	Tengra	10.2
	314s	-1.42	X	Tengra	5.6
	290	-1.58	X	Bailia	4.1
1.50-1.74	289	-1.58	X	Baim	10.5
	290	-1.58	X	Baim	10.4
	288	-1.62	X	Baim	11.9
	313s	-1.53	X	Chanda	4.1
	289	-1.58	X	Chanda	4.5
	290	-1.58	X	Chanda	4.2
	308	-1.58	X	Chanda	3.9
	288	-1.62	X	Chanda	5.2
	313s	-1.53	X	Chapila	8.4
	308	-1.58	X	Chirka balm	7.6
	289	-1.58	X	Darkina	6.6
	290	-1.58	X	Dhela	5.3
	308	-1.58	X	Dhela	4.7
	288	-1.62	X	Dhela	6.5
	289	-1.58	X	Golda chingri	16.8
	313s	-1.53	X	Gutum	8.1
	290	-1.58	X	Gutum	8.9
	288	-1.62	X	Gutum	7.6
	313s	-1.53	X	Icha	3.9
	308	-1.58	X	Icha	3.0
	288	-1.62	X	Kholisha	7.7
	313s	-1.53	X	Mola	4.0
	289	-1.58	X	Mola	7.1
	290	-1.58	X	Mola	5.2
	288	-1.62	X	Mola	5.1



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	290	-1.58	X	Potka	6.6
	288	-1.62	X	Potka	5.6
	289	-1.58	X	Puti	5.9
	290	-1.58	X	Puti	4.8
	288	-1.62	X	Puti	4.8
	289	-1.58	X	Rani	4.7
	290	-1.58	X	Rani	5.5
	288	-1.62	X	Rani	4.8
	289	-1.58	X	Shing	11.2
	290	-1.58	X	Shing	12.3
	288	-1.62	X	Shing	10.3
	288	-1.62	X	Taki	12.3
2.00-2.24	309s	-2.12	X	Chanda	3.6
	311s	-2.14	X	Chanda	4.1
	309s	-2.12	X	Gutum	6.7
	311s	-2.14	X	Icha	3.8
	311s	-2.14	X	Kazoli	10.3
	309s	-2.12	X	Mola	4.3
	311s	-2.14	X	Tengra	5.0
2.25-2.50	311ss	-2.47	X	Chanda	4.1
	311ss	-2.47	X	Icha	3.8
	311ss	-2.47	X	Potka	6.2
COUNTERCURRENT SWIMMING					
0.00-0.99	282s	-0.42	X	Bheda	5.7
	282s	-0.42	X	Chanda	3.8
	303s	-0.82	X	Chanda	4.0
	305s	-0.94	X	Chapila	5.8
	303s	-0.82	X	Chela	6.4
	284s	-0.84	X	Chela	8.3
	282s	-0.42	X	Chirka baim	8.0
	284s	-0.84	X	Chirka baim	8.1
	282s	-0.42	X	Dhela	4.7
	284s	-0.84	X	Dhela	4.3
	282s	-0.42	X	Foli	17.3
	303s	-0.82	X	Gutum	6.3
	282s	-0.42	X	Icha	4.0
	305s	-0.94	X	Icha	3.9
	282s	-0.42	X	Kaikka	15.2
	282s	-0.42	X	Mola	4.0
	284s	-0.84	X	Mola	4.6
	305s	-0.94	X	Mola	4.0
	282s	-0.42	X	Napit koi	4.5
	303s	-0.82	X	Puti	4.6
	284s	-0.84	X	Puti	4.3
	284s	-0.84	X	Rani	4.7
	282s	-0.42	X	Shing	12.3
	284s	-0.84	X	Shing	7.9
1.00-1.24	293ss	-1.21	X	Bacha	13.5
	285s	-1.10	X	Bailla	6.0
	293s	-1.21	X	Bailla	6.0
	293ss	-1.21	X	Bailla	6.9
	297s	-1.21	X	Bailla	7.1
	297ss	-1.21	X	Bailla	4.7
	285s	-1.10	X	Baim	6.8
	300s	-1.24	X	Baim	10.6
	293s	-1.21	X	Bheda	9.3
	293ss	-1.21	X	Bheda	5.3
	297s	-1.21	X	Bheda	9.0
	305ss	-1.01	X	Chanda	4.0
	293s	-1.21	X	Chanda	3.2

	293ss	-1.21	X	Chanda	4.3
	297s	-1.21	X	Chanda	4.0
	300s	-1.24	X	Chanda	4.5
	285s	-1.10	X	Chapila	6.8
	293ss	-1.21	X	Chapila	5.6
	297ss	-1.21	X	Chapila	9.8
	297ss	-1.21	X	Chela	5.3
	300s	-1.24	X	Chela	9.0
	305ss	-1.01	X	Chirka baim	7.3
	285s	-1.10	X	Dhela	5.8
	300s	-1.24	X	Dhela	4.9
	305ss	-1.01	X	Gutum	5.9
	285s	-1.10	X	Gutum	6.6
	293ss	-1.21	X	Gutum	8.1
	297ss	-1.21	X	Gutum	7.7
	305ss	-1.01	X	Icha	3.9
	297ss	-1.21	X	Icha	4.0
	285s	-1.10	X	Kaikka	15.6
	293ss	-1.21	X	Kaikka	13.1
	293s	-1.21	X	Kalibaush	17.4
	305ss	-1.01	X	Mola	4.0
	285s	-1.10	X	Mola	3.8
	293ss	-1.21	X	Mola	4.6
	297ss	-1.21	X	Mola	5.6
	300s	-1.24	X	Mola	6.8
	285s	-1.10	X	Mrigel	44.0
	297s	-1.21	X	Mrigel	24.6
	293s	-1.21	X	Napit koi	3.1
	293s	-1.21	X	Potka	5.5
	293ss	-1.21	X	Potka	5.0
	297s	-1.21	X	Potka	5.0
	297ss	-1.21	X	Potka	6.1
	305ss	-1.01	X	Puti	5.4
	285s	-1.10	X	Puti	4.7
	293s	-1.21	X	Puti	4.0
	293ss	-1.21	X	Puti	4.4
	297s	-1.21	X	Puti	4.1
	300s	-1.24	X	Puti	5.2
	285s	-1.10	X	Rani	6.3
	293s	-1.21	X	Rani	6.5
	293ss	-1.21	X	Rani	7.0
	297s	-1.21	X	Rani	6.4
	297ss	-1.21	X	Rani	8.1
	285s	-1.10	X	Shing	7.6
	297ss	-1.21	X	Shing	8.2
	285s	-1.10	X	Taki	13.4
	293ss	-1.21	X	Taki	8.7
1.25-1.49	286s	-1.30	X	Bailla	5.7
	299s	-1.3	X	Bailla	6.1
	299ss	-1.3	X	Bailla	8.3
	295s	-1.32	X	Bailla	4.8
	286s	-1.30	X	Baim	11.3
	301s	-1.42	X	Batashi	8.7
	299ss	-1.3	X	Bheda	4.1
	306s	-1.26	X	Chanda	4.0
	315	-1.28	X	Chanda	5.2
	286s	-1.30	X	Chanda	4.8
	299s	-1.3	X	Chanda	3.0
	299ss	-1.3	X	Chanda	3.7
	295s	-1.32	X	Chanda	4.5
	295ss	-1.32	X	Chanda	4.2
	302s	-1.32	X	Chanda	5.3

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316	-1.38	X	Chanda	4.7
307s	-1.4	X	Chanda	3.8
301s	-1.42	X	Chanda	4.1
314	-1.49	X	Chanda	3.2
315	-1.28	X	Chapila	6.3
286s	-1.30	X	Chapila	6.8
299s	-1.3	X	Chapila	6.0
299ss	-1.3	X	Chapila	5.0
295s	-1.32	X	Chapila	9.0
295ss	-1.32	X	Chapila	6.1
316	-1.38	X	Chapila	9.0
307s	-1.4	X	Chapila	6.0
286s	-1.30	X	Cheka	21.4
306s	-1.26	X	Chela	7.2
315	-1.28	X	Chela	10.8
299s	-1.3	X	Chela	6.0
299ss	-1.3	X	Chela	6.3
295s	-1.32	X	Chela	5.0
295ss	-1.32	X	Chela	5.4
302s	-1.32	X	Chela	8.3
316	-1.38	X	Chela	10.1
314	-1.49	X	Chela	5.5
286s	-1.30	X	Darkina	5.5
315	-1.28	X	Dhela	10.2
286s	-1.30	X	Dhela	6.9
295ss	-1.32	X	Dhela	4.0
316	-1.38	X	Dhela	4.7
301s	-1.42	X	Dhela	5.5
315	-1.28	X	Gutum	6.5
286s	-1.30	X	Gutum	6.8
299ss	-1.3	X	Gutum	7.4
295ss	-1.32	X	Gutum	8.3
314	-1.49	X	Gutum	8.0
315	-1.28	X	Icha	3.1
286s	-1.30	X	Icha	4.2
295ss	-1.32	X	Icha	4.8
316	-1.38	X	Icha	2.5
301s	-1.42	X	Icha	6.1
314	-1.49	X	Icha	4.0
286s	-1.30	X	Kaikka	13.2
295s	-1.32	X	Kaikka	8.9
295ss	-1.32	X	Kaikka	11.9
299s	-1.3	X	Kalibaush	27.4
301s	-1.42	X	Kalibaush	22.3
316	-1.38	X	Lachu	10.6
306s	-1.26	X	Mola	4.2
286s	-1.30	X	Mola	3.1
299s	-1.3	X	Mola	4.0
299ss	-1.3	X	Mola	4.2
295s	-1.32	X	Mola	5.5
295ss	-1.32	X	Mola	5.2
302s	-1.32	X	Mola	6.5
307s	-1.4	X	Mola	4.9
314	-1.49	X	Mola	4.2
315	-1.28	X	Mrigel	23.0
286s	-1.30	X	Potka	3.3
299s	-1.3	X	Potka	5.2
299ss	-1.3	X	Potka	6.0
306s	-1.26	X	Puti	4.1
315	-1.28	X	Puti	3.7
286s	-1.30	X	Puti	4.3
299s	-1.3	X	Puti	4.3

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	299ss	-1.3	X	Puti	4.3
	295s	-1.32	X	Puti	4.6
	295ss	-1.32	X	Puti	4.7
	302s	-1.32	X	Puti	5.8
	316	-1.38	X	Puti	3.2
	307s	-1.4	X	Puti	4.1
	301s	-1.42	X	Puti	7.4
	314	-1.49	X	Puti	6.7
	315	-1.28	X	Rani	4.2
	299s	-1.3	X	Rani	7.1
	299ss	-1.3	X	Rani	9.1
	295s	-1.32	X	Rani	5.7
	295ss	-1.32	X	Rani	5.4
	315	-1.28	X	Shing	10.8
	286s	-1.30	X	Shing	10.8
	295s	-1.32	X	Shing	8.6
1.50-1.74	287s	-1.53	X	Baim	8.2
	289s	-1.58	X	Baim	12.2
	287s	-1.53	X	Chanda	4.3
	289s	-1.58	X	Chanda	6.8
	287s	-1.53	X	Dhela	4.7
	287s	-1.53	X	Gutum	7.7
	287s	-1.53	X	Icha	4.1
	289s	-1.58	X	Lachu	14.3
	287s	-1.53	X	Mola	4.8
	289s	-1.58	X	Mola	5.7
	287s	-1.53	X	Potka	5.2
	287s	-1.53	X	Puti	5.8
	289s	-1.58	X	Puti	6.2
	287s	-1.53	X	Rani	6.1
	289s	-1.58	X	Rani	5.8
	287s	-1.53	X	Rui	51.2
	287s	-1.53	X	Shing	11.2
1.75-1.99	313	-1.83	X	Chanda	4.0
	313	-1.83	X	Foli	19.7
	313	-1.83	X	Mola	4.6
	313	-1.83	X	Puti	4.3
2.00-2.24	311	-2.14	X	Bailla	7.8
	309	-2.03	X	Chanda	3.8
	310	-2.14	X	Chanda	4.0
	311	-2.14	X	Chanda	3.8
	310	-2.14	X	Chapila	5.2
	311	-2.14	X	Icha	4.0
	309	-2.03	X	Mola	4.1
	310	-2.14	X	Mola	4.0
	309	-2.03	X	Puti	4.9
	310	-2.14	X	Rani	6.7
	311	-2.14	X	Taki	11.2
2.25-2.50	312	-2.49	X	Chanda	4.2
	312	-2.49	X	Gutum	7.0
	312	-2.49	X	Puti	5.0
COUNTERCURRENT SWIMMING					
2.25-2.50	137	2.25	X	Bacha	9.8
	137	2.25	X	Darkina	4.3
	137	2.25	X	Icha	3.0
	137	2.25	X	Lachu	17.7
	137	2.25	X	Puti	3.3
	137	2.25	X	Rani	6.5
	137	2.25	X	Shing	6.3
2.00-2.24	138	2.18	X	Bacha	13.0

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	151	2.09	X	Bacha	4.2
	152	2.05	X	Bacha	6.9
	151	2.09	X	Bamosh	28.8
	151	2.09	X	Batashi	7.8
	151	2.09	X	Chanda	4.6
	152	2.05	X	Chanda	4.2
	139	2.14	X	Chela	9.1
	151	2.09	X	Darkina	6.3
	151	2.09	X	Dhela	5.8
	151	2.09	X	Gutum	6.3
	139	2.14	X	Jainzza	4.2
	151	2.09	X	Mola	8.1
	139	2.14	X	Puti	4.0
	152	2.05	X	Puti	4.1
	152	2.05	X	Rani	5.9
	151	2.09	X	Shing	15.2
	152	2.05	X	Tengra	4.5
1.75-1.99	153	1.98	X	Bacha	7.2
	153	1.98	X	Puti	4.1
	153	1.98	X	Rani	5.8
1.50-1.74	158	1.73	X	Bacha	11.3
	158	1.73	X	Chanda	3.7
	158	1.73	X	Lachu	18.1
	158	1.73	X	Puti	6.2
1.25-1.49	162	1.47	X	Bacha	13.8
	165	1.40	X	Bacha	14.1
	201	1.34	X	Bacha	9.8
	202	1.30	X	Bacha	12.3
	167	1.27	X	Bacha	14.8
	169	1.25	X	Bacha	14.0
	170	1.25	X	Bacha	16.3
	167	1.27	X	Baim	12.2
	162	1.47	X	Chanda	4.2
	201	1.34	X	Chanda	4.3
	202	1.30	X	Chanda	3.8
	169	1.25	X	Chanda	5.5
	170	1.25	X	Chanda	5.0
	201	1.34	X	Chapila	7.0
	202	1.30	X	Chela	9.2
	170	1.25	X	Chela	5.5
	162	1.47	X	Chirka baim	11.4
	202	1.30	X	Chirka baim	9.7
	170	1.25	X	Chirka baim	7.2
	201	1.34	X	Icha	3.5
	201	1.34	X	Kalibaush	13.5
	169	1.25	X	Lachu	12.0
	165	1.40	X	Matibangra	6.3
	169	1.25	X	Matibangra	6.1
	202	1.30	X	Mola	4.3
	202	1.30	X	Potka	5.8
	162	1.47	X	Puti	4.8
	201	1.34	X	Puti	4.5
	202	1.30	X	Puti	4.6
	167	1.27	X	Puti	7.7
	170	1.25	X	Puti	4.5
	201	1.34	X	Rani	7.5
	167	1.27	X	Rani	6.8
	167	1.27	X	Shing	5.7
	169	1.25	X	Shing	7.3
1.00-1.24	205	1.24	X	Air	12.5
	207	1.23	X	Air	9.5
	205	1.24	X	Bacha	15.6

