JAPAN INTERNATIONAL COOPERATION AGENCY

DEPARTMENT OF THE ENVIRONMENT
MINISTRY OF JIHAD-E-AGRICULTURE
THE ISLAMIC REPUBLIC OF IRAN

THE STUDY ON INTEGRATED MANAGEMENT FOR ECOSYSTEM CONSERVATION OF THE ANZALI WETLAND IN THE ISLAMIC REPUBLIC OF IRAN

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EXCHANGE RATE

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THE STUDY ON INTEGRATED MANAGEMENT FOR ECOSYSTEM CONSERVATION OF THE ANZALI WETLAND

FINAL REPORT

Volume IV : DATA BOOK

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ABBREVIATIONS

B/C	Benefit-Cost Ratio
BEA	Business Environment Association
BOD	Biochemical Oxygen Demand
CEP	Caspian Environment Programme
CHTO	Culture, Heritage, and Tourism Organization
COD	Chemical Oxygen Demand
COP	Conference of Parties
CPI	Consumer Price Index
DO	Dissolved Oxygen
DOE	Department of the Environment
DOE Guilan	DOE Guilan Provincial Office
EIA	Environmental Impact Assessment
EIRR	Economic Internal Rate of Return
EMS	Environmental Management System
EPM	Erosion Potential Method
EU	European Union
FAO	Food and Agriculture Organization
FFS	Farmer Field Schools
F/S	Feasibility Study
FRO	Forestry and Range Organization
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIS	Geographic Information System
GOJ	Government of Japan
GOI	Government of Islamic Republic of Iran
GPS	Global Positioning System
GRDP	Gross Regional Domestic Product
GWWC	Guilan Water and Wastewater Company
HQ	Headquarter
HUDO	Housing and Urban Development Organization
IEE	Initial Environmental Examination
IMF	International Monetary Fund
IMO	Industrial Mining Organization
IPM	Integrated Pest Management
IRR	Iranian Rial
ISO	International Organization for Standardization
ISW	Industrial Solid Waste
ITTO	Iran Touring and Tourism Organization
IUCN	The World Conservation Union
JICA	Japan International Cooperation Agency
JPY	Japanese Yen
MOE	Ministry of Energy
MOED	Ministry of Education
MOE Guilan	MOE Guilan Provincial Office
MOIM	Ministry of Industries and Mines
MOJA	Ministry of Jihad-e-Agriculture
MOJA Guilan	MOJA Guilan Provincial Directorates
MORT	Ministry of Roads and Transportation
M/P	Master Plan
MPO	Management and Planning Organization
NCSD	National Council for Sustainable Development

NGO	Non Governmental Organization
NPV	Net Present Value
NRGO	Natural Resources General Office
NWWEC	National Water and Wastewater Engineering Company
O&M	Operation and Maintenance
PEC	Provincial Environmental Committee
PPP	Polluter Pay Principle
PRA	Participatory Rural Appraisal
PSIAC	Pacific Southwest Inter-agency Committee
PSO	Ports and Shipping Organization
RAN	Rural Advisers Network
RAP	Resettlement Action Plan
REAN	Rural Environment Advisers Network
RET	Rural Environment Team
RWO	Regional Water Organization
RWWC	Rural Water and Wastewater Company
SCI	Statistical Center of Iran
SEG	Schools Environmental Group
SS	Suspended Solid
SWIM	Solid Waste Improvement Meeting
SWIM-H	Solid Waste Improvement Meeting for Hospital Waste
SWIM-I	Solid Waste Improvement Meeting for Industrial Waste
SWIM-M	Solid Waste Improvement Meeting for Municipal Waste
SWM	Solid Waste Management
The Study	The Study on Integrated Management for Ecosystem Conservation of the Anzali Wetland
TDS	Total Dissolved Solid
T-N	Total Nitrogen
TOR	Terms of Reference
T-P	Total Phosphorus
UN	United Nations
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific, and Cultural Organization
USD	United States Dollar
US EPA	United States Environmental Protection Agency
VAT	Value Added Tax
WEMP	Wetland Ecological Management Plan
WGLEP	Working Group on Landuse, Environment and Population
WEAT	Wetland Environmental Action Team
WGLEP	Working Group on Landuse, Environment and Population
WMD	Watershed Management Department
WMP	Watershed Management Plan
WPDT	Wetland Professional Development Team
WTP	Willingness-To-Pay
WWTP	Wastewater Treatment Plant

MEASUREMENT UNIT

Length

mm	millimeter
cm	centimeter
m	meter
km	kilometer

Area

m^2	square meter
km^2	square kilometer
ha	hectare

Volume

m^3	cubic meter
l, L	liter
MCM	million cubic meter

Concentration

ppm	parts per million

Weight

mg	milligram
g	gram
kg	kilogram
ton	metric ton

Time

sec	second
min	minute
hr	hour
yr	year

Currency

IRR	Iranian Rial
JPY	Japanese Yen
USD	United States Dollar

Others

%	percent
°C	degree centigrade
10^3	thousand
10^6	million
10^9	billion

Data 1: Water Quality and Bottom Sediment Survey

DATA 1: WATER QUALITY AND BOTTOM SEDIMENT SURVEY

1.1 General

This survey aimed to collect data on the physical and chemical characteristics of water and bottom sediment in and around the Anzali Wetland, in order to assess the environmental conditions of the wetland and its watershed. This survey was sublet to the laboratory of DOE Guilan.

1.2 Scope of the Work

1.2.1 Sampling

The sampling was carried out in and around the Anzali Wetland. The number of sampling points was 43 points for water quality survey and 36 points for bottom sediment survey. The sampling points are shown in Table 1.2.1 below, and their locations are shown in Figures 1.2.1 and 1.2.2.

Table 1.2.1 Sampling Point

Environment	Sampling Point
Rivers near the major municipalities and rural areas	Twenty (20) points: Siah River, Pirbazar River, Ciahmezgi River, Pasikhan River, Siah-darvishan River, Massuleh River, Palanahvar River, Khalkaii River, Morghak River, Bahambar River
Wetland	Sixteen (16) points: Marsh, small streams, rivers and lagoon in wetland
Leachate from waste disposal sites in Rasht and Anzali cities	Two (2) points
Industrial wastewater drainage and sewerage system in Rasht and Anzali cities	Five (5) points*

Note: * water quality analysis only

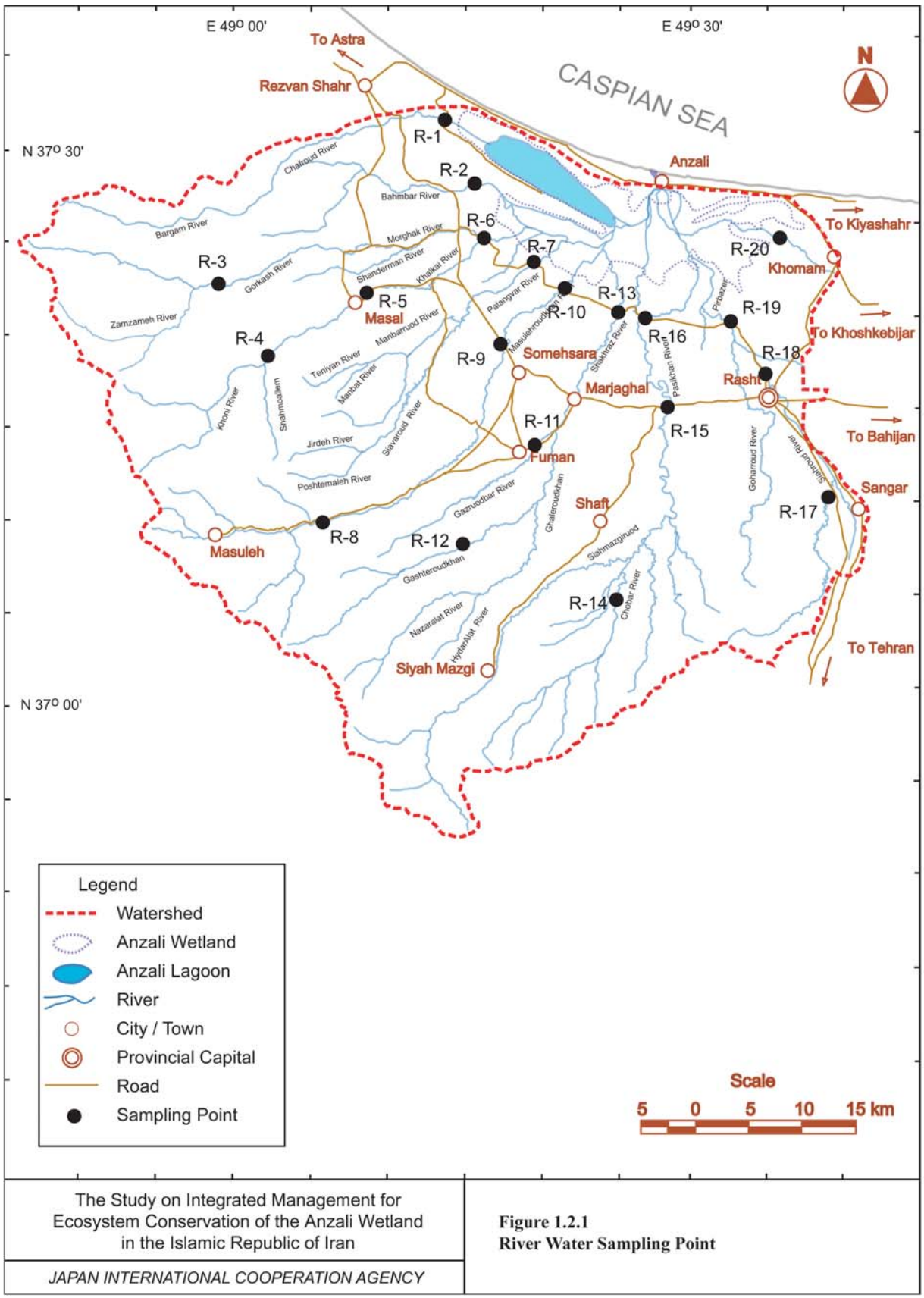

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Figure 1.2.1
River Water Sampling Point

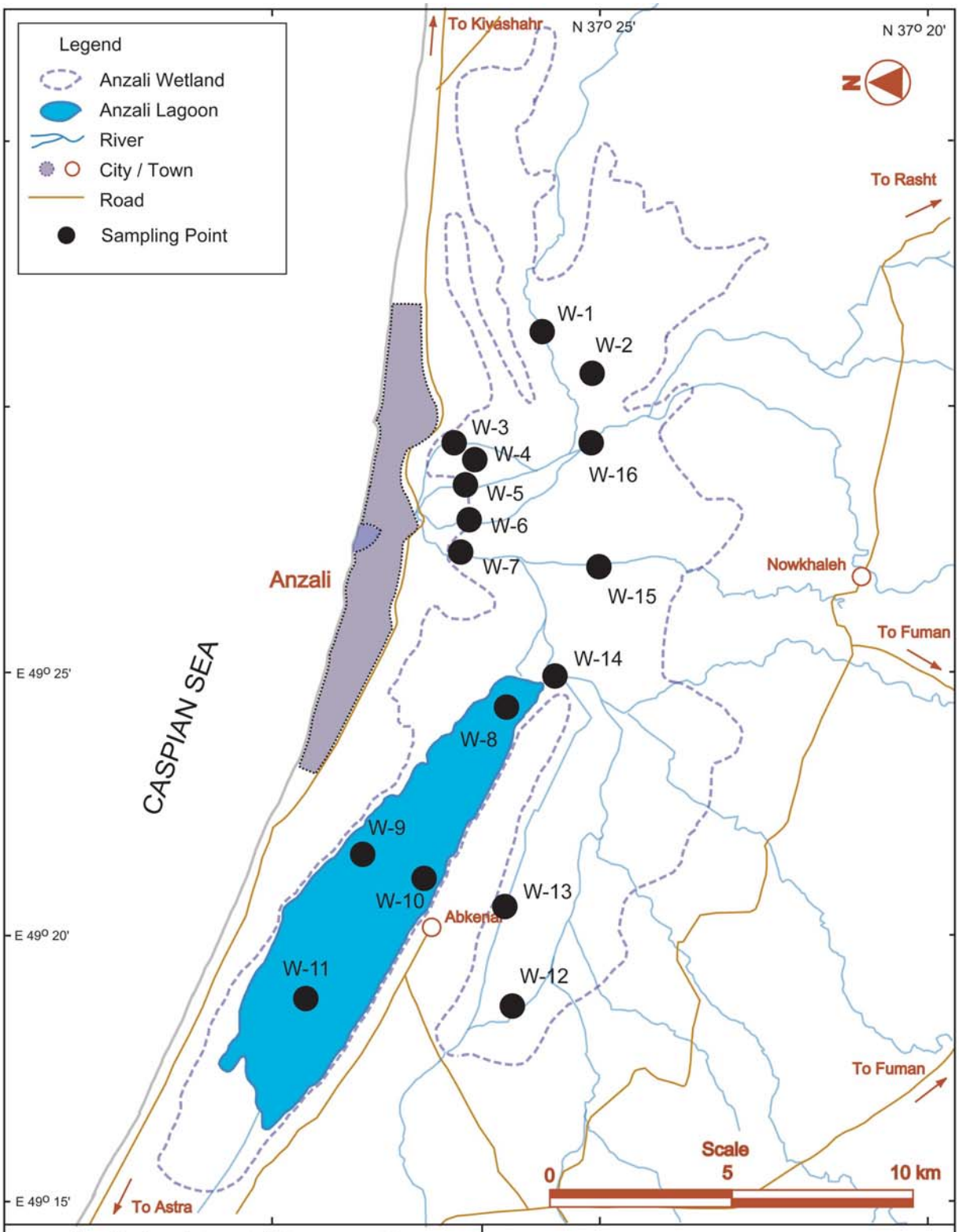

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Figure 1.2.2
Wetland Water Sampling Point

1.2.2 Survey Items

The survey items are given in the Table 1.2.2. The water quality was surveyed for 34 items and the bottom sediment was surveyed for 21 items.

Table 1.2.2 Survey Items

Survey	Survey Items and Analytical Parameters
Water Quality Survey	1) water level or water depth, 2) river flow or discharge amount of wastewater, 3) cross section, 4) water and air temperature, 5) DO, 6) pH, 7) salinity, 8) color, 9) transparency, 10) COD, 11) BOD, 12) total nitrogen (T-N), 13) nitrite nitrogen (NO_2-N), 14) nitrate-nitrogen (NO_3-N), 15) ammonium nitrogen (NH_4-N), 16) total phosphorous (T-P), 17) phosphate phosphorous (PO_4-P), 18) suspended solid (SS), 19) total organic carbon (TOC), 20) chlorophyll a, 21) pheophytin, 22) general bacteria, 23) fecal coliform, 24) cadmium (Cd), 25) total cyanide (T-CN), 26) lead (Pb), 27) hexavalent chromium (Cr^{6+}), 28) arsenic (As), 29) total mercury (T-Hg), 30) copper (Cu), 31) nickel (Ni), 32) zinc (Zn), 33) iron (Fe), 34) pesticides (selected 3 substances)
Bottom Sediment Survey	1) sediment temperature, 2) oxidation-reduction potential, 3) particle size distribution (sand, silt, clay), 4) COD, 5) total phosphorous (T-P), 6) total nitrogen (T-N), 7) total organic carbon (TOC), 8) ignition loss, 9) sulfide, 10) general bacteria, 11) pesticides (selected 3 substances), 12) cadmium (Cd), 13) total cyanide (T-CN), 14) lead (Pb), 15) hexavalent chromium (Cr^{6+}), 16) arsenic (As), 17) total mercury (T-Hg), 18) copper (Cu), 19) nickel (Ni), 20) zinc (Zn), 21) iron (Fe)

1.2.3 Analytical Method

The analytical methods adopted are shown in Table 1.2.3.

Table 1.2.3 Analytical Method

Parameter	Analytical Method
pH	Measurement by electrode (field measurement)
DO (dissolved oxygen)	Measurement by electrode (field measurement)
COD	Titrimetric method
BOD	Titrimetric method
Total nitrogen (T-N)	Calculation by measurement of organic nitrogen, nitrite nitrogen, and nitrate nitrogen
Nitrite nitrogen (NO_2-N)	Colorimetric method
Nitrate-nitrogen (NO_3-N)	Cadmium reduction method
Ammonium nitrogen (NH_4-N),	Nesslerization method
Total phosphorous (T-P)	Colorimetric method
Phosphate phosphorous (PO_4-P)	Vanadomolybdophosphoric acid colorimetric method
Suspended solid (SS)	Gravity measurement
Total organic carbon (TOC)	Persulfate-ultraviolet oxidation method
Chlorophyll a	Fluorometric method
Pheophytin	Colorimetric method
General bacteria	Counting of cultivated colony
Fecal coliform	Most probable number (MPN) test
Heavy metals	Atomic adsorption method
Total cyanide (T-CN)	Colorimetric method
Pesticides	Purge and trap gas chromatograph (GC) method

1.2.4 Sampling Frequency

The sampling field survey was carried out three times. The first (dry season) survey was conducted from late August to early September. The second (early rainy season) survey was conducted in October. The third (mid-rainy season) survey was conducted in December.

1st sampling : 23rd August – 1st September
2nd sampling : 13th October – 25th October
3rd sampling : 2nd December – 14th December

1.3 Results

1.3.1 Organic Pollution

(1) Wetland

COD is an indicator of organic pollution, which is caused by the inflow of domestic, livestock and industrial wastewater that contains elevated levels of organic pollutants. Summarized survey results are shown in Table 1.3.1. The COD concentration in wetland water is high, especially in the central part and estuary of the wetland.

Table 1.3.1 Analytical Result of COD in Wetland Water

(Unit: mg/L)

Area	Eastern part	Central Part	Estuary of the Wetland	Siahkeshim	Lagoon	Average
Average	35	39	43	27	44	39
Range	22 - 54	12 - 107	17– 195	15 – 50	13 – 67	12 - 195
Criteria (US EPA)	High : COD >30 mg/L, Moderate : COD 20 -30 mg/L, Slight : COD 10 – 20 mg/L, Minimal : COD <10 mg/L					

(2) Organic Pollution Load to the Wetland

The organic pollution load from the Anzali watershed to Anzali wetland was estimated by equation shown below.

Pollution load (t/day) = Σ Organic pollutant in each river (t-COD/day) x Each river flow (t/day)

The Organic Pollution Load from relevant rivers to the wetland is shown in Figure 1.3.1. Approximately 50% of the total organic pollution load flowed into the wetland from the Pirbazar River. This means that wetland water quality is strongly affected by domestic wastewater discharges from Rasht city. The average COD concentration in the domestic wastewater of Rasht was 156 mg/L.

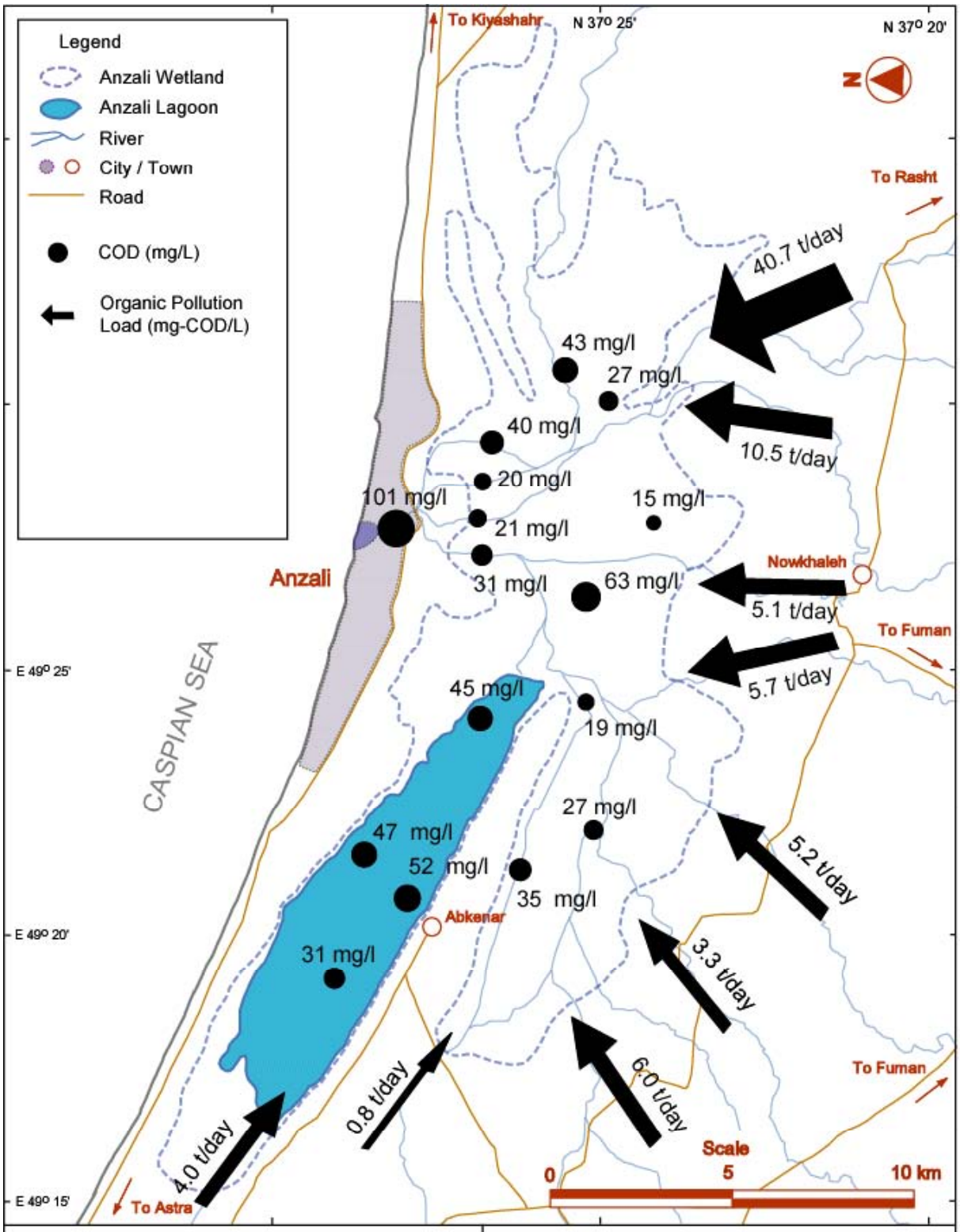

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Figure 1.3.1
Organic Substance Concentration in Wetland Water and Pollution Load from Watershed

(2) Eutrophication

The average concentrations of chlorophyll *a* and phosphorus are basic parameters from which to identify the eutrophic condition of water. Those results are shown in Table 1.3.2. It can be concluded that the water quality condition in the Anzali Wetland is eutrophic comparing with OECD and other criteria.

Table 1.3.2 Analytical Results of Total Phosphorus and Chlorophyll *a* in Wetland Water

(Unit: mg/L)

Area	Eastern part	Central Part	Estuary of the Wetland	Siahkeshim	Lagoon	Average	OECD Eutrophication Criteria
T-P	0.22	0.18	0.25	0.16	0.08	39	0.035 – 0.1
Chl. *a*	3	13	38	4	13	19	8 - 25

Criteria of Eutrophic Condition (T-P)	Vollenweider	0.03 – 0.1 mg/L
	US EPA	> 0.02 mg/L
	OECD	0.035 – 0.1 mg/L
Japanese Standard for lake (T-P)	Fishery (Class 2)	< 0.05 mg/L
	Fishery (Class 3)	< 0.1 mg/L

(3) Heavy Metals

Tables 1.3.3 and 1.3.4 show the analytical results for heavy metals in sediment and water.. Comparing the analytical results with international standard values, it is demonstrated that serious heavy metal pollution is not occurring in the wetland.

Table 1.3.3 Analytical Results of Heavy Metals in Sediments

(Unit: mg/kg)

Area		Cd	Pb	Cr^{6+}	Cu	Zn
Result	Wetland	n.d. - 0.2	n.d. - 50.9	4.3. - 40.6	18.8 - 86.4	31.9 - 221.5
	River	n.d. - 0.2	11.2 - 43.4	3.2. - 39.0	36.4 - 63.8	49.3 - 144.8
Criteria	Canada	3.5	91.3	90 (Cr)	197	315
	Washington State	6.7	530	260 (Cr)	390	960

Source: Canadian Environmental Quality Guidelines (2002)
Web-site of US EPA (www.epa.gov)

Table 1.3.4 Heavy Metal Concentration in Anzali Wetland and Relevant River (1991-1992)

(Unit: mg/L)

Area	Location	Cd	Cr	Pb	Zn	Ni	Cu	Fe	Mn
Wetland	Siahkeshim	n.d. - 0.008	-	n.d. - 0.058	0.004 - 0.48	n.d. - 0.046	n.d. - 0.008	0.057 - 0.62	0.035 - 0.235
River	Chafroud River	n.d. - 0.003	-	n.d. - 0.05	n.d. - 0.123	n.d. - 0.1	n.d. - 0.08	0.344 - 36.4	0.035 - 2.05
	Bahambar River	n.d. - 0.004	n.d.	n.d. - 0.05	0.001 - 0.028	n.d. - 0.033	n.d. - 0.007	0.11 - 8.8	n.d. - 0.48
	Morghak-Khalkaii River	n.d. - 0.003	-	n.d. - 0.074	0.003 - 0.19	n.d. - 0.3	n.d. - 0.083	0.382 - 5.1	0.04 - 3.1
Criteria for Evaluation	Criteria for Aquatic Life (US EPA)	0.004 - 0.013	-	0.20 - 0.80	0.22 - 0.55	0.84 – 2.1	0.026 - 0.076	-	-
	Surface Water Standard (JPN)	0.01	-	0.01	-	-	-	-	-
	Surface Water Quality Criteria (US EPA)	0.002	-	0.065	0.120	0.470	0.013	-	-

Note: Criteria values for Aquatic life is calculated with Ca hardness values which is from 200 mg/L to 600 mg/L based on the analytical result by DOE in the wetland in 2002. Standard and criteria on chromium is designated for chromium (III) and chromium (VI), so the values are not described.

Source: Studies on Environmental Information for Reconstruction of Irrigation Drainage vol.4,MOE, 2001
Web-site of US EPA (www.epa.gov), and Japan MOE (www.env.go.jp)

(4) Pesticide

Table 1.3.5 shows the analytical results of pesticides in river and wetland water. Comparing the analytical results with international standard values, a part of analytical results on Diazinon exceeds the standard value.

Table 1.3.5 Analytical Results of Pesticides

(Unit: ug/L)

Area		Diazinon	Paraquat	DDT
Result	Wetland	14.2 – 24.3	0.2 - 1.4	n.d.
	River	12.4 – 88.5	0.1 – 2.9	n.d.
Criteria	Canada	20	10	-

Source: Canadian Environmental Quality Guidelines (2002)

1.4 Analyzed Data

Analyzed data are shown in Tables 1.4.1 and 1.4.2.