198	1.23	X	Bacha	14.7
207	1.23	X	Bacha	20.3
212	1.20	X	Bacha	14.6
208	1.19	X	Bacha	17.0
209	1.19	X	Bacha	13.1
217	1.18	X	Bacha	18.7
218	1.14	X	Bacha	19.0
177	1.13	X	Bacha	10.5
181	1.11	X	Bacha	9.0
236	1.10	X	Bacha	17.3
182	1.09	X	Bacha	13.1
222	1.08	X	Bacha	11.3
225	1.08	X	Bacha	12.5
226	1.08	X	Bacha	11.9
229	1.07	X	Bacha	13.5
230	1.07	X	Bacha	13.0
185	1.05	X	Bacha	9.8
233	1.05	X	Bacha	14.6
197	1.04	X	Bacha	11.2
207	1.23	X	Bailla	5.1
186	1.02	X	Bailla	5.8
218	1.14	X	Baim	13.8
197	1.04	X	Baim	7.0
205	1.24	X	Batashi	7.3
207	1.23	X	Batashi	7.5
197	1.04	X	Batashi	6.3
205	1.24	X	Boal	34.3
207	1.23	X	Boal	38.9
212	1.20	X	Boal	39.3
205	1.24	X	Chanda	4.0
198	1.23	X	Chanda	4.1
207	1.23	X	Chanda	6.4
212	1.20	X	Chanda	4.5
208	1.19	X	Chanda	5.2
209	1.19	X	Chanda	5.1
217	1.18	X	Chanda	4.8
218	1.14	X	Chanda	4.7
178	1.11	X	Chanda	5.4
181	1.11	X	Chanda	3.4
182	1.09	X	Chanda	3.2
222	1.08	X	Chanda	3.8
225	1.08	X	Chanda	3.7
226	1.08	X	Chanda	3.8
229	1.07	X	Chanda	3.7
230	1.07	X	Chanda	3.5
233	1.05	X	Chanda	3.7
197	1.04	X	Chanda	4.1
186	1.02	X	Chanda	4.1
205	1.24	X	Chapila	4.6
198	1.23	X	Chapila	6.2
207	1.23	X	Chapila	4.2
209	1.19	X	Chapila	7.8
181	1.11	X	Chapila	5.9
185	1.05	X	Chapila	4.9
197	1.04	X	Chapila	6.5
186	1.02	X	Chapila	6.3
207	1.23	X	Cheka	3.3
198	1.23	X	Chela	5.4
207	1.23	X	Chela	9.2
212	1.20	X	Chela	8.7
182	1.09	X	Chela	8.1
197	1.04	X	Chela	6.5

Q2a

186	1.02	X	Chela	5.3
207	1.23	X	Chirka baim	12.2
222	1.08	X	Chirka baim	5.9
198	1.23	X	Dhela	4.3
207	1.23	X	Dhela	5.5
197	1.04	X	Dhela	4.7
186	1.02	X	Dhela	4.2
230	1.07	X	Foli	16.2
207	1.23	X	Golda chingri	7.2
197	1.04	X	Golda chingri	12.5
207	1.23	X	Gulsha	9.0
198	1.23	X	Gutum	6.1
208	1.19	X	Gutum	6.2
177	1.13	X	Gutum	7.0
178	1.11	X	Gutum	7.8
186	1.02	X	Gutum	5.9
205	1.24	X	Icha	4.7
207	1.23	X	Icha	3.9
209	1.19	X	Icha	3.8
177	1.13	X	Icha	4.8
181	1.11	X	Icha	3.6
225	1.08	X	Icha	2.7
226	1.08	X	Icha	4.0
229	1.07	X	Icha	3.6
230	1.07	X	Icha	3.8
185	1.05	X	Icha	3.1
233	1.05	X	Icha	3.5
197	1.04	X	Icha	3.6
177	1.13	X	Jainzza	6.8
197	1.04	X	Jainzza	6.8
207	1.23	X	Kaikka	22.0
198	1.23	X	Kalibaush	19.5
208	1.19	X	Kalibaush	12.5
229	1.07	X	Kalibaush	17.5
197	1.04	X	Kalibaush	15.5
236	1.10	X	Kazoli	9.4
197	1.04	X	Kazoli	5.3
197	1.04	X	Ketchki	3.2
186	1.02	X	Ketchki	4.8
212	1.20	X	Lachu	10.5
177	1.13	X	Lachu	4.1
198	1.23	X	Matibangra	5.3
186	1.02	X	Matibangra	5.4
205	1.24	X	Mola	5.2
207	1.23	X	Mola	6.2
209	1.19	X	Mola	6.2
177	1.13	X	Mola	7.3
178	1.11	X	Mola	7.1
185	1.05	X	Mola	7.2
197	1.04	X	Mola	4.6
207	1.23	X	Napit koi	4.3
177	1.13	X	Naptani	5.8
207	1.23	X	Potka	5.7
197	1.04	X	Potka	5.5
205	1.24	X	Puti	4.1
198	1.23	X	Puti	7.2
207	1.23	X	Puti	5.1
212	1.20	X	Puti	4.3
208	1.19	X	Puti	4.5
209	1.19	X	Puti	4.1
218	1.14	X	Puti	4.1
177	1.13	X	Puti	3.9

	178	1.11	X	Puti	4.9
	181	1.11	X	Puti	5.5
	182	1.09	X	Puti	4.3
	222	1.08	X	Puti	2.5
	229	1.07	X	Puti	4.0
	185	1.05	X	Puti	5.1
	186	1.02	X	Puti	4.3
	205	1.24	X	Rani	4.8
	207	1.23	X	Rani	6.1
	208	1.19	X	Rani	5.8
	217	1.18	X	Rani	6.8
	222	1.08	X	Rani	4.2
	225	1.08	X	Rani	4.5
	229	1.07	X	Rani	4.7
	197	1.04	X	Rui	11.5
	207	1.23	X	Tengra	4.9
	217	1.18	X	Tengra	8.8
0.00-0.99	189	0.95	X	Bacha	12.6
	239	0.94	X	Bacha	14.7
	190	0.91	X	Bacha	11.2
	244	0.91	X	Bacha	18.6
	245	0.91	X	Bacha	17.2
	240	0.88	X	Bacha	13.6
	241	0.88	X	Bacha	13.2
	193	0.86	X	Bacha	11.3
	247	0.85	X	Bacha	19.0
	248	0.81	X	Bacha	15.0
	249	0.81	X	Bacha	17.0
	194	0.72	X	Bacha	14.1
	269	0.71	X	Bacha	18.6
	266	0.70	X	Bacha	19.4
	270	0.68	X	Bacha	18.1
	250	0.67	X	Bacha	18.1
	263	0.65	X	Bacha	19.2
	262	0.58	X	Bacha	18.6
	271	0.57	X	Bacha	16.4
	251	0.56	X	Bacha	10.1
	260	0.50	X	Bacha	15.6
	272	0.50	X	Bacha	16.4
	274	0.48	X	Bacha	12.8
	275	0.48	X	Bacha	13.8
	273	0.47	X	Bacha	15.4
	259	0.42	X	Bacha	21.9
	276	0.40	X	Bacha	18.7
	254	0.38	X	Bacha	14.7
	278	0.37	X	Bacha	16.5
	258	0.31	X	Bacha	17.3
	280	0.24	X	Bacha	17.6
	190	0.91	X	Bailla	4.1
	241	0.88	X	Bailla	7.3
	268	0.74	X	Bailla	8.1
	263	0.65	X	Bailla	7.2
	262	0.58	X	Bailla	5.9
	252	0.56	X	Bailla	6.2
	260	0.50	X	Bailla	9.1
	261	0.50	X	Bailla	7.1
	273	0.47	X	Bailla	9.0
	254	0.38	X	Bailla	6.8
	257	0.19	X	Bailla	5.4
	259	0.42	X	Baim	13.7
	244	0.91	X	Bata	13.4
	247	0.85	X	Bata	16.2

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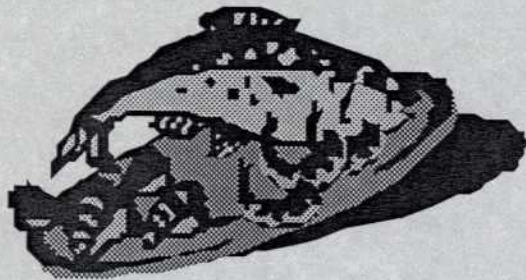
251	0.56	X	Bata	4.3
241	0.88	X	Balashi	6.8
268	0.74	X	Bheda	11.3
189	0.95	X	Chanda	3.5
190	0.91	X	Chanda	3.5
244	0.91	X	Chanda	4.8
240	0.88	X	Chanda	3.6
241	0.88	X	Chanda	3.6
193	0.86	X	Chanda	3.2
248	0.81	X	Chanda	6.0
267	0.73	X	Chanda	5.1
194	0.72	X	Chanda	3.9
266	0.70	X	Chanda	4.9
270	0.68	X	Chanda	5.2
250	0.67	X	Chanda	5.5
263	0.65	X	Chanda	3.0
264	0.65	X	Chanda	3.7
265	0.65	X	Chanda	4.7
262	0.58	X	Chanda	3.1
271	0.57	X	Chanda	6.0
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260	0.50	X	Chanda	3.1
261	0.50	X	Chanda	3.8
272	0.50	X	Chanda	4.6
274	0.48	X	Chanda	4.3
275	0.48	X	Chanda	5.1
273	0.47	X	Chanda	4.4
259	0.42	X	Chanda	3.4
276	0.40	X	Chanda	3.7
277	0.40	X	Chanda	4.0
254	0.38	X	Chanda	3.4
278	0.37	X	Chanda	4.0
279	0.37	X	Chanda	4.0
258	0.31	X	Chanda	3.2
255	0.27	X	Chanda	3.7
280	0.24	X	Chanda	4.1
189	0.95	X	Chapila	4.8
241	0.88	X	Chapila	4.3
193	0.86	X	Chapila	3.6
268	0.74	X	Chapila	6.6
194	0.72	X	Chapila	5.1
269	0.71	X	Chapila	6.1
266	0.70	X	Chapila	7.1
264	0.65	X	Chapila	8.1
252	0.56	X	Chapila	4.0
259	0.42	X	Chapila	4.2
194	0.72	X	Chela	9.7
264	0.65	X	Chela	6.4
271	0.57	X	Chela	5.2
253	0.53	X	Chela	5.0
261	0.50	X	Chela	6.0
272	0.50	X	Chela	5.1
275	0.48	X	Chela	6.0
273	0.47	X	Chela	5.1
259	0.42	X	Chela	7.8
254	0.38	X	Chela	6.7
255	0.27	X	Chela	6.0
280	0.24	X	Chela	6.4
194	0.72	X	Dhela	4.2
263	0.65	X	Dhela	3.9
265	0.65	X	Dhela	4.5

QRT

262	0.58	X	Dhela	3.6
252	0.56	X	Dhela	4.3
253	0.53	X	Dhela	4.3
260	0.50	X	Dhela	4.0
261	0.50	X	Dhela	4.0
274	0.48	X	Dhela	4.6
275	0.48	X	Dhela	5.1
276	0.40	X	Dhela	4.0
277	0.40	X	Dhela	3.8
254	0.38	X	Dhela	4.0
278	0.37	X	Dhela	4.0
279	0.37	X	Dhela	4.0
258	0.31	X	Dhela	4.0
255	0.27	X	Dhela	3.8
280	0.24	X	Dhela	3.9
249	0.81	X	Foli	21.3
245	0.91	X	Golda chingri	11.0
241	0.88	X	Golda chingri	15.6
248	0.81	X	Golda chingri	12.2
249	0.81	X	Golda chingri	15.2
267	0.73	X	Golda chingri	16.5
250	0.67	X	Golda chingri	14.3
264	0.65	X	Golda chingri	11.6
265	0.65	X	Golda chingri	13.6
262	0.58	X	Golda chingri	9.3
271	0.57	X	Golda chingri	13.6
272	0.50	X	Golda chingri	18.6
190	0.91	X	Gutum	4.7
193	0.86	X	Gutum	6.8
268	0.74	X	Gutum	7.3
269	0.71	X	Gutum	8.0
263	0.65	X	Gutum	6.4
262	0.58	X	Gutum	7.0
261	0.50	X	Gutum	6.7
273	0.47	X	Gutum	5.5
259	0.42	X	Gutum	7.2
254	0.38	X	Gutum	7.2
258	0.31	X	Gutum	7.3
189	0.95	X	Icha	3.8
239	0.94	X	Icha	3.3
241	0.88	X	Icha	3.2
193	0.86	X	Icha	3.0
267	0.73	X	Icha	5.0
269	0.71	X	Icha	5.9
263	0.65	X	Icha	3.0
264	0.65	X	Icha	2.9
262	0.58	X	Icha	3.0
251	0.56	X	Icha	3.2
252	0.56	X	Icha	3.7
260	0.50	X	Icha	3.0
274	0.48	X	Icha	5.2
273	0.47	X	Icha	7.1
276	0.40	X	Icha	3.4
254	0.38	X	Icha	3.3
278	0.37	X	Icha	3.8
258	0.31	X	Icha	3.0
255	0.27	X	Icha	3.5
257	0.19	X	Icha	3.0
239	0.94	X	Jainzza	4.7
248	0.81	X	Kalibaush	16.2
245	0.91	X	Kazoli	9.7
240	0.88	X	Kazoli	9.8

Q22

249	0.81	X	Kazoli	7.2
267	0.73	X	Kazoli	6.5
270	0.68	X	Kazoli	7.3
250	0.67	X	Kazoli	10.1
271	0.57	X	Kazoli	6.8
257	0.19	X	Kazoli	7.3
266	0.70	X	Ketchki	4.3
245	0.91	X	Lachu	17.0
241	0.88	X	Lachu	12.2
247	0.85	X	Lachu	8.0
248	0.81	X	Lachu	20.1
251	0.56	X	Lachu	10.3
267	0.73	X	Mola	4.5
194	0.72	X	Mola	4.2
269	0.71	X	Mola	6.5
270	0.68	X	Mola	6.2
262	0.58	X	Mola	4.7
251	0.56	X	Mola	4.6
253	0.53	X	Mola	4.6
261	0.50	X	Mola	4.1
274	0.48	X	Mola	5.8
275	0.48	X	Mola	6.4
254	0.38	X	Mola	4.3
255	0.27	X	Mola	4.3
280	0.24	X	Mola	4.6
257	0.19	X	Mola	4.5
189	0.95	X	Potka	5.2
194	0.72	X	Potka	5.8
190	0.91	X	Puti	4.7
240	0.88	X	Puti	4.7
193	0.86	X	Puti	3.3
268	0.74	X	Puti	4.8
267	0.73	X	Puti	4.8
194	0.72	X	Puti	3.6
269	0.71	X	Puti	5.7
266	0.70	X	Puti	4.7
265	0.65	X	Puti	5.7
271	0.57	X	Puti	4.7
253	0.53	X	Puti	4.0
261	0.50	X	Puti	4.6
259	0.42	X	Puti	4.0
280	0.24	X	Puti	4.3
244	0.91	X	Rani	6.6
241	0.88	X	Rani	7.1
193	0.86	X	Rani	8.5
249	0.81	X	Rani	6.8
259	0.42	X	Rani	6.1
251	0.56	X	Shing	9.7
277	0.40	X	Shing	8.3
279	0.37	X	Shing	8.0
280	0.24	X	Taki	7.1
257	0.19	X	Taki	16.1
257	0.19	X	Tengra	4.9



ANNEX E

BIOLOGICAL PROFILES

AIR

Species: *Aorichthys aor* (Hamilton-Buchanan)

Family: Bagridae

Standard name: *Air*

Other names: *Air*, *Guzi air*

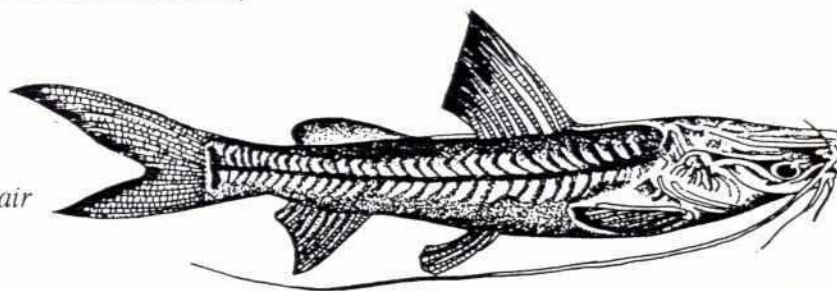


Fig. *Aorichthys aor*

Status in northeast region: This species of catfish is common in all water bodies of the Sylhet region.

Preferred habitat: *Air* prefers open water, and mainly riverine habitat. This species is abundant in Sunamgonj *haor* areas, especially in the Surma and Kushiya Rivers. During the dry season, they take shelter in *kathas* in the *haor* and *duars* in the river.

Feeding: *Air* is a bottom column feeder species, preferring zooplankton, benthos, small fish species, and crustaceans. It also eats dead bait and earthworms.

Migration and reproduction: It prefers short distance migration during the period April-October. *Air* spawns during the period April-July. Spawning takes place in less flashy rivers and channels inside the *haor*. They dig pit in the river bed for spawning and offer parental care to their offspring.

Growth: *Air* has high growth rate in open water. Within the first six months, it grows about 41 cm in length and 550 gm in weight. The size at first maturity is 50 cm, at about one year of age. The biggest specimen, seen in Sherpur fish market, was 90 cm long and weighed 4700 gm. The species migrating through the fishpass having the lowest and highest length, 4.3 and 30.30 cm respectively, were found during the 1996 monsoon season.

Economic importance: It is one of the most commercially important catfish in Bangladesh. The high price is due to its tasty boneless flesh. *Air* has been exported to different foreign countries after processing at Ajmiriganj Fish Industries and Kuliarchar Cold Storage.

BACHA

Species: *Eutropiichthys vacha* (Hamilton-Buchanan)

Family: Schilbeidae

Standard name: *Bacha*

Other names: *Bacha*

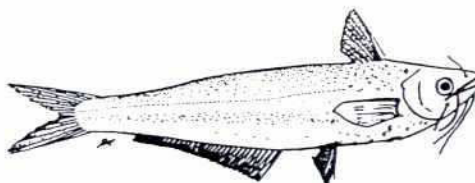


Fig. *Eutropiichthys vacha*

Status in northeast region: Bacha is a riverine fish species found all over the country. In the Sylhet region, it is abundant in almost all the rivers. Bacha constitutes about seven percent of the total fish production of the Kushiara River.

Preferred habitat: It is a fresh and tidal water fish species. They only migrate to the *haors* and *beels* to graze. Since they are destructive to other species with respect to food competition, their culture in ponds is not recommended.

Feeding: *Bacha* is a surface feeder species. It is a voracious feeder on smaller fish and insects.

Migration and Reproduction: It is most abundant during the period March-November and spawns in June/July (the actual breeding time of this species is still under investigation). In June they were passing through the fishpass from river-to-*haor*, and in August they started reversing direction.

Growth: The annual growth rate of this species is 21 cm in length and 70 gm in weight. Their size at first maturity is 17 cm. The species migrating through the fishpass having lowest and highest length, 3.00 and 23.60 cm respectively, were found during the 1996 monsoon season. The highest size seen in Sherpur fish market was 30 cm long.

Economic importance: It is one of the most popular table-fish in the country due to its oily flesh. In the market it fetches a higher price than other similar-sized species. This species is also being exported.

BOAL

Species: *Wallagu attu* (Schneider)

Family: Siluridae

Standard name: *Boal*

Other names: *Bol, Boali, Paira, Paran*

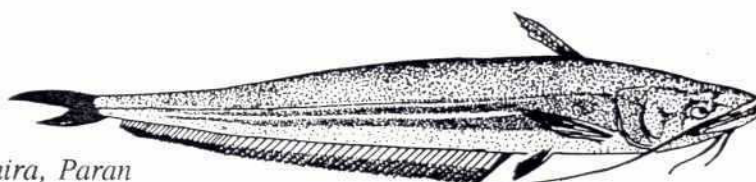


Fig. *Wallagu attu*

Status in northeast region: *Boal* is the dominant species in the waters of the northeast region. It constitutes the highest proportion of large-sized fish production.

Preferred habitat: *Boal* are available in all types of water bodies. In the Sylhet region, they are abundant in *beels* and rivers. During the dry season, they take shelter in *kathas* set in the *haor* and *duars* in the river. *Boal* is not cultured in ponds due to its predatory behavior.

Feeding: *Boal* is a voracious and carnivorous fish species. It is well known for its predatory behavior, and is often termed a freshwater shark. It eats small fish, crustaceans, and insects. It also feeds on live and dead bait.

Migration and reproduction: *Boal* is a local migrant, moving short distances for feeding and breeding. It spawns during the period May-July. Spawning takes place in shallow areas flooded by rain. During breeding season, they form pairs and run towards shallow water, which is locally called "birdhara". They build nests for breeding, and offer parental care to their offspring.

Growth: The annual growth rate of *boal* observed at Kawadighi Haor was 78 cm in length and 1350 gm in weight. The biggest size, seen at the Sherpur Fish Fair in January 1993, was 180 cm. Species migrating through the fishpass having the lowest and highest length, 8.7 and 41.50 cm respectively, were found during the 1996 monsoon season. Their size at first maturity is 50 cm in length at about one year of age.

Economic importance: It is one of the country's most commercially important large catfish. *Boal* is a high value fish in the market due to its oily boneless flesh. This species has been exported to different foreign countries.

CHANDA

Species: Chanda ranga (Hamilton)

Family: Ambassidae

Standard name: *Chanda*

Other names: *Chandu*, *Lal chanda*, *Ranga chanda*

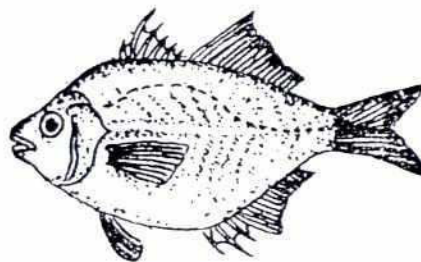


Fig. *Chanda ranga*

Status in northeast region: It is a freshwater, transparent fish exceedingly common in all parts of the country. In the Sylhet and Mymensingh regions it is more abundant in the rivers, channels, *haor*, *beels*, ponds, and floodplain (especially in clear water) than in any other area of the country.

Preferred Habitat: They prefer clear shallow floodplain water, and as such are most abundant during the rainy season. *Chanda* also grows well in closed water bodies. It does fairly well in aquariums.

Feeding: *Chanda* is a mid-level and surface feeder species, preferring phytoplakton, zooplankton, and mosquito larvae.

Migration and breeding: They generally migrate in school form towards clear shallow water as soon as the monsoon water begins rising. The period March-September is the main breeding season of *chanda*. They breed more than twice a year, and make nests to guard their offsrping.

Growth: It attains a maximum length of 10 cm. Their size at first maturity is 4 cm at about four months of age. The species migrating through the fishpass having lowest and highest length, 2.10 and 7.80 cm respectively, were found during the 1996 monsoon season.

Economic importance: This small fish is sold along with other small fish in the fish markets. This species is preferred by the poor people due to its low price. It is a good commodity when sold live in urban areas for use in aquariums.

GOLDA CHINGRI

Species: Macrobrachium rosenbergii (De Man)

Family: Palaemonidae

Standard name: *Golda chingri*

Other names: *Boro icha, Golda icha, Mocha icha*

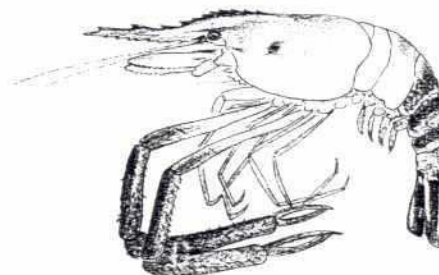


Fig. *Macrobrachium rosenbergii*

Status in northeast region: This species is found in abundance in the northeast region from Bhairab to Ajmiriganj. The Meghna River spreads the species over the floodplain areas of the region. Young *golda chingri* are also abundant in floodplains and *beels* of the region during the monsoon season.

Preferred habitat: *Golda chingri* occur in a wide range of environmental conditions. They are found in estuarine, freshwater lentic, and lotic habitats. Culturing *golda chingri* in ponds has recently become popular in the country.

Feeding: It is an omnivorous bottom feeder species. It prefers to feed on diatoms, aquatic vegetation, crustaceans, and small aquatic animals. The *golda chingri* at larval stage are being fed with Artimia auplii, Tubifex worm, and fish meal when being cultured in confined waters.

Migration and breeding: The species breeds during the period May-July, with the peak falling in June/July. It is a long distance migratory species, and travels up to about 400 km upstream to graze. It is found most abundantly in the rivers from September-February. After attainment of maturity, they start travelling towards coastal areas to breed. They grow to juvenile stage in brackish water, then resume migration to freshwater habitats for nursing and grazing.

Growth: It attains a maximum length of 27 cm. The size at first maturity is 15 cm. The species migrating through fishpass having lowest and highest length, 6 and 19.30 cm respectively, were found during the 1996 monsoon season.

Economic importance: *Golda chingri* is a highly priced and important commercial species in Bangladesh. The country is earning significant amounts of foreign currency through export of processed *golda chingri*. Catches from the region that are intended for exporting are processed mainly in Kuliarchar Cold Storage in the district of Kishoreganj.

GONIA

Species: Labeo gonius (Hamilton)

Family: Cyprinidae

Standard name: *Gonia*

Other names: *Goainna*, *Goni*, *Kurchi*.

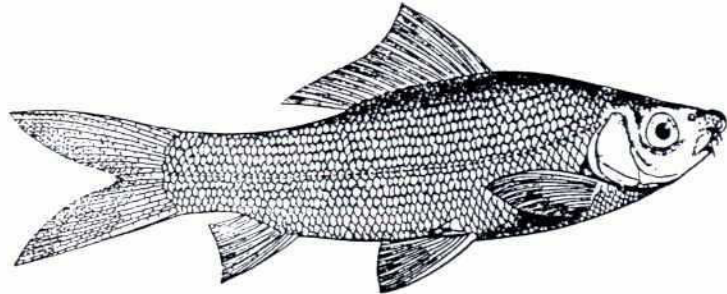


Fig: *Labeo gonius*

Status in northeast region: Although it is widely abundant in the northeast region of Bangladesh, especially in the greater districts of Sylhet and Mymensingh, it is not commonly seen in other areas of the country. In the Sylhet region it is most abundant in the Baulai River, Nandina River, Hashmara River, and Tanguar Haor.

Preferred habitat: It is a riverine freshwater fish species. They prefer uniform flow with low velocity. It does not normally inhabit access vegetative areas. During the dry season, they take shelter in *kathas* in the *beels* and *duars* in the rivers.

Feeding: It is a bottom column feeder species, preferring algae, planktons, aquatic plants, and crustaceans.

Migration and reproduction: April to June is the main period for their breeding migration. When the early flash floods begin, *Gonia* starts looking for suitable breeding places. They move in schools and prefer low velocity, shallow, clear water. Halir Haor, Shanir Haor, Maitan Haor, Tanguar Haor, and the adjacent rivers in Sunamgong district are the important breeding grounds for *gonia*. They start breeding in the shallow water of the *haor* just after the harvesting of rice crop.

Growth: In open water, average yearly growth rate is 450 gm in weight and 32 cm in length. In closed water their growth is comparatively low. The size at first maturity is 23 cm. The species found migrating through the fishpass having lowest and highest length were 3.90 and 23.60 cm respectively.

Economic importance: It has one of the highest market values of any non-carp species.

ICHA

Species: Macrobrachium species

Family: Palaemonidae

Standard name: *Icha*, *Choto chingri*

Other names: *Gura icha*, *Shul icha*, *Dema icha*,

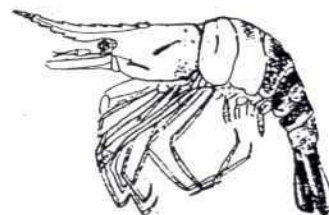


Fig. Macrobrachium species

Status in northeast region: It is highly abundant in all types of water bodies in Bangladesh. In the northeast region it is widely available in rivers, *haors*, *beels*, ponds, and is very common in catches.

Preferred habitat: It is highly abundant in the *haors*, *beels* and floodplains of the northeast region. In the monsoon season it prefers shallow paddy land. Some species are common in closed water bodies.

Feeding: *Icha* is a nocturnal and bottom feeder species. They are omnivorous and feed on lower animals and plants, partly decomposed animals, and clayey and sandy particles.

Migration and breeding: Most of the species were observed migrating locally, but some can migrate long distances. They spawn during the period March-October. *Icha* normally breeds two or more times a year. Most of them breed in both running and closed freshwater environments.

Growth: The spawning and growth rate of *icha* are very high. Some species attain maturity within three months of age. The species found migrating through fishpass having lowest and highest lengths were 2.60 and 13.90 cm respectively. The approximate size at first maturity is 4 cm long.

Economic importance: *Icha* is a very common and available species at all retail fish markets. The species is preferred by poor people because of the low price. Fishermen get a higher price when *icha* is sold in dried form.

KALIBAUSH

Species: *Labeo calbasu* (Hamilton)

Family: Cyprinidae

Standard name: *Kalibaoush*

Other name: *Baush, Kalabaush, Kalia, Kailara.*

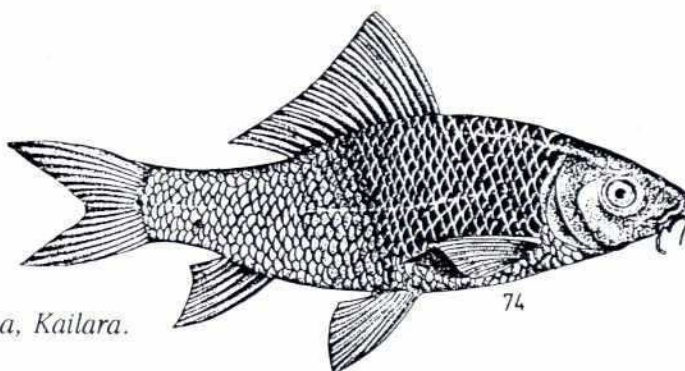


Fig: *Labeo calbasu*

Status in northeast region: It is one of the major carp of Bangladesh, and common in the northeast region. It is most abundant in *beels* and *haors* in the districts of greater Sylhet and Mymensingh, and is usually reared and cultured in ponds.

Preferred habitat: It is a freshwater fish species, available all over the country. *Kalibaush* prefers a bottom layer with a clayey surface. It takes shelter in *duars* in the river and *kathas* in the *haor* during the dry season. During the early monsoon season, they start migrating from their overwintering grounds to environments suitable for breeding and feeding.

Feeding: *Kalibaush* is a bottom feeder species, preferring plankton, algae, and decomposed vegetation in the bottom layer.

Migration and reproduction: April to August, the beginning of the flash flood season, is the main period for their breeding migration. They begin searching for environments suitable to breed and graze. *Kalibaush* spawns during the period April-August. They prefer less flashy rivers and connecting channels of the *haor*. In the Sylhet region, *kalibaush* breeds in the Tanguar and Matian Haor area. Juveniles of *kalibaush* are available in this area during the monsoon season.

Growth: In open water, average yearly growth rate is 600 gm in weight and 37 cm in length. This species reaches maturity at a size of 28 cm, after about one year. The biggest species was recorded in the Kushiya River at Machukhali in October 1993. It was 4500 gm in weight and 63 cm in length. The species migrating through fishpass having lowest and highest length, 13.20 and 51 cm respectively, were found during the 1996 monsoon season.

Economic importance: *Kalibaush* is one of the commercially important species in northeast region of the country. This species is also being exported.

PUTI

Species: Puntius sophore (Hamilton)

Family: Cyprinidae Standard name: *Jati puti*

Other names: *Jati puti*, *Vadi puti*, *Roa puti*

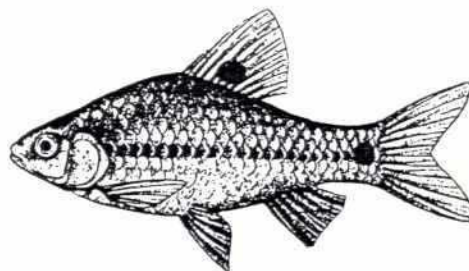


Fig. *Puntius sophore*

Status in northeast region: *Puti* is very common in the northeast region, prevalent in rivers, haors, beels, and ponds. Kawadighi Haor is renowned to contain this species.

Preferred habitat: It is most abundant during the rainy season. It prefers clear shallow waters and inundated paddy fields. This species is also common in the closed water bodies.

Feeding: *Puti* is a mid-level and bottom feeder, preferring plankton, aquatic plants, algae, and decomposed vegetation.

Migration and Reproduction: With the occurrence of the first monsoon floods, they start migrating towards shallow clear water for breeding and grazing. The breeding period of *puti* is April-June. In males, a red band develops along the middle of either side during breeding season. In females, this band is less distinct.

Growth: It attains a maximum length of 15 cm. The size at first maturity is 6 cm in length. The species migrating through the fishpass having lowest and highest length, 3.60 and 10.30 cm respectively, were found during the 1996 monsoon season.

Economic importance: This species is perennially available in every fish market. In the monsoon season, it has low market value due to its high abundance. It is a suitable fish for making *sidol* (fermented fish).