Table 1.4.1 Analytical Results of Wetland Water (1/8)

Sampling Point	Anzali Wetland (W-1)	
Location	Eastern Part	
Coordinate (UTM)	369,259	4,142,876

Item	Unit	Analytical Result		
Sampling Date	-	23-Aug	13-Oct	2-Dec
Air temperature	°C	27.0	21.0	10.8
Water temperature	°C	24.8	20.9	9.5
Water depth	m	1.50	1.30	1.50
DO	mg/L	5.40	7.20	8.40
pH	-	7.3	7.2	7.4
Salinity	ppm	0.05	0.05	0.02
Color	FTU	10	15	5
Transparency	m	1.40	1.20	0.85
Suspended solid	mg/L	45	56	31
COD	mg/L	54	30	46
BOD	mg/L	15	5	3
Total organic carbon (TOC)	mg/L	25	18	14
Total nitrogen (T-N)	mg/L	1.321	2.454	1.738
Nitrite nitrogen (NO2-N)	mg/L	0.019	0.007	0.026
Nitrate-nitrogen (NO3-N)	mg/L	0.110	0.128	0.608
Ammonium nitrogen (NH4-N)	mg/L	0.333	0.959	0.146
Total phosphorous (T-P)	mg/L	0.371	0.281	0.363
Phosphate phosphorous (PO4-P)	mg/L	0.138	0.050	0.090
Chlorophil a	g/m^3	7	4	5
Pheophytin	g/m^3	0	7	0
General bacteria	unit/ml	17,810	2,470	2,210
Fecal coliform	MPN/100ml	90	48	23
Cadmium (Cd)	mg/L	0.0040	-	n.d
Lead (Pb),	mg/L	0.018	-	0.024
Hexavalent chromium (Cr6+)	mg/L	n.d	-	n.d
Arsenic (As),	mg/L	0.030	-	0.001
Total mercury (T-Hg)	mg/L	n.d	-	n.d
Copper (Cu),	mg/L	0.703	-	2.335
Nickel (Ni),	mg/L	0.031	-	0.012
Zinc (Zn),	mg/L	0.315	-	0.072
Iron (Fe),	mg/L	0.154	-	0.024
Total cyanide (T-CN),	mg/L	n.d	-	n.d
Diazinon	mg/L	28.2	20.2	-
Paraquat	mg/L	1.4	1.1	-
DDT	mg/L	n.d.	n.d.	-

Sampling Point	Anzali Wetland (W-2)	
Location	Eastern Part	
Coordinate (UTM)	367,841	4,142,213

Item	Unit	Analytical Result		
Sampling Date	-	23-Aug	13-Oct	2-Dec
Air temperature	°C	27.0	21.3	10.0
Water temperature	°C	25.7	21.0	12.0
Water depth	m	0.90	0.65	1.00
DO	mg/L	7.49	5.85	8.00
pH	-	7.6	7.2	7.4
Salinity	ppm	0.05	0.05	0.01
Color	FTU	15	15	5
Transparency	m	0.85	0.65	0.85
Suspended solid	mg/L	50	13	17
COD	mg/L	25	33	22
BOD	mg/L	12	4	4
Total organic carbon (TOC)	mg/L	12	19	14
Total nitrogen (T-N)	mg/L	2.582	2.166	1.626
Nitrite nitrogen (NO2-N)	mg/L	0.015	0.008	0.023
Nitrate-nitrogen (NO3-N)	mg/L	0.130	0.302	0.440
Ammonium nitrogen (NH4-N)	mg/L	0.215	0.382	0.299
Total phosphorous (T-P)	mg/L	0.173	0.329	0.424
Phosphate phosphorous (PO4-P)	mg/L	0.064	0.046	0.090
Chlorophil a	g/m^3	1	0	3
Pheophytin	g/m^3	7	8	2
General bacteria	unit/ml	7,150	2,730	4,030
Fecal coliform	MPN/100ml	23	93	230
Cadmium (Cd)	mg/L	0.0020	-	n.d
Lead (Pb),	mg/L	0.011	-	0.018
Hexavalent chromium (Cr6+)	mg/L	n.d	-	n.d
Arsenic (As),	mg/L	0.011	-	0.002
Total mercury (T-Hg)	mg/L	n.d	-	n.d
Copper (Cu),	mg/L	0.403	-	2.461
Nickel (Ni),	mg/L	0.007	-	0.134
Zinc (Zn),	mg/L	0.251	-	0.071
Iron (Fe),	mg/L	0.185	-	0.098
Total cyanide (T-CN),	mg/L	n.d	-	n.d
Diazinon	mg/L	27.4	19.4	-
Paraquat	mg/L	0.7	0.4	-
DDT	mg/L	n.d.	n.d.	-

Table 1.4.1 Analytical Results of Wetland Water (2/8)

Sampling Point	Anzali Wetland (W-3)	
Location	Estuary	
Coordinate (UTM)	364,108	4,146,937

Item	Unit	Analytical Result		
Sampling Date	-	23-Aug	13-Oct	2-Dec
Air temperature	°C	27	25	12
Water temperature	°C	26	22	12
Water depth	m	1.5	1.7	1.5
DO	mg/L	6.23	7.53	9.5
pH	-	7.5	7.35	7.15
Salinity	ppm	0.05	0.07	0.01
Color	FTU	20	20	10
Transparency	m	0.45	0.5	0.4
Suspended solid	mg/L	38	255.2	61
COD	mg/L	32.64	18.4	13.44
BOD	mg/L	11	8.5	3
Total organic carbon (TOC)	mg/L	15.3	15.6	6.3
Total nitrogen (T-N)	mg/L	1.968	4.015	2.576
Nitrite nitrogen (NO2-N)	mg/L	0.004	0.0004	0.034
Nitrate-nitrogen (NO3-N)	mg/L	0.022	0.275	0.876
Ammonium nitrogen (NH4-N)	mg/L	1.899	0.505	0.574
Total phosphorous (T-P)	mg/L	0.405	0.420	0.244
Phosphate phosphorous (PO4-P)	mg/L	0.361	0.212	0.167
Chlorophil a	g/m^3	66.3	18	9
Pheophytin	g/m^3	6	6.5	0
General bacteria	unit/ml	21,710	16,640	61,100
Fecal coliform	MPN/100ml	2,400	2,400	750
Cadmium (Cd)	mg/L	n.d	-	n.d
Lead (Pb),	mg/L	n.d	-	n.d
Hexavalent chromium (Cr6+)	mg/L	n.d	-	0.2
Arsenic (As),	mg/L	0.00435	-	0.004
Total mercury (T-Hg)	mg/L	n.d	-	0.001
Copper (Cu),	mg/L	0.239	-	2.088
Nickel (Ni),	mg/L	0.002	-	0.033
Zinc (Zn),	mg/L	0.027	-	0.01
Iron (Fe),	mg/L	0.21	-	0.323
Total cyanide (T-CN),	mg/L	n.d	-	n.d
Diazinon	mg/L	36.2	25	-
Paraquat	mg/L	0.6	0.4	-
DDT	mg/L	n.d.	n.d.	-

Sampling Point	Anzali Wetland (W-4)	
Location	Estuary	
Coordinate (UTM)	365,240	4,146,189

Item	Unit	Analytical Result		
Sampling Date	-	23-Aug	13-Oct	2004/12/2
Air temperature	°C	26.0	22.2	10.0
Water temperature	°C	25.7	21.0	11.0
Water depth	m	1.50	1.30	1.50
DO	mg/L	5.90	6.65	9.70
pH	-	7.4	7.3	7.3
Salinity	ppm	0.04	0.03	0.01
Color	FTU	15	20	10
Transparency	m	0.45	0.40	0.20
Suspended solid	mg/L	90	251	238
COD	mg/L	23	20	18
BOD	mg/L	11	8	7
Total organic carbon (TOC)	mg/L	11	16	14
Total nitrogen (T-N)	mg/L	2.026	3.520	2.313
Nitrite nitrogen (NO2-N)	mg/L	0.041	0.002	0.075
Nitrate-nitrogen (NO3-N)	mg/L	0.191	0.179	0.424
Ammonium nitrogen (NH4-N)	mg/L	1.794	0.999	0.452
Total phosphorous (T-P)	mg/L	0.390	0.497	0.320
Phosphate phosphorous (PO4-P)	mg/L	0.312	0.489	0.223
Chlorophil a	g/m^3	19	16	8
Pheophytin	g/m^3	0	14	1
General bacteria	unit/ml	10,270	133,900	52,000
Fecal coliform	MPN/100ml	4,600	≥24000	11,000
Cadmium (Cd)	mg/L	n.d	-	n.d
Lead (Pb),	mg/L	n.d	-	n.d
Hexavalent chromium (Cr6+)	mg/L	n.d	-	11.530
Arsenic (As),	mg/L	0.011	-	0.004
Total mercury (T-Hg)	mg/L	0.0009	-	0.0002
Copper (Cu),	mg/L	0.338	-	2.101
Nickel (Ni),	mg/L	0.004	-	0.025
Zinc (Zn),	mg/L	0.166	-	0.010
Iron (Fe),	mg/L	0.212	-	0.841
Total cyanide (T-CN),	mg/L	n.d	-	n.d
Diazinon	mg/L	36.2	27.2	-
Paraquat	mg/L	1.3	0.9	-
DDT	mg/L	n.d.	n.d.	-

Table 1.4.1 Analytical Results of Wetland Water (3/8)

Sampling Point	Anzali Wetland (W-5)	
Location	Estuary	
Coordinate (UTM)	366,447	4,146,249

Item	Unit	Analytical Result		
Sampling Date	-	23-Aug	13-Oct	2-Dec
Air temperature	°C	28.0	22.3	10.0
Water temperature	°C	26.5	20.0	11.3
Water depth	m	3.00	3.60	3.00
DO	mg/L	5.64	7.03	9.00
pH	-	7.3	7.2	7.3
Salinity	ppm	0.08	0.15	0.02
Color	FTU	15	30	10
Transparency	m	1.25	1.00	1.00
Suspended solid	mg/L	53	282	46
COD	mg/L	61	37	22
BOD	mg/L	12	6	6
Total organic carbon (TOC)	mg/L	29	14	13
Total nitrogen (T-N)	mg/L	2.832	2.854	2.607
Nitrite nitrogen (NO2-N)	mg/L	0.042	0.080	0.028
Nitrate-nitrogen (NO3-N)	mg/L	0.107	0.654	0.972
Ammonium nitrogen (NH4-N)	mg/L	0.501	0.493	0.354
Total phosphorous (T-P)	mg/L	0.209	0.224	0.186
Phosphate phosphorous (PO4-P)	mg/L	0.128	0.097	0.092
Chlorophil a	g/m^3	37	36	11
Pheophytin	g/m^3	7	17	0
General bacteria	unit/ml	15,990	11,050	3,250
Fecal coliform	MPN/100ml	40	2,400	90
Cadmium (Cd)	mg/L	n.d	-	n.d
Lead (Pb),	mg/L	n.d	-	0.003
Hexavalent chromium (Cr6+)	mg/L	n.d	-	n.d
Arsenic (As),	mg/L	0.002	-	0.001
Total mercury (T-Hg)	mg/L	n.d.	-	n.d
Copper (Cu),	mg/L	0.339	-	1.949
Nickel (Ni),	mg/L	0.002	-	0.030
Zinc (Zn),	mg/L	0.169	-	0.006
Iron (Fe),	mg/L	0.060	-	0.165
Total cyanide (T-CN),	mg/L	n.d	-	n.d
Diazinon	mg/L	27.5	18.6	-
Paraquat	mg/L	1.1	0.8	-
DDT	mg/L	n.d.	n.d.	-

Sampling Point	Anzali Wetland (W-6)	
Location	Estuary	
Coordinate (UTM)	363,714	4,148,191

Item	Unit	Analytical Result		
Sampling Date	-	23-Aug	13-Oct	2-Dec
Air temperature	°C	29.0	26.0	9.5
Water temperature	°C	26.8	23.0	10.8
Water depth	m	2.30	1.90	2.30
DO	mg/L	5.76	6.45	6.81
pH	-	7.5	7.6	7.7
Salinity	ppm	0.27	0.10	0.06
Color	FTU	20	35	5
Transparency	m	0.40	0.70	1.10
Suspended solid	mg/L	125	286	86
COD	mg/L	67	195	40
BOD	mg/L	17	12	5
Total organic carbon (TOC)	mg/L	32	91	17
Total nitrogen (T-N)	mg/L	2.184	2.152	2.200
Nitrite nitrogen (NO2-N)	mg/L	0.007	0.034	0.048
Nitrate-nitrogen (NO3-N)	mg/L	0.170	0.313	0.543
Ammonium nitrogen (NH4-N)	mg/L	0.577	1.015	0.688
Total phosphorous (T-P)	mg/L	0.206	0.320	0.435
Phosphate phosphorous (PO4-P)	mg/L	0.144	0.217	0.071
Chlorophil a	g/m^3	49	46	6
Pheophytin	g/m^3	0	7	5
General bacteria	unit/ml	15,600	143,000	3,250
Fecal coliform	MPN/100ml	1,500	≥24000	930
Cadmium (Cd)	mg/L	n.d	-	n.d
Lead (Pb),	mg/L	n.d	-	n.d
Hexavalent chromium (Cr6+)	mg/L	n.d	-	n.d
Arsenic (As),	mg/L	0.013	-	n.d.
Total mercury (T-Hg)	mg/L	n.d	-	0.001
Copper (Cu),	mg/L	0.144	-	1.888
Nickel (Ni),	mg/L	0.017	-	0.026
Zinc (Zn),	mg/L	0.174	-	0.015
Iron (Fe),	mg/L	0.045	-	0.055
Total cyanide (T-CN),	mg/L	0.062	-	n.d
Diazinon	mg/L	143	88.7	-
Paraquat	mg/L	1.1	1.0	-
DDT	mg/L	n.d.	n.d.	-

Table 1.4.1 Analytical Results of Wetland Water (4/8)

Sampling Point	Anzali Wetland (W-7)
Location	Estuary
Coordinate (UTM)	3,634,624 4,146,590

Item	Unit	Analytical Result		
Sampling Date	-	23-Aug	13-Oct	2-Dec
Air temperature	°C	29.0	22.4	9.5
Water temperature	°C	26.8	20.0	10.8
Water depth	m	6.00	5.70	6.50
DO	mg/L	7.1	7.2	9.4
pH	-	7.71	7.67	7.69
Salinity	ppm	0.16	0.19	0.01
Color	FTU	20	35	10
Transparency	m	0.45	0.80	0.50
Suspended solid	mg/L	110	325	72
COD	mg/L	17	59	17
BOD	mg/L	15	6	4
Total organic carbon (TOC)	mg/L	8	15	13
Total nitrogen (T-N)	mg/L	1.115	2.237	2.080
Nitrite nitrogen (NO2-N)	mg/L	0.004	0.026	0.065
Nitrate-nitrogen (NO3-N)	mg/L	0.110	0.501	1.255
Ammonium nitrogen (NH4-N)	mg/L	1.002	0.653	0.438
Total phosphorous (T-P)	mg/L	0.150	0.277	0.155
Phosphate phosphorous (PO4-P)	mg/L	0.087	0.095	0.082
Chlorophil a	g/m^3	49	40	15
Pheophytin	g/m^3	0	0	10
General bacteria	unit/ml	10,920	5,590	7,540
Fecal coliform	MPN/100ml	40	≥2400	480
Cadmium (Cd)	mg/L	n.d	-	n.d
Lead (Pb),	mg/L	n.d	-	n.d
Hexavalent chromium (Cr6+)	mg/L	n.d	-	n.d
Arsenic (As),	mg/L	0.005	-	0.001
Total mercury (T-Hg)	mg/L	n.d	-	0.001
Copper (Cu),	mg/L	0.239	-	1.081
Nickel (Ni),	mg/L	n.d	-	n.d
Zinc (Zn),	mg/L	0.121	-	0.014
Iron (Fe),	mg/L	0.119	-	0.563
Total cyanide (T-CN),	mg/L	n.d	-	n.d
Diazinon	mg/L	30.6	22.2	-
Paraquat	mg/L	2.0	1.3	-
DDT	mg/L	n.d.	n.d.	-

Sampling Point	Anzali Wetland (W-8)
Location	Estuary
Coordinate (UTM)	3,601,970 4,145,079

Item	Unit	Analytical Result		
Sampling Date	-	23-Aug	14-Oct	2-Dec
Air temperature	°C	26.5	25.0	10.5
Water temperature	°C	26.1	22.5	11.0
Water depth	m	1.90	1.90	1.90
DO	mg/L	7.27	6.60	8.29
pH	-	8.3	7.5	7.3
Salinity	ppm	0.17	0.11	0.01
Color	FTU	15	15	15
Transparency	m	0.50	1.00	0.90
Suspended solid	mg/L	55	34	96
COD	mg/L	67	44	25
BOD	mg/L	8	5	1
Total organic carbon (TOC)	mg/L	32	17..94	13
Total nitrogen (T-N)	mg/L	1.891	2.200	3.047
Nitrite nitrogen (NO2-N)	mg/L	0.001	0.010	0.011
Nitrate-nitrogen (NO3-N)	mg/L	0.134	0.239	0.907
Ammonium nitrogen (NH4-N)	mg/L	0.528	0.424	0.438
Total phosphorous (T-P)	mg/L	0.063	0.091	0.097
Phosphate phosphorous (PO4-P)	mg/L	0.011	0.026	0.033
Chlorophil a	g/m^3	4	8	1
Pheophytin	g/m^3	61	0	1
General bacteria	unit/ml	21,970	3,120	410
Fecal coliform	MPN/100ml	4	48	90
Cadmium (Cd)	mg/L	n.d	-	0.0020
Lead (Pb),	mg/L	n.d	-	0.005
Hexavalent chromium (Cr6+)	mg/L	n.d	-	n.d
Arsenic (As),	mg/L	0.035	-	0.020
Total mercury (T-Hg)	mg/L	n.d	-	n.d
Copper (Cu),	mg/L	0.093	-	0.379
Nickel (Ni),	mg/L	0.003	-	n.d
Zinc (Zn),	mg/L	0.058	-	0.004
Iron (Fe),	mg/L	0.091	-	0.049
Total cyanide (T-CN),	mg/L	0.051	-	n.d
Diazinon	mg/L	22	20.1	-
Paraquat	mg/L	0.3	0.2	-
DDT	mg/L	n.d.	n.d.	-

Table 1.4.1 Analytical Results of Wetland Water (5/8)

Sampling Point	Anzali Wetland (W-9)	
Location	Lagoon	
Coordinate (UTM)	353,139	4,147,825

Item	Unit	Analytical Result		
Sampling Date	-	23-Aug	14-Oct	2-Dec
Air temperature	°C	27.0	24.3	10.3
Water temperature	°C	26.6	24.0	11.0
Water depth	m	1.80	2.00	2.10
DO	mg/L	6.20	7.61	11.25
pH	-	8.7	8.6	7.8
Salinity	ppm	0.12	0.09	0.01
Color	FTU	15	25	10
Transparency	m	0.30	0.30	0.50
Suspended solid	mg/L	63	27	26
COD	mg/L	56	59	42
BOD	mg/L	3	5	3
Total organic carbon (TOC)	mg/L	26	19..5	16
Total nitrogen (T-N)	mg/L	2.768	2.848	1.825
Nitrite nitrogen (NO2-N)	mg/L	0.006	0.010	0.015
Nitrate-nitrogen (NO3-N)	mg/L	0.168	0.190	0.149
Ammonium nitrogen (NH4-N)	mg/L	0.452	0.507	0.299
Total phosphorous (T-P)	mg/L	0.041	0.040	0.064
Phosphate phosphorous (PO4-P)	mg/L	0.026	0.020	0.038
Chlorophil a	g/m^3	61	31	35
Pheophytin	g/m^3	4	13	0
General bacteria	unit/ml	1,430	1,430	3,081
Fecal coliform	MPN/100ml	<3	4	9
Cadmium (Cd)	mg/L	n.d	-	n.d
Lead (Pb),	mg/L	0.003	-	n.d
Hexavalent chromium (Cr6+)	mg/L	n.d	-	n.d
Arsenic (As),	mg/L	0.001	-	0.002
Total mercury (T-Hg)	mg/L	n.d	-	n.d
Copper (Cu),	mg/L	0.186	-	0.070
Nickel (Ni),	mg/L	n.d	-	n.d
Zinc (Zn),	mg/L	0.196	-	n.d
Iron (Fe),	mg/L	0.033	-	0.009
Total cyanide (T-CN),	mg/L	n.d	-	n.d
Diazinon	mg/L	27	20.4	-
Paraquat	mg/L	0.3	0.3	-
DDT	mg/L	n.d.	n.d.	-

Sampling Point	Anzali Wetland (W-10)	
Location	Lagoon	
Coordinate (UTM)	348,470	4,151,735

Item	Unit	Analytical Result		
Sampling Date	-	23-Aug	14-Oct	3-Dec
Air temperature	°C	27.0	26.0	10.6
Water temperature	°C	25.8	24.2	11.0
Water depth	m	1.90	2.00	2.00
DO	mg/L	7.22	7.62	11.17
pH	-	8.4	8.6	6.8
Salinity	ppm	0.04	0.07	0.01
Color	FTU	15	25	15
Transparency	m	0.45	0.30	0.70
Suspended solid	mg/L	66	83	71
COD	mg/L	38	13	42
BOD	mg/L	6	7	1
Total organic carbon (TOC)	mg/L	18	22	13
Total nitrogen (T-N)	mg/L	1.693	1.485	3.249
Nitrite nitrogen (NO2-N)	mg/L	0.006	0.011	0.013
Nitrate-nitrogen (NO3-N)	mg/L	0.003	0.420	0.677
Ammonium nitrogen (NH4-N)	mg/L	0.187	0.435	0.097
Total phosphorous (T-P)	mg/L	0.236	0.163	0.078
Phosphate phosphorous (PO4-P)	mg/L	0.015	0.029	0.024
Chlorophil a	g/m^3	15	63	62
Pheophytin	g/m^3	25	0	0
General bacteria	unit/ml	247	1,860	600
Fecal coliform	MPN/100ml	>3	4	70
Cadmium (Cd)	mg/L	n..d	-	n.d
Lead (Pb),	mg/L	0.003	-	n.d
Hexavalent chromium (Cr6+)	mg/L	n.d	-	n.d
Arsenic (As),	mg/L	0.003	-	0.001
Total mercury (T-Hg)	mg/L	n.d	-	n.d
Copper (Cu),	mg/L	0.086	-	0.014
Nickel (Ni),	mg/L	n.d	-	0.006
Zinc (Zn),	mg/L	0.196	-	0.020
Iron (Fe),	mg/L	0.008	-	n.d
Total cyanide (T-CN),	mg/L	n.d	-	n.d
Diazinon	mg/L	57.2	32.6	-
Paraquat	mg/L	0.2	0.2	-
DDT	mg/L	n.d.	n.d.	-

Table 1.4.1 Analytical Results of Wetland Water (6/8)

Sampling Point	Anzali Wetland (W-11)
Location	Lagoon
Coordinate (UTM)	3,540,360 4,149,908

Item	Unit	Analytical Result		
Sampling Date	-	24-Aug	14-Oct	3-Dec
Air temperature	°C	27.0	26.0	10.1
Water temperature	°C	25.8	25.0	11.0
Water depth	m	1.90	2.00	1.90
DO	mg/L	7.82	7.28	11.67
pH	-	8.6	8.6	8.0
Salinity	ppm	0.12	0.08	0.06
Color	FTU	15	35	10
Transparency	m	0.25	0.30	0.60
Suspended solid	mg/L	62	57	66
COD	mg/L	63	31	46
BOD	mg/L	3	7	5
Total organic carbon (TOC)	mg/L	30	19	12
Total nitrogen (T-N)	mg/L	3.339	2.454	3.256
Nitrite nitrogen (NO2-N)	mg/L	0.011	0.013	0.015
Nitrate-nitrogen (NO3-N)	mg/L	0.004	0.122	0.153
Ammonium nitrogen (NH4-N)	mg/L	0.152	0.479	0.118
Total phosphorous (T-P)	mg/L	0.064	0.104	0.068
Phosphate phosphorous (PO4-P)	mg/L	0.029	0.063	0.031
Chlorophil a	g/m^3	10	39	31
Pheophytin	g/m^3	0	29	5
General bacteria	unit/ml	6,370	780	2,652
Fecal coliform	MPN/100ml	<3	≤3	4
Cadmium (Cd)	mg/L	n.d	-	n.d
Lead (Pb),	mg/L	n.d	-	n.d
Hexavalent chromium (Cr6+)	mg/L	n.d	-	n.d
Arsenic (As),	mg/L	0.006	-	0.080
Total mercury (T-Hg)	mg/L	n.d	-	n.d
Copper (Cu),	mg/L	0.059	-	0.023
Nickel (Ni),	mg/L	n.d	-	n.d
Zinc (Zn),	mg/L	0.205	-	0.002
Iron (Fe),	mg/L	0.008	-	0.002
Total cyanide (T-CN),	mg/L	0.0004	-	n.d
Diazinon	mg/L	64.1	38.4	-
Paraquat	mg/L	0.2	0.2	-
DDT	mg/L	n.d.	n.d.	-

Sampling Point	Anzali Wetland (W-12)
Location	Shiakeshim
Coordinate (UTM)	354,897 4,144,618

Item	Unit	Analytical Result		
Sampling Date	-	24-Aug	14-Oct	2004/12/3
Air temperature	°C	27.0	24.0	11.0
Water temperature	°C	24.1	21.1	12.5
Water depth	m	1.50	2.00	2.50
DO	mg/L	7.65	6.13	8.35
pH	-	6.4	7.3	7.4
Salinity	ppm	0.02	0.01	0.00
Color	FTU	15	35	15
Transparency	m	0.25	1.50	1.00
Suspended solid	mg/L	75	78	11
COD	mg/L	50	31	25
BOD	mg/L	3	5	15
Total organic carbon (TOC)	mg/L	23	14	12
Total nitrogen (T-N)	mg/L	2.552	2.277	1.848
Nitrite nitrogen (NO2-N)	mg/L	0.006	0.006	0.013
Nitrate-nitrogen (NO3-N)	mg/L	0.317	0.306	0.390
Ammonium nitrogen (NH4-N)	mg/L	0.020	0.674	0.661
Total phosphorous (T-P)	mg/L	18.992	0.271	0.081
Phosphate phosphorous (PO4-P)	mg/L	0.075	0.086	0.037
Chlorophil a	g/m^3	6	6	1
Pheophytin	g/m^3	3	0	0
General bacteria	unit/ml	5,850	7,800	530
Fecal coliform	MPN/100ml	930	4	93
Cadmium (Cd)	mg/L	n.d	-	n.d
Lead (Pb),	mg/L	0.004	-	n.d
Hexavalent chromium (Cr6+)	mg/L	n.d	-	n.d
Arsenic (As),	mg/L	0.002	-	0.003
Total mercury (T-Hg)	mg/L	n.d	-	n.d
Copper (Cu),	mg/L	0.062	-	0.078
Nickel (Ni),	mg/L	n.d	-	0.007
Zinc (Zn),	mg/L	0.225	-	n.d
Iron (Fe),	mg/L	0.067	-	0.019
Total cyanide (T-CN),	mg/L	n.d	-	n.d
Diazinon	mg/L	14.2	16.2	-
Paraquat	mg/L	0.8	0.6	-
DDT	mg/L	n.d.	n.d.	-