RUI

Species: *Labeo rohita* (Hamilton)

Family: Cyprinidae

Standard name: *Rui*

Other names: *Rohu*, *Ruhit*, *Rou*

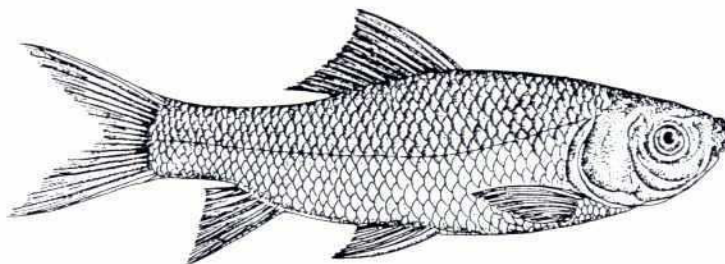


Fig: *Labeo rohita*

Status in northeast region: Rui is treated as the most commercially important native carp in the northeast region. This species was abundant in the Surma and Kushiya Rivers, and also in Sunamgonj and Netrokona *haor* areas. Abundance of *rui* in the region's rivers is declining. This is likely due to industrial pollution, siltation, gradual destruction of the breeding grounds, overfishing, and other factors.

Preferred habitat: It is found in almost all rivers, *haors* and *beels* of the northeast region. *Rui* is also extensively cultured in ponds. It takes shelter in *duars* in the rivers and *kathas* in the *haors* during the dry season. During the early monsoon season, they start migration from their overwintering ground to suitable breeding and grazing environments.

Feeding: *Rui* is a predominantly column feeder, preferring plankton, decayed higher aquatic plants, and decomposed vegetation. Fingerlings usually prefer zooplankton and vegetable debris.

Migration and reproduction : April and May is their main migratory season. With the occurrence of the first flash flood, they start migrating to places suitable for breeding and grazing. *Rui* spawns during the period May-July. Spawning takes place in flash-flooded rivers and *haor* channels where there is current. In the Sylhet region, *rui* breeds in the upstream reaches of the Surma and Kushiya Rivers. The species attains sexual maturity within two years. In the last few years, *rui* spawn were observed during the early monsoon season in the Kushiya River near Sherpur bridge. Some large brood fish (above 10 kg wt) carrying eggs were found in the Kushiya River downstream of Sherpurghut on 17 May 1994. This indicates that there are some carp breeding grounds in the Kushiya River and adjacent areas.

Growth: In open water, average yearly growth rate of this species is 700 gm in weight and 41 cm in length. Their size at first maturity is 50 cm at about 2 years of age. The biggest specimen was seen in January 1995 at Sherpur fish market. It was 91 cm in length and 10.5 kg in weight. The species having lowest and highest length, 4.6 and 17.5 cm respectively, were found migrating during the 1996 monsoon season.

Economic importance: It is one of the most commercially important species in Bangladesh. It fetches a higher price than any other fish because of the taste and of the value of its flesh as food. After processing at Ajmirigonj Fish Industry and Kuliarchar Cold Storage, *rui* from the northeast region is being exported to the UK, USA, and some middle-eastern countries.

ANNEX F
MINUTES OF MEETINGS

MINUTES OF THE MEETING HELD ON APRIL 24, 1996 TO DISCUSS THE MATTERS ON FISHPASS OPERATION AND FISH SANCTUARY MANAGEMENT

A meeting was held on April 24, 1996 at Kashimpur Fishpass Field Office under the chairmanship of Mr. Murshedunnabi, Executive Engineer, BWDB, Moulvibazar to discuss the problems of fishpass operation and to find out a strategy to be adopted for operation of the fishpass and proper management of the fish sanctuary with the active participation of the local community members.

Following participants were present at the meeting:

Bangladesh Water Development Board (BWDB)

1. Mr. B.M.Nath, Subdivisional Engineer-1, Moulvibazar
2. Mr. S.M.Shahidul Hoque, Subdivisional Engineer-2, Rajnagar
3. Mr. Siraj Mowla, Subdivisional Engineer, Kashimpur
4. Mr. Mosharraf Hossain, Asstt. Extension Officer
5. Mr. Md. Babar Ali, Sub Asstt. Engineer
6. Mr. Abdul Quddus, Sub Asstt. Engineer
7. Mr. Md. Shah Alam, Sub Asstt. Engineer

Department of Fisheries(DOF)

1. Mr. Murad Hossain, District Fisheries Officer, Moulvibazar
2. Mr. Saleh Ahmed, Thana Fisheries Officer, Rajnagar

People's Representative

1. Mr. Md. Jami Ahmed, Chairman, Fatehpur Union Council
2. Mr. Suresh Namasudra, Member, Fatehpur U.P.
3. Mr. Md. Sayeed Mia, Member, Fatehpur U.P.
4. Mr. Abdul Barik, Member, Fatehpur U.P.
5. Mr. Abdul Kader, Ex-member, Fatehpur U.P.

Members of the Farmer and the Fishermen Community

1. Mr. Shamsul Islam, Islampur
2. Mr. Faizullah, Islampur
3. Mr. Mohammad Ali, Islampur
4. Mr. Fatik Mia, Pailanpur
5. Mr. Md. Monir Mia, Kashimpur
6. Mr. Sufian Mia, Kashimpur
7. Mr. Akal Mia, Kashimpur
8. Mr. Abdul Hamid, Kashimpur
9. Mr. Jahangir Alam, Hamidpur
10. Mr. Sunil Chandra Mahesnyadas

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11. Mr. Md. Mosabbir Mia, Kashimpur

Northeast Regional Project(NERP)

1. Mr. Nazmul Islam, Fisheries Specialist and Project Coordinator
2. Dr. Q.R. Islam, Agronomist
3. Mr. Mohiuddin Ahmed, Senior Social Anthropologist
4. Mr. Sk. Borhan Ali, Administrative Manager
5. Mr. Abdur Razzak, DOF Fisheries Biologist (deputed to NERP)
6. Mr. Tarek Akbar, Fisheries Biologist
7. Mr. Abu Sarwar, Community Organizer
8. Mrs. Jebunnesa, Community Organizer

Mr. Nazmul Islam, Fisheries Specialist and Project Coordinator of Fishpass Pilot Project welcomed the participants of the meeting on behalf of the Northeast Regional Project. He explained the necessity and objectives of the construction of the fishpass at Manu River project and the success achieved through operation of the structure during the last season. Defining the difficulties and problems of the operation of the fishpass which were experienced during the last operation season, he sought cooperation of the local people as well as from the various agencies for smooth operation of the structure and proper management of the fish sanctuary.

Mr. B.M. Nath, Subdivisional Engineer, BWDB discussed about the impact of the water discharges through the structure. He described his observations on fishpass operation in the last year and informed the participants that if the fishpass was kept open continuously for 24 hours, the water level of the entire project area would increase by 1/4 inch. Moreover he told that fishpass discharged maximum 30 Cusec of water while 1200 Cusec of water were being bailed out through 8 pumps during monsoon and hence there was no possibility of increase of water level by the additional water coming in to the haor through fishpass. He indicated that the water level increased in the haor due to water coming from the hills through streams and heavy rainfall. Mr. Nazmul Islam informed the meeting the findings of the study carried out by the Hydrologist of the project and made them understand that fishpass did not influence on the increase of water level of the haor.

Dr. Q.R. Islam, Agronomist requested the members of the farmers community to express their views on the impact of the additional water discharges through fishpass during premonsoon. Mr. Sufian Mia told that if fishpass operation starts after harvesting of boro crop, no adverse impact on crop would be occurred. Mr. Akal Mia informed that if there would no flood in the haor then the fishpass could be operated. Mr. Shamsul Islam told that if there were no crops in the field then fishpass can be operated even the flood occurred. Mr. Musabbir Mia and some other members of the community stated that when water level started rising in the last year, they become mentally upset and were unwilling to allow fishpass operation without knowing how much the structure was responsible for the adverse situation. Dr. Islam explained them about the relation of water level with the different stages of crop being cultured in the Manu River Project area and precautionary measures to be taken to save the possible loss.

Mr. Murad Hossain, District Fisheries Officer, Moulvibazar expressed his deep satisfaction regarding performance of the fishpass and told that the streams coming from the hills were carrying only water but the fishpass was carrying not only the water but also the fish from the adjacent rivers. He also informed the meeting that so far he got information from his sources, fish production of the haor was in increasing trend. He put a stress on the smooth operation of the fishpass structure and also on the proper management of the sanctuary.

Mr. Jami Ahmed, Chairman, Fatehpur Union council opined that as the fishpass was constructed to revitalize the fisheries resource of the haor and we as the beneficiary of the resource, should extend cooperation to the concerned authority to carry out their activities. He also mentioned that the amount of water coming through one stream from the hill was much more than the amount of water passes through the fishpass structure. He requested the local people to come forward with positive attitude to help the development agencies to implement their program. He requested the chairman of the meeting to make an arrangement for getting full time supply of electricity so that pumps could be operated without any disruption. Mr. Ahmed also requested the District Fisheries Officer to take necessary steps and declare one beel of the haor as sanctuary or pile fishery for conservation of the fishes and to allow them to grow as mother fish in the subsequent years.

Mr. Mohiuddin Ahmed, Senior Social Anthropologist, NERP also urged the participants to extend their cooperation in order to smooth operation of the fishpass and enjoy its benefit.

Discussions were also made on leakage of 3-vent regular, impact of operation of 3-vent regulator when water level of the haor comes down below 4 m PWD, use of banned fishing gear etc.

In the meeting after detail discussion on various issues it was proposed by the participants to form a local committee to assist the fishpass team to operate the fishpass without any obstacle. A committee was formed including the following members:

- | | |
|--|------------|
| 1. Mr. Md. Jami Ahmed, Chairman,
Fatehpur Union Council | - Convener |
| 2. Mr. Sayeed Mia | - Member |
| 3. Mr. Akal Mia | - Member |
| 4. Mr. Kadir Mia | - Member |
| 5. Mr. Sufian Mia | - Member |
| 6. Mr. Md. Munir Mia | - Member |
| 7. Mr. Md. Shamsul Islam Mollah | - Member |
| 8. Mr. Suresh Chandra Namasudra | - Member |
| 9. Mr. Md. Mosabbir Mia | - Member |
| 10. Mr. Md. Hanif Ullah | - Member |
| 11. Mr. Abdul Hamid | - Member |

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Terms of Reference of the Committee:

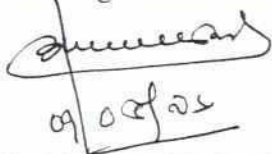
1. Will help the fishpass team to take decision on fishpass operation and management of fish sanctuary.
2. Will meet time to time but not less than once in a month to review the situation related to fishpass operation and management of fish sanctuary.
3. Any other work which will deem necessary to perform as per requirement of the fishpass team.

Officials of BWDB, DOF and NERP may attend the meeting(s) of the above committee as the observer and give their opinion at the time of taking any decision.

It was also decided to hold the first meeting of the committee on May 8, 1996.

The chairman of the meeting requested local people to cooperate with the fishpass team so that the fishpass could be operated smoothly. He also instructed local BWDB officials to extend all possible cooperation to the fishpass team in order to enable them to perform their job without any hindrance.

The meeting ended with vote of thanks from the chair.



(Md. Murshed Un Nabi)
Executive Engineer
O & M Division-1, BWDB
Moulvibazar

**MINUTES OF THE FIRST MEETING OF THE FISHPASS OPERATION
AND FISH SANCTUARY MANAGEMENT COMMITTEE HELD ON MAY 8, 1996**

The first meeting of the Fishpass Operation and Fish Sanctuary Management Committee was held at Fishpass Field Office on May 8, 1996 under the chairmanship of Mr. Jami Ahmed, Chairman, Fatehpur Union Council and the convener of the committee.

Following members of the committee attended the meeting:

1. Mr. Md. Sayeed Mia, Member Fatehpur U.P.
2. Mr. Abdul Kader, Member Fatehpur U.P.
3. Mr. Munir Mia
4. Mr. Akal Mia
5. Mr. Sufian Mia
6. Mr. Md. Hanif Ullah
7. Mr. Shamsul Islam Mollah
8. Mr. Musabbir Mia
9. Mr. Md. Abdul Hamid

One member of the committee named Mr. Suresh Chandra Namasudra could not attend the meeting due to his illness.

Following persons were present in the meeting as observer:

1. Mr. Siraj Mowla, Subdivisional Engineer, BWDB, Kashimpur
2. Mr. Nazmul Islam, Fisheries Specialist & FPP Coordinator, NERP
3. Mr. Abdur Razzak, DOF Fisheries Biologist
4. Mr. Tarek Akber, Fisheries Biologist, FPP
5. Mr. Abu Sarwar, Community Organizer, FPP

At the outset of the meeting Mr. Jami Ahmed welcomed the participants and opened the discussion. He explained the importance of the committee and requested the participants to be practical in giving their views. He invited comments from the members of the committee regarding operation of the fishpass during the coming season. During discussion all participants took part in presenting their opinion. Mr. Musabbir told that the harvesting of crops at the low lying areas was completed and they had no disagreement if fishpass operation would be started as soon as the water would rise to operating level. Other members supported his statement and reached a consensus after detail discussion that the fishpass would be kept in operation continuously until any severe flood situation occurs. In case of any unfavorable natural circumstance, the committee will meet immediately to adopt a strategy on fishpass operation and communicate it to the fishpass team but nobody other than the committee member would be allowed to come to the fishpass team and press them to shut the fishpass gates. The committee requested the fishpass team not to consider the individual opinion on the operation unless any decision would come from the committee

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members. To take any decision on closing of fishpass operation at an emergency situation at least five members of the committee will be required. The members will personally verify the field situation before taking any decision for closing of the fishpass operation. But the fishpass team would be empowered to restart the operation when the adverse situation would over.

It was also decided that the committee members will discourage the local people from catching fish from the fish sanctuary. If anybody would catch fish from the sanctuary area, the person will have to appear before the committee and the committee would review, after hearing him and decide whether the matter would be brought to the local administration/ law enforcing agencies or released him after giving warning not to do the same offense for the second time. But for the second time offense committed by any person the fishpass team would take the shelter of the court of law/ local administration against him and in that case committee will raise no question for the action to be taken.

The committee proposed that Patasingra (Katasingra) beel should be declared as a fish sanctuary/ reserve fishery for a period of at least 7 years as an another step for re-vitalizing the fisheries resource of the Kawadighi Haor and decided to send a formal request to the Deputy Commissioner and District Fisheries Officer, Moulvibazar to make necessary arrangement in this regard.

In the meeting the Chairman urged the participant to resist the use of prohibited fishing gear especially the gill net made of monofilament synthetic fibre (locally called current jal).

The meeting ended with a vote of thanks from the chair.

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ANNEX G
VISITORS TO FISHPASS

ANNEX G: VISITORS TO FISHPASS

Date	Names of the visitors
16 March 1995	Canadian television team headed by Micheliene Larivee, Journalist
27 April 1995	1. Mr. Murad Hossain, District Fisheries Officer 2. Thana Fisheries Officer, Sadar, Moulvibazar
16 June 1995	CIDA Mission: 1. Mr. Ronald J. Schatz, Project Team Leader 2. Dr. Patricia Lane, Environmental Specialist 3. Mr. Thomas George, Fisheries Specialist 4. Dr. Paul Egli, Water Resources Planner
11 July 1995	60 fishermen from 18 fishermen villages
22 July 1995	Mr. John Slater, Project Director
23 August 1995	Mr. Mahmudul Hoque, Asstt. Chief, DOF, Dhaka
25 August 1995	Thana Nirbahi Officer, Rajnagar
28 August 1995	1. Ms. Sarah Breault, First Secretary, CHC
13 September 1995	1. Syed Anwar Yusuf, Member, Planning, BWDB 2. Mr. Ratish Chandra Das, Superintending Engineer, BWDB, Moulvibazar
24 September 1995	CIDA Environmental Specialist Team: 1. Mr. John Ambrose, Resource Planner 2. Mr. Sayeed Iqbal, Consultant 3. Mr. S M A Rashid, Consultant
03 October 1995	Fisheries Specialists from Char Development and Settlement Project, Noakhali (A Dutch-aided project): 1. Dr. Paul Farrow 2. Mr. M A Baki
05 November 1995	Participants of the Training on Design of Fishpass Structure: 1. Mr. Mukhlesuzzaman, Superintending Engineer, Design Circle-2, BWDB 2. Mr. A.N.M. Wahedul Hoque, Superintending Engineer, Design Circle-1, BWDB 3. Mr. Md. Anwar Hossain, Superintending Engineer, Design Circle-5, BWDB 4. Mr. Md. Nawshad Ali, Executive Engineer, Design Circle-1, BWDB 5. Mr. Md. Mizanur Rahman, Executive Engineer, Design Circle, Northern Zone, BWDB 6. Mr. Murshedun Nabi, Executive Engineer, O & M Division-1, BWDB, Moulvibazar 7. Mr. A.K.M. Mukhlesur Rahman, Executive Engineer, O & M Division-2, BWDB, Moulvibazar 8. Mr. Md. Alimuzzaman Chowdhury, Asstt. Engineer, 2nd ADP, Department of Fisheries, Dhaka 9. Mr. Md. Shahjahan Ali, Asstt. Engineer, FCDI Project, Department of Fisheries
12 January 1996	1. Mr. M. A. Matin, Director of Fisheries 2. Mr. Kabir Ahmed, Assistant Director of Fisheries, Chittagong Division, Comilla 3. Mr. Chandra Kumar Chakma, District Fisheries Officer, Sylhet

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14 January 1996	Mr. Amiangshu Sen, Member (Admin.), BWDB
	ODA and CARE Fisheries Team: 1. Ms. Debbie Williams (ODA) 2. Ms. Jean MacGrory (ODA) 3. Mr. S.M. Ziaul Huque (CARE) 4. Ms. Sayema Sayeed (ODA)
28 January 1996	1. Dr. Paul Egli
29 January 1996	1. Dr. John Deyell, CIDA 2. Mr. Md. Shariatullah
05 April 1996	Dr. Ferdous Ahmed, IFCDR, Bangladesh University of Engineering and Technology
14 April 1996	1. Mr. Don Shales, CIDA 2. Mr. Md. Shariatullah
24 April 1996	Chairmen and members of local Union council and Officials of BWDB of Moulvibazar.
11 May 1996	Mr. Md. Mohsin Ali, Chief Engineer, BWDB, Comilla Zone
27 May 1996	26 Leaders of fishermen community from 15 fishermen villages
21 June 1996	1. Mr. A.K.M. Fazlul Karim, District Judge 2. Mr. Murad Hossain, District Fisheries Officer 3. Mr. Md. Yunus, Sub-Judge 4. Mr. Motahar Hossain, Manager, BKB
22 June 1996	22 fishermen community leaders from eight villages
23 June 1996	1. Mr. Shahidul Hoque, Executive Engineer 2. Mr. Manzurul Alam, Asstt. Engineer, LGED
09 July 1996	A team of Engineers who participated in an orientation course at Moulvibazar organized by BWDB.
12 July 1996	Mr. Ali Akber, Deputy Director of Fisheries, Chittagong Division, Comilla
13 July 1996	CIDA Mission : 1. Mr. Ronald J. Schatz, Project Manager 2. Mr. Paul Egli, Water Resource planner 3. Ms. Judi Allen, Environment Specialist 4. Ms. Ferdousi Sultana, Gender and social Specialist BWDB : 1. Mr. Giasuddin Ahmed Chowdhury, Director, Planning Schemes-1 2. Mr. Ratish Chandra Das, Superintending Engineer, Moulvibazar
10 August 1996	Ten union parishad Chairmen and Members of Rajnagar thana
27 August 1996	Dr. Md. Anwar Hossain, Fisheries Specialist Jessore-Khulna Drainage Project
31 August 1996	1. Mr. Shamsul Hoque, Chief Engineer, Planning, BWDB 2. Mr. Halimur Rahman, Superintending Engineer, WARPO 3. Mr. Rafiqul Islam Ansari, Executive Engineer, DPS-1, BWDB
15 September 1996	Mr. John F. Brooks, Senior Project Implementation Officer, Asian Development Bank
17 October 1996	50 fisherwomen from 25 villages
26 October 1996	A team from BWDB and Northwest Hydraulic Consultants: 1. Mr. Anwar Hossain Bhuiyan, Superintending Engineer, Design Circle- 5, BWDB 2. Mr. Wahidul Hoque, Superintending Engineer, Design Circle- 1, BWDB 3. Mr. Mukhleszaman, Superintending Engineer, Design Circle- 2, BWDB 4. Mr. Sahadat Hossain, Superintending Engineer, Project Implementation Unit 5. Mr. Akram Hossain, Engineer, NHC 6. Mr. Gazi Nurul Alam, Fisheries Specialist, NHC
13 November 1996	His Excellency Mr. Nicholas Etheridge, the High Commissioner of Canada

CD

ANNEX H
MEDIA COVERAGE OF FPP

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List of News Items/Features on Fishpass Published in Different Newspapers/Periodicals

Date	Name of the News Paper/Periodicals	Title	Author/Reporter
26 March 95	Weekly Manubarta, Moulvibazar, page 1	Fishpass Pilot Project	M. Shahidul Islam
July 95	Fisheries Newsletter, (Fish Fortnight '95, Celebration Special Issue), Published by Bangladesh Fisheries Research Institute, Mymensingh, Vol. 3, No. 3, page 2	Fishpass at Manu River Basin	Special Correspondent
10 September 95	The Daily Sangram, A national daily published from Dhaka, page 1	Fishpass	Mizanul Karim
28 January 96	The Daily Rupshi Bangla, Comilla, page 2	Fish Fair at Sherpur (special emphasis given on fishpass)	S. M. Emdadul Hoque
Jan-March 96	BETS Quarterly (A News Bulletin of Bangladesh Engineering and Technological Services), Issue No. 19, pages 1,5	Northeast Regional Water Management Project	Staff Correspondent
24 July 96	The Daily Sangbad, A national daily newspaper published from Dhaka, page 9	Fishpass- A project for augmenting fish production in haor areas	Shishir Moral
August 96	Fish Fortnight '96 Journal published by the Ministry of Fisheries and Livestock, Government of Bangladesh pages 27-29, 149	Fishpass	Nazmul Islam
18 August 96	The Bangladesh Observer, A leading national daily published from Dhaka, page 5	Fish Migration and Fishpass	Gazi Nurul Alam
15 November 96	The Daily Independent (Weekend independent), page 17	Fishpass for Bio-diversity	Mohiuddin Ahmad



সাপ্তাহিক মনুবার্তা

২৬ মার্চ/১৯৯৫

মনুবার্তা- ৪

ফিটার

ফিসপাস পাইলট প্রজেক্ট মাছের চাহিদা পূরণে ব্যাপক ভূমিকা রাখতে পারে

এম শহীদুল ইসলাম:

মৌলভীবাজার জেলার রাজনগর থানাধীন বাংলাদেশ পানি উন্নয়ন বোর্ডের মনু প্রকল্পের কাশিমপুর পাম্প হাউসের পাশ ঘেঁষে নির্মিত হচ্ছে কাশিমপুর 'ফিসপাস পাইলট প্রজেক্ট'।

দীর্ঘ কয়েক বছর যাবত হাওর কাওরাদিঘি নিয়ে অনেক গবেষণা, পরীক্ষা-নিরীক্ষার পর এই ফিসপাস পাইলট প্রজেক্ট নির্মাণের সিদ্ধান্তে পৌঁছে কানাডিয়ান আন্তর্জাতিক উন্নয়ন সংস্থা।

এই প্রজেক্ট নির্মাণের উদ্দেশ্যঃ বাংলাদেশ পানি উন্নয়ন বোর্ড বন্যা নিয়ন্ত্রণের লক্ষ্যে রাজনগর থানাধীন হাওর কাওরাদিঘির চতুর্দিকে বাঁধ নির্মাণ করে। এই বাঁধ নির্মাণের ফলে জল থেকে হাওরে মাছ প্রবেশ সম্পূর্ণ

বন্ধ হয়ে যায়। এতে মাছ শূন্য হয়ে পড়ে হাওর কার্তাদিঘি। কিন্তু এই বাঁধ নির্মাণের পূর্বে এই হাওরে ছোট বড় মাছের প্রাচুর্য ছিল। প্রতি রাতে একজন জেলে প্রচুর মাছ ধরতে পারতেন। সেই ঐতিহ্য এখন রূপকথার মত। পুনরায় যাতে নদী থেকে হাওরে মাছ প্রবেশ করতে পারে, সেই লক্ষ্যে নির্মাণ করা হচ্ছে

এই 'ফিসপাস পাইলট প্রজেক্ট'। এই প্রকল্পটি সম্পূর্ণ বাস্তবায়ন করছে কানাডিয়ান আন্তর্জাতিক উন্নয়ন সংস্থা।

গত ৭ জানুয়ারি '৯৫ এ আনুষ্ঠানিকভাবে প্রজেক্টটির উদ্বোধন করেন অর্থমন্ত্রী এম সাইফুর রহমান। উক্ত অনুষ্ঠানে বিশেষ অতিথি ছিলেন কানাডিয়ান হাইকমিশন এর

ফাষ্ট সেক্রেটারী মিস সারা ব্রো। অনুষ্ঠানটি উপস্থাপনা করেন এই প্রজেক্টের প্রশিক্ষন সমন্বয়কারী টিভি নাট্যশিল্পী আবুল কাশেম। মূল বক্তব্য রাখেন প্রকল্প সমন্বয়কারী নির্মল চন্দ্র পাল। অন্যান্যের মধ্যে অতিথি ছিলেন জেলা প্রশাসক মোঃ আবু সাঈদ, FPCCO এর প্রধান প্রকৌশলী কমল সিদ্দিকী। বাংলাদেশ পানি উন্নয়ন বোর্ডের উত্তর পূর্বাঞ্চলীয় প্রধান প্রকৌশলী সিরাজউল্লাহ উইয়া, উত্তর পূর্বাঞ্চলীয় পানি ব্যবস্থাপনা প্রকল্পের টিম লিডার ইল্যাব্দের হারিকিং এবং ডেপুটি টিম লিডার মুজিবুল হক প্রমুখ।

এই প্রকল্পটি বাংলাদেশের উদ্দেশ্যে সফল হলে বৃহত্তর শ্রীকায় মাছের চাহিদা পূরণে বিশেষ ভূমিকা রাখবে বলে আশা করা হচ্ছে।

Fisheries Newsletter



A QUARTERLY PUBLISHED BY FISHERIES RESEARCH INSTITUTE, BANGLADESH

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DYNAMISM IN FISHERIES DEVELOPMENT URGED



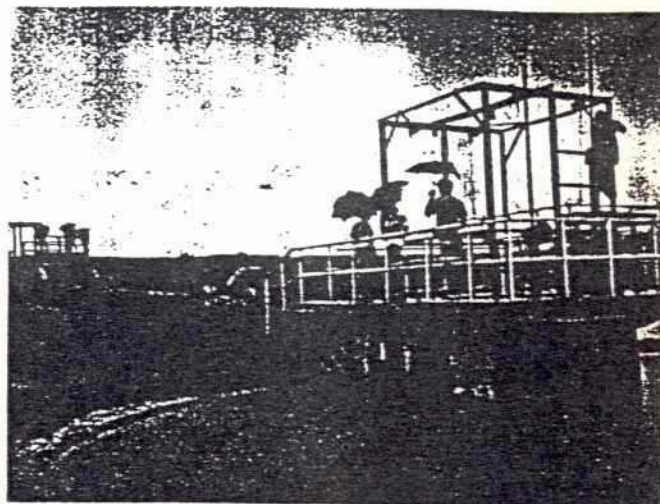
On the eve of Fish Fortnight '95, the Hon'ble Prime Minister Begum Khaleda Zia once again underscored the importance and potential of fisheries sector in the development of our national economy. Fish is not only the dominant source of animal protein, contributing 80% of the protein supply in our

daily diet, but it also supports the livelihood of nerarly 10 million people involved directly or indirectly in fisheries and ancillary activities. Bangladesh is uniquely endowed with the diverse physical and biological aquatic resources much needed for planned and efficient raising of fish and shrimp production, which in turn would have positive impact on national income and poverty alleviation. Begum Zia reiterated her Govt.'s firm commitment for sustainable development of fisheries sector by adopting technology-based aquaculture and resource-management. She, however, indicated that initiatives from NGOs and private entrepreneurs are required for bringing dynamism to the development of nation's fisheries sector. The PM wished allout success for the celebration of the Third National Fish Fortnight.

FISHPASS AT MANU RIVER BASIN

A fishpass has been constructed by the Northeast Regional Water Management Project across the Manu River at the Irrigation Project in Kashimpur, in the district of Maulvibazar. The project was financially assisted by Canadian International Development Agency (CIDA). The fishpass is a series of pools installed to aid fish in migrating across the full flood embankment from Kushiya river to Kawadighi haor. This is the first fishpass in the country and indeed the first application of its type anywhere in the world in a flood control project. The design of the fishpass is of single jet vertical slot type with an overall length of 61.85 m. There are 16 baffles and 17 pools with two observation chambers one at each end. The design of the structure results in a maximum flow velocity through the vertical slots of about 1.3 m/s, and inlet velocity of about 0.5 m/s. Operation of the fishpass started during the last week of May 1995. A large number of fish species including *Labeo rohita*, *L. gonius*, *Mystus aor*, *Wallago attu*, *Notopterus chitala*, *N. notopterus* and many small fish species have been observed using the fishpass.

The fishpass at Manu river basin is a large and complex full flood control project with pumped drainage and irrigation facilities. Presently, within the river in the northwest and south, and Bhatara



hills in the east, Kawadighi haor was of outstanding regional importance as a brood fishery resource prior to the project implementation. The project virtually decimated Kawadighi haor as a brood fishery resource, resulting in severe damage to fisheries resources and major economic loss to the fishing community in the area. The fishpass offers the possibility of recovery of a portion of the production of Kawadighi haor mother fishery over a period of perhaps five to seven years.

দৈনিক সংগ্রাম

THE DAILY SANGRAM

ঢাকা :: রোববার ২৬ ভাদ্র, ১৪০২ :: ১০-সেপ্টেম্বর, ১৯৯৫

এ দেশেই প্রথম চালু করা হলো

ফিশপাসঃ বন্যা নিয়ন্ত্রণ প্রকল্পেও মাছের বংশ বৃদ্ধি নিশ্চিত হবে

মীয়ানুল করীম ♦ বাংলাদেশে প্রথমবারের মতো 'ফিশপাস' চালু হয়েছে। এমনকি সমগ্র বিশ্বে এর আগে আর কখনো কোন দেশে বন্যা নিয়ন্ত্রণ প্রকল্পে এই প্রযুক্তি প্রয়োগ করা হয়নি। সেচ ও বন্যানিয়ন্ত্রণ প্রকল্পগুলো দেশের প্রাকৃতিক পরিবেশ বিনষ্ট করেছে বলে যখন সবাই চিৎকার, তখন এমনি এক সময়ে 'ফিশপাস'-এর প্রচলন এই উদ্দেশ্যে অনেকটাই হ্রাস করবে। উল্লেখ্য, চাঁদপুরের মেঘনা-ধনাগোনা এবং হুলনার বিল ভাঙতিয়াসহ অন্যান্য বন্যা নিয়ন্ত্রণ প্রকল্পেও জৈব ভারসাম্য, তথা মাছের উৎপাদন ব্যাহত করেছে বলে অভিযোগ পাওয়া গেছে। মৎস্য গবেষণা ইনস্টিটিউট সূত্র জানান, 'উত্তর-পূর্ব আঞ্চলিক পানি ব্যবস্থাপনা প্রকল্প'-এর উদ্যোগে এবং কনাতার আন্তর্জাতিক উন্নয়ন সংস্থা (সিডা) আর্থিক সহায়তায় মনু নদীর উপর আড়াআড়িভাবে 'ফিশপাস' তৈরি করা হয়েছে। মৌলবীবাজার জেলার কুশিমনপুরে সেচ প্রকল্পের স্থানে এটা নির্মিত হয়। এখানে প্রবল বন্যার সময়ে বাধ পেরিয়ে যাতে মাছ কুশিয়ারা নদী থেকে কাওয়াদীঘি হাওড়ে যেতে পারে সে জন্য 'ফিশপাস' নির্মাণ করা হয়েছে। 'ফিশপাস' হলো পর পর বেশ কয়েকটি জলাশয়ের একটি সিরিজ। এতলোর মোট দৈর্ঘ্য ৬১ নশমিক ৮৫ মিটার। এর মধ্যে ১৭টি জলাশয় আছে। এতলোর মাঝে রয়েছে ১৬টি 'ব্যাফল' বা প্রতিবন্ধক। ফিশপাসের দুই প্রান্তে দুটি পর্যবেক্ষণ চেয়ার বদানো হয়েছে। গত মে মাসের শেষ সপ্তাহে ফিশপাসটি চালু হয়। এর পর কই, ঘনিমা, আইড়, চিতল,