Table 1.4.1 Analytical Results of Wetland Water (7/8)

Sampling Point	Anzali Wetland (W-13)
Location	Shiakeshim
Coordinate (UTM)	

Item	Unit	Analytical Result		
Sampling Date	-	24-Aug	14-Oct	3-Dec
Air temperature	°C	27.5	24.0	10.6
Water temperature	°C	24.6	21.3	12.0
Water depth	m	1.75	0.85	2.00
DO	mg/L	7.60	6.34	8.65
pH	-	6.9	7.4	7.1
Salinity	ppm	0.03	0.01	0.01
Color	FTU	15	35	15
Transparency	m	0.85	0.55	0.70
Suspended solid	mg/L	80	61	25
COD	mg/L	22	21	15
BOD	mg/L	4	5	6
Total organic carbon (TOC)	mg/L	10	7	14
Total nitrogen (T-N)	mg/L	2.063	2.727	1.306
Nitrite nitrogen (NO2-N)	mg/L	0.003	0.017	0.013
Nitrate-nitrogen (NO3-N)	mg/L	0.091	0.271	0.912
Ammonium nitrogen (NH4-N)	mg/L	0.111	0.806	0.251
Total phosphorous (T-P)	mg/L	0.205	0.290	0.083
Phosphate phosphorous (PO4-P)	mg/L	0.101	0.083	0.058
Chlorophil a	g/m^3	2	5	1
Pheophytin	g/m^3	2	0	0
General bacteria	unit/ml	845	1,690	820
Fecal coliform	MPN/100ml	30	≤3	240
Cadmium (Cd)	mg/L	n.d	-	n.d
Lead (Pb),	mg/L	n.d	-	0.018
Hexavalent chromium (Cr6+)	mg/L	n.d	-	n.d
Arsenic (As),	mg/L	0.003	-	0.001
Total mercury (T-Hg)	mg/L	n.d	-	0.0003
Copper (Cu),	mg/L	0.058	-	0.029
Nickel (Ni),	mg/L	n.d	-	n.d
Zinc (Zn),	mg/L	0.264	-	n.d
Iron (Fe),	mg/L	0.012	-	0.017
Total cyanide (T-CN),	mg/L	n.d	-	n.d
Diazinon	mg/L	18.7	19.1	-
Paraquat	mg/L	0.4	0.4	-
DDT	mg/L	n.d.	n.d.	-

Sampling Point	Anzali Wetland (W-14)	
Location	Shiakeshim	
Coordinate (UTM)	355,549	4,142,261

Item	Unit	Analytical Result		
Sampling Date	-	24-Aug	14-Oct	3-Dec
Air temperature	°C	27.5	26.0	11.0
Water temperature	°C	24.4	21.4	10.6
Water depth	m	0.90	0.80	1.00
DO	mg/L	8.13	6.70	9.10
pH	-	7.0	7.1	6.9
Salinity	ppm	0.02	0.07	0.01
Color	FTU	15	35	15
Transparency	m	0.30	0.58	0.70
Suspended solid	mg/L	87	69	89
COD	mg/L	26	20	35
BOD	mg/L	3	6	4
Total organic carbon (TOC)	mg/L	12	16	13
Total nitrogen (T-N)	mg/L	0.287	2.338	1.331
Nitrite nitrogen (NO2-N)	mg/L	0.032	0.019	0.009
Nitrate-nitrogen (NO3-N)	mg/L	0.068	0.045	0.911
Ammonium nitrogen (NH4-N)	mg/L	0.187	0.229	0.236
Total phosphorous (T-P)	mg/L	0.127	0.201	0.107
Phosphate phosphorous (PO4-P)	mg/L	0.046	0.078	0.061
Chlorophil a	g/m^3	12	7	2
Pheophytin	g/m^3	0	0	0
General bacteria	unit/ml	2,730	14,300	1,150
Fecal coliform	MPN/100ml	40	≤3	460
Cadmium (Cd)	mg/L	n.d	-	n.d
Lead (Pb),	mg/L	n.d	-	n.d
Hexavalent chromium (Cr6+)	mg/L	n.d	-	n.d
Arsenic (As),	mg/L	0.006	-	0.003
Total mercury (T-Hg)	mg/L	n.d	-	n.d
Copper (Cu),	mg/L	0.126	-	0.014
Nickel (Ni),	mg/L	n.d	-	0.003
Zinc (Zn),	mg/L	0.276	-	n.d
Iron (Fe),	mg/L	0.018	-	0.010
Total cyanide (T-CN),	mg/L	n.d	-	n.d
Diazinon	mg/L	20.4	17.3	-
Paraquat	mg/L	0.9	0.6	-
DDT	mg/L	n.d.	n.d.	-

Table 1.4.1 Analytical Results of Wetland Water (8/8)

Sampling Point	Anzali Wetland (W-15)
Location	Central Part
Coordinate (UTM)	

Item	Unit	Analytical Result		
Sampling Date	-	24-Aug	14-Oct	3-Dec
Air temperature	°C	27.5	22.9	12.0
Water temperature	°C	24.5	22.0	11.6
Water depth	m	0.95	2.20	1.00
DO	mg/L	7.14	6.20	10.58
pH	-	6.8	7.5	7.3
Salinity	ppm	0.04	0.02	0.00
Color	FTU	20	35	20
Transparency	m	0.95	0.60	0.25
Suspended solid	mg/L	60	123	143
COD	mg/L	19	13	12
BOD	mg/L	4	6	4
Total organic carbon (TOC)	mg/L	9	6	15
Total nitrogen (T-N)	mg/L	3.574	2.348	1.463
Nitrite nitrogen (NO2-N)	mg/L	0.006	0.024	0.047
Nitrate-nitrogen (NO3-N)	mg/L	0.187	0.260	0.925
Ammonium nitrogen (NH4-N)	mg/L	0.535	0.347	0.139
Total phosphorous (T-P)	mg/L	0.173	0.216	0.152
Phosphate phosphorous (PO4-P)	mg/L	0.077	0.044	0.098
Chlorophil a	g/m^3	15	5	4
Pheophytin	g/m^3	0	3	1
General bacteria	unit/ml	8,840	2,080	590
Fecal coliform	MPN/100ml	40	4	93
Cadmium (Cd)	mg/L	n.d	-	n.d
Lead (Pb),	mg/L	n.d	-	n.d
Hexavalent chromium (Cr6+)	mg/L	n.d	-	n.d
Arsenic (As),	mg/L	0.002	-	0.002
Total mercury (T-Hg)	mg/L	n.d	-	n.d
Copper (Cu),	mg/L	0.044	-	0.005
Nickel (Ni),	mg/L	n.d	-	n.d
Zinc (Zn),	mg/L	0.112	-	n.d
Iron (Fe),	mg/L	0.028	-	n.d
Total cyanide (T-CN),	mg/L	n.d	-	n.d
Diazinon	mg/L	41.2	22.8	-
Paraquat	mg/L	0.2	0.3	-
DDT	mg/L	n.d.	n.d.	-

Sampling Point	Anzali Wetland (W-16)	
Location	Central Part	
Coordinate (UTM)	362,809	4,143,309

Item	Unit	Analytical Result		
Sampling Date	-	24-Aug	13-Oct	3-Dec
Air temperature	°C	29.0	22.9	10.3
Water temperature	°C	27.6	20.0	9.5
Water depth	m	1.50	1.40	1.00
DO	mg/L	7.44	7.28	10.58
pH	-	7.9	8.0	7.3
Salinity	ppm	0.16	0.05	0.00
Color	FTU	15	30	20
Transparency	m	0.55	0.60	0.25
Suspended solid	mg/L	65	85	143
COD	mg/L	108	55	12
BOD	mg/L	15	8	4
Total organic carbon (TOC)	mg/L	50	16	14
Total nitrogen (T-N)	mg/L	1.689	2.232	2.626
Nitrite nitrogen (NO2-N)	mg/L	0.012	0.036	0.047
Nitrate-nitrogen (NO3-N)	mg/L	0.100	0.497	0.925
Ammonium nitrogen (NH4-N)	mg/L	0.264	0.654	0.139
Total phosphorous (T-P)	mg/L	0.110	0.305	0.152
Phosphate phosphorous (PO4-P)	mg/L	0.046	0.028	0.098
Chlorophil a	g/m^3	32	33	7
Pheophytin	g/m^3	0	0	2
General bacteria	unit/ml	5,070	5,720	590
Fecal coliform	MPN/100ml	<3	23	93
Cadmium (Cd)	mg/L	n..d	-	n.d
Lead (Pb),	mg/L	n.d	-	0.032
Hexavalent chromium (Cr6+)	mg/L	n.d	-	2.200
Arsenic (As),	mg/L	0.004	-	0.001
Total mercury (T-Hg)	mg/L	n.d	-	0.001
Copper (Cu),	mg/L	0.037	-	1.577
Nickel (Ni),	mg/L	n.d	-	0.007
Zinc (Zn),	mg/L	0.322	-	0.009
Iron (Fe),	mg/L	0.013	-	0.056
Total cyanide (T-CN),	mg/L	n.d	-	n.d
Diazinon	mg/L	14.3	8.5	-
Paraquat	mg/L	0.7	0.6	-
DDT	mg/L	n.d.	n.d.	-

Table 1.4.2 Analytical Results of River Water (1/10)

Sampling Point	Chafroud	R-1
Location	Shilesar	
Coordinate (UTM)	344,010	4,155,003

Item	Unit	Analytical Result		
Sampling Date	-	27-Aug	15-Oct	9-Dec
Air temperature	°C	27.0	23.5	15.0
Water temperature	°C	26.4	22.4	11.8
Water depth	m	0.32	0.30	0.80
River flow	m^3/s	-	0.422	5.750
DO	mg/L	6.53	6.98	10.65
pH	-	7.7	8.0	7.6
Salinity	ppm	0.01	0.01	0.03
Color	FTU	5	5	5
Transparency	m	0.10	0.30	0.80
Suspended solid	mg/L	73	106	230
COD	mg/L	42	36	21
BOD	mg/L	9	6	5
Total organic carbon (TOC)	mg/L	20	15	14
Total nitrogen (T-N)	mg/L	1.486	1.378	3.020
Nitrite nitrogen (NO2-N)	mg/L	0.034	0.006	0.019
Nitrate-nitrogen (NO3-N)	mg/L	1.209	0.474	0.451
Ammonium nitrogen (NH4-N)	mg/L	0.243	0.598	0.375
Total phosphorous (T-P)	mg/L	0.250	0.448	0.072
Phosphate phosphorous (PO4-P)	mg/L	0.099	0.080	0.061
Chlorophil a	g/m^3	8	4	2
Pheophytin	unit/ml	0	0	1
General bacteria	ftu/ml	17,400	9,100	1,640
Fecal coliform	MPN/100ml	2,400	240	230
Cadmium (Cd)	mg/L	n.d	-	n.d
Lead (Pb),	mg/L	n.d	-	0.014
Hexavalent chromium (Cr6+)	mg/L	n.d	-	n.d
Arsenic (As),	mg/L	0.002	-	0.002
Total mercury (T-Hg)	mg/L	n.d	-	n.d
Copper (Cu),	mg/L	0.105	-	0.541
Nickel (Ni),	mg/L	0.004	-	0.045
Zinc (Zn),	mg/L	0.078	-	0.033
Iron (Fe),	mg/L	0.010	-	1.185
Total cyanide (T-CN),	mg/L	n.d	-	n.d
Diazinon	mg/L	29.1	20.7	-
Paraquat	mg/L	0.7	0.4	-
DDT	mg/L	n.d.	n.d.	-

Sampling Point	Bahambar	No.2
Location	Aghamahaleh	
Coordinate (UTM)	343,794	4,147,516

Item	Unit	Analytical Result		
Sampling Date	-	27-Aug	15-Oct	9-Dec
Air temperature	°C	27.0	24.0	18.5
Water temperature	°C	26.0	21.5	13.0
Water depth	m	0.40	0.35	0.30
River flow	m^3/s	1.115	0.160	2.398
DO	mg/L	8.73	8.20	11.44
pH	-	7.9	8.0	7.8
Salinity	ppm	0.01	0.02	0.01
Color	FTU	5	5	5
Transparency	m	0.10	0.35	0.30
Suspended solid	mg/L	90	12	148
COD	mg/L	36	25	16
BOD	mg/L	7	5	4
Total organic carbon (TOC)	mg/L	17	18	7
Total nitrogen (T-N)	mg/L	1.756	1.853	2.975
Nitrite nitrogen (NO2-N)	mg/L	0.038	0.019	0.020
Nitrate-nitrogen (NO3-N)	mg/L	0.995	0.394	0.792
Ammonium nitrogen (NH4-N)	mg/L	0.723	0.215	0.375
Total phosphorous (T-P)	mg/L	0.116	0.633	0.135
Phosphate phosphorous (PO4-P)	mg/L	0.071	0.039	0.071
Chlorophil a	g/m^3	0	0	2
Pheophytin	unit/ml	0	0	0
General bacteria	ftu/ml	17,500	5,200	1,530
Fecal coliform	MPN/100ml	930	240	480
Cadmium (Cd)	mg/L	n.d	-	n.d
Lead (Pb),	mg/L	0.012	-	0.010
Hexavalent chromium (Cr6+)	mg/L	n.d	-	n.d
Arsenic (As),	mg/L	0.005	-	0.001
Total mercury (T-Hg)	mg/L	n.d	-	n.d
Copper (Cu),	mg/L	0.045	-	0.016
Nickel (Ni),	mg/L	0.009	-	0.006
Zinc (Zn),	mg/L	0.022	-	0.011
Iron (Fe),	mg/L	1.175	-	0.933
Total cyanide (T-CN),	mg/L	n.d	-	n.d
Diazinon	mg/L	22.6	12.1	-
Paraquat	mg/L	0.5	0.9	-
DDT	mg/L	n.d.	n.d	-

Table 1.4.2 Analytical Results of River Water (2/10)

Sampling Point	Morghak	R-3
Location	Imamzadeh shafee	
Coordinate (UTM)	328,074	4,141,551

Item	Unit	Analytical Result		
Sampling Date	-	27-Aug	15-Oct	9-Dec
Air temperature	°C	27.0	21.0	18.0
Water temperature	°C	23.7	18.7	11.3
Water depth	m	0.35	0.30	0.50
River flow	m^3/s	2.516	2.717	13.840
DO	mg/L	9.05	8.62	11.53
pH	-	7.9	8.1	8.0
Salinity	ppm	0.01	0.01	0.00
Color	FTU	5	5	5
Transparency	m	0.18	0.30	0.25
Suspended solid	mg/L	35	97	144
COD	mg/L	48	26	17
BOD	mg/L	6	5	3
Total organic carbon (TOC)	mg/L	23	19	16
Total nitrogen (T-N)	mg/L	1.592	2.378	4.056
Nitrite nitrogen (NO2-N)	mg/L	0.018	0.019	0.020
Nitrate-nitrogen (NO3-N)	mg/L	1.435	1.458	1.921
Ammonium nitrogen (NH4-N)	mg/L	0.139	0.438	0.486
Total phosphorous (T-P)	mg/L	0.071	0.278	0.100
Phosphate phosphorous (PO4-P)	mg/L	0.066	0.003	0.064
Chlorophil a	g/m^3	0	0	1
Pheophytin	unit/ml	0	0	1
General bacteria	ftu/ml	44,200	15,600	702
Fecal coliform	MPN/100ml	> 2,400	750	23
Cadmium (Cd)	mg/L	n.d	-	n.d
Lead (Pb),	mg/L	n.d	-	0.022
Hexavalent chromium (Cr6+)	mg/L	n.d	-	n.d
Arsenic (As),	mg/L	0.003	-	0.001
Total mercury (T-Hg)	mg/L	n.d	-	n.d
Copper (Cu),	mg/L	1.114	-	1.022
Nickel (Ni),	mg/L	0.026	-	0.018
Zinc (Zn),	mg/L	0.097	-	0.005
Iron (Fe),	mg/L	0.105	-	3.466
Total cyanide (T-CN),	mg/L	0.020	-	n.d
Diazinon	mg/L	22.3	14.8	-
Paraquat	mg/L	0.4	0.5	-
DDT	mg/L	n.d.	n.d.	-

Sampling Point	Morghak	R-4
Location		
Coordinate (UTM)	347,201	4,142,944

Item	Unit	Analytical Result		
Sampling Date	-	27-Aug	15-Oct	9-Dec
Air temperature	°C	38.0	24.0	15.5
Water temperature	°C	27.2	20.5	10.7
Water depth	m	0.60	0.10	1.00
River flow	m^3/s	1.338	1.814	11.612
DO	mg/L	6.85	8.42	11.80
pH	-	7.8	7.9	7.6
Salinity	ppm	0.01	0.01	0.01
Color	FTU	5	5	5
Transparency	m	0.20	1.00	0.20
Suspended solid	mg/L	65	131	125
COD	mg/L	58	30	52
BOD	mg/L	10	8	2
Total organic carbon (TOC)	mg/L	27	14	13
Total nitrogen (T-N)	mg/L	1.258	2.722	3.245
Nitrite nitrogen (NO2-N)	mg/L	0.017	0.022	0.042
Nitrate-nitrogen (NO3-N)	mg/L	1.040	1.477	1.833
Ammonium nitrogen (NH4-N)	mg/L	0.201	0.319	0.354
Total phosphorous (T-P)	mg/L	0.069	0.408	0.196
Phosphate phosphorous (PO4-P)	mg/L	0.061	0.052	0.134
Chlorophil a	g/m^3	0	2	1
Pheophytin	unit/ml	0	0	0
General bacteria	ftu/ml	14,200	2,990	850
Fecal coliform	MPN/100ml	9,300	4,600	150
Cadmium (Cd)	mg/L	n.d	-	0.0030
Lead (Pb),	mg/L	n.d	-	n.d
Hexavalent chromium (Cr6+)	mg/L	n.d	-	3.400
Arsenic (As),	mg/L	0.004	-	0.004
Total mercury (T-Hg)	mg/L	n.d	-	n.d
Copper (Cu),	mg/L	0.009	-	0.245
Nickel (Ni),	mg/L	0.012	-	n.d
Zinc (Zn),	mg/L	0.007	-	n.d
Iron (Fe),	mg/L	0.651	-	0.253
Total cyanide (T-CN),	mg/L		-	n.d
Diazinon	mg/L	29.7	14.3	-
Paraquat	mg/L	0.9	2.9	-
DDT	mg/L	n.d.	n.d.	-

Table 1.4.2 Analytical Results of River Water (3/10)

Sampling Point	Khalkai	R-5
Location	Taskooh	
Coordinate (UTM)	329,380	4,133,495

Item	Unit	Analytical Result		
Sampling Date	-	27-Aug	18-Oct	9-Dec
Air temperature	°C	27.0	22.5	17.5
Water temperature	°C	24.3	19.0	10.7
Water depth	m	0.40	0.35	0.55
River flow	m^3/s	2.353	2.737	16.967
DO	mg/L	8.44	8.05	12.00
pH	-	8.1	8.2	7.9
Salinity	ppm	0.01	0.01	0.00
Color	FTU	5	5	5
Transparency	m	0.40	0.35	0.25
Suspended solid	mg/L	38	102	174
COD	mg/L	54	12	13
BOD	mg/L	6	6	2
Total organic carbon (TOC)	mg/L	25	5	11
Total nitrogen (T-N)	mg/L	1.646	2.995	3.702
Nitrite nitrogen (NO2-N)	mg/L	0.018	0.007	0.013
Nitrate-nitrogen (NO3-N)	mg/L	1.469	1.772	2.606
Ammonium nitrogen (NH4-N)	mg/L	0.159	0.076	0.208
Total phosphorous (T-P)	mg/L	0.060	0.269	0.083
Phosphate phosphorous (PO4-P)	mg/L	0.045	0.018	0.057
Chlorophil a	g/m^3	0	2	2
Pheophytin	unit/ml	0	0	0
General bacteria	ftu/ml	40,300	13,000	1,550
Fecal coliform	MPN/100ml	> 2400	11,000	2,400
Cadmium (Cd)	mg/L	n.d	-	n.d
Lead (Pb),	mg/L	n.d	-	0.017
Hexavalent chromium (Cr6+)	mg/L	n.d	-	n.d
Arsenic (As),	mg/L	0.003	-	0.001
Total mercury (T-Hg)	mg/L	n.d	-	0.001
Copper (Cu),	mg/L	0.005	-	0.239
Nickel (Ni),	mg/L	0.014	-	n.d
Zinc (Zn),	mg/L	0.022	-	0.036
Iron (Fe),	mg/L	0.058	-	1.784
Total cyanide (T-CN),	mg/L	n.d	-	n.d
Diazinon	mg/L	22.6	13.1	-
Paraquat	mg/L	0.6	0.6	-
DDT	mg/L	n.d.	n.d.	-

Sampling Point	Khalkai	R-6
Location	Masal Town	
Coordinate (UTM)	336,336	4,138,053

Item	Unit	Analytical Result		
Sampling Date	-	27-Aug	18-Oct	9-Dec
Air temperature	°C	31.0	24.0	18.0
Water temperature	°C	28.7	21.4	11.0
Water depth	m	0.15	0.25	0.40
River flow	m^3/s	-	1.372	7.250
DO	mg/L	7.94	7.50	11.60
pH	-	7.0	8.1	7.9
Salinity	ppm	0.01	0.01	0.00
Color	FTU	5	5	5
Transparency	m	0.15	0.25	0.30
Suspended solid	mg/L	45	126	180
COD	mg/L	48	29	38
BOD	mg/L	9	7	3
Total organic carbon (TOC)	mg/L	23	12	16
Total nitrogen (T-N)	mg/L	2.483	4.142	3.030
Nitrite nitrogen (NO2-N)	mg/L	0.035	0.003	0.024
Nitrate-nitrogen (NO3-N)	mg/L	1.446	1.856	2.755
Ammonium nitrogen (NH4-N)	mg/L	1.002	0.222	0.799
Total phosphorous (T-P)	mg/L	0.087	0.169	0.070
Phosphate phosphorous (PO4-P)	mg/L	0.079	0.048	0.048
Chlorophil a	g/m^3	0	2	1
Pheophytin	unit/ml	0	0	0
General bacteria	ftu/ml	11,000	15,600	930
Fecal coliform	MPN/100ml	40	930	90
Cadmium (Cd)	mg/L	n.d	-	n.d
Lead (Pb),	mg/L	n.d	-	n.d
Hexavalent chromium (Cr6+)	mg/L	n.d	-	n.d
Arsenic (As),	mg/L	0.002	-	0.001
Total mercury (T-Hg)	mg/L	n.d	-	n.d
Copper (Cu),	mg/L	0.068	-	0.607
Nickel (Ni),	mg/L	n.d	-	n.d
Zinc (Zn),	mg/L	0.036	-	0.006
Iron (Fe),	mg/L	0.299	-	2.046
Total cyanide (T-CN),	mg/L	n.d	-	n.d
Diazinon	mg/L	24.9	18.3	-
Paraquat	mg/L	0.9	0.4	-
DDT	mg/L	n.d.	n.d.	-

Table 1.4.2 Analytical Results of River Water (4/10)

Sampling Point	Khalkai	R-7
Location		
Coordinate (UTM)	347,545	4,142,836

Item	Unit	Analytical Result		
Sampling Date	-	27-Aug	18-Oct	9-Dec
Air temperature	°C	34.0	22.0	15.0
Water temperature	°C	26.7	21.1	11.7
Water depth	m	0.40	0.60	1.20
River flow	m^3/s	2.614	2.104	14.982
DO	mg/L	6.87	7.12	11.30
pH	-	7.8	7.9	7.6
Salinity	ppm	0.01	0.01	0.01
Color	FTU	5	5	5
Transparency	m	0.20	0.60	0.30
Suspended solid	mg/L	66	61	129
COD	mg/L	38	13	15
BOD	mg/L	8	8	2
Total organic carbon (TOC)	mg/L	18	6	11
Total nitrogen (T-N)	mg/L	1.445	1.757	3.950
Nitrite nitrogen (NO2-N)	mg/L	0.041	0.027	0.021
Nitrate-nitrogen (NO3-N)	mg/L	1.328	1.630	2.177
Ammonium nitrogen (NH4-N)	mg/L	0.076	0.354	1.829
Total phosphorous (T-P)	mg/L	0.110	0.212	0.091
Phosphate phosphorous (PO4-P)	mg/L	0.076	0.038	0.071
Chlorophil a	g/m^3	0	4	1
Pheophytin	unit/ml	0	0	1
General bacteria	ftu/ml	244,400	28,600	429
Fecal coliform	MPN/100ml	4,600	240	230
Cadmium (Cd)	mg/L	n.d	-	n.d
Lead (Pb),	mg/L	n.d	-	n.d
Hexavalent chromium (Cr6+)	mg/L	n.d	-	0.600
Arsenic (As),	mg/L	0.005	-	0.002
Total mercury (T-Hg)	mg/L	n.d	-	n.d
Copper (Cu),	mg/L	0.007	-	n.d
Nickel (Ni),	mg/L	n.d	-	0.012
Zinc (Zn),	mg/L	0.010	-	n.d
Iron (Fe),	mg/L	0.400	-	0.069
Total cyanide (T-CN),	mg/L	n.d	-	n.d
Diazinon	mg/L	27.8	11.8	-
Paraquat	mg/L	0.2	0.2	-
DDT	mg/L	n.d.	n.d.	-

Sampling Point	Palangvar	R-8
Location	Kolsar	
Coordinate (UTM)	347,565	4,142,825

Item	Unit	Analytical Result		
Sampling Date	-	27-Aug	18-Oct	2004/12/12
Air temperature	°C	37.0	22.5	18.0
Water temperature	°C	28.4	22.0	13.2
Water depth	m	0.60	0.35	0.60
River flow	m^3/s	3.125	1.289	9.291
DO	mg/L	6.90	7.16	11.25
pH	-	7.8	7.9	7.5
Salinity	ppm	0.01	0.01	0.01
Color	FTU	5	5	5
Transparency	m	0.50	0.35	0.30
Suspended solid	mg/L	48	37	76
COD	mg/L	25	23	44
BOD	mg/L	11	9	2
Total organic carbon (TOC)	mg/L	12	12	12
Total nitrogen (T-N)	mg/L	2.525	2.080	2.437
Nitrite nitrogen (NO2-N)	mg/L	0.034	0.006	0.011
Nitrate-nitrogen (NO3-N)	mg/L	1.220	0.413	2.066
Ammonium nitrogen (NH4-N)	mg/L	0.271	0.216	0.041
Total phosphorous (T-P)	mg/L	0.128	0.144	0.080
Phosphate phosphorous (PO4-P)	mg/L	0.091	0.044	0.049
Chlorophil a	g/m^3	8	5	3
Pheophytin	unit/ml	0	0	0
General bacteria	ftu/ml	17,500	23,400	1,030
Fecal coliform	MPN/100ml	4,600	48	480
Cadmium (Cd)	mg/L	n.d	-	n.d
Lead (Pb),	mg/L	n.d	-	n.d
Hexavalent chromium (Cr6+)	mg/L	n.d	-	n.d
Arsenic (As),	mg/L	0.004	-	0.001
Total mercury (T-Hg)	mg/L	n.d	-	n.d
Copper (Cu),	mg/L	0.015	-	0.020
Nickel (Ni),	mg/L	n.d	-	n.d
Zinc (Zn),	mg/L	n.d	-	0.007
Iron (Fe),	mg/L	1.967	-	0.468
Total cyanide (T-CN),	mg/L	n.d	-	n.d
Diazinon	mg/L	22.6	12.7	-
Paraquat	mg/L	0.2	0.1	-
DDT	mg/L	n.d.	n.d.	-

Table 1.4.2 Analytical Results of River Water (5/10)

Sampling Point	Masulehroud R-9	
Location	Komadol	
Coordinate (UTM)	333,931	4,115,945

Item	Unit	Analytical Result		
Sampling Date	-	27-Aug	20-Oct	12-Dec
Air temperature	°C	28.5	16.8	17.0
Water temperature	°C	23.1	15.0	12.5
Water depth	m	0.20	0.30	0.10
River flow	m^3/s	3.713	1.980	8.009
DO	mg/L	7.12	9.95	10.23
pH	-	8.30	8.13	7.90
Salinity	ppm	0.01	0.00	0.00
Color	FTU	5	5	10
Transparency	m	0.20	0.30	0.30
Suspended solid	mg/L	23	218	241
COD	mg/L	20	42	46
BOD	mg/L	8	3	1
Total organic carbon (TOC)	mg/L	9	19	12
Total nitrogen (T-N)	mg/L	1.887	2.080	2.369
Nitrite nitrogen (NO2-N)	mg/L	0.008	0.009	0.032
Nitrate-nitrogen (NO3-N)	mg/L	1.726	1.867	2.824
Ammonium nitrogen (NH4-N)	mg/L	0.153	0.021	0.076
Total phosphorous (T-P)	mg/L	0.174	0.374	0.105
Phosphate phosphorous (PO4-P)	mg/L	0.057	0.022	0.102
Chlorophil a	g/m^3	2	1	3
Pheophytin	unit/ml	0	0	0
General bacteria	ftu/ml	5,980	36,400	897
Fecal coliform	MPN/100ml	11,000	≥24000	480
Cadmium (Cd)	mg/L	n.d	-	n.d
Lead (Pb),	mg/L	n.d	-	0.008
Hexavalent chromium (Cr6+)	mg/L	n.d	-	n.d
Arsenic (As),	mg/L	0.003	-	0.004
Total mercury (T-Hg)	mg/L	n.d	-	0.001
Copper (Cu),	mg/L	0.010	-	n.d
Nickel (Ni),	mg/L	n.d	-	n.d
Zinc (Zn),	mg/L	n.d	-	0.051
Iron (Fe),	mg/L	0.386	-	0.687
Total cyanide (T-CN),	mg/L	n.d	-	n.d
Diazinon	mg/L	88.5	52.3	-
Paraquat	mg/L	0.7	0.3	-
DDT	mg/L	n.d.	n.d.	-

Sampling Point	Masulehroud R-10	
Location	Somehsara Town	
Coordinate (UTM)	349,541	4,132,207

Item	Unit	Analytical Result		
Sampling Date	-	27-Aug	20-Oct	12-Dec
Air temperature	°C	31.0	20.5	16.0
Water temperature	°C	28.6	17.0	12.1
Water depth	m	0.30	0.25	0.20
River flow	m^3/s	-	0.546	8.699
DO	mg/L	7.66	8.75	11.96
pH	-	7.7	7.6	7.6
Salinity	ppm	0.02	0.02	0.00
Color	FTU	5	<5	5
Transparency	m	0.10	0.25	0.20
Suspended solid	mg/L	31	91	158
COD	mg/L	46	19	56
BOD	mg/L	11	9	4
Total organic carbon (TOC)	mg/L	22	16	8
Total nitrogen (T-N)	mg/L	1.377	1.444	2.920
Nitrite nitrogen (NO2-N)	mg/L	0.030	0.005	0.041
Nitrate-nitrogen (NO3-N)	mg/L	1.132	0.700	2.889
Ammonium nitrogen (NH4-N)	mg/L	0.215	0.187	0.048
Total phosphorous (T-P)	mg/L	0.112	0.905	0.105
Phosphate phosphorous (PO4-P)	mg/L	0.076	0.023	0.103
Chlorophil a	g/m^3	0	2	2
Pheophytin	unit/ml	0	0	0
General bacteria	ftu/ml	39,000	22,100	3,510
Fecal coliform	MPN/100ml	>2400	4,600	230
Cadmium (Cd)	mg/L	n.d	-	n.d
Lead (Pb),	mg/L	n.d	-	n.d
Hexavalent chromium (Cr6+)	mg/L	n.d	-	21.400
Arsenic (As),	mg/L	0.001	-	n.d
Total mercury (T-Hg)	mg/L	n.d	-	0.0002
Copper (Cu),	mg/L	0.085	-	0.369
Nickel (Ni),	mg/L	0.004	-	0.027
Zinc (Zn),	mg/L	0.035	-	n.d
Iron (Fe),	mg/L	1.107	-	0.951
Total cyanide (T-CN),	mg/L	n.d	-	n.d
Diazinon	mg/L	53.9	41.7	-
Paraquat	mg/L	0.6	0.2	-
DDT	mg/L	n.d.	n.d.	-

Table 1.4.2 Analytical Results of River Water (6/10)

Sampling Point	Masulehroud	R-11
Location	Chomesghal	
Coordinate (UTM)	355,174	4,137,515

Item	Unit	Analytical Result		
Sampling Date	-	27-Aug	20-Oct	12-Dec
Air temperature	°C	34.0	20.8	18.3
Water temperature	°C	29.1	18.0	13.9
Water depth	m	0.30	0.20	0.60
River flow	m^3/s	2.728	0.568	22.131
DO	mg/L	6.45	7.04	10.63
pH	-	7.7	7.6	7.8
Salinity	ppm	0.02	0.02	0.00
Color	FTU	5	<5	10
Transparency	m	0.10	0.20	0.20
Suspended solid	mg/L	48	44	143
COD	mg/L	38	31	46
BOD	mg/L	11	8	3
Total organic carbon (TOC)	mg/L	18	14	7
Total nitrogen (T-N)	mg/L	2.123	3.186	2.821
Nitrite nitrogen (NO2-N)	mg/L	0.126	0.450	0.052
Nitrate-nitrogen (NO3-N)	mg/L	1.163	1.308	2.678
Ammonium nitrogen (NH4-N)	mg/L	0.834	0.417	0.027
Total phosphorous (T-P)	mg/L	0.207	0.285	0.134
Phosphate phosphorous (PO4-P)	mg/L	0.133	0.088	0.126
Chlorophil a	g/m^3	0	1	3
Pheophytin	unit/ml	0	1	0
General bacteria	ftu/ml	45,500	61,100	4,290
Fecal coliform	MPN/100ml	1,500	≥24000	4,600
Cadmium (Cd)	mg/L	n.d	-	n.d
Lead (Pb),	mg/L	n.d	-	n.d
Hexavalent chromium (Cr6+)	mg/L	n.d	-	n.d
Arsenic (As),	mg/L	0.002	-	0.001
Total mercury (T-Hg)	mg/L	n.d	-	n.d
Copper (Cu),	mg/L	0.010	-	n.d
Nickel (Ni),	mg/L	n.d	-	n.d
Zinc (Zn),	mg/L	0.011	-	0.082
Iron (Fe),	mg/L	1.275	-	1.281
Total cyanide (T-CN),	mg/L	n.d	-	n.d
Diazinon	mg/L	20.4	11.7	-
Paraquat	mg/L	0.4	0.3	-
DDT	mg/L	n.d.	n.d.	-

Sampling Point	Shakhaz	R-12
Location	Pirsara	
Coordinate (UTM)	340,983	4,411,379

Item	Unit	Analytical Result		
Sampling Date	-	30-Aug	21-Oct	12-Dec
Air temperature	°C	37.0	17.0	17.0
Water temperature	°C	24.8	16.7	11.5
Water depth	m	0.15	0.30	0.40
River flow	m^3/s	4.507	1.529	5.121
DO	mg/L	8.74	9.11	12.25
pH	-	7.9	7.8	7.8
Salinity	ppm	0.00	0.00	0.00
Color	FTU	5	5	10
Transparency	m	0.15	0.30	0.40
Suspended solid	mg/L	19	23	54
COD	mg/L	27	13	38
BOD	mg/L	8	2	3
Total organic carbon (TOC)	mg/L	13	6	10
Total nitrogen (T-N)	mg/L	1.620	1.843	2.291
Nitrite nitrogen (NO2-N)	mg/L	0.002	0.018	0.001
Nitrate-nitrogen (NO3-N)	mg/L	1.549	1.389	2.801
Ammonium nitrogen (NH4-N)	mg/L	0.069	0.779	0.013
Total phosphorous (T-P)	mg/L	0.160	0.224	0.069
Phosphate phosphorous (PO4-P)	mg/L	0.038	0.020	0.022
Chlorophil a	g/m^3	2	3	2
Pheophytin	unit/ml	0	0	0
General bacteria	ftu/ml	6,500	8,190	6,890
Fecal coliform	MPN/100ml	11,000	930	230
Cadmium (Cd)	mg/L	n.d	-	n.d
Lead (Pb),	mg/L	n.d	-	0.013
Hexavalent chromium (Cr6+)	mg/L	n.d	-	n.d
Arsenic (As),	mg/L	0.0004	-	0.009
Total mercury (T-Hg)	mg/L	n.d	-	n.d
Copper (Cu),	mg/L	0.004	-	0.038
Nickel (Ni),	mg/L	0.012	-	n.d
Zinc (Zn),	mg/L	0.002	-	0.023
Iron (Fe),	mg/L	0.437	-	1.824
Total cyanide (T-CN),	mg/L	0.010	-	n.d
Diazinon	mg/L	39.5	10.6	-
Paraquat	mg/L	1.4	0.4	-
DDT	mg/L	n.d.	n.d.	-

Table 1.4.2 Analytical Results of River Water (7/10)

Sampling Point	Shakhaz	R-13
Location	Ghaleh roudkhan	
Coordinate (UTM)	351,277	4,121,562

Item	Unit	Analytical Result		
Sampling Date	-	30-Aug	21-Oct	12-Dec
Air temperature	°C	35.0	19.2	18.0
Water temperature	°C	26.8	19.0	13.3
Water depth	m	0.20	0.22	0.25
River flow	m^3/s	2.714	1.217	7.095
DO	mg/L	7.10	8.53	10.94
pH	-	7.3	7.3	7.5
Salinity	ppm	0.02	0.01	0.01
Color	FTU	5	5	15
Transparency	m	0.20	0.22	0.25
Suspended solid	mg/L	33	29	68
COD	mg/L	42	35	60
BOD	mg/L	21	11	7
Total organic carbon (TOC)	mg/L	20	12	11
Total nitrogen (T-N)	mg/L	1.082	1.823	2.022
Nitrite nitrogen (NO2-N)	mg/L	0.084	0.055	0.061
Nitrate-nitrogen (NO3-N)	mg/L	0.880	0.704	1.810
Ammonium nitrogen (NH4-N)	mg/L	0.118	1.752	0.994
Total phosphorous (T-P)	mg/L	0.809	0.424	0.292
Phosphate phosphorous (PO4-P)	mg/L	0.781	0.255	0.253
Chlorophil a	g/m^3	3	1	2
Pheophytin	unit/ml	0	0	0
General bacteria	ftu/ml	254,800	97,500	56,800
Fecal coliform	MPN/100ml	24,000	≥24000	³24000
Cadmium (Cd)	mg/L	0.007	-	n.d
Lead (Pb),	mg/L	n.d	-	0.009
Hexavalent chromium (Cr6+)	mg/L	n.d	-	n.d
Arsenic (As),	mg/L	0.0003	-	1.200
Total mercury (T-Hg)	mg/L	n.d	-	n.d
Copper (Cu),	mg/L	0.006	-	0.535
Nickel (Ni),	mg/L	0.014	-	n.d
Zinc (Zn),	mg/L	0.006	-	0.034
Iron (Fe),	mg/L	0.048	-	0.664
Total cyanide (T-CN),	mg/L	0.049	-	n.d
Diazinon	mg/L	22.8	20.2	-
Paraquat	mg/L	0.2	0.1	-
DDT	mg/L	n.d.	n.d.	-

Sampling Point	Shakhaz	R-14
Location	Laksar	
Coordinate (UTM)	360,223	4,135,159

Item	Unit	Analytical Result		
Sampling Date	-	27-Aug	21-Oct	12-Dec
Air temperature	°C	31.0	20.1	18.0
Water temperature	°C	28.2	19.0	15.1
Water depth	m	0.20	0.40	0.50
River flow	m^3/s	3.288	2.378	25.663
DO	mg/L	7.51	7.95	10.23
pH	-	7.7	7.7	8.0
Salinity	ppm	0.01	0.01	0.00
Color	FTU	5	5	10
Transparency	m	0.10	0.40	0.40
Suspended solid	mg/L	38	28	86
COD	mg/L	20	17	43
BOD	mg/L	12	7	3
Total organic carbon (TOC)	mg/L	9	16	11
Total nitrogen (T-N)	mg/L	1.229	2.186	2.109
Nitrite nitrogen (NO2-N)	mg/L	0.013	0.010	0.021
Nitrate-nitrogen (NO3-N)	mg/L	1.140	0.696	2.296
Ammonium nitrogen (NH4-N)	mg/L	0.076	0.396	0.048
Total phosphorous (T-P)	mg/L	0.264	0.168	0.087
Phosphate phosphorous (PO4-P)	mg/L	0.080	0.079	0.050
Chlorophil a	g/m^3	4	1	2
Pheophytin	unit/ml	0	1	1
General bacteria	ftu/ml	22,100	39,000	5,850
Fecal coliform	MPN/100ml	2,400	2,400	480
Cadmium (Cd)	mg/L	n.d	-	n.d
Lead (Pb),	mg/L	0.003	-	0.022
Hexavalent chromium (Cr6+)	mg/L	n.d	-	n.d
Arsenic (As),	mg/L	0.004	-	0.003
Total mercury (T-Hg)	mg/L	n.d	-	n.d
Copper (Cu),	mg/L	0.013	-	0.356
Nickel (Ni),	mg/L	n.d	-	n.d
Zinc (Zn),	mg/L	0.011	-	0.002
Iron (Fe),	mg/L	1.654	-	0.205
Total cyanide (T-CN),	mg/L	n.d	-	n.d
Diazinon	mg/L	26.9	17.6	-
Paraquat	mg/L	0.4	0.2	-
DDT	mg/L	n.d.	n.d.	-

Table 1.4.2 Analytical Results of River Water (8/10)

Sampling Point	Pasikan	R-15
Location	Mobarakabad	
Coordinate (UTM)	3,592,224	4,103,732

Item	Unit	Analytical Result		
Sampling Date	-	31-Aug	21-Oct	2004/12/12
Air temperature	°C	28.0	23.0	12.0
Water temperature	°C	25.3	19.5	11.8
Water depth	m	0.10	0.30	0.30
River flow	m^3/s	3.561	1.474	9.058
DO	mg/L	8.30	7.19	12.02
pH	-	8.3	8.3	7.9
Salinity	ppm	0.01	0.00	0.00
Color	FTU	5	<5	5
Transparency	m	0.10	0.30	0.30
Suspended solid	mg/L	17	15	37
COD	mg/L	19	15	24
BOD	mg/L	5	2	4
Total organic carbon (TOC)	mg/L	9	13	11
Total nitrogen (T-N)	mg/L	1.885	1.867	2.324
Nitrite nitrogen (NO2-N)	mg/L	0.010	0.001	0.031
Nitrate-nitrogen (NO3-N)	mg/L	0.646	0.505	1.435
Ammonium nitrogen (NH4-N)	mg/L	0.229	0.146	0.021
Total phosphorous (T-P)	mg/L	0.284	0.329	0.072
Phosphate phosphorous (PO4-P)	mg/L	0.035	0.049	0.020
Chlorophil a	g/m^3	2	1	2
Pheophytin	unit/ml	0	0	1
General bacteria	ftu/ml	3,120	1,690	1,820
Fecal coliform	MPN/100ml	480	750	460
Cadmium (Cd)	mg/L	0.005	-	n.d
Lead (Pb),	mg/L	n.d	-	n.d
Hexavalent chromium (Cr6+)	mg/L	n.d	-	n.d
Arsenic (As),	mg/L	0.010	-	0.004
Total mercury (T-Hg)	mg/L	n.d	-	n.d
Copper (Cu),	mg/L	0.006	-	0.690
Nickel (Ni),	mg/L	0.011	-	0.025
Zinc (Zn),	mg/L	0.036	-	n.d
Iron (Fe),	mg/L	0.022	-	0.273
Total cyanide (T-CN),	mg/L	n.d	-	n.d
Diazinon	mg/L	29.6	18.6	-
Paraquat	mg/L	2.9	1.1	-
DDT	mg/L	n.d.	n.d.	-

Sampling Point	Pasikan	R-16
Location	Nokhaleh	
Coordinate (UTM)	3,629,334	134,776

Item	Unit	Analytical Result		
Sampling Date	-	31-Aug	22-Oct	12-Dec
Air temperature	°C	30.0	22.0	14.0
Water temperature	°C	27.3	19.6	9.0
Water depth	m	0.25	0.45	0.50
River flow	m^3/s	7.730	5.498	37.250
DO	mg/L	5.30	6.74	10.63
pH	-	7.7	7.5	7.8
Salinity	ppm	0.02	0.01	0.01
Color	FTU	5	20	5
Transparency	m	0.25	0.45	0.50
Suspended solid	mg/L	28	16	128
COD	mg/L	25	15	47
BOD	mg/L	10	7	5
Total organic carbon (TOC)	mg/L	12	7	12
Total nitrogen (T-N)	mg/L	1.415	1.570	1.737
Nitrite nitrogen (NO2-N)	mg/L	0.004	0.045	0.005
Nitrate-nitrogen (NO3-N)	mg/L	1.098	0.451	1.412
Ammonium nitrogen (NH4-N)	mg/L	0.313	0.499	0.111
Total phosphorous (T-P)	mg/L	0.258	0.289	0.101
Phosphate phosphorous (PO4-P)	mg/L	0.061	0.064	0.056
Chlorophil a	g/m^3	14	8	4
Pheophytin	unit/ml	0	0	1
General bacteria	ftu/ml	1,560	3,900	7,900
Fecal coliform	MPN/100ml	230	2,400	480
Cadmium (Cd)	mg/L	n.d	-	n.d
Lead (Pb),	mg/L	0.133	-	0.011
Hexavalent chromium (Cr6+)	mg/L	n.d	-	2.0000
Arsenic (As),	mg/L	0.007	-	0.005
Total mercury (T-Hg)	mg/L	n.d	-	n.d
Copper (Cu),	mg/L	0.005	-	0.712
Nickel (Ni),	mg/L	0.020	-	0.006
Zinc (Zn),	mg/L	0.038	-	n.d
Iron (Fe),	mg/L	0.579	-	0.244
Total cyanide (T-CN),	mg/L	n.d	-	n.d
Diazinon	mg/L	24.6	12.4	-
Paraquat	mg/L	0.1	0.2	-
DDT	mg/L	n.d.	n.d.	-

Table 1.4.2 Analytical Results of River Water (9/10)

Sampling Point	Siahroud	R-17
Location	Behdan	
Coordinate (UTM)	379,934	4,411,463

Item	Unit	Analytical Result		
Sampling Date	-	1-Sep	25-Oct	12-Dec
Air temperature	°C	34.0	29.0	17.0
Water temperature	°C	25.0	19.9	10.8
Water depth	m	0.20	0.40	0.25
River flow	m^3/s	-	0.600	1.107
DO	mg/L	6.60	6.92	11.70
pH	-	7.3	7.4	7.4
Salinity	ppm	0.02	0.01	0.00
Color	FTU	10	5	5
Transparency	m	0.20	0.40	0.25
Suspended solid	mg/L	21	18	17
COD	mg/L	13	25	81
BOD	mg/L	2	4	3
Total organic carbon (TOC)	mg/L	6	16	13
Total nitrogen (T-N)	mg/L	3.533	1.548	2.704
Nitrite nitrogen (NO2-N)	mg/L	0.001	0.115	0.057
Nitrate-nitrogen (NO3-N)	mg/L	2.774	0.330	1.882
Ammonium nitrogen (NH4-N)	mg/L	0.758	0.330	1.266
Total phosphorous (T-P)	mg/L	0.122	0.184	0.116
Phosphate phosphorous (PO4-P)	mg/L	0.088	0.130	0.058
Chlorophil a	g/m^3	4	3	3
Pheophytin	unit/ml	0	0	0
General bacteria	ftu/ml	11,310	2,510	1,610
Fecal coliform	MPN/100ml	1,500	2,510	48
Cadmium (Cd)	mg/L	n.d	-	0.002
Lead (Pb),	mg/L	n.d	-	n.d
Hexavalent chromium (Cr6+)	mg/L	n.d	-	n.d
Arsenic (As),	mg/L	0.006	-	0.003
Total mercury (T-Hg)	mg/L	n.d	-	n.d
Copper (Cu),	mg/L	0.022	-	0.765
Nickel (Ni),	mg/L	0.004	-	0.022
Zinc (Zn),	mg/L	0.011	-	0.003
Iron (Fe),	mg/L	0.019	-	0.818
Total cyanide (T-CN),	mg/L	n.d	-	n.d
Diazinon	mg/L	35.9	18.5	-
Paraquat	mg/L	0.8	0.6	-
DDT	mg/L	n.d.	n.d.	-

Sampling Point	Siahroud	R-18
Location	Polesazeman	
Coordinate (UTM)	376,968	4,124,421

Item	Unit	Analytical Result		
Sampling Date	-	1-Sep	25-Oct	12-Dec
Air temperature	°C	34.0	29.0	15.3
Water temperature	°C	26.5	21.6	10.4
Water depth	m	0.30	-	0.60
River flow	m^3/s	-	3.760	4.532
DO	mg/L	5.77	6.20	11.43
pH	-	7.6	7.5	7.5
Salinity	ppm	0.04	0.03	0.00
Color	FTU	5	5	5
Transparency	m	0.30	-	0.30
Suspended solid	mg/L	33	69	54
COD	mg/L	23	33	91
BOD	mg/L	13	11	6
Total organic carbon (TOC)	mg/L	11	12	13
Total nitrogen (T-N)	mg/L	2.675	3.060	2.447
Nitrite nitrogen (NO2-N)	mg/L	0.056	0.026	0.063
Nitrate-nitrogen (NO3-N)	mg/L	1.186	1.121	1.419
Ammonium nitrogen (NH4-N)	mg/L	1.433	1.121	0.946
Total phosphorous (T-P)	mg/L	0.323	0.273	0.125
Phosphate phosphorous (PO4-P)	mg/L	0.257	0.259	0.124
Chlorophil a	g/m^3	5	5	3
Pheophytin	unit/ml	1	4	0
General bacteria	ftu/ml	21,840	202,800	8,190
Fecal coliform	MPN/100ml	11,000	202,800	2,400
Cadmium (Cd)	mg/L	n.d	-	0.002
Lead (Pb),	mg/L	n.d	-	n.d
Hexavalent chromium (Cr6+)	mg/L	n.d	-	n.d
Arsenic (As),	mg/L	0.011	-	0.003
Total mercury (T-Hg)	mg/L	n.d	-	n.d
Copper (Cu),	mg/L	0.032	-	0.668
Nickel (Ni),	mg/L	0.039	-	0.043
Zinc (Zn),	mg/L	0.053	-	n.d
Iron (Fe),	mg/L	0.768	-	0.504
Total cyanide (T-CN),	mg/L	n.d	-	n.d
Diazinon	mg/L	23.3	21.6	-
Paraquat	mg/L	0.4	0.3	-
DDT	mg/L	n.d.	n.d.	-

Table 1.4.2 Analytical Results of River Water (10/10)

Sampling Point	Pirbazar	R-19
Location		
Coordinate (UTM)	371,289	4,133,989

Item	Unit	Analytical Result		
Sampling Date	-	1-Sep	25-Oct	12-Dec
Air temperature	°C	30.0	23.0	16.3
Water temperature	°C	26.0	21.8	10.1
Water depth	m	0.30	0.45	0.60
River flow	m^3/s	-	11.770	9.643
DO	mg/L	5.30	6.30	7.40
pH	-	7.3	7.4	7.5
Salinity	ppm	0.05	0.04	0.01
Color	FTU	5	5	5
Transparency	m	0.30	0.45	0.15
Suspended solid	mg/L	38	75	65
COD	mg/L	27	31	31
BOD	mg/L	17	16	9
Total organic carbon (TOC)	mg/L	13	23	13
Total nitrogen (T-N)	mg/L	3.205	2.843	2.112
Nitrite nitrogen (NO2-N)	mg/L	0.042	0.036	0.081
Nitrate-nitrogen (NO3-N)	mg/L	0.501	0.466	1.492
Ammonium nitrogen (NH4-N)	mg/L	0.566	0.466	0.890
Total phosphorous (T-P)	mg/L	0.945	0.762	0.228
Phosphate phosphorous (PO4-P)	mg/L	0.886	0.694	0.162
Chlorophil a	g/m^3	10	10	2
Pheophytin	unit/ml	0	0	1
General bacteria	ftu/ml	24,310	399,100	85,800
Fecal coliform	MPN/100ml	11,000	399,100	2,400
Cadmium (Cd)	mg/L	0.008	-	0.002
Lead (Pb),	mg/L	0.022	-	0.043
Hexavalent chromium (Cr6+)	mg/L	n.d	-	8.5000
Arsenic (As),	mg/L	0.004	-	0.005
Total mercury (T-Hg)	mg/L	0.0042	-	n.d
Copper (Cu),	mg/L	0.900	-	0.548
Nickel (Ni),	mg/L	0.057	-	0.021
Zinc (Zn),	mg/L	0.104	-	n.d
Iron (Fe),	mg/L	0.592	-	1.203
Total cyanide (T-CN),	mg/L	0.009	-	n.d
Diazinon	mg/L	88.3	44.6	-
Paraquat	mg/L	0.8	0.6	-
DDT	mg/L	n.d.	n.d.	-

Sampling Point	Khomamrou	R-20
Location		
Coordinate (UTM)	381,636	4,139,745

Item	Unit	Analytical Result		
Sampling Date	-	1-Sep	25-Oct	12-Dec
Air temperature	°C	30.0	22.0	16.0
Water temperature	°C	25.2	20.5	11.2
Water depth	m	0.25	0.45	0.50
River flow	m^3/s	-	n.d	0.977
DO	mg/L	6.34	7.49	11.50
pH	-	7.6	7.6	7.9
Salinity	ppm	0.05	0.05	0.01
Color	FTU	5	5	5
Transparency	m	0.25	0.45	0.15
Suspended solid	mg/L	28	42	39
COD	mg/L	15	16	16
BOD	mg/L	6	3	4
Total organic carbon (TOC)	mg/L	712	14	14
Total nitrogen (T-N)	mg/L	2.191	1.386	1.506
Nitrite nitrogen (NO2-N)	mg/L	0.005	0.016	0.038
Nitrate-nitrogen (NO3-N)	mg/L	1.748	0.348	0.551
Ammonium nitrogen (NH4-N)	mg/L	0.438	0.348	0.097
Total phosphorous (T-P)	mg/L	0.182	0.168	0.254
Phosphate phosphorous (PO4-P)	mg/L	0.102	0.140	0.120
Chlorophil a	g/m^3	2	5	2
Pheophytin	unit/ml	0	0	0
General bacteria	ftu/ml	20,280	57,200	19,000
Fecal coliform	MPN/100ml	11,000	2,400	1,500
Cadmium (Cd)	mg/L	n.d	-	n.d
Lead (Pb),	mg/L	n.d	-	0.011
Hexavalent chromium (Cr6+)	mg/L	n.d	-	3.000
Arsenic (As),	mg/L	0.018	-	0.006
Total mercury (T-Hg)	mg/L	n.d	-	0.001
Copper (Cu),	mg/L	0.067	-	0.281
Nickel (Ni),	mg/L	0.008	-	0.017
Zinc (Zn),	mg/L	0.024	-	n.d
Iron (Fe),	mg/L	0.346	-	0.902
Total cyanide (T-CN),	mg/L	n.d	-	n.d
Diazinon	mg/L	26.5	15.8	-
Paraquat	mg/L	0.2	0.1	-
DDT	mg/L	n.d.	n.d.	-

Data 2: Plankton and Benthos Survey

DATA 2: PLANKTON AND BENTHOS SURVEY

2.1 General

This survey aimed to collect data related with plankton and benthos in and around the Anzali Wetland. The results of the work were used to assess the environmental conditions of Anzali Wetland and its basin. This survey was sublet to the Caspian Bony Fish Research Center.