(৭ম পৃঃ ৭-এর কলামে দেখুন)

বংশ বৃদ্ধি নিশ্চিত হবে

(১ম পাতার ৬-এর কঃ পর)

প্রভৃতি বড়নাছ হাড়াও বহু প্রজাতির ছোট মাছ এর মধ্য দিয়ে যেতে দেখা গেছে। বিশেষজ্ঞরা জানান, বন্যাগ্রস্ত মনু নদীর অববাহিকায় 'ফিশপাস' চালু করা এক

যুগান্তরকর পদক্ষেপ। এটা মূলতঃ ছটিল ও বৃহৎ বন্যা নিয়ন্ত্রণ প্রকল্প। এতে পানিং-এর ঘারা পানি নিষ্কাশন এবং আবানী জমিতে সেচের ব্যবস্থা আছে।

কাওয়া দীঘি হাওড় দিলেট অঞ্চলের কয়েকটি হাওড়ের একটি। কিন্তু বিবিধ জাতের সুবাদু মাছের পোনা উৎপাদনের বিরাট উৎস হিসেবে এই হাওড়ের আঞ্চলিক গুরুত্ব অনেক বেশী। কাওয়াদীঘির পূর্বে ডাটোয়া পাহাড় এবং দক্ষিণ ও উত্তর-পশ্চিমে মনু নদী।

পানি উন্নয়ন বোর্ড বেশ কয়েক বছর আগে মনু প্রকল্প গ্রহণ করে। এই প্রকল্পের

ক্ষতিকর প্রভাব কাওয়া দীঘি হাওড়ের প্রাকৃতিক মৎস্য হ্যাচারীটি ধ্বংস হয়ে গিয়েছিল। ফলে এলাকার মুসলমান মৎস্য সম্পদ এবং মৎস্যজীবী জনগণের আর্থনৈতিক ভিত্তি বিনষ্ট হয়ে যায়। ফিশপাস চালু হওয়ায় ৫/৭ বছরের মধ্যে এই হাওড় আবার অন্ততঃ আংশিকভাবে পোনা উৎপাদন করতে পারবে।

মৌলভী বাজার জেলা সদর থেকে ২৮ কিঃ মিঃ দূরে শেরপুরে কুশিয়ারা নদীর তীরে গত- ১৩ ও ১৪ জানুয়ারী/ ৯৬ তারিখে প্রতি বছরের ন্যায় দু'দিন ব্যাপী মৎস্য মেলা অনুষ্ঠিত হয়ে গেল। মেলার আয়োজক ছিলেন স্থানীয় মৎস্য ব্যবসায়ীমহল। 'মেলা' প্রসংগে মৎস্য ব্যবসায়ী, মৎস্য চাষী, মৎস্য কর্মকর্তা, স্থানীয় জনসাধারণ ও অংশ গ্রহনকারী দর্শকদের অনেকের সংগে এ প্রতিবেদকের আলাপ হয়েছে। তাঁরা জানান, প্রতি বছর পৌষ সংক্রান্তিকে কেন্দ্র করে মেলায় আদর বসা এটা এলাকার পুরানো প্রচলিত প্রথা।

রকমারী পনের নাখে মাছের ও সরবরাহ হতো এখানে। মেলা থেকে পছন্দসই মাছ ক্রয় করে আত্মীয়-স্বজনদের মধ্যে বিতরণ করা এ এলাকায় একটি প্রচলিত রেওয়াজ ছিল। মেলায় ব্যবসায়ীরা বিভিন্ন আকর্ষণীয় পণ্য নিয়ে হাজির হতেন ব্যবসার জন্য আর দর্শনার্থীরা তীর্ড জমাতেন আনন্দ উপভোগের সাথে কিছু কেনাকাটা করতে। পরবর্তীতে মাছের আমদানী ও ক্রেতাদের তীর্ড বাজারে থাকে এবং সৌখিন ক্রেতাদের আগমন লক্ষ্য করে মৎস্য চাষী ও ব্যবসায়ীরাও আকর্ষণীয় সাইজের বিভিন্ন প্রজাতির মাছের সরবরাহ বাজারে থাকেন। যারফলে বর্তমানে এটা বিরাট মৎস্য মেলায় রূপান্তরিত হয়েছে।

কুশিয়ারা নদীর তীরে বিশাল মেলাঙ্গনের একাংশ জুড়ে ছিল মাছের বাজার বড় আকৃতির ১০/১২ টি টলের বাহিরে ও খোলা আকাশের নীচে অনেক দোকান সাজিয়ে বৃহদাকৃতির মাছ নিয়ে বসে ছিলেন বিক্রেতগণ। তার মধ্যে বোয়াল, চিতল রুই, কাতল, মৃগল, আইডু, পাংগাস, রিটা ও কার্পজাতীয় মাছ উল্লেখযোগ্য। জানা যায় বেশীর ভাগ মাছের আবাসস্থল হচ্ছে কুশিয়ারা নদী ও হাওর এলাকায় মাতৃজলমহাল।

মৎস্য টলগুলোর পাশে ছিল কানডীয়া আন্তর্জাতিক উন্নয়ন মৎস্য উদ্যোগে মৎস্য সম্পদ

মৎস্য মেলা দেখে এলাম কুশিয়ারা তীরে

॥ এস, এম এমদাদুল হক ॥

উন্নয়নে গৃহীত প্রকল্প "ফিসপাস পাইলট প্রজেক্ট" এর টল মনোরমভাবে সাজানো শুধুই নুঙ্গর টলটি দর্শনার্থীদের জন্য আনন্দ ও শিক্ষার কেন্দ্র বিন্দু ছিল। মৎস্য ও পশুসম্পদ তথা দপ্তর, আঞ্চলিক অফিস, কুমিল্লার পক্ষ থেকে ব্যানার, কেসেট ও অন্যান্য প্রচার পত্র নিয়ে সহযোগিতা করাতে এটা আরও আকর্ষণীয় হয়ে উঠেছিল।

দিবসব্যাপি সার্বক্ষণ দর্শকদের তীর্ড পরিপূর্ণ ছিল। ফিসপাস প্রজেক্টের টল ও মৎস্য গুলোতে কৌতূহলী দর্শকদের অনেকে প্রথমে প্রজেক্টের টলে ঢুকে ঘুরে ফিরে দেখছিলেন একুরিয়ামে সংরক্ষিত বিভিন্ন প্রজাতির মাছ, তথা মূলক ব্যানার, পোস্টার, ফিসপাস প্রজেক্টের সচিত্র কার্যক্রম, ভিডিও কেসেটে মৎস্য চাষ পদ্ধতি ইত্যাদি। মাঝে মাঝে অনেকে প্রশ্ন করে জানতে চেয়েছে বিভিন্ন তথ্য। আর তার জবাব দিতে বাস্তব ছিলেন উক্ত প্রজেক্টের বায়োলজিস্টগণ। মৎস্য বাজারেও প্রচুর তীর্ড ছিল। সেখানে বিভিন্ন প্রজাতির বৃহদাকৃতির মাছগুলো

সবই ঘুরে ফিরে দেখছিলেন। তাদের সকলেই যে ক্রেতা ছিলেন এমন নয়, অধিকাংশই এসেছিলেন দেখার জন্য। বৃহদাকৃতির মাছ দেখার সুযোগ হতো অনেকেরই হয় না সেখানে কিছু মাছের মূল্য কম, তা বলা যায় না তবে পছন্দ নষ্ট প্রজাতি ও সাইজের মাছ পাওয়া যায় এটা একটা বৈশিষ্ট্য।

ফিসপাস প্রজেক্টের উদ্দেশ্য ও লক্ষ্যক্রম ব্যাখ্যা করে প্রজেক্টের প্র. অফিসার জনাব এস. এম. নাজমুল ইসলামও প্রতিবেদককে জানান, ফিসপাস হচ্ছে এমন একটি কাঠামো যার মাধ্যমে দু'টি জলাশয়ের মাঝে নির্মিত বাঁধ দ্বারা মাছের চলাচলে যে বাধা সৃষ্টি হয় তা দূর করে মাছের অবাধ চলাচলের সুযোগ নিশ্চিত করা। ১৯৮৩ সনে মনু নদী প্রকল্পে নির্মিত বাঁধের জনাকুশিয়ারা নদী হতে কাওয়াদীঘি হাওরে এবং কাওয়াদীঘি হাওর হতে কুশিয়ারা নদীতে মাছের অবাধ চলাচল বিঘ্নিত হতো।

কাওয়াদীঘি হাওয়া দেশের উত্তর পূর্ব অঞ্চলের শ্রেষ্ঠ পাঁচটি মাতৃ জলমহালের মধ্যে অন্যতম।

প্রজননের অনুকূল পরিবেশ বিদ্যমান থাকতে দেখানে শতাধিক প্রজাতির মাছ পাওয়া যেতো এবং বিভিন্ন প্রজাতির বৃহদাকৃতির মাছের ভান্ডার বলে এটা পরিচিত ছিল। মনু নদী প্রকল্প বাস্তবায়নে কৃষিক্ষেত্রে উন্নয়ন হলেও হাওরে মাছের উৎপাদন হ্রাস পেয়ে -২৫% এ দাঁড়িয়েছে। তাই হাওরে মাছের প্রজননের পরিবেশ ফিরিয়ে এনে মাছের উৎপাদন ও প্রজাতির সংখ্যা বৃদ্ধির লক্ষ্যে মাছ মতাব্যাহার জনো করাদাইর খালে সাথে সংযোগ করে কাশিমপুরে মনু প্রকল্পের বাঁধের উপর আড়াআড়ি ভাবে পিসপাসটি নির্মাণ করা হয়েছে। দৈর্ঘ্য ৬২ মিটার ও প্রস্থ ৫ মিটারের নির্মিত পিসপাসের বিশেষব্যবস্থার মাধ্যমে পানির স্রোত নিয়ন্ত্রনের সাথে কোন প্রজাতির কত সংখ্যক মাছ কোন দিকে যাতায়াত করছে তা নির্ণয় করা যায়।

তিনি আরও বলেন, কুশিয়ারা নদী থেকে মাছ যাতে ফিসপাসের মাধ্যমে হাওরে প্রবেশ করতে পারে এবং প্রবেশ কৃত মাছ বৃদ্ধি

পেয়ে প্রজননক্ষম মাছে পরিণত হতে পারে তার লক্ষ্যে সরকার কর্তৃক করাদাইর খালকে মৎস্য অভয়ারণ্য হিসেবে ঘোষণা করে তাতে মাছ ধরা সম্পূর্ণ নিষিদ্ধ করা হয়েছে।

ফিসপাস ব্যবহারকারী মাছের চলাচল ও গন্তব্যস্থল জানার জন্য বহু সংখ্যক বৃহদাকৃতির মাছের এক প্রকার রাসিন প্রাস্টিক দ্বারা চিহ্নিত (টাগ) করে নদী ও হাওরে ছেড়ে দেয়া হয়েছে। এ ধরনের চিহ্নিত মাছ পেয়ে তার ট্যাগ ফেরত সহ তথ্য প্রদানকারীকে ৫শত টাকা হারে পুরস্কার দেয়ার ঘোষণা দেয়া হয়েছে। তা ছাড়া হাওর এলাকায় মৎস্যজীবগণকে ধৃত মাছের উন্নত পরিবহন, বাজার জাত করণ, ও সংরক্ষণ পদ্ধতির উপর প্রশিক্ষণ দেয়া হচ্ছে।

ফিসপাস খুলে দেয়াতে হাওরে অতিরিক্ত পানি প্রবেশ করে ফসলের ক্ষতি হয় কিনা জানতে চাইলে তিনি জানান যে, বৈশাখ-জ্যৈষ্ঠ মাসে হাওরের বোর ধান কাটার পর বর্ষা মৌসুমে যখন বান ভেঙে নদীতে পানি আসে তখনই পিসপাসের গেট খুলে দেয়া হয়। সমীক্ষা চালিয়ে দেখা গেছে কাশিমপুরস্থ পাস্প হাউজের ৮টি পাস্পের একটি পাস্প থেকে যে পরিমাণ হাওয়ার থেকে বের করে দেয় প্রবেশকৃত পানি তার চেয়ে অনেক কম। তাই ফসলের ক্ষতি হয় না।

পরীক্ষামূলক ফিসপাস প্রজেক্টটি ৯৫ মাসে চালু করে বর্তমানে যে ফলাফল পাওয়া গেছে তাতে আগামী-৫-৭ বছরের মধ্যে কাওয়াদীঘি হাওরের মৎস্য উৎপাদন পূর্বের অবস্থায় ফিরে আসবে এবং উক্ত হাওর মাতৃজলমহাল বিধায় এর উৎপাদন বৃদ্ধি পেলে তৎসংলগ্ন নদ-নদী ও বিল সমূহে ও আনুপাতিক হারে মাছের উৎপাদন বৃদ্ধি পাবে বলে তিনি আশাবাদ ব্যক্ত করেন। এ প্রকল্প কৃতকার্য হলে পরবর্তীতে জলমহাল সংলগ্ন অন্যান্য বাঁধ ও অনুরূপ প্রকল্প স্থাপন করা হবে।

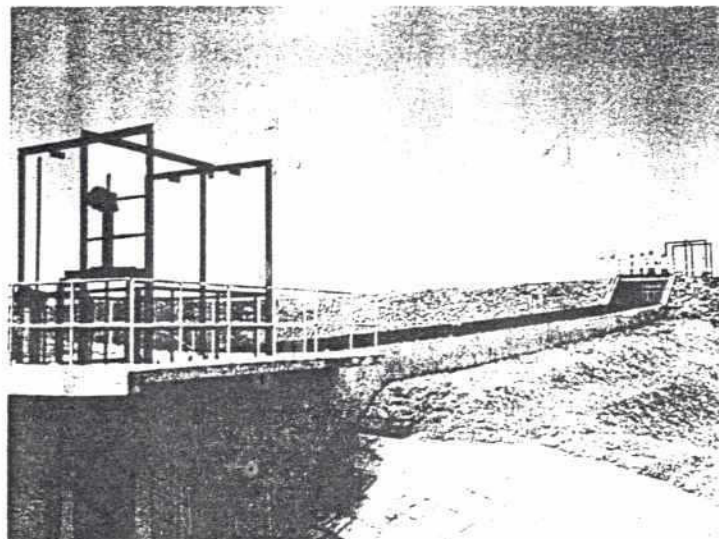
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Constructed for the First Time in Bangladesh, the Fishpass Structure at Kashimpur, Moulavibazar under EAP-6

Slogan of 1996

**Through Dedicated Professionalism
We Share in Nation Building**

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Northeast Regional Water Management Project (Fap-6 / P-28)

Scheduled activities and programmes of the project are in progress. Major programmes are as follows :

Kalni-Kushiyara feasibility study is in progress. Pilot dredging at Kakailseo (6 km. d/s of Ajmiriganj) is going to be finished by the end of this month. Gazaria (3 km d/s of Ajmiriganj) dredging has started on 7 March and expected to be finished by June 1996. Under Fish Pass Pilot Project of EAP-6, a Fish Pass Structure at Kashimpur was built in May 1995 for the fisheries development in the Kowerdhigir Haor. Impact monitoring of the fish pass is going on. Final Feasibility report of Dampara Project of EAP-6 is expected to be finished by the end of this month. A fish fair was organized by local fish traders at Sherpur under Moulvibazar District on 13-14 January, 1996. Many fishermen in the region attended the fair along with their caught fishes. It created an opportunity to disseminate the concept of fishpass to such a big gathering of fishermen in the region. NERP (EAP-6) took a stall in the fair and displayed pictures, drawings, sample fishes, videos on fisheries activities of NERI and distributed a simple Bangla leaflet on fishpass to the fishermen. NERI professionals who attended the fair talked to a large section of people and answered to their various queries about the fishpass. Workshop on Water Management Planning Progress by NERP is expected to be held on 19-20 March, 1996 at GEZ training center, Gulshan Dhaka. Participants from six Government agencies BWDB, DOF, DOE, LGED, BIWTA and DAE will attend this workshop. NERP professionals of various disciplines will act as facilitators of the workshop.