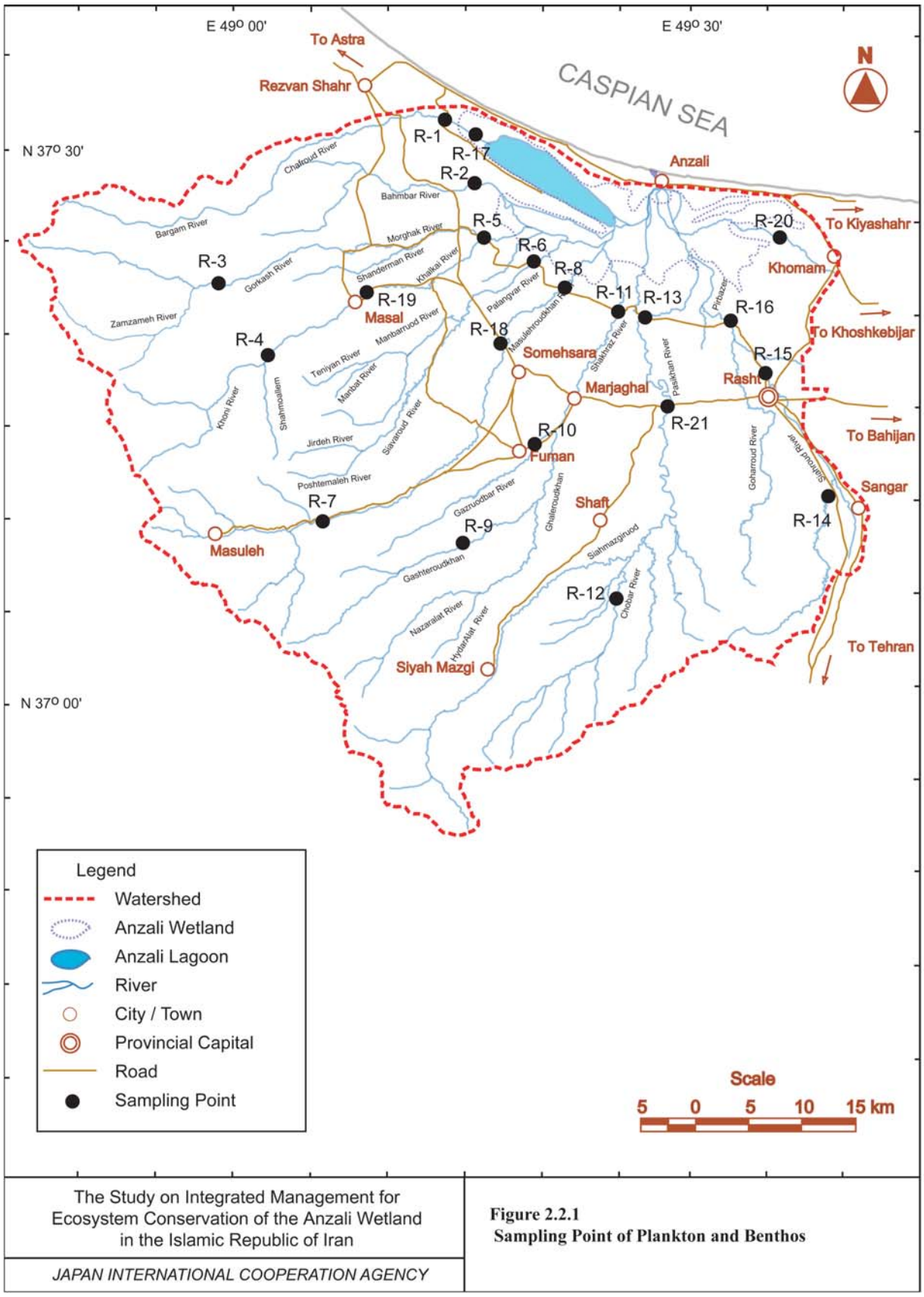
2.2 Scope of the Work

2.2.1 Sampling

The sampling is carried out in and around the Anzali Wetland. The number of sampling points is 36 points for plankton and benthos survey. The sampling points are shown in Table 2.2.1 below, and locations are shown in Figures 2.2.1 and 2.2.2.

Table 2.2.1 Sampling Point

Environment	Sampling Point
Rivers near the major municipalities and rural areas	Twenty (20) points: Siah River, Pirbazar River, Ciahmezgi River, Pasikhan River, Siah-darvishan River, Massuleh River, Palanahvar River, Khalkaii River, Morghak River, Bahambar River
Wetland	Sixteen (16) points: Marsh, small streams, rivers and lagoon in wetland



The Study on Integrated Management for Ecosystem Conservation of the Anzali Wetland in the Islamic Republic of Iran

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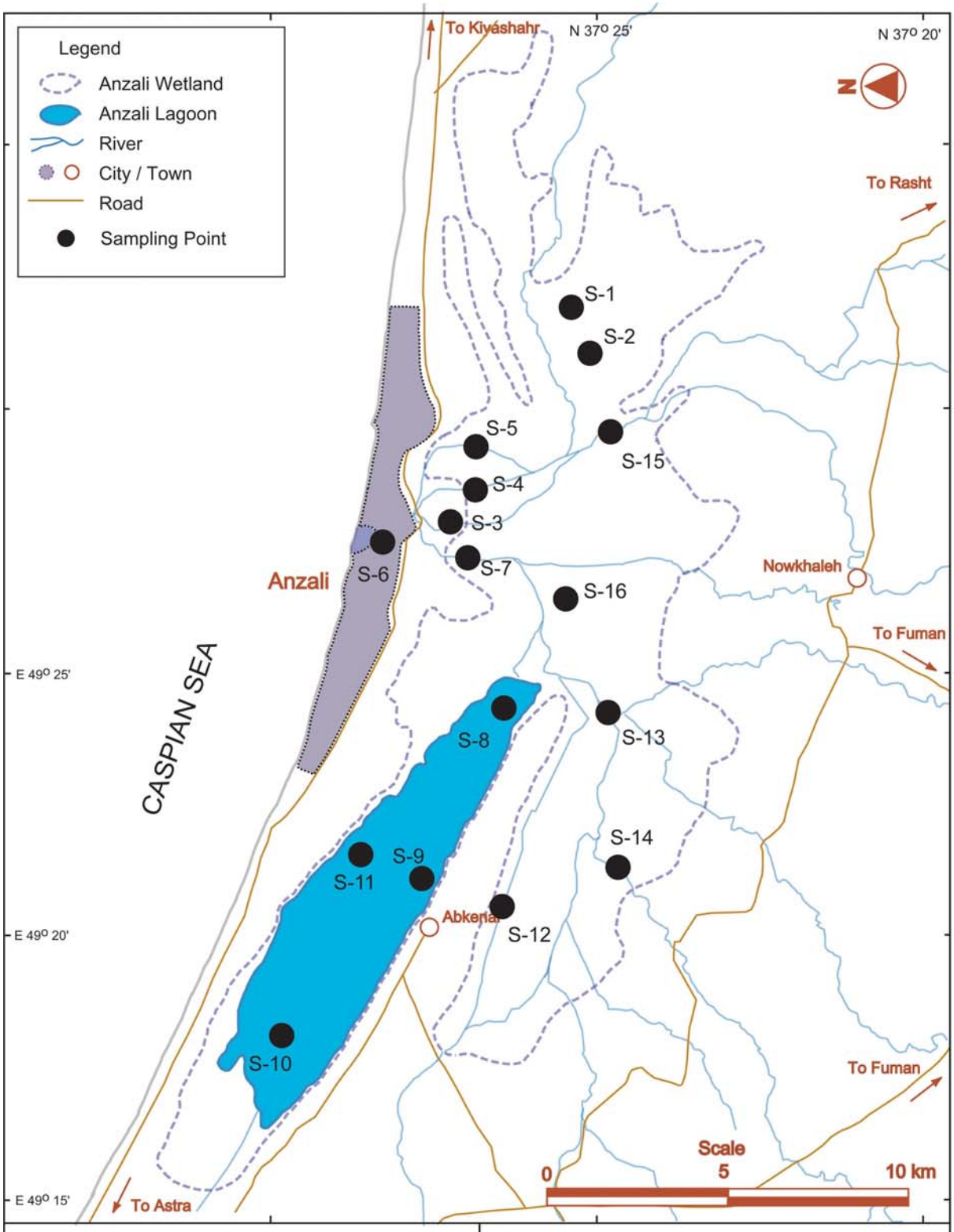
Figure 2.2.1
Sampling Point of Plankton and Benthos



The Study on Integrated Management for Ecosystem Conservation of the Anzali Wetland in the Islamic Republic of Iran

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Figure 2.2.2
Wetland Sampling Point of Plankton and Benthos

2.2.2 Survey and Analysis

The survey and Analytical items were as shown in the Table 2.2.2.

Table 2.2.2 Survey and Analytical Item

Survey Item	
General Condition	Location by GPS, visible conditions of water and bottom sediment
Plankton and Benthos	Phytoplankton: collection of phytoplankton in the fixed amount of water, identification of species and counting number of each species in the samples taken Zooplankton: collection of zooplankton in the fixed amount of water, identification of species and counting number of each species in the samples taken Benthos: In the Anzali Wetland, the samples with three replicate obtained by a bottom sampler (20cm x 20cm). Sampling procedure in stream and rivers were carried out using a Sorber (40cm x 40cm) with three replicate. Number of each species in the samples were counted, and wet weights were measured.

2.2.3 Sampling Frequency

The sampling field survey was carried out three times. The first (dry season) survey was conducted from late August to early September. The second (early rainy season) survey was conducted in October. The third (mid-rainy season) survey was conducted in December.

1st sampling : 23rd August – 1st September
2nd sampling : 13th October – 25th October
3rd sampling : 2nd December – 14th December

2.3 Results

2.3.1 Phytoplankton

(1) First Period (August to September)

The abundance of phytoplankton divisions are illustrated in Figures 2.3.1 and 2.3.2. The phytoplankton composition was observed to be different in five areas of the wetland. In the

central part, lagoon and Shiakeshim, Cyanophyta was the dominant division, while the eastern part and estuary of the wetland, Chrysophyta were dominant. The Cyanophyta group includes *Microcystis* spp., which can cause 'blue tides' when it blooms. In this study, *Microcystis* spp. were observed at 11 sampling points among 16 sampling points, but their abundance was not high. The number of *Microcystis* sp. recorded was from 50,000 to 4,810,000/L, and made up from 1 to 22% of the total number of Cyanophyta at each sampling point.

In the river, the main division observed was Chrysophyta. Downstream of the Pashikan River and in the middle stream and downstream of the Pirbazar River, the ratio of Chrysophyta was low, and ratio of Cyanophyta was high, compared with other sampling points. Especially in the downstream part of the Pirbazar River, 89% of the genera recorded belong to the Cyanophyta. The downstream part of the Pirbazar River thus has a unique genus composition among the rivers in the Anzali watershed, which is probably due to its poor water quality.

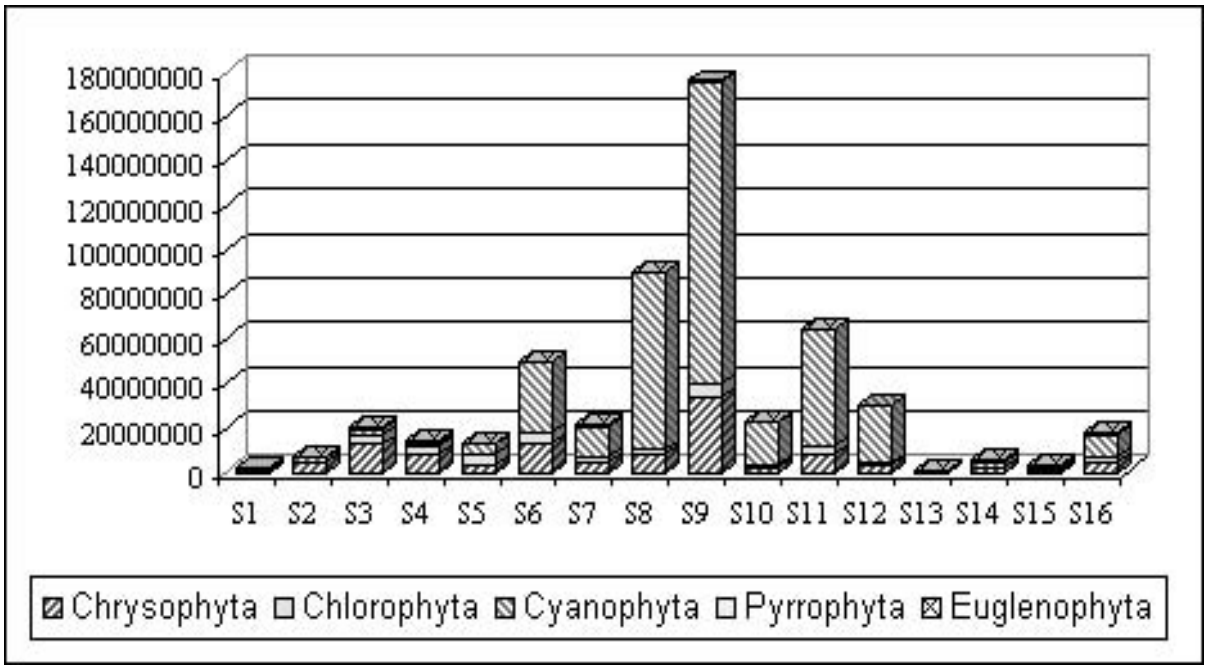

Figure 2.3.1 Abundance of Phytoplankton in Anzali Wetland (First)

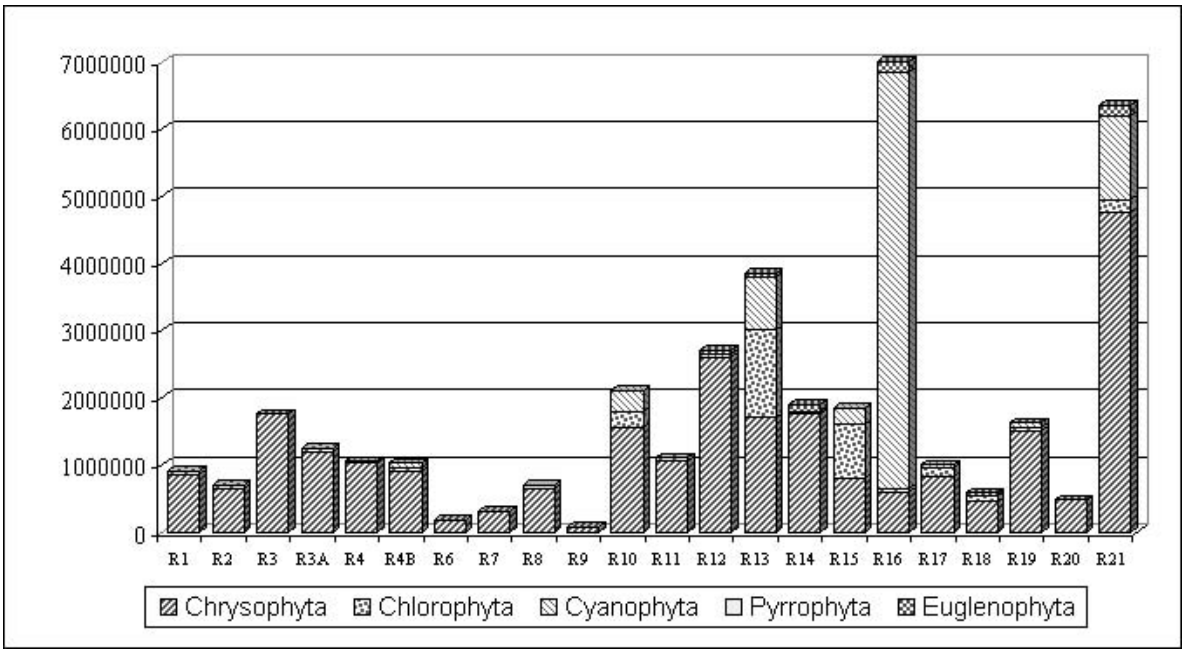

Figure 2.3.2 Abundance of Phytoplankton Station in Rivers (First)

(2) Second Period (October)

The abundance of phytoplankton divisions are illustrated in Figures 2.3.3 and 2.3.4. Cyanophyta was the dominant group in lagoon same as first period. The abundance of phytoplankton in the wetland is lower than the first period.

In the river, the main division observed was Chrysophyta especially in the upstream of Masuleh river.

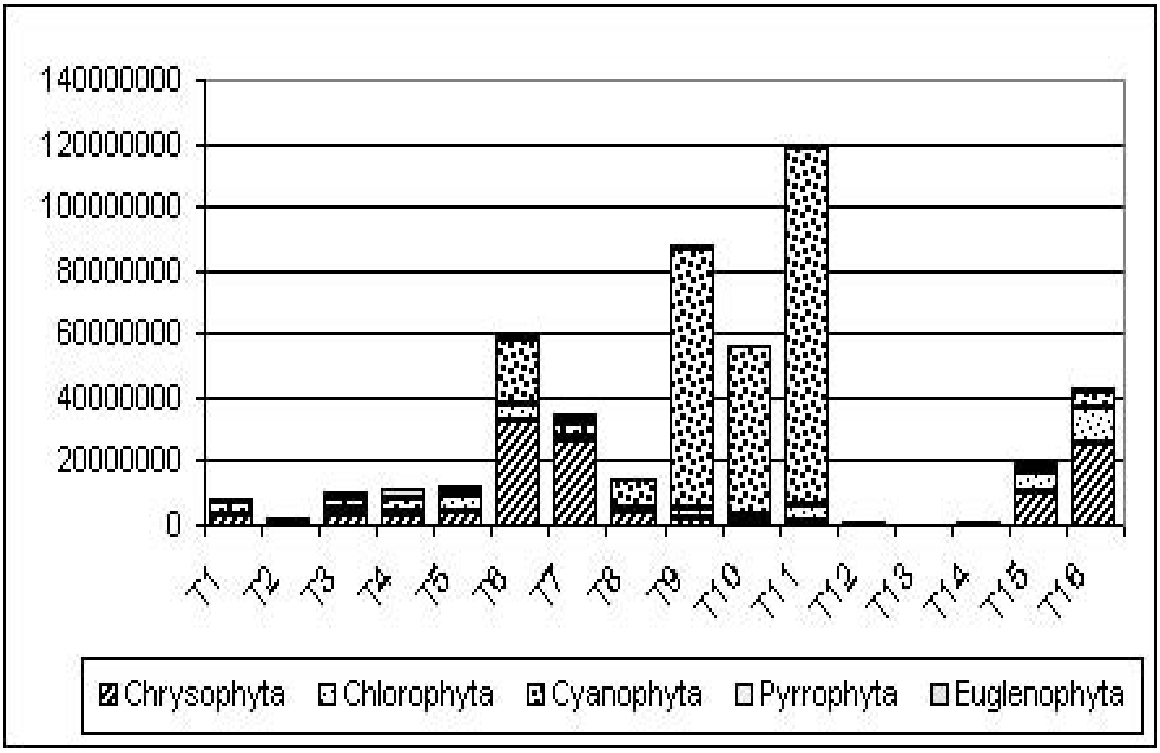

Figure 2.3.3 Abundance of Phytoplankton in Anzali Wetland (Second)

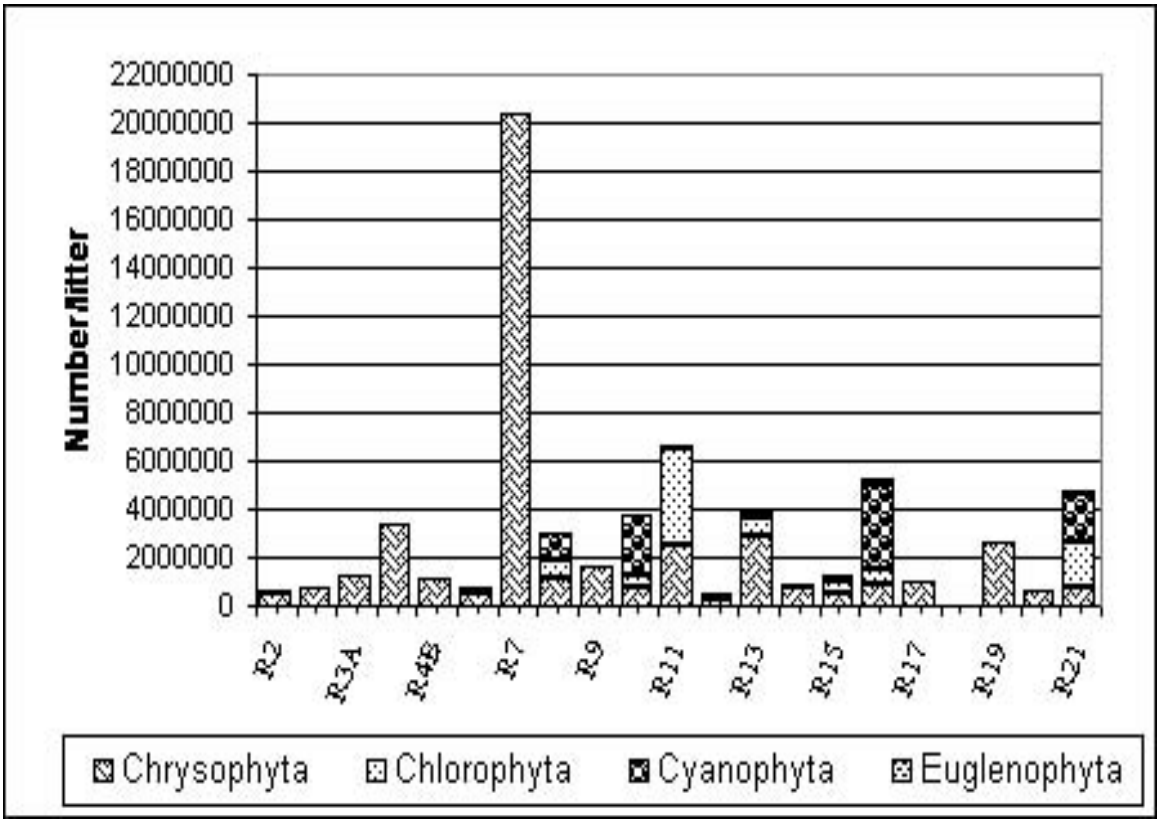

Figure 2.3.4 Abundance of Phytoplankton Station in Rivers (Second)

(3) Third Period (December)

The abundance of phytoplankton divisions are illustrated in Figures 2.3.5 and 2.3.6. Cyanophyta was the dominant group in lagoon and estuary of the wetland. The number of phytoplankton in the other stations is small.

In the river, the main division observed was Chrysophyta. The number of phytoplankton is almost 1/10 of the number in the second survey.