সংবাদ

সরজমিন প্রতিবেদন

ফিশপাস : হাওড় এলাকায় মাছ উৎপাদন বাড়ানোর প্রকল্প

শিশির মোড়ল। হাওড় এলাকায় মাছের উৎপাদন বৃদ্ধির জন্য দেশের সর্বপ্রথম ফিশপাস পাইলট প্রকল্প নিয়ে সরকারি কর্মকর্তা এবং প্রকল্প-সংশ্লিষ্ট বৈজ্ঞানিক কর্মকর্তারা ব্যাপক আশাবাদ ব্যক্ত করলেও স্থানীয় জনগণ, বিশেষ করে হাওড়ের বসবাসকারী মৎস্যজীবীরা প্রকল্পের সাফল্য নিয়ে ভিন্নমত প্রকাশ করেছে। উত্তর-পূর্ব আঞ্চলিক পানি ব্যবস্থাপনা প্রকল্পের (ফ্যাপ-৬) নামে যে প্রকল্প সুবচেয়ে বেশি পরিচিত। অধীনে এই পরীক্ষামূলক ফিশপাসটি নির্মিত হয়েছে মৌলভীবাজার জেলার রাজনগর থানার কাশিমপুরে মনু নদী বন্যা নিয়ন্ত্রণ ও সেচ প্রকল্প বাঁধে।

কৃত্রিম বাঁধ নির্মাণ করে হাওড় এলাকার মৎস্য সম্পদের যে ব্যাপক ক্ষতি করা হয় তা পূরণ করার জন্য আবার কৃত্রিম ব্যবস্থা গ্রহণ করা হয়েছে। দু'টি ক্ষেত্রেই স্বরচ করা হয়েছে বিপুল পরিমাণ বৈদেশিক অর্থ।

কানাডীয় আন্তর্জাতিক উন্নয়ন সংস্থার (সিডা) আর্থিক সহায়তায় বাংলাদেশ সরকার ও বাংলাদেশ পানি উন্নয়ন বোর্ডের অনুমোদনক্রমে ফিশপাস নির্মাণের কাজ ১৯৯৫ সালের জানুয়ারি মাসে শুরু হয়ে এপ্রিল মাসে শেষ হয় এবং মে মাসে চালু করা হয়। উত্তর-পূর্ব আঞ্চলিক পানি ব্যবস্থাপনা প্রকল্পের (ফ্যাপ-৬) অধীনে যে চারটি পাইলট প্রজেক্ট হাতে নেয়া হয় ফিশপাস তার একটি। ১৯৯৭ সালের মে মাসে এই প্রকল্পের যাবতীয় পরীক্ষা-নিরীক্ষার কাজ শেষ হবে। প্রকল্পটি সফল বা কার্যকর বলে বিবেচিত হলে এবং প্রয়োজনীয় বিদেশী অর্থ পাওয়া যায় তাহলে দেশের বিভিন্ন এলাকায় বাস্তবায়ন করা হবে বলে প্রকল্প সূত্রে জানা যায়।

ফিশপাস হচ্ছে একটি কাঠামো। দু'টি জলাশয়ের মাঝে কোন বাঁধ মাছ চলাচলের যে বাধার সৃষ্টি করে ফিশপাসের মাধ্যমে সে বাধা দূর করা হয় এবং অব্যাহত মাছ চলাচলের সুযোগ সৃষ্টি হয়। মনু নদী প্রকল্প বাঁধের কারণে কুশিয়ারা নদী হতে কাওয়াদীঘি হাওড় এবং কাওয়াদীঘি হাওড় হতে কুশিয়ারা নদীতে মাছের অব্যাহত চলাচল বিঘ্নিত হতো বা এখনো হয় বলে প্রকল্প কর্মকর্তারা মনে করেন। বাঁধ তৈরির আগে মোট সাতটি প্রাকৃতিক খালের মধ্য দিয়ে মাছ যাতায়াত করতো। ফিশপাসের প্রধান উদ্দেশ্য বর্ণনা করতে গিয়ে বলা হয়েছে, "কুশিয়ারা নদী এবং কাওয়াদীঘি হাওড়ের বাঁধের মধ্য দিয়ে মাছের অব্যাহত যাতায়াতের ব্যবস্থা করা যেন মাছের প্রজাতির সংখ্যা বৃদ্ধিসহ উৎপাদনও বেড়ে যায়"। কাওয়াদীঘি হাওড় মৌলভীবাজার জেলায়। দেশের উত্তর-পূর্ব অঞ্চলের অন্যতম প্রধান মাতৃমৎস্য জলমহাল এটি। নিকট-অতীতেও এই হাওড়ে শতাধিক প্রজাতির মাছ পাওয়া যেত বলে মুন্সিংগ বিজ্ঞানীরা জানিয়েছেন। তাছাড়া বহু প্রজাতির মাছের প্রজননের অনুকূল পরিবেশ ছিল এই হাওড়ে। বৃহদাকার মাছের ভাতার বলেও কাওয়াদীঘি হাওড়ের পরিচিতি ছিল।

উত্তরে কুশিয়ারা, পশ্চিম ও দক্ষিণে মনু নদী এবং পূর্বে বাটেরা পাহাড় - এই সীমানার মাঝে মোট ৫৬ হাজার একর জমিকে বন্যামুক্ত ও সেচ সুবিধা দেবার জন্য ৫৯ কিলোমিটার দীর্ঘ তেড়ি বাঁধ নির্মাণ করা হয় মনু নদী প্রকল্পের আওতায়। ১৯৭৫-৭৬ সালে কুয়েতী অর্থসাহায্যে এই প্রকল্পের কাজ শুরু হয় এবং ১৯৮৩ সালে শেষ হয়। স্বরচ হয় মোট ৭২ কোটি টাকা। কাওয়াদীঘি হাওড় এই প্রকল্প এলাকার ঠিক মাঝে। মৌলভীবাজার পানি উন্নয়ন বোর্ডে কর্মরত একজন প্রবীণ প্রকৌশলী বলেন, "প্রকল্পের নাম কাওয়াদীঘি হাওড় প্রকল্প হওয়াই যুক্তিসঙ্গত ছিল।"

ফিশপাস পাইলট প্রজেক্টের পক্ষ থেকে কাওয়াদীঘি হাওড়ে মাছ কমে যাওয়ার কারণ হিসেবে বলা হচ্ছে, মনু বাঁধ নির্মাণের পূর্বে বর্ষা মৌসুমে কুশিয়ারা নদীর বিভিন্ন প্রজাতির প্রজননকর্ম মাছ বাঁধে ঝাঁকে বিভিন্ন খাল ও নদী দিয়ে হাওড়ে প্রবেশ করতো এবং স্বচ্ছ পানি ও নিম্ন পরিবেশে প্রজনন ঘটায় বর্ষাশেষে পুনরায় নদীতে ফিরে যেত। বাঁধ নির্মাণের ফলে সমস্ত খাল বন্ধ হয়ে গেছে। সুতরাং আগের মত মাছ আর হাওড়ে ঢুকতে পারে না। তাছাড়া মাছের প্রজননের পরিবেশও নষ্ট হয়েছে। তাই রুই, কাতলা, মৃগেল, ঘনিতা, কাকিবাঁশ, তিসা, মাইতি, জিতন ইত্যাদি মাছের উপস্থিতি প্রায় শূন্য। নেমে এসেছে। রাজনগর থানার অস্ত্রহরি গ্রামের বারীন্দ্রকুমার নমশূত্র (৫৫) বলেন, "বাঁধ দেবার ফলে তাড়ি এলাকার মাছ হাওড়ে উঠতে পারে না। হাওড়ে ৭৫% মাছ কমে গেছে। আগে ১০/১২ ঘন্টা পরিশ্রম করলে ২৫/৩০ কেজি মাছ ধরা যেত। এখন ৪/৫ কেজি মাছও পাওয়া যায় না। এ প্রসঙ্গে মন্তব্য করতে গিয়ে মৌলভীবাজার পানি উন্নয়ন বোর্ডের তত্ত্বাবধায়ক প্রকৌশলী রতীশ চন্দ্র দাশ বলেন, "যখন মনু নদী প্রকল্প করা হয়

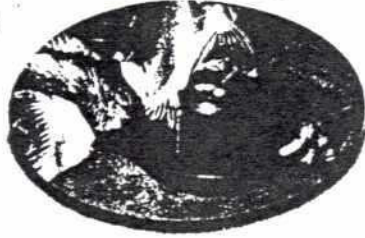
তখন কৃষি উৎপাদন বৃদ্ধির বিষয়টি ছিল প্রধান বিবেচ্য। মাছের বিষয়টি তখন ভাবা হয়নি। তবে ভাবা উচিত ছিল।"

মনু নদী প্রকল্পের কারণে মৎস্য সম্পদের যে ব্যাপক ক্ষতি হয়েছে তাকে মোকাবিলা করার জন্য ফিশপাস পাইলট প্রজেক্ট হাতে নেয়া হয়েছে। এই প্রকল্পটি যদি সফল বিবেচিত হয় এবং পরবর্তী সময়ে যদি প্রয়োজনীয় বিদেশী অর্থসাহায্য পাওয়া যায় তাহলে দেশের বিভিন্ন এলাকার হাওড়ে এই প্রকল্প আরও ব্যাপকভাবে বাস্তবায়ন করা হবে বলে প্রকল্পের কর্তাব্যক্তির মনে করেন।

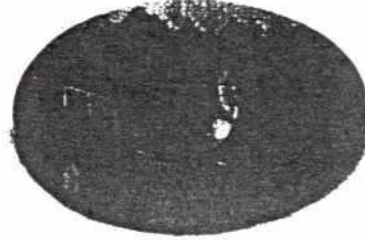
ফিশপাসটি নির্মাণ করা হয়েছে মনু প্রকল্প বাঁধের ওপর আড়াআড়িভাবে। একে বলা হচ্ছে Single jet vertical slot. এর মাধ্যমে যুক্ত হয়েছে কুশিয়ারা নদী এবং কাওয়াদীঘি হাওড়। কাঠামোর দৈর্ঘ্য ৬২ মিটার এবং প্রস্থ ৫ মিটার। এর অভ্যন্তরে রয়েছে চৌবাচ্চা মতো ১৬টি কাঠামো (পুন্ড), যার প্রতিটির আয়তন ৭-৭৫ বর্গমিটার এবং ১৭টি ফলক (বাক্সেল)। ফিশপাস কাঠামোর দু'প্রান্তে রয়েছে দু'টি পর্যবেক্ষণ চৌবাচ্চা। ফিশপাসের গুটি খুলে দিলে এতে পানি প্রবেশ করে যখন এক চৌবাচ্চা হতে অপর চৌবাচ্চায় প্রবাহিত হয়, তখন পানির স্রোত বাক্সেলের মাধ্যমে নিয়ন্ত্রিত হয়ে এমন অবস্থায় আসে যাতে মাছ সহজেই স্রোতের বাধা অতিক্রম করে বা স্রোতের গতির সাথে খাপ খাইয়ে নদী হতে হাওড়ে এবং হাওড় হতে নদীতে প্রবেশ করতে পারে। কোন প্রজাতির কতসংখ্যক মাছ কোনদিকে চলাচল করছে তা পর্যবেক্ষণ চৌবাচ্চায় বিশেষ ব্যবস্থার মাধ্যমে নির্ণয় করা যায়।

মৎস্যসম্পদ উন্নয়ন প্রযুক্তি ও ব্যবস্থাপনা

মৎস্য পক্ষ '৯৬
সংকলন



মাছের চাষ করবো
সোনার বাংলা গড়বো



মৎস্য ও পশুসম্পদ মন্ত্রণালয়

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সময় বিশেষে পানিসম্পদের বহুমুখী ব্যবহার বিস্তার লাভ করেছে। বাংলাদেশের এর ব্যতিক্রম নয়। বিপত্ত কয়েক দশক আগে বন্যা নিয়ন্ত্রণ ও সেচ কার্যক্রমের উদ্দেশ্যে দেশের বহুস্থানে বাঁধ, পানি নিয়ন্ত্রক গেট ইত্যাদি নির্মিত হয়েছে। এ ধরনের অবকাঠামো নির্মাণের ফলে মাছের চলাচল বিঘ্নিত হচ্ছে। উদ্ভূত বা প্রবাহমান জলাশয়ে মাছের স্বাভাবিক চলাচল বাধাগ্রস্ত হওয়ায় মাছের প্রচরণশীল স্বভাব (migratory behaviour) ক্রমান্বয়ে পরিবর্তন আসছে যার ফলশ্রুতিতে এদের প্রাকৃতিক প্রজননের ওপর মারাত্মক ভর্তুকি প্রভাব পরিলক্ষিত হচ্ছে। মাছ তার প্রাথমিকভাবে বিভিন্ন সময়ে প্রজনন, বৃদ্ধি বা বাদ্যাদুসংস্থানের জন্যে অথবা জলবায়ু বিপত্ত প্রভাব হতে নিজেদের সুরক্ষার জন্যে বা সঠিক পরিবেশ প্রাপ্তির জন্যে এক স্থান হতে অন্য স্থানে অথবা কোন বিশেষ পরিবেশ হতে তিন্তু পরিবেশে পরিভ্রমণ করে থাকে। একেই সাধারণভাবে মৎস্য প্রচরণ (fish migration) বলা হয়। কিন্তু পানিসম্পদ উন্নয়নের বিভিন্ন কার্যক্রমে বহুস্থানে বাঁধ নির্মাণের ফলে মাছের চলাচল বিঘ্নিত হওয়ায় এদের প্রজনন ও বৃদ্ধির অনুকূল পরিবেশ হারিয়ে বাধাগ্রস্ত হয়ে মৎস্যসম্পদ হ্রাস পাচ্ছে। দেশের মৎস্যসম্পদ হ্রাসের চিহ্নিত কারণসমূহের মধ্যে বন্যা নিয়ন্ত্রণ ও সেচকর্ম অন্যতম।

মৎস্য প্রচরণে প্রতিবন্ধকতা সৃষ্টি হওয়ায় নির্দিষ্ট বৌদ্ধিক বা জীবনচক্রের নির্দিষ্ট সময়ে মাছ তাদের প্রজননক্ষেত্র বা বৃদ্ধিত সহায়কযোগ্য অঞ্চলে প্রবেশ করতে পারেনা। এ অবস্থার ফলে ইতোমধ্যে বহু প্রজাতির উৎপাদন হ্রাস পেয়েছে এবং কতিপয় প্রজাতির বিলুপ্তি হতে চলেছে। কোন প্রকার সমাধান না খোঁজে হাজারসমূহ ঘিরে বাঁধ প্রদানের ফলে প্রবাহমান জলাশয় বন্ধ জলাশয়ে পরিণত হয়, প্রাকৃতিক পরিবেশের পরিবর্তন ঘটে, দীর্ঘকাল যাবৎ বিদ্যমান জৈবশৃঙ্খল ছিন্ন হয়, মৎস্য প্রজননযোগ্য এলাকার

ভৌত-রাসায়নিক ধর্মের পরিবর্তন ঘটে এবং বাঁধের অভ্যন্তরস্থ মৎস্য বিচরণকৃত সংকুচিত হয়ে আসে।

কাশিমপুর ফিশপাস

মৌলভীবাজার জেলায় বাংলাদেশ পানি উন্নয়ন বোর্ড কর্তৃক বাস্তবায়িত মনু নদী বন্যা নিয়ন্ত্রণ ও সেচ প্রকল্প বাঁধের কাশিমপুর নামক স্থানে কানাডীয় আন্তর্জাতিক উন্নয়ন সংস্থা (Canadian International Development Agency, সংক্ষেপে CIDA) অর্থানুকূল্যে উত্তর-পূর্ব আঞ্চলিক পানি ব্যবস্থাপনা প্রকল্পের (North-east Regional Water Management Project, সংক্ষেপে NERP) অধীনে ১৯৯৫ সালের মে মাসে এদেশে সর্বপ্রথম একটি ফিশপাস পরীক্ষামূলকভাবে চালু করা হয়। এ প্রযুক্তির প্রচেষ্টা আমাদের দেশে নতুন হলেও

Fishpass

আমাদের দেশের অধিকাংশ সেচকার্যের জন্য নির্মিত হওয়ায় প্রাচীন পানি হাওরের স্রোত মতো ভাটি-ক্যাল ট্রাট ফিশপাস অধিকতর হচ্ছে। বাঁধের দু'পাশের পানির ব ওয়ায় ফিশপাসে নির্মাণ করা যেতে বিশেষে এর ধরন তিনু রকমও হ ধরন ও স্থান নির্বাচন কালে নিম্নবর্ণিত বোঝা আবশ্যিক।

During the last decades natural migratory patterns of fishes have been largely interrupted by construction of dykes, regulators etc. for flood control and irrigation purposes without any provision for the passage of fish. The abundance of majority of freshwater fishes have declined and researchers have identified barriers to migration of fish as a major contributing factor for this decline. In order to permit fish migrations in rivers and floodplains, it is necessary to maintain conditions which help migrants reach their destination. To overcome obstacles, placed in the migratory route of fish, a fishpass is the only sustainable mitigation measure. A fishpass consists of a series of pools installed to aid the fish to overcome natural or artificial obstacles during migration. A vertical slot fishpass has been constructed in 1995 at Kashimpur of Moulvibazar district under Northeast Regional Project (FAP-6) with the financial assistance of Canadian International Development Agency (CIDA) across the full flood embankment of Manu River Project. This Flood Control Drainage and Irrigation (FCDI) Project has had a particularly negative impact on the important Kawadighat Haor fishery. Results of the fishpass to date have been encouraging. Some 62 species of fish have been found using the structure. Migration is in both directions - river to haor, and haor to river - and both countercurrent and concurrent. Fish biodiversity in the haor has responded strongly to the structure and fish production has also increased significantly.