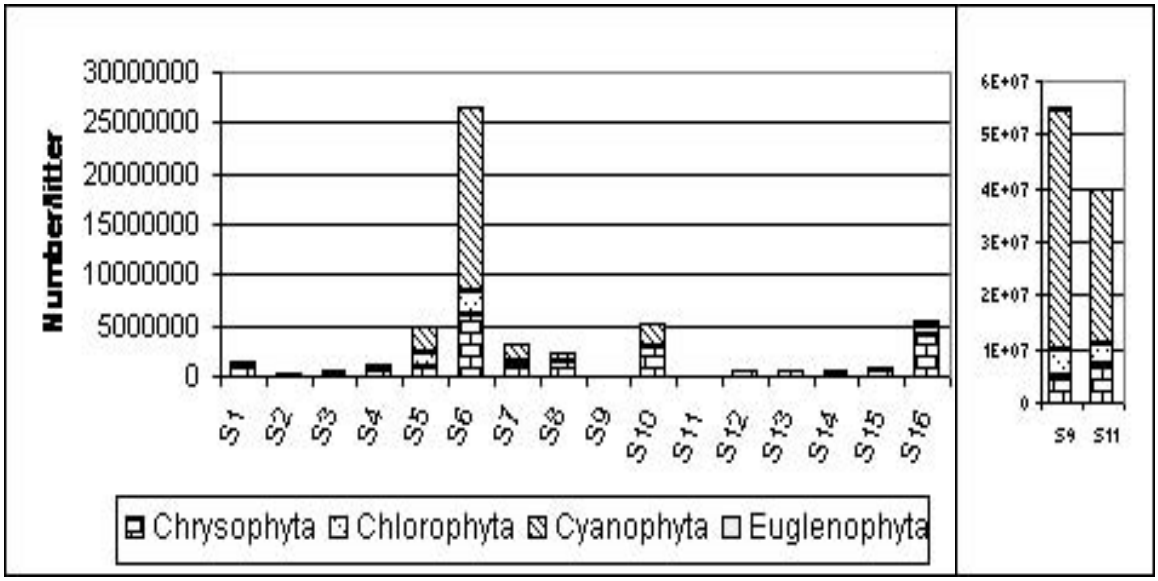

Figure 2.3.5 Abundance of Phytoplankton in Anzali Wetland (Third)

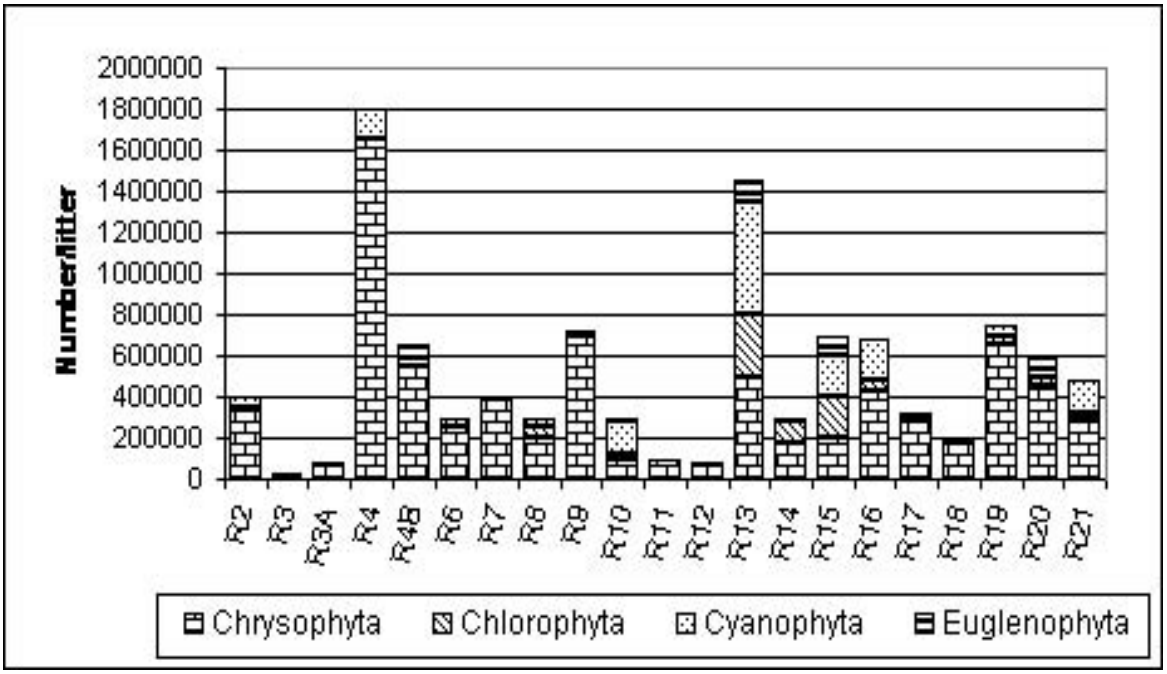

Figure 2.3.6 Abundance of Phytoplankton in Rivers (Third)

2.3.2 Zooplankton

(1) First Period (August to September)

The result of zooplankton survey is illustrated in Figures 2.3.7 and 2.3.8. In the wetland, 6 divisions of zooplankton were observed. The abundance of zooplankton in the wetland was different according to area. More than 5,000/L were observed in the eastern part of the wetland, while in the lagoon, the abundance was approximately 2,000 to 4,000/L. In the Shiakeshim Protected Area, the abundance was lower, at approximately 500 to 2,000/L.

In the river, five divisions of zooplankton were observed. The dominant division was the Protozoa and Rotatoria. At almost all of the sampling points, the abundance of zooplankton was approximately 500 to 1,000 number/L, which was much less than that in the wetland. However the downstream part of the Pirbazar River had an exceptional characteristic. The abundance of zooplankton here was approximately 4,700/L, which was about the same as in the wetland. This was probably related to the high nutrient content, and therefore high phytoplankton concentration.

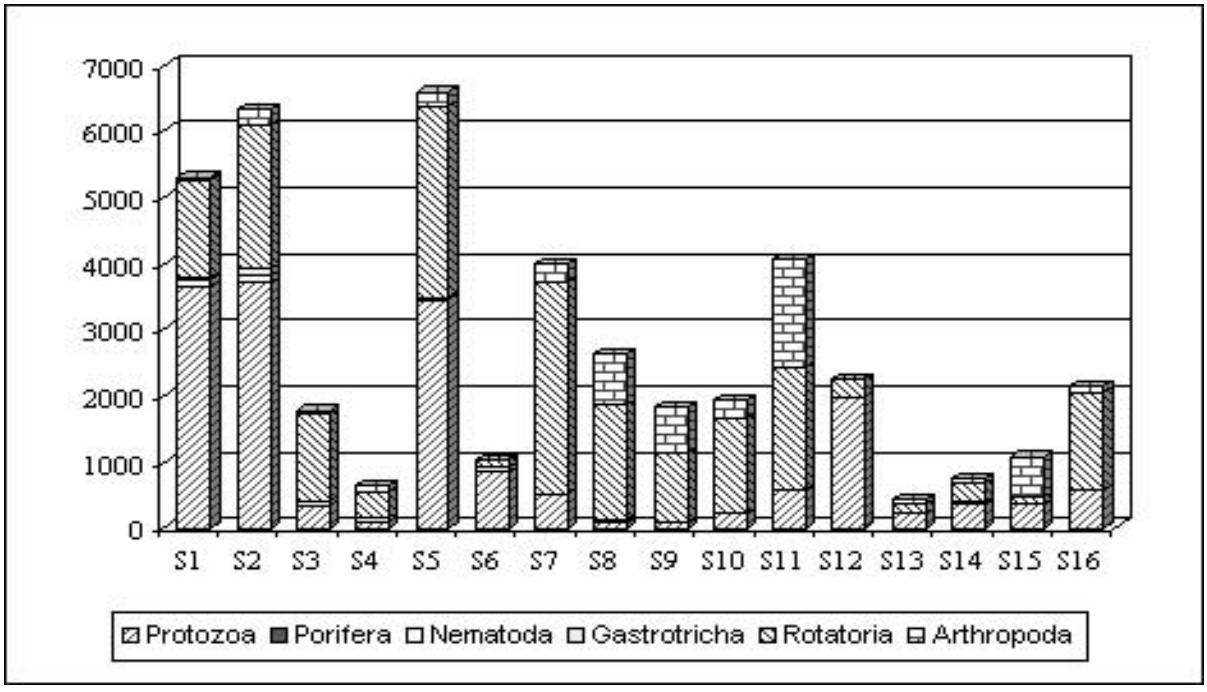

Figure 2.3.7 Abundance of Zooplankton in Anzali Wetland (First)

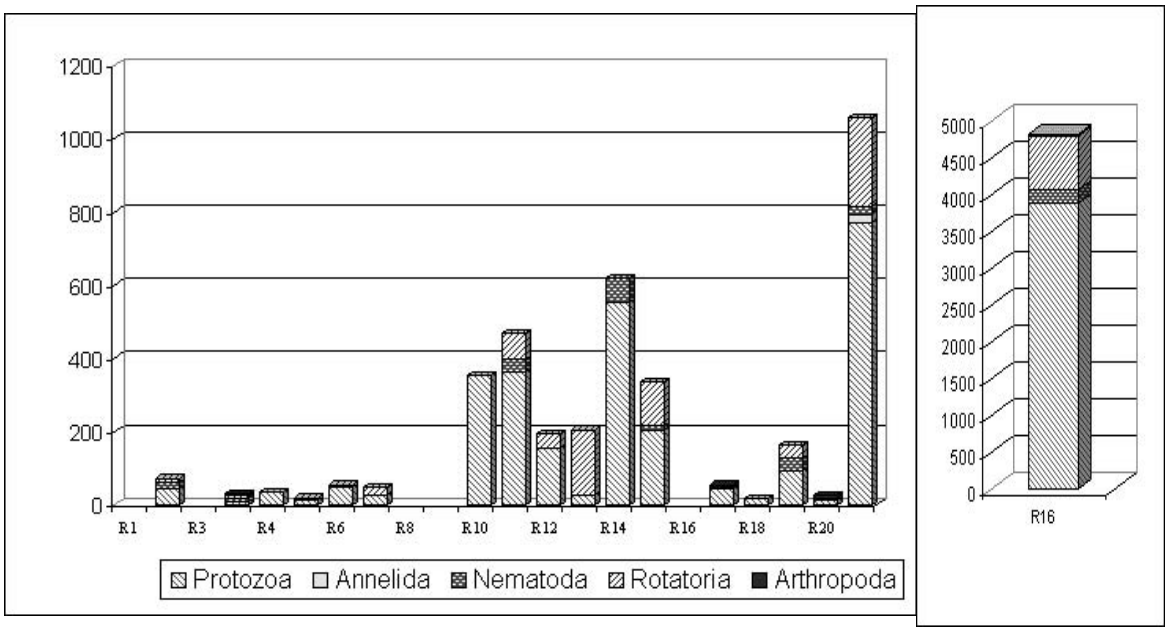

Figure 2.3.8 Abundance of Zooplankton in Rivers (First)

(2) Second Period (October)

The result of zooplankton survey is illustrated in Figures 2.3.9 and 2.3.10. The abundant of Zooplankton in the wetland varies from 121/L to 19,400/L. More than half of stations were less than 1,200/L, but more than 10,000/ L were observed in the eastern part.

In the river, Rotatoria and Protozoa were the dominant group over most sampling points. The density of zooplankton is high at Pirbazar River same as first period.

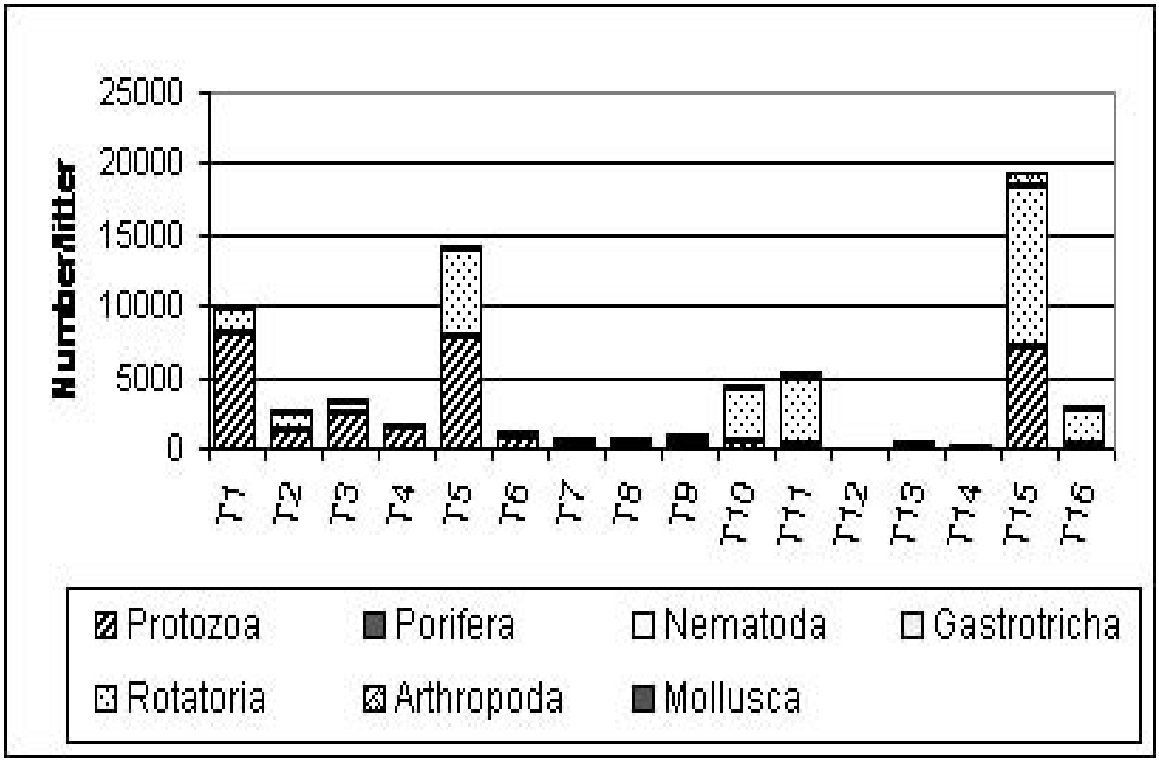

Figure 2.3.9 Abundance of Zooplankton in Anzali Wetland (Second)

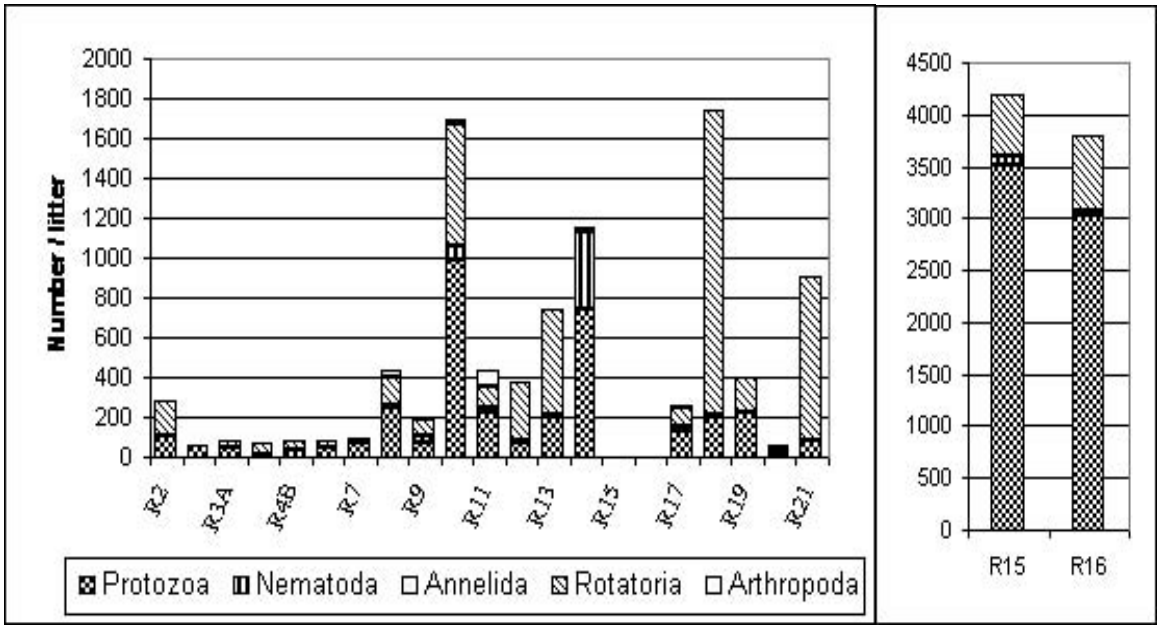

Figure 2.3.10 Abundance of Zooplankton in Rivers (Second)

(3) Third Period (December)

The result of zooplankton survey is illustrated in Figures 2.3.11 and 2.3.12. The abundance of Zooplankton in the wetland varies from 55/L to 2057/L. Seven group of zooplankton were observed where Protozoa and Rotatoria had the highest abundance.

In the river, 550/L was the highest concentration at the sampling point 10. The highest number of genus belonged to Protozoa.

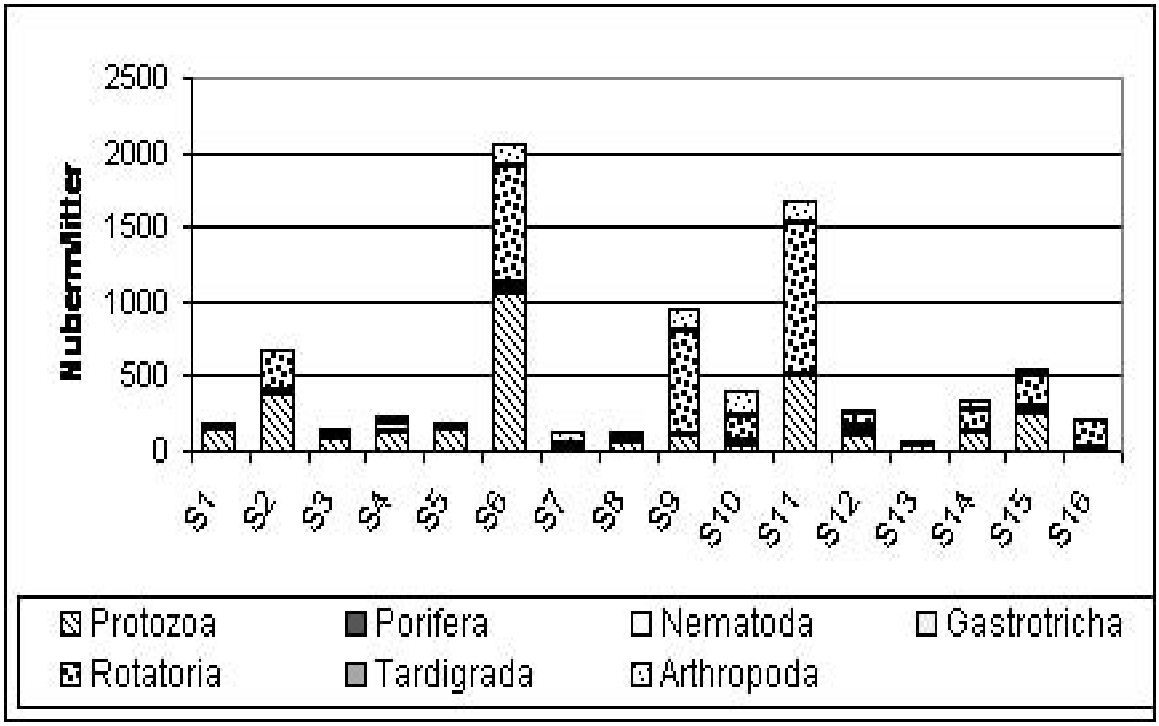

Figure 2.3.11 Abundance of Zooplankton in Anzali Wetland (Third)

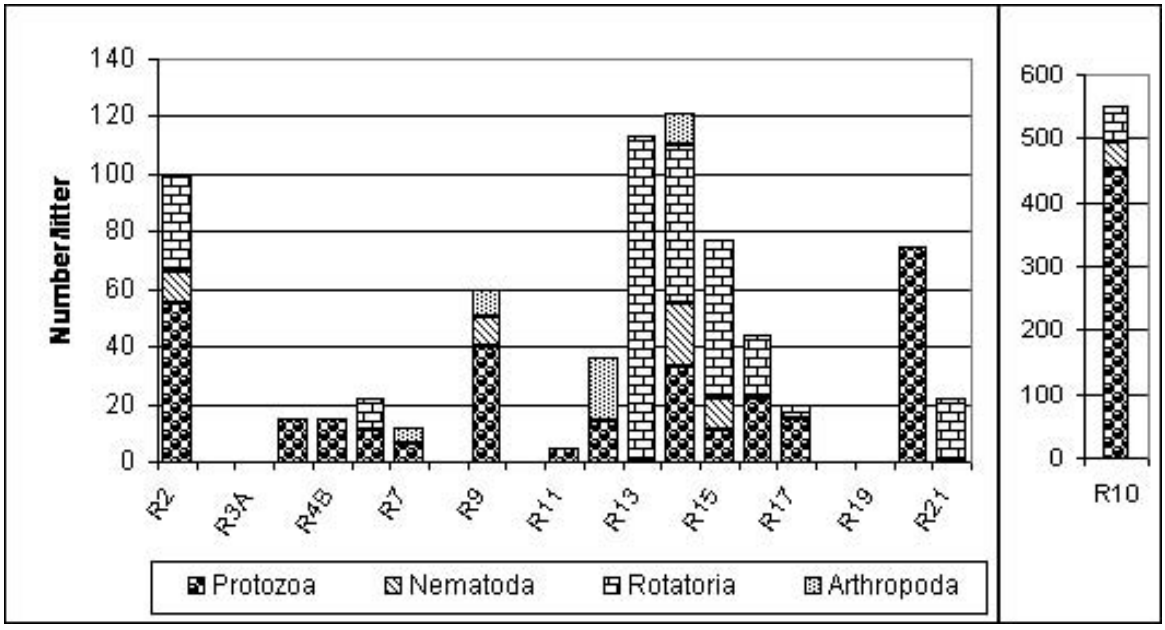

Figure 2.3.12 Abundance of Zooplankton in Rivers (Third)

2.3.3 Benthos

(1) First Period (August to September)

A family observed widely in the wetland was Tubificidae. The largest biomass, 35 g/m^2, was observed at sampling point No.2 in the eastern part of the wetland. In the river, the benthic fauna was mainly composed of Tubificidae, Gatnida, Chironomidae, Tricoptera and Bactidae. In the upstream area, the composition of benthos was different, and Ephemeroptera was the dominant order. Generally, the diversity of benthos was low upstream compared with the downstream area. However, the lowest diversity was observed at the downstream sampling point in the Pirbazar River. This means that the downstream part of the Pirbazar River has a unique characteristic of benthic fauna, compared with other rivers in the watershed. This is likely to be caused by the degraded water quality having a high organic pollution load, which is also reflected by the phytoplankton and zooplankton concentrations at this point. (detail data is shown in section 2.4.)

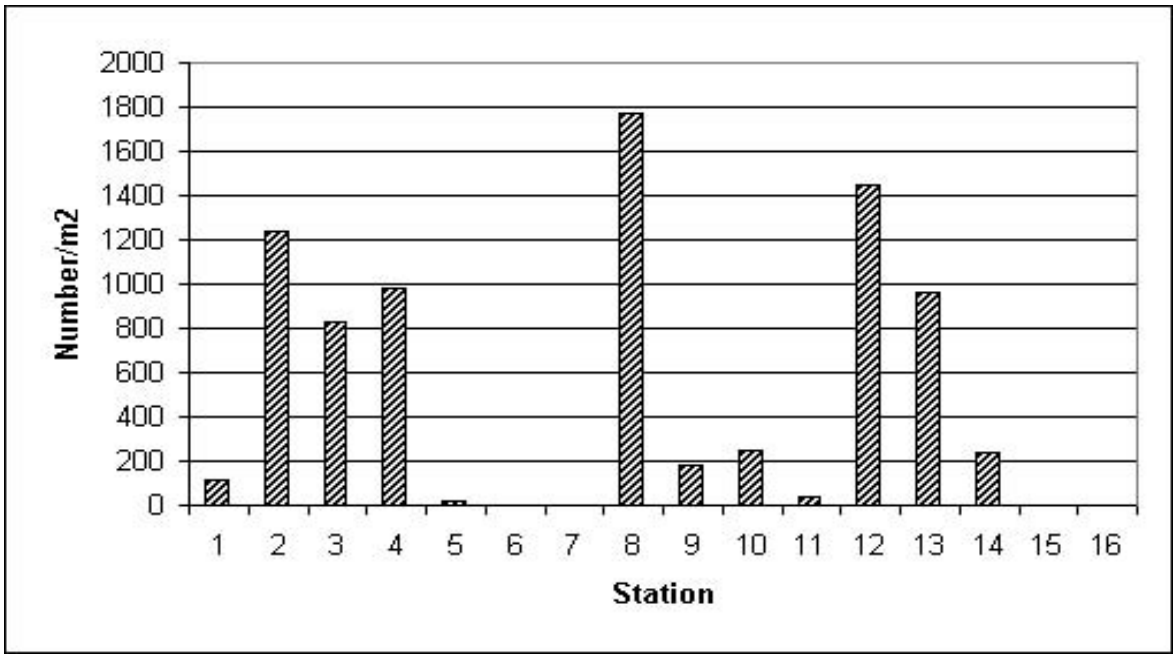

Figure 2.3.11 Abundance of Benthos in Anzali Wetland (First)

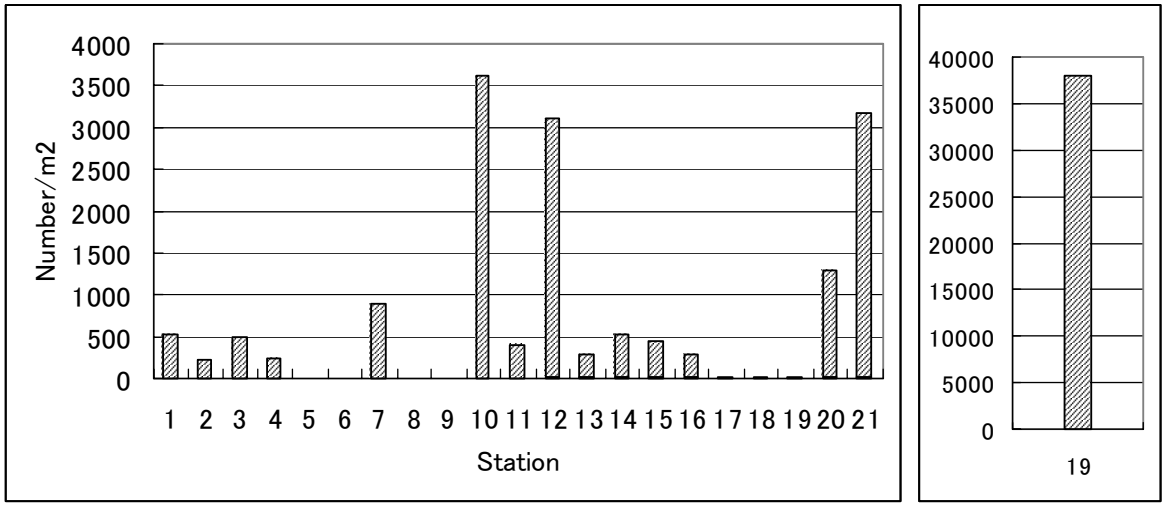

Figure 2.3.12 Abundance of Benthos in Rivers (First)

(2) Second Period (October)

A family observed widely in the wetland was Tubificidae. The largest biomass, 14 g/m^2, was observed at sampling point No.4 in the central part of the wetland. In the river, Chironomidae were observed in all sampling points. Tubificidae, Hydropsychidae, Baetidae, Simulidae, Caenidae and Heptagenidae were found over 50% of sampling points. The biomass was large at 4b, 9 and 12 which are in the upstream. (detail data is shown in section 2.4.)

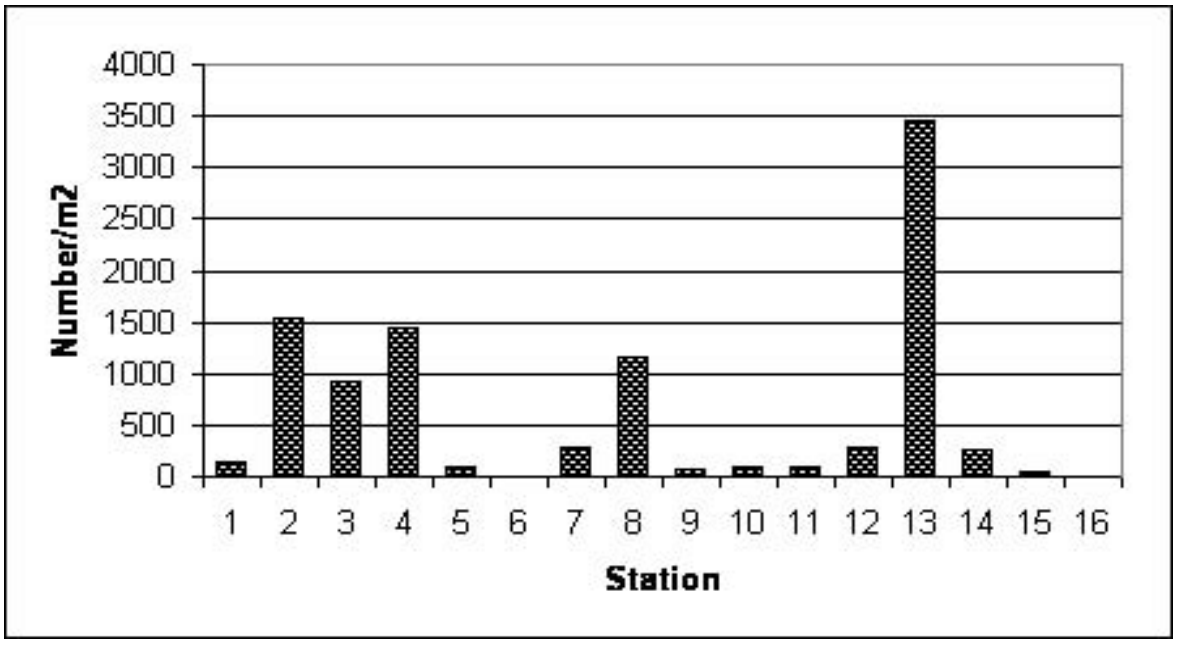

Figure 2.3.13 Abundance of Benthos in Anzali Wetland (Second)

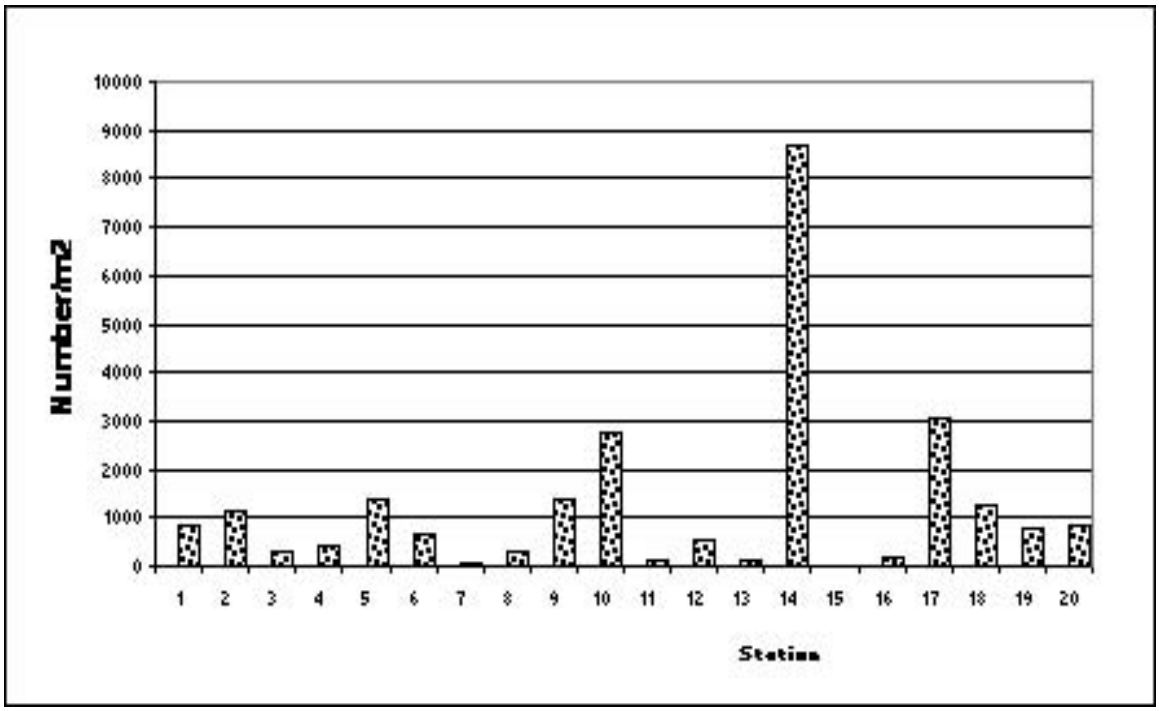

Figure 2.3.14 Abundance of Benthos in Rivers (Second)

(3) Third Period (October)

A family observed widely in the wetland was Tubificidae. The largest biomass, 1 g/m^2, was observed at sampling point No.1 in the eastern part of the wetland. In the river, Tubificidae were observed in all sampling points. Elmidae, Chionomidae, Simulidae and Caenidae were found over 50% of sampling points. The largest biomass, 9.2 g/m^2, was observed at sampling point No. 12. (detail data is shown in section 2.4.)

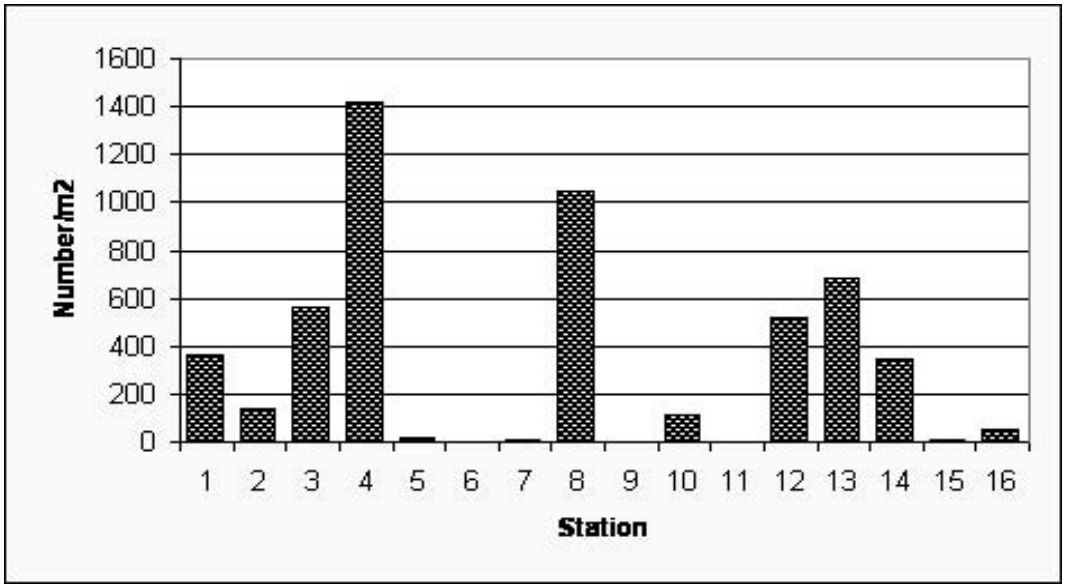

Figure 2.3.15 Abundance of Benthos in Anzali Wetland (Third)

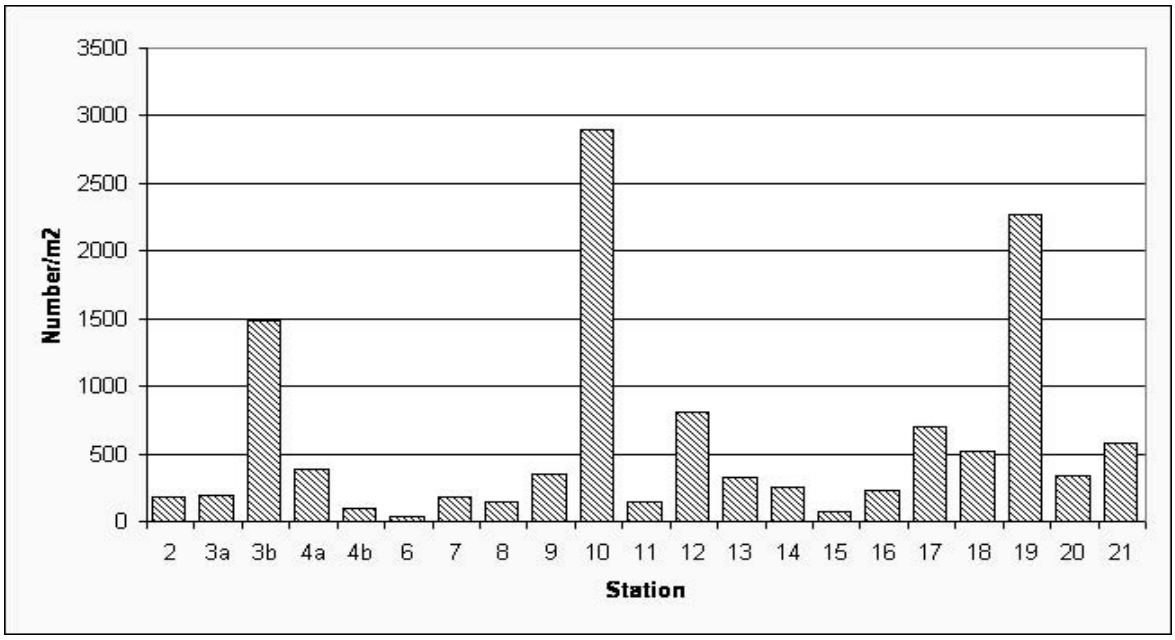

Figure 2.3.16 Abundance of Benthos in Rivers (Third)

2.4 Biomass Data of Benthos

Biomass data are shown in Tables 2.4.1 to 2.4.6.

Table 2.4.1 Biomass (gr/m^2) of Benthos in Anzali Wetland (First)

Station	Order	Family	mean std	min	max
1	Diptera	Chironomidae	0.03 ± 0.038	0	0.075
	Oligocheata	Tubificidae	0.025 ± 0.025	0	0.05
2	Odonata	Anizoptera	10.07 ± 17.45	0	30.22
	Gastropoda	Radix sp.	22.62 ± 30.86	2.82	58.17
	Ephemeroptera	Caenidae	0.033 ± 0.57	0	0.1
	Diptera	Chironomidae	0.058 ± 0.038	0.025	0.1
	Hemiptera	Hydrophilidae	0.05 ± 0.086	0	0.15
	Hemiptera	Plea	0.017 ± 0.029	0	0.05
	Hirudina	Psiculidae	0.59 ± 0.49	0.025	0.92
	Gastropoda	Planorbidae	1.21 ± 1.53	0.325	2.97
3	Oligocheata	Tubificidae	0.59 ± 0.26	0.35	0.875
4	Bivalvia	Mytilidae (Mytilastre)	0.17 ± 0.31	0	0.525
	Decapoda	Paleomonidae	1.2 ± 2.08	0	3.6
	Oligocheata	Tubificidae	0.47 ± 0.43	0	0.85
5	Oligocheata	Tubificidae	0.008 ± 0.014	0	0.025
8	Ciripedia	Balanidea (Balanus sp.)	7.28 ± 12.62	0	21.85
	Decapoda	Paleomonida	1.6 ± 2.77	0	4.8
	Oligocheata	Tubificidae	0.97 ± 1.043	0	2.075
9	Oligocheata	Tubificidae	0.142 ± 0.09	0.075	0.25
10	Oligocheata	Tubificidae	0.416 ± 0.511	0.05	1
11	Oligocheata	Tubificidae	0.025 ± 0.043	0	0.075
12	Bivalvia	Mytilidae (Mytilaster)	1.058 ± 1.83	0	3.17
		Sphaeriidae	3.75 ± 6.49	0	11.25
	Oligocheata	Tubificidae	0.72 ± 0.832	0.17	1.67
13	Oligocheata	Tubificidae	0.97 ± 0.655	0.25	1.52
14	Gastropoda	Coretus sp.	0.042 ± 0.072	0	0.125
		Radix sp.	1.25 ± 1.156	0	2.27
		Physa sp.	5.73 ± 1.08	4.5	6.25
	Coleoptera	Helodidae	0.017 ± 0.028	0	0.05

Table 2.4.2 Biomass (gr/m^2) of Benthos in Rivers (First)

Station	Order	Family	mean	std	min	max
No. 1	Coleoptera	Elmidae	0.004	0.003	0	0.006
	Diptera	Chironomidae	0.019	0.019	0	0.038
		Simulidae	0.002	0.003	0	0.006
	Ephemeroptera	Baetidae	0.01	0.018	0	0.031
		Caenidae	0.183	0.142	0.025	0.3
		Heptagenidae	0.004	0.003	0	0.006
	Oligochaeta	Tubificidae	0.019	0.006	0.013	0.025
	Trichoptera	Hydropsychidae	0.002	0.003	0	0.006
No. 2	Bivalve	Sphaeriidae	0.029	0.051	0	0.088
	Coleoptera	helodidae	0.002	0.003	0	0.006
	Ephemeroptera	Heptagenidae	0.004	0.008	0	0.013
	Nematodae	nematod	0.002	0.003	0	0.006
	Oligochaeta	Lumbricidae	0.01	0.018	0	0.031
		Tubificidae	0.025	0.016	0.013	0.044
No. 3A	Bivalve	Sphaeriidae	1.419	2.457	0	4.256
	Oligochaeta	Tubificidae	0.1	0.094	0.013	0.2
No. 3B	Diptera	Chironomidae	0.013	0.007	0.006	0.019
		Simulidae	0.002	0.003	0	0.006
		Tipulidae	0.011	0.01	0	0.019
	Ephemeroptera	Baetidae	0.387	0.644	0.006	1.131
		Heptagenidae	0.065	0.112	0	0.194
	Oligochaeta	Tubificidae	0.01	0.013	0	0.025
	Trichoptera	Hydropsychidae	0.012	0.016	0	0.031
		Rhyacophilidae	0.004	0.003	0	0.006
No. 4	Coleoptera	Elmidae	0.002	0.003	0	0.006
	Diptera	Ceratopogonidae	0.002	0.003	0	0.006
		Chironomidae	0.017	0.003	0.013	0.019
		Ragonidae	0.048	0.02	0.025	0.063
	Ephemeroptera	Baetidae	0.129	0.148	0.038	0.3
		Caenidae	0.013	0.007	0.006	0.019
	Oligochaeta	Tubificidae	0.008	0.004	0.006	0.013
	Trichoptera	Hydropsychidae	0.042	0.072	0	0.125
		Rhyacophilidae	0.002	0.003	0	0.006
No. 4B	Diptera	Ceratopogonidae	0.002	0.003	0	0.006
		Chironomidae	0.004	0.003	0	0.006
	Ephemeroptera	Caenidae	0.004	0.003	0	0.006
	Oligochaeta	Tubificidae	0.102	0.155	0.006	0.281

Table 2.4.2 Biomass (gr/m^2) of Benthos in Rivers (First)

No. 7	Coleoptera	Elmidae	0.019	0.006	0.013	0.025
		helodidae	0.002	0.003	0	0.006
	Crustacean	Crab	0.123	0.213	0	0.369
	Diptera	Blephariceridae	0.034	0.031	0.013	0.069
		Chironomidae	0.015	0.008	0.006	0.019
		Empididae	0.002	0.003	0	0.006
		Psycodidae	0.013	0.022	0	0.038
		Ragonidae	0.071	0.059	0.013	0.131
		Simulidae	0.01	0.013	0	0.025
		Tabanidae	0.44	0.762	0	1.319
		Tipulidae	0.138	0.159	0.025	0.319
	Ephemeroptera	Baetidae	0.077	0.067	0	0.119
		Caenidae	0.012	0.016	0	0.031
	Gastropoda	physidae	0.035	0.061	0	0.106
	Hirudinea	Psiculidae	0.002	0.003	0	0.006
	Lepidoptera	Lepidoptera	0.05	0.087	0	0.15
	Oligochaeta	Tubificidae	0.015	0.013	0	0.025
	Trichoptera	Hydropsychidae	1.502	0.524	1.119	2.1
		Rhyacophilidae	0.002	0.003	0	0.006
No. 10	Coleoptera	Elmidae	0.006	0.007	0	0.013
	Diptera	Chironomidae	0.14	0.123	0.063	0.281
		Psycodidae	0.002	0.003	0	0.006
		Stratiomydae	0.144	0.119	0.063	0.281
	Ephemeroptera	Baetidae	0.05	0.023	0.025	0.069
		Caenidae	0.637	0.423	0.231	1.075
	Gastropoda	physidae	1.69	1.585	0.494	3.488
		Planorbidae	0.233	0.235	0	0.469
	Hirudinea	Psiculidae	0.446	0.354	0.188	0.85
	Nematodae	nematod	0.002	0.003	0	0.006
	Oligochaeta	Tubificidae	5.721	4.234	0.888	8.775
No. 11	Bivalve	Sphaeriidae	0.135	0.234	0	0.406
	Diptera	Chironomidae	0.015	0.01	0.006	0.025
	Ephemeroptera	Caenidae	0.009	0.008	0	0.013
	Oligochaeta	Tubificidae	0.098	0.047	0.044	0.131
	Trichoptera	Rhyacophilidae	8.25	8.283	3.013	17.8

Table 2.4.2 Biomass (gr/m^2) of Benthos in Rivers (First)

No. 12	Aracnid	Aracnid	0.002	0.003	0	0.006
	Coleoptera	Elmidae	0.073	0.042	0.025	0.1
	Diptera	Chironomidae	0.05	0.017	0.031	0.063
		Simulidae	0.14	0.194	0.013	0.363
	Ephemeroptera	Baetidae	0.304	0.376	0.069	0.738
		Caenidae	0.858	0.578	0.338	1.481
		Heptagenidae	0.006	0.011	0	0.019
	Gastropoda	Limnaeidae	0.013	0.022	0	0.038
	Gastropoda	Planorbidae	0.021	0.036	0	0.063
	Trichoptera	Glossosomatidae	0.733	0.487	0.175	1.069
			0.05	0.05	0	0.1
		Hydropsychidae	2.657	2.375	0.738	5.313
		Rhyacophilidae	0.019	0.006	0.013	0.025
No. 13	Bivalve	Sphaeriidae	0.002	0.003	0	0.006
	Coleoptera	Elmidae	0.006	0.011	0	0.019
	Diptera	Chironomidae	0.021	0.007	0.013	0.025
	Ephemeroptera	Baetidae	0.015	0.003	0.013	0.019
		Caenidae	0.05	0.047	0.006	0.1
	Oligochaeta	Tubificidae	0.079	0.094	0.025	0.188
No. 14	Coleoptera	Elmidae	0.004	0.008	0	0.013
	Diptera	Chironomidae	0.315	0.475	0.031	0.863
		Stratiomydae	0.002	0.003	0	0.006
	Ephemeroptera	Baetidae	0.004	0.008	0	0.013
		Caenidae	0.065	0.087	0	0.163
		Heptagenidae	0.131	0.142	0.031	0.294
	Trichoptera	Hydropsychidae	0.167	0.267	0	0.475
No. 15	Diptera	Chironomidae	0.058	0.101	0	0.175
	Oligochaeta	Tubificidae	0.55	0.953	0	1.65
No. 16	Gastropoda	Physidae	0.027	0.047	0	0.081
	Oligochaeta	Tubificidae	0.5	0.385	0.163	0.919
No. 19	Coleoptera	Elmidae	0.002	0.003	0	0.006
		Hydrophilidae	0.023	0.016	0.006	0.038
	Culicidae	Culicoides	0.011	0.01	0	0.019
	Diptera	Ceratopogonidae	0.002	0.003	0	0.006
		Chironomidae	0.217	0.187	0.063	0.425
		Simulidae	0.008	0.014	0	0.025
		Tipulidae	0.015	0.025	0	0.044
	Ephemeroptera	Baetidae	0.986	1.075	0.313	2.225
		Caenidae	21.738	9.061	11.594	29.031
		Heptagenidae	0.01	0.018	0	0.031
			0.002	0.003	0	0.006
	Gastropoda	Limnaeidae	0.046	0.08	0	0.138
	Odonata	Gomphidae	0.077	0.133	0	0.231
	Oligochaeta	Tubificidae	0.182	0.051	0.138	0.238
	Trichoptera	Hydropsychidae	0.148	0.23	0	0.413

Table 2.4.2 Biomass (gr/m^2) of Benthos in Rivers (First)

No. 20	Bivalve	Sphaeriidae	1.352	1.816	0.125	3.438
	Crustacean	Gammaridae	0.648	0.849	0.094	1.625
	Diptera	Chironomidae	0.417	0.33	0.156	0.788
		Simulidae	0.017	0.024	0	0.044
	Ephemeroptera	Baetidae	0.002	0.003	0	0.006
		Caenidae	0.015	0.025	0	0.044
	Lepidopterae	Lepidopterae	0.015	0.025	0	0.044
	Nematodae	Nematod	0.004	0.003	0	0.006
	Oligochaeta	Naididae	0.017	0.029	0	0.05
		Tubificidae	0.315	0.456	0	0.838
No. 21	Diptera	Chironomidae	2.229	1.241	1.231	3.619
	Ephemeroptera	Baetidae	0.012	0.016	0	0.031
	Gastropoda	Limnaeidae	0.856	0.9	0	1.794
	Oligochaeta	Naididae	0.002	0.003	0	0.006
		Tubificidae	0.304	0.432	0.006	0.8

Table 2.4.3 Biomass (gr/m^2) of Benthos in Anzali Wetland (Second)

Station	Order	Family	mean	std	min	max
1	Diptera	Chironomidae	0.0083	0.014	0	0.025
	Oligochaeta	Tubificidae	0.3	0.27	0	0.52
2	Diptera	Chironomidae	0	0	0	0
	Oligochaeta	Tubificidae	2.79	0.52	2.32	3.5
3	Oligochaeta	Tubificidae	1.19	0.27	1.025	1.5
4	Bivalve	Sphaeriidae	12.55	21.73	0	37.65
	Hirudinea	Hirudidae	0	0	0	0
	Oligochaeta	Tubificidae	1.37	1.43	0.52	3.02
5	Diptera	Strationomydae	1.83	3.26	0	5.65
	Oligochaeta	Tubificidae	0.05	0.086	0	0.15
7	Oligochaeta	Naididae	0.12	0.13	0	0.25
8	Oligochaeta	Tubificidae	1.28	0.64	0.67	1.95
9	Oligochaeta	Tubificidae	0.06	0.101	0	0.175
10	Oligochaeta	Tubificidae	0.075	0.07	0.025	0.15
11	Oligochaeta	Tubificidae	0.04	0.05	0	0.1
12	Oligochaeta	Tubificidae	0.242	0.3	0	0.57
13	Oligochaeta	Lumbricidae	0.025	0.04	0	0.07
		Tubificidae	2.3	2.25	0	4.97
14	Diptera	Chironomidae	0.04	0.07	0	0.125
	Gastropoda	Limnaeidae	0.11	0.19	0	0.325
	Gastropoda	Physidae	0.16	0.27	0	0.475
	Oligochaeta	Tubificidae	0.17	0.27	0	0.475
15	Gastropoda	Limnaeidae	0.07	0.115	0	0.2
		Physidae	0.61	1.07	0	1.85
		Planorbidae	0.02	0.03	0	0.05
16	Oligochaeta	Tubificidae	0.009	0.014	0	0.009

Table 2.4.4 Biomass (gr/m^2) of Benthos in Rivers (Second)

Station	Order	Family	mean	std	min	max
No. 2	Bivalve	Sphaeriidae	2.675	4.633	0	8.025
	Coleoptera	Elmidae	0.033	0.047	0	0.088
	Diptera	Chironomidae	0.050	0.054	0.013	0.113
		Simulidae	0.048	0.083	0	0.144
	Ephemeroptera	Baetidae	0.123	0.123	0.031	0.263
		Caenidae	0.033	0.013	0.019	0.044
		Heptagenidae	0.029	0.040	0.006	0.075
	Oligochaeta	Tubificidae	0.002	0.004	0	0.006
	Trichoptera	Hydropsychidae	0.002	0.004	0	0.006
No. 3A	Diptera	Ceratopogonidae	0.002	0.004	0	0.006
		Chironomidae	0.229	0.120	0.100	0.338
	Ephemeroptera	Baetidae	0.015	0.013	0	0.025
	Odonata	Zygoptera	0.073	0.126	0	0.219
	Oligochaeta	Tubificidae	0.054	0.053	0	0.106
No. 3B	Coleoptera	Elmidae	0.004	0.007	0	0.013
	Diptera	Blephariceridae	0.010	0.018	0	0.031
		Chironomidae	0.010	0.013	0	0.025
	Ephemeroptera	Baetidae	0.227	0.186	0.056	0.425
		Heptagenidae	0.006	0.011	0	0.019
			0.006	0.011	0	0.019
		Leptophledae	0.002	0.004	0	0.006
	Lepidotera	Oecophoridae	0.004	0.007	0	0.013
	Oligochaeta	Tubificidae	0.006	0.011	0	0.019
	Trichoptera	Hydropsychidae	0.094	0.126	0	0.238

Table 2.4.4 Biomass (gr/m^2) of Benthos in Rivers (Second)

No. 4	Diptera	Blephariceridae	0.004	0.007	0	0.013
		Chironomidae	0.156	0.087	0.100	0.256
		Simulidae	0.021	0.026	0	0.050
	Ephemeroptera	Baetidae	0.094	0.047	0.050	0.144
		Heptagenidae	0.015	0.025	0	0.044
	Oligochaeta	Tubificidae	0.006	0.011	0	0.019
	Trichoptera	Hydropsychidae	0.306	0.261	0.031	0.550
No. 4B	Coleoptera	Helmidae	0.006	0.011	0	0.019
	Diptera	Chironomidae	0.256	0.149	0.144	0.425
		Simulidae	0.033	0.058	0	0.100
		Tabanidae	0.127	0.220	0	0.381
	Ephemeroptera	Baetidae	0.867	0.756	0.256	1.713
		Caenidae	0.008	0.007	0	0.013
		Heptagenidae	0.004	0.007	0	0.013
			0.015	0.025	0	0.044
	Oligochaeta	Tubificidae	0.010	0.010	0	0.019
	Plecoptera	Luctridae	0.285	0.494	0	0.856
	Trichoptera	Hydropsychidae	0.046	0.059	0	0.113
		Rhyacophilidae	0.002	0.004	0	0.006
No. 6	Decapoda	Paleomonidae	0.323	0.559	0	0.969
	Diptera	Chironomidae	0.025	0.006	0.019	0.031
	Ephemeroptera	Baetidae	0.008	0.014	0	0.025
		Caenidae	0.021	0.016	0.006	0.038
	Oligochaeta	Tubificidae	0.140	0.062	0.069	0.181
	Trichoptera	Hydropsychidae	0.000	0.000	0	0.000
No. 7	Diptera	Chironomidae	0.004	0.007	0	0.013
		Tipulidae	0.002	0.004	0	0.006
	Trichoptera	Hydropsychidae	0.238	0.401	0	0.700

Table 2.4.4 Biomass (gr/m^2) of Benthos in Rivers (Second)