৫৪৩



প্রধানমন্ত্রী
গণপ্রজাতন্ত্রী বাংলাদেশ সরকার

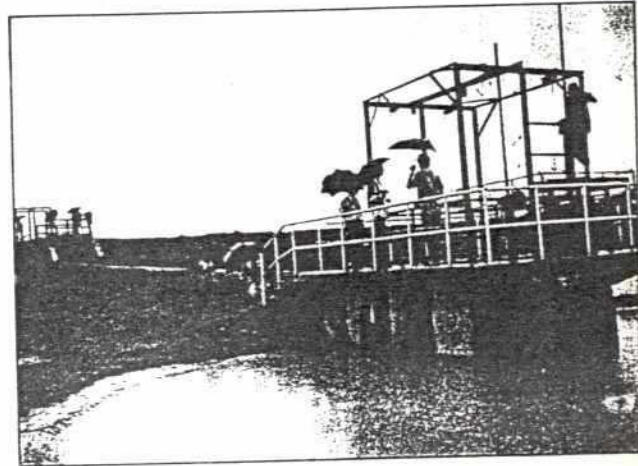
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বাণী

সময় এসেছে 'মৎস্য পক্ষ' উপলক্ষে মাছের চাষ ও উৎপাদন বৃদ্ধিতে একটি সম্মেলিত অধিবেশনে
পরিণত করে জাতির শ্রিতা বঙ্গবন্ধুর সোনার বাংলায় বঙ্গবন্ধুদের পক্ষে পথ প্রদর্শন করবে।
ছাদি মৎস্য পক্ষ '৯৬-এর সর্বজনীন সাক্ষ্য রাখনা করি।

অঃ বাণী, অঃ বঙ্গবন্ধু
বাংলাদেশ দীর্ঘজীবী হোক।

(শেখ হাদিকা)



Fish Migration And Fishpass

Gazi Nurul Alam

MIGRATION is an important exercise for fish species, especially for the fish fauna of capture fisheries. Migration of fish from river to floodplain and vice versa helps breeding, rearing, feeding and growth of fish. More than 52.2% of the total national fish harvest comes from the capture fisheries sector. Harvesting of naturally occurring and self reproducing fish population is known as capture fishery. There is a hue and cry about the acute crisis of fish all over the country. Moreover, the per capita fish availability is also decreasing alarmingly day by day. But the question is what are the reasons responsible for the significant declination of the fish population? It is very clear that both man-made and natural factors are responsible for this alarming decline of fish production. As already mentioned, more than 50% of the total annual national fish production is contributed by capture fishery, being seriously threatened by identified and unidentified reasons, thus a causing serious fisheries loss. Bangladesh Fisheries Resources Survey System (BFRSS) data reveal that there are about 4,047,316 hectares constituting capture fisheries. It may be mentioned here that 50,000 sq. km out of the total area of a little over 88,500 sq km area of Bangladesh are flood vulnerable. All the open water components, i.e. rivers, canals, beels, and floodplains become connected with each other and turn into an integrated single biological production system during the monsoon months. This integrated single production system lasts for up to 5 months providing suitable aquatic habitats for reproduction, migration, feeding and growth of aquatic organisms.

In this integrated single production system, the inundated floodplains (floodland) during 5 months' inundation play a most significant role in expanding and maintaining the open inland water capture fishery production. Many fin fish breed in the favourable habitat conditions in the inundated floodplains, where the new born juveniles feed and grow in the nutrient rich flooded lands.

Young and juveniles of many fin fish resulting from breeding in the flowing rivers and estuaries also migrate into the inaudated lands for feeding and completing early growth. At the end of the monsoon the fish return to the rivers and beels from floodplains with the receding water. The integrity of this production system can be maintained intact only if the natural pattern of flooding and water move-

ment is preserved. But such preservation has not been possible because of the need for flood control, drainage and irrigation. Flood control and improved drainage are needed primarily for maximising food grain production. Improved drainage of low land increases cropping intensity, while flood control is needed to protect life and property of the rural people.

Impact Of Flood Control

Typical impact of flood control and drainage (FCD) and flood control, drainage and irrigation (FCDI) on fisheries are:

— FCD restricts the floodplains and also modifies the timing and amplitude of flooding. These two together reduce fish productivity and species diversity.

— Flood control measures can, and in most instances do, inhibit migration and movement of fish to their feeding and breeding grounds.

— Portions of rivers falling within embankments and regulators of FCD/FCDI projects become altered from flowing (lotic) to stagnant (lentic) water body, i.e. destruction of the riverine character. This change restricts the passage of fry, juveniles, and adults of migratory species in the altered parts of the rivers.

Solutions

In order to sustain and save our valuable capture fisheries, resource, we should find out a reasonable and acceptable solution. Most beels and floodplains are connected with the surroundings rivers through small khals. During the monsoon period, water along with many aquatic fauna (fish, fish eggs, larvae, etc) moves freely from river to the floodplains. But the development of the recent FCD and FCDI schemes has become a great impediment for migration of fish fauna. We need both fish and crops, so in order to save both of the resources we should adopt the provision of "Fishpass" the fish friendly structure for incorporating in the existing as well as future infrastructure development.

Fishpass

Fishpass is a gate structure specially designed and incorporated to facilitate fish migration through it in either direction. It is the most acceptable concept to be followed to avoid a conflict between farmers and fishermen. If the fishpass is suitably designed and operated in timely manner it serves the purpose of fish migration to a reasonable extent. In every part of the structure being

constructed in all the FCD projects in Bangladesh the fishpass should be incorporated under compulsion.

Fishpass In Bangladesh

A fishpass has been constructed by the north-east Regional Water Management Project across the Manu river at the irrigation project in Kashimpur in the district of Moulvibazar. The project was financially assisted by Canadian International Development Agency (CIDA). The fishpass is a series of pools installed to aid fish in migrating across the full-flood embankment from the Kushiara river to Kawadighi haor. This is the first fishpass in the country and indeed the first application of its type anywhere in the world in a flood control project. The design of the fishpass is of single jet vertical slot type with an overall length of 61.85 m. There are 16 baffles and 17 pools with 2 observation chambers one at each end. The design of the structure results in a maximum flow velocity through the vertical slots of about 1.3m/s and inlet velocity of about 0.5m/s.

Operation of the Manu fishpass started during the last week of May 1995. A large number of fish species, including carp, cat fish and many other small miscellaneous fishes, have been observed using the fishpass. The fishpass at the Manu river basin is a large and complex full flood control project with pumped drainage and irrigation facilities. At present within the river in the north-east and south and Bhatera hill in the east, Kawadighi haor was of outstanding regional importance as a brood fishery resource prior to the project implementation. The project virtually decimated Kawadighi haor as a brood fishery resource, resulting in severe damage to fisheries resources and major economic loss to the fishing community in the area. The fishpass offers the possibility of a recovery of a portion of the production of Kawadighi haor mother fishery over a period of perhaps 5 to 7 years.

Suggestions

Under the present green revolution expedition in the agriculture sector followed by indiscriminate construction of FCD/FCDI infrastructures in different projects, and at the same time to maintain the fish population of capture fishery in the open water system of Bangladesh, the writer suggests the following recommendations for immediate implementation and constant monitoring:

— The provision of fishpass should be incorporated in every gated structure. In this connection the professional expertise of the fisheries expert should be entertained.

— One of the major concerns is the design, construction, and management of regulators (sluices). They should be constructed and operated in such a way that adult carp can migrate upstream at the beginning of May and the hatchlings can enter the floodplains in June/July.

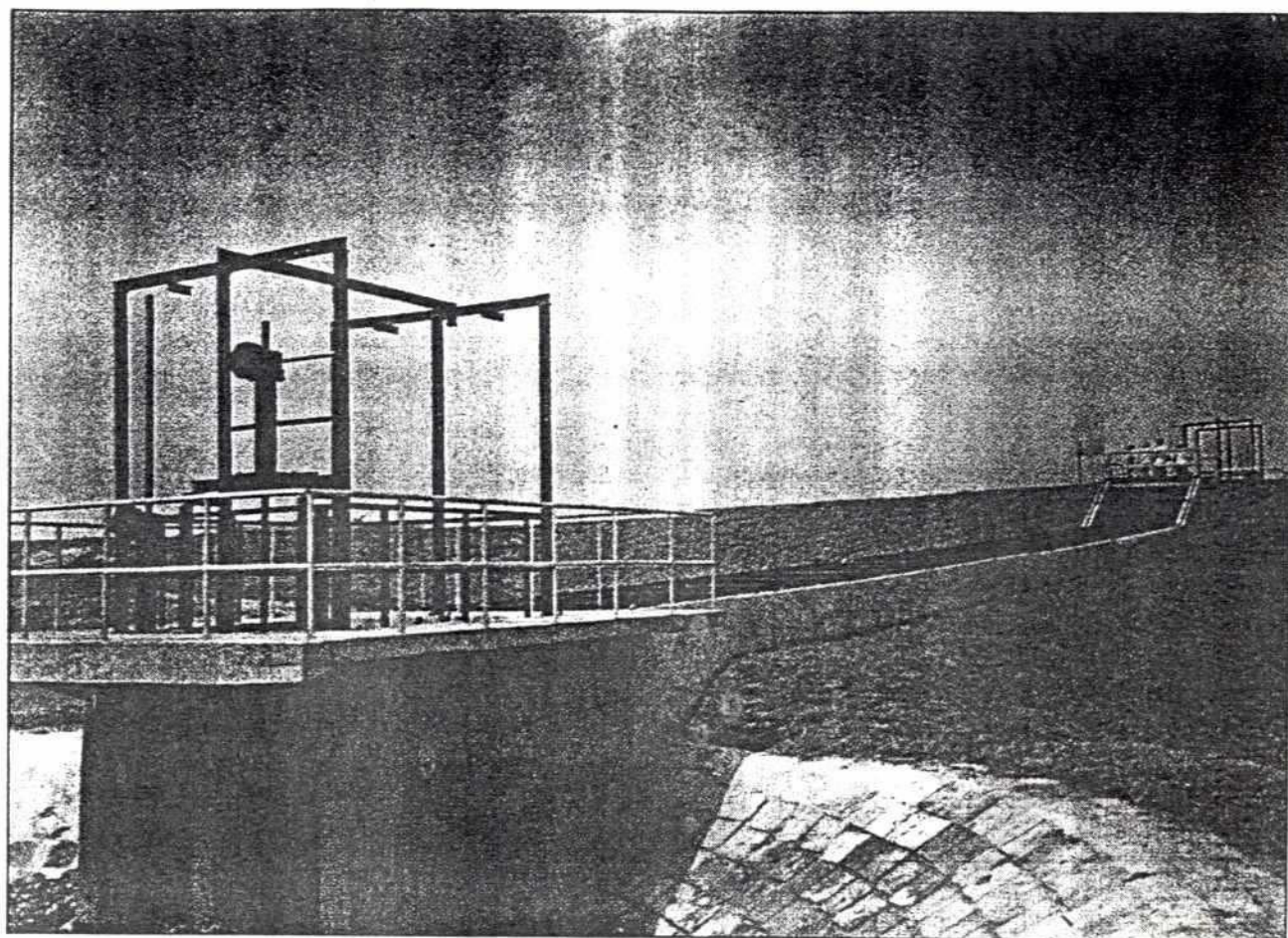
— The migration of carp fry and fingerlings is more or less passive. At a certain moment thousands of young are drifting down stream. This phenomenon occurs within peak periods during the months of May-July (writers own practical experience). At a certain moment the concentration of hatchlings/fry per cubic meter of river water is extremely high. This is the moment in which the inlets of the gated structure should be open in order to have a maximum fisheries output. From a fisheries point of view there is some flexibility. It is a question of weeks and flood water should enter in the peak period of June-July.

— From a fisheries point of view the concept of gated openings is recommended, as long as the regulators or sluices are built in such a way that (passive) fish migration will not be hampered. The structure should be completely open from the bottom to the top layer of the water. This is to facilitate all fish to enter. Migration of fish is related to water layer, they are in carps eggs, and fingerlings are in the top layers.

— Members of the fishermen's community and landless groups should be nominated in the management committees of the operation of the sluice gates.

— Throttled regulators have the advantage that they operate as designed to do once they are placed. Within the design of throttled regulators, special attention should be given in order to avoid whirling current before and after the regulator, known to trap and damage young fish.

As soon as the fish migration is facilitated through introduction of fishpass in the structure, the capture fisheries status will be enhanced by ensuring feeding, rearing and breeding of fishes in the floodplains. So, the FCD/FCDI project implementation authorities should take immediate and necessary steps for incorporation of the fishpass system in the greater interest of national fish production and professional fishermen.



The Fishpass on the embankment in village Kashimpur of Rajnagar thana in Moulvibazar district.

Photo courtesy: NERP

Fishpass for bio-diversity

Mohiuddin Ahmad

FLOOD protection embankments have been the major engineering interventions for water management projects in Bangladesh. These are mainly rationalised in the context of increased demand for rice cultivation. While there has been substantial growth in rice production in flood-protected areas in the short run, its environmental costs are heavy. Environmental issues had largely been overlooked in appraising water management projects in the past. Now the situation has changed to some extent.

The *Monu River Irrigation Project* (MRIP) was implemented in the early eighties by the Bangladesh Water Development Board (BWDB). The MRIP ruined the mother fishery of the *Kawadighi Haor*. This haor was one of the few mother fisheries of the region rich in bio-diversity. It was cut off from the *Kushiyara* river by the MRIP embankment. This resulted in loss of fishery and consequent impoverishment of several thousand fisher families.

An idea of reviving the old status of the *Kawadighi Haor* was first conceived in the early nineties. A pre-feasibility study was done within the framework of the Northeast Regional Project (NERP), a bilateral endeavour of the governments of Bangladesh and Canada. The study resulted in an innovative project, the first of its kind in South Asia region.

A Fishpass was designed to facilitate the migration of fish in

the pre-monsoon and the monsoon seasons (April-October) from the river to shallow areas inside the MRIP. The site of the Fishpass was selected after analysing migratory routes of fishes in the *Kushiyara* river over a period of three years. A Fishpass was built on the embankment in village Kashimpur of Rajnagar thana in Moulvibazar district. The structure has been functioning since May 1995 immediately after its construction.

This is a single-jet vertical slot structure, 5 meters wide and 62 meters long. It has 17 pools, two observation chambers and 16 baffles. The structure has the maximum flow velocity of 1.3 m/sec through vertical slot. It is a low-cost structure and easy to operate.

The project staff have been monitoring the functioning of the Fishpass since May 1995. They stay in Kashimpur, take samples of fish passing through the structure regularly and record the species passing through the structure. The monitoring phase will end in April 1997 and may be extended up to December 1997.

Initial observations show that the Fishpass structure has been successful in helping the migration of fish from the river to the *haor*. Among the fish are certain species which had earlier disappeared from the *Kawadighi Haor*. Now these are seen in the *beels* of the *haor*. NERP professionals expect that if an appropriate conservation strategy is pursued by the government, the *Kawadighi Haor* could be revived to its old form in next five to ten years. They say that the Fishpass has already been proved successful as a technical device and it should be replicated in other flood protection projects. ■