No. 8	Aracnida	Arcnoidae	0.004	0.004	0	0.006
	Decapoda	Paleomonidae	27.688	7.903	20.563	36.188
	Diptera	Chironomidae	0.013	0.000	0.013	0.013
	Ephemeroptera	Caenidae	0.002	0.004	0	0.006
	Oligochaeta	Lumbricidae	0.615	1.064	0	1.844
		Tubificidae	0.135	0.112	0.006	0.206
	Trichoptera	Hydropsychidae	0.017	0.024	0	0.044
No. 9	Diptera	Blephariceridae	0.058	0.080	0	0.150
		Ceratopogonidae	0.004	0.007	0	0.013
		Chironomidae	0.831	0.908	0.150	1.863
		Simulidae	0.029	0.051	0	0.088
		Tabanidae	0.002	0.004	0	0.006
		Tipulidae	0.004	0.007	0	0.013
	Ephemeroptera	Baetidae	0.198	0.202	0.075	0.431
		Heptagenidae	0.077	0.134	0	0.231
		Leptophledae	0.002	0.004	0	0.006
	Oligochaeta	Tubificidae	0.002	0.004	0	0.006
	Trichoptera	Hydropsychidae	0.088	0.152	0	0.263
		Philopotumidae	0.002	0.004	0	0.006
No. 10	Diptera	Chironomidae	1.025	1.424	0.200	2.669
		Empididae	0.025	0.029	0	0.056
		Simulidae	0.002	0.004	0	0.006
		Tipulidae	0.015	0.020	0	0.038
	Ephemeroptera	Baetidae	0.016	0.022	0	0.031
		Caenidae	0.010	0.018	0	0.031
	Gastropoda	Planorbidae	0.179	0.310	0	0.538
	Hirudinea	Glossiphonidae	0.313	0.360	0	0.706
			0.229	0.205	0	0.394
	Oligochaeta	Tubificidae	4.333	5.212	0.750	10.313

Table 2.4.4 Biomass (gr/m^2) of Benthos in Rivers (Second)

No. 11	Annelida	Lumbriculidae	0.129	0.224	0	0.388
	Diptera	Chironomidae	0.035	0.028	0.006	0.063
		Simulidae	0.010	0.018	0	0.031
	Ephemeroptera	Baetidae	0.029	0.026	0	0.050
		Caenidae	0.000	0.000	0	0.000
	Oligochaeta	Naididae	0.004	0.007	0	0.013
		Tubificidae	0.067	0.100	0	0.181
	Trichoptera	Hydropsychidae	0.044	0.076	0	0.131
No. 12	Amphipoda	Gammaridae	0.006	0.011	0	0.019
	Coleoptera	Elmidae	0.006	0.011	0	0.019
	Diptera	Chironomidae	0.092	0.057	0.050	0.156
		Ragonidae	0.010	0.018	0	0.031
		Simulidae	0.013	0.022	0	0.038
	Ephemeroptera	Baetidae	0.300	0.221	0.100	0.538
		Caenidae	0.008	0.014	0	0.025
		Heptagenidae	0.056	0.049	0	0.088
	Odonata	Anisoptera	0.060	0.105	0	0.181
	Trichoptera	Hydropsychidae	2.115	1.643	0.269	3.419
		Rhyacophilidae	0.004	0.007	0	0.013
No. 13	Diptera	Chironomidae	0.010	0.010	0	0.019
		Simulidae	0.006	0.011	0	0.019
	Ephemeroptera	Baetidae	0.013	0.022	0	0.038
		Caenidae	0.006	0.011	0	0.019
	Oligochaeta	Naididae	0.004	0.007	0	0.013
		Tubificidae	0.025	0.023	0	0.044

Table 2.4.4 Biomass (gr/m^2) of Benthos in Rivers (Second)

No. 14	Coleoptera	Elmidae	0.002	0.004	0	0.006
	Diptera	Chironomidae	2.948	2.234	1.238	5.475
		Simulidae	0.508	0.439	0.050	0.925
	Ephemeroptera	Baetidae	0.015	0.025	0	0.044
			0.065	0.066	0	0.131
			0.006	0.011	0	0.019
		Caenidae	0.013	0.006	0.006	0.019
		Heptagenidae	0.329	0.559	0	0.975
			0.179	0.310	0	0.538
	Trichoptera	Hydropsychidae	0.538	0.438	0.219	1.038
No. 16	Diptera	Empididae	0.004	0.007	0	0.013
	Oligochaeta	Tubificidae	0.656	0.530	0.069	1.100
No. 17	Coleoptera	Elmidae	0.002	0.004	0	0.006
	Diptera	Chironomidae	1.129	0.972	0.013	1.788
		Simulidae	0.231	0.214	0.006	0.431
	Ephemeroptera	Baetidae	0.269	0.234	0	0.425
		Caenidae	0.033	0.037	0.006	0.075
		Heptagenidae	0.042	0.034	0.006	0.075
	Oligochaeta	Lumbricidae	0.117	0.122	0	0.244
		Tubificidae	0.048	0.062	0.006	0.119
	Trichoptera	Hydropsychidae	2.046	1.834	0.038	3.631
No. 18	Coleoptera	Elmidae	0.006	0.006	0	0.013
	Diptera	Chironomidae	0.060	0.072	0.013	0.144
	Ephemeroptera	Baetidae	0.058	0.026	0.038	0.088
		Caenidae	0.008	0.010	0	0.019
	Oligochaeta	Tubificidae	0.373	0.193	0.213	0.588
	Trichoptera	Glossosomatidae	0.013	0.022	0	0.038
		Hydropsychidae	0.473	0.406	0.069	0.881
		Philopotumidae	0.004	0.007	0	0.013

Table 2.4.4 Biomass (gr/m^2) of Benthos in Rivers (Second)

No. 19	Coleoptera	Elmidae	0.004	0.007	0	0.013
		Helmidaes	0.008	0.007	0	0.013
	Diptera	Chironomidae	0.194	0.122	0.075	0.319
		Simulidae	0.006	0.006	0	0.013
	Ephemeroptera	Baetidae	0.385	0.241	0.225	0.663
		Caenidae	0.002	0.004	0	0.006
	Oligochaeta	Tubificidae	0.004	0.007	0	0.013
	Trichoptera	Hydropsychidae	0.217	0.318	0	0.581
No. 20	Amphipoda	Gammaridae	0.042	0.044	0	0.088
	Diptera	Chironomidae	0.231	0.125	0.125	0.369
		Simulidae	0.279	0.440	0.019	0.788
	Ephemeroptera	Caenidae	0.002	0.004	0	0.006
	Nematodae	Nematod	0.004	0.007	0	0.013
	Trichoptera	Hydropsychidae	0.025	0.043	0	0.075
No. 21	Bivalve	Sphaeriidae	0.008	0.014	0	0.025
	Diptera	Chironomidae	8.471	2.130	6.531	10.750
		Simulidae	0.006	0.006	0	0.013
	Ephemeroptera	Baetidae	0.006	0.006	0	0.013
		Caenidae	0.008	0.010	0	0.019
		Heptagenidae	0.010	0.010	0	0.019
	Gastropoda	Limeneidae	1.606	1.294	0.113	2.363
		Physidae	0.115	0.198	0	0.344
	Nematodae	Nematod	0.029	0.034	0.006	0.069
	Oligochaeta	Tubificidae	2.698	1.204	1.744	4.050

Table 2.4.5 Biomass (gr/m^2) of Benthos in Anzali Wetland (Third)

Station	Order	Family	mean	std	min	max
1	Diptera	Chironomidae	0.058	0.101	0.000	0.175
1	Oligochaeta	Tubificidae	1.167	0.820	0.225	1.725
2	Oligochaeta	Tubificidae	0.317	0.115	0.250	0.450
3	Oligochaeta	Tubificidae	0.792	0.643	0.325	1.525
4	Oligochaeta	Tubificidae	1.142	1.107	0.175	2.350
5	Oligochaeta	Tubificidae	0.008	0.014	0.000	0.025
7	Polychatea	Nereidae	0.292	0.505	0.000	0.875
8	Oligochaeta	Tubificidae	0.967	0.850	0.000	1.600
10	Gastropoda	Paleomonida	0.717	1.241	0.000	2.150
	Oligochaeta	Tubificidae	0.008	0.014	0.000	0.025
12	Diptera	Chironomidae	0.042	0.072	0.000	0.125
	Oligochaeta	Tubificidae	0.583	0.216	0.350	0.775
13	Diptera	Chironomidae	0.000	0.000	0.000	0.000
	Oligochaeta	Tubificidae	0.375	0.650	0.000	1.125
			0.608	0.816	0.100	1.550
14	Diptera	Ceratopognidae	0.042	0.038	0.000	0.075
	Oligochaeta	Tubificidae	0.150	0.218	0.000	0.400
15	Oligochaeta	Tubificidae	0.042	0.072	0.000	0.125
16	Oligochaeta	Tubificidae	0.083	0.104	0.000	0.200

Table 2.4.6 Biomass (gr/m^2) of Benthos in Rivers (Third)

Station	Order	Family	mean	std	min	max
No. 2	Coleoptera	Elmidae	0.01	0.01	0	0.02
	Diptera	Chironomidae	0	0	0	0.01
		Simulidae	0.01	0.01	0	0.03
	Ephemeroptera	Baetidae	0.01	0.01	0	0.02
		Caenidae	0.01	0	0.01	0.01
	Oligochaeta	Tubificidae	0.02	0.02	0	0.04
No. 3A	Diptera	Chironomidae	0.01	0	0.01	0.01
	Ephemeroptera	Baetidae	0.13	0.08	0.05	0.21
	Gastropoda	Planorbis	0.04	0.06	0	0.11
	Hirudinea	Hirudidae	0	0.01	0	0.01
	Oligochaeta	Tubificidae	0	0.01	0	0.01
No. 3B	Coleoptera	Elmidae	0.01	0.01	0	0.02
		Helmis	0.01	0.01	0	0.01
	Diptera	Ceratopogonidae	0	0	0	0.01
		Chironomidae	0.06	0.09	0.01	0.17
		Dolichopodidae	0	0	0	0.01
		Psychodidae	0	0	0	0.01
		Rhagionidae	0.01	0.01	0	0.02
		Simulidae	0	0	0	0.01
		Stratiomyidae	0	0	0	0.01
		Tipulidae	0.18	0.21	0	0.41
	Ephemeroptera	Baetidae	0.43	0.55	0.08	1.07
		Caenidae	0.01	0.01	0	0.01
		Ephemeridae	0	0.01	0	0.01
		Heptagenidae	0.06	0.05	0	0.09
			0.14	0.16	0	0.31
			0.12	0.18	0	0.33
		Leptoidae	0.08	0.11	0	0.21
	Oligochaeta	Tubificidae	0	0.01	0	0.01
	Plecoptera	Nemouridae	0	0.01	0	0.01
		Perlidae	0.01	0.03	0	0.04
	Trichoptera	Hydropsychidae	2.68	3.92	0.07	7.19
		Rhyacophilidae	0.01	0.01	0	0.02
			0.02	0.02	0	0.04

Table 2.4.6 Biomass (gr/m^2) of Benthos in Rivers (Third)

No. 4	Arthropoda	Crustacea	0.58	1	0	1.74
	Coleoptera	Elmidae	0.01	0.01	0	0.01
		Helmis	0	0.01	0	0.01
	Diptera	Ceratopogonidae	0.01	0	0.01	0.01
		Chironomidae	0.03	0.01	0.02	0.04
		Psychodidae	0	0.01	0	0.01
		Simulidae	0.01	0.01	0.01	0.03
		Tabanidae	0.06	0.1	0	0.18
		Tipulidae	0.02	0.03	0	0.05
	Ephemeroptera	Baetidae	0.01	0.01	0	0.03
		Caenidae	0.01	0.01	0	0.02
		Heptagenidae	0.03	0.05	0	0.08
		Leptoidae	0	0	0	0.01
	Hirudinea	Psiculidae	0.14	0.25	0	0.43
	Oligochaeta	Lumbricidae	0.07	0.12	0	0.21
		Tubificidae	0.01	0.01	0	0.01
	Plecoptera	Leuctridae	0	0.01	0	0.01
	Trichoptera	Glossosomatidae	0.41	0.64	0	1.15
No. 4B	Bivalvia	Sphaeriidae	0.03	0.04	0	0.08
	Coleoptera	Elmidae	0.01	0.01	0	0.01
	Diptera	Chironomidae	0.02	0.01	0.01	0.03
		Dolicopodidae	0	0	0	0.01
		Simulidae	0.01	0	0.01	0.01
	Ephemeroptera	Baetidae	0.01	0.01	0.01	0.02
	Odonata	Zygoptera	0.05	0.08	0	0.14
	Oligochaeta	Tubificidae	0	0	0	0.01
	Trichoptera	Hydropsychidae	0.03	0.06	0	0.1
No. 6	Oligochaeta	Lumbricidae	0.03	0.05	0	0.09
		Tubificidae	0	0.01	0	0.01
No. 7	Diptera	Chironomidae	0.02	0.01	0.02	0.03
		Tipulidae	0.04	0.07	0	0.11
	Ephemeroptera	Baetidae	0.03	0.03	0	0.05
	Hirudinea	Psiculidae	0.01	0.02	0	0.03
	Lepidotera	Oecophoridae	0	0.01	0	0.01
	Oligochaeta	Tubificidae	0	0	0	0.01
	Trichoptera	Hydropsychidae	0.18	0.3	0	0.53
No. 8	Diptera	Chironomidae	0.01	0.02	0	0.03
		Simulidae	0	0	0	0.01
	Ephemeroptera	Baetidae	0.05	0.06	0	0.11
	Oligochaeta	Tubificidae	0	0.01	0	0.01

Table 2.4.6 Biomass (gr/m^2) of Benthos in Rivers (Third)

No. 9	Coleoptera	Elmidae	0.01	0.01	0	0.03
	Diptera	Chironomidae	0.08	0.05	0.04	0.13
		Simulidae	0.2	0.19	0.03	0.41
		Tipulidae	0	0	0	0.01
	Ephemeroptera	Baetidae	0.05	0.06	0.01	0.11
		Caenidae	0	0	0	0.01
	Oligochaeta	Tubificidae	0.01	0.01	0	0.02
	Plecoptera	Capnidae	0	0	0	0.01
		Nemouridae	0	0	0	0.01
		Perlidae	0.29	0.5	0	0.86
	Trichoptera	Glossosomatidae	0.5	0.44	0	0.81
		Philopotamidae	0.01	0.01	0	0.02
No. 10	Diptera	Chironomidae	0.02	0.01	0.01	0.04
		Simulidae	0.03	0.04	0	0.07
	Ephemeroptera	Baetidae	0.18	0.04	0.15	0.23
		Caenidae	0	0.01	0	0.01
	Oligochaeta	Tubificidae	2.18	1.5	0.45	3.21
No. 11	Decapoda	Paleomonidae	6.76	6.03	0	11.59
	Diptera	Chironomidae	0.02	0.01	0.01	0.03
		Empididae	0	0	0	0.01
		Simulidae	0.01	0.02	0	0.04
	Ephemeroptera	Baetidae	0.1	0.09	0	0.16
		Caenidae	0	0	0	0.01
	Oligochaeta	Tubificidae	0	0	0	0.01
No. 12	Coleoptera	Elmidae	0.03	0.05	0	0.08
		Helmis	0	0	0	0.01
	Diptera	Ceratopogonidae	0	0	0	0.01
		Chironomidae	0.06	0.04	0.01	0.09
		Rhagionidae	0.01	0.02	0	0.03
	Ephemeroptera	Baetidae	0.1	0.12	0.03	0.24
		Caenidae	0	0.01	0	0.01
	Odonata	Anyzoptera	0.15	0.27	0	0.46
	Oligochaeta	Tubificidae	0.04	0.08	0	0.13
	Trichoptera	Hydropsychidae	8.51	11.34	0.27	21.44
		Rhyacophilidae	0.31	0.53	0	0.92
No. 13	Coleoptera	Elmidae	0	0	0	0.01
	Diptera	Chironomidae	0.01	0.01	0	0.02
		Simulidae	0.03	0.04	0	0.08
	Ephemeroptera	Baetidae	0.04	0.05	0	0.09
		Caenidae	0.04	0.05	0.01	0.1
	Oligochaeta	Tubificidae	0.06	0.08	0	0.15
	Trichoptera	Hydropsychidae	0	0.01	0	0.01

Table 2.4.6 Biomass (gr/m^2) of Benthos in Rivers (Third)

No. 14	Diptera	Chironomidae	0.04	0.03	0.02	0.07
		Psychodidae	0	0	0	0.01
		Rhagionidae	0.04	0.06	0	0.11
		Simulidae	0.01	0.02	0	0.04
		Tabanidae	0.03	0.05	0	0.09
		Tipulidae	0	0.01	0	0.01
	Ephemeroptera	Baetidae	0.01	0.01	0	0.03
			0.04	0.05	0.01	0.1
		Caenidae	0	0	0	0.01
		Heptagenidae	0.01	0.01	0	0.02
	Odonata	Anizoptera	0.89	1.54	0	2.68
	Oligochaeta	Lumbricidae	0.04	0.07	0	0.13
		Tubificidae	0.02	0.02	0	0.04
	Trichoptera	Hydropsychidae	0.01	0.02	0	0.04
No. 15	Oligochaeta	Tubificidae	0.03	0	0.03	0.03
No. 16	Diptera	Chironomidae	0	0	0	0.01
		Empididae	0.01	0.02	0	0.04
		Psychodidae	0.01	0.01	0	0.01
	Lepidotera	Oecophoridae	0.01	0.02	0	0.03
	Oligochaeta	Tubificidae	0.06	0.07	0.01	0.14
No. 17	Coleoptera	Elmidae	0	0	0	0.01
	Diptera	Chironomidae	0.02	0.01	0.01	0.03
		Simulidae	0.43	0.02	0.41	0.44
		Tabanidae	0.01	0.01	0	0.01
		Tipulidae	0.29	0.51	0	0.88
	Ephemeroptera	Baetidae	0.15	0.1	0.04	0.21
		Caenidae	0.02	0	0.01	0.02
		Heptagenidae	0.05	0.07	0	0.13
	Oligochaeta	Lumbriculidae	0.05	0.09	0	0.16
		Tubificidae	0.03	0.03	0	0.05
	Trichoptera	Hydropsychidae	0.16	0.14	0	0.26
No. 18	Coleoptera	Elmidae	0	0.01	0	0.01
	Diptera	Chironomidae	0.04	0.03	0.01	0.06
	Ephemeroptera	Baetidae	0.01	0.01	0	0.02
			0.06	0.07	0.02	0.14
		Caenidae	0	0	0	0.01
	Oligochaeta	Tubificidae	0.15	0.05	0.09	0.19
	Trichoptera	Hydropsychidae	0.16	0.12	0.03	0.24

Table 2.4.6 Biomass (gr/m^2) of Benthos in Rivers (Third)

No. 19	Arthropoda	Arachnida	0.04	0.03	0.01	0.07
	Coleoptera	Elmidae	0.01	0.01	0	0.03
			0	0	0	0.01
		Helmis	0.01	0.01	0	0.01
	Diptera	Chironomidae	0.78	0.58	0.41	1.45
		Dolicopodidae	0	0	0	0.01
		Empididae	0.01	0.02	0	0.03
		Psychodidae	0.01	0.01	0	0.03
		Simulidae	0	0	0	0.01
	Ephemeroptera	Baetidae	0.48	0.28	0.31	0.81
		Caenidae	0	0	0	0.01
	Oligochaeta	Tubificidae	0.03	0.04	0	0.08
	Polychaeta	Nereidae	0.16	0.28	0	0.49
	Trichoptera	Hydropsychidae	0.18	0.07	0.13	0.25
No. 20	Oligochaeta	Tubificidae	0.24	0.25	0	0.5
No. 21	Diptera	Chironomidae	0.03	0.04	0	0.07
		Simulidae	0	0	0	0.01
	Ephemeroptera	Caenidae	0.01	0.01	0	0.02
		Heptagenidae	0	0.01	0	0.01
	Oligochaeta	Naididae	0	0.01	0	0.01
		Tubificidae	0.11	0.05	0.06	0.15

Data 3: Bathymetric Survey

DATA 3: BATHYMETRIC SURVEY

This survey was sublet to the Dastoor-E Novin, Consulting Engineers.

3.1 Monthly Rainfall Data

Rainfall data for the following 12 rainfall stations (Table 3.1.1) in and near the Anzali watershed are presented in this section. Their locations are shown in Figure 3.1.1 and their coordinates and availability are given in Table 3.1.2. The mean monthly rainfall is shown in Table 3.1.3.

Table 3.1.1 Rainfall Stations

No.	Name	Station ID.
Within watershed		
1	Anzali	18002
2	Rasht	17082
3	Ghaleroudkhan	18003
4	Kasma	18007
5	Shanderman	18017
6	Masoleh	18105
7	Chaparpar	18108
8	unknown	18059
Near watershed		
9	Ponel	18021
10	Sarvan	17089
11	Baragvar	17049
12	Tarikroud	17047

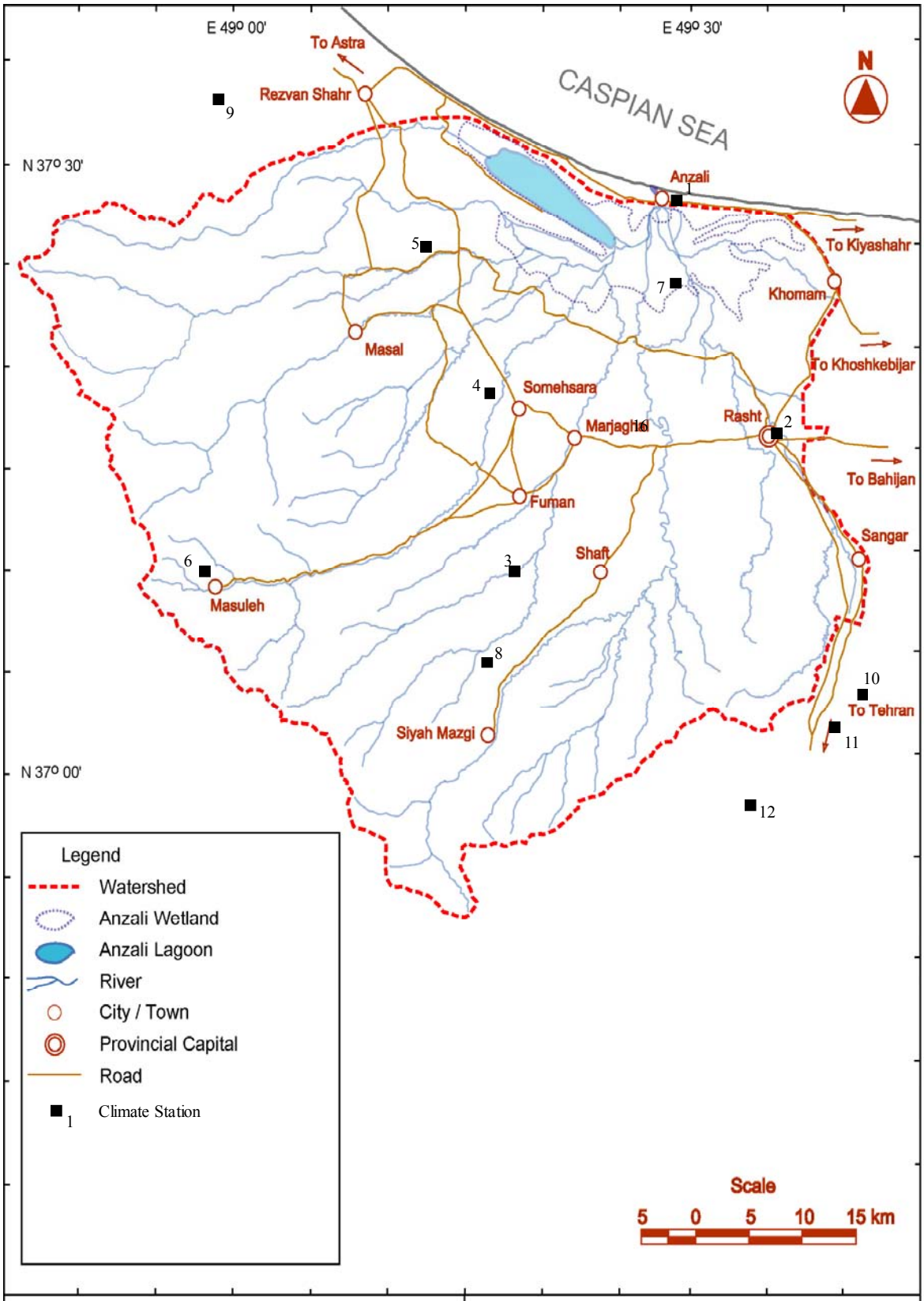

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Figure 3.1.1
Location of Climate Gaging Stations

Table 3.1.2 Climate Data Availability

No.	Station	MOE Code	Northing	Easting	Elevation (m)	Year																												Number of Years
						67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	
Within watershed																																		
1	Anzali	18002	37-28	49-28	-16																													26
2	Rasht	17082	37-15	49-36	-3																													28
3	Ghaleroudkhan	18003	37-05	49-15	125																													24
4	Kasma	18007	37-19	49-17	-5																													24
5	Shanderman	18017	37-26	49-08	31																													26
6	Masoleh	18105	37-09*	48-49*	950																													5
7	Chaparpar	18108	37-26	49-28	-19																													4
8	-	18059	37-05	49-14	170																													9
Near watershed																																		
9	Ponel	18021	37-32	49-05	75																													20
10	Sarvan	17089	37-01	49-40	90																													12
11	Baragvar	17049	37-00	49-38	130																													12
12	Tarikroud	17047	36-59	49-33	120																													19

Note: * - reporeted coordinates are incorrect
Source: MOE

Table 3.1.3 Mean Monthly Rainfall (1/12)

Station Anzali MOE Code 18002 Latitude 37-28
Longitude 49-28 (Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1966	-	-	-	-	-	-	-	-	460.9	184	11.2	32.5	-
1967	153.9	146.5	95.1	34.4	32.1	26.5	34.8	237	298.6	183.1	100.8	75.3	1,418
1968	194.6	98.2	117.5	48.2	125.4	28.7	19.4	104.1	167.1	424.7	157.3	230.9	1,716
1969	323.3	151.3	123.2	20.9	207.2	22.5	90.8	346.5	389.2	343.6	55.3	143.7	2,218
1970	192.9	91.3	49.5	25.7	21	17.5	124	90.7	196	113.4	437.1	229.2	1,588
1971	81.4	35.8	70	35.6	12.5	0	9.7	0.3	275.8	223.8	94.6	408.4	1,248
1972	353.1	190.6	45	84.8	13.1	7.8	133.4	100.9	290	294.3	382.1	254.3	2,149
1973	83.6	75.8	79.7	44.1	55.4	42.5	29.4	414.1	50.3	232	187.6	190.2	1,485
1974	215.1	122.8	111.8	25.8	13	153.1	95.1	295.9	26.4	296.4	152.9	187.5	1,696
1975	152.6	135.3	4	70.4	87	0	149.7	182.5	676.1	380.7	400.7	120.7	2,360
1976	195.6	224.4	26.3	43.8	68.4	82.5	1.1	276	319.4	303.9	293.5	404.4	2,239
1977	82.3	50.4	28.7	75.6	18.5	86.5	124.9	158.3	598.8	573.5	185	128.3	2,111
1978	55.6	105.4	46.1	46	124.4	31.7	0	14.2	284.6	921.9	78.7	239	1,948
1979	121.1	155.3	64.6	68.5	24.4	27.8	17.4	142.6	236.9	279.3	194.3	191	1,523
1980	190.4	232.8	39.2	64.9	10.8	0	77.3	118.3	325.6	235.6	128.5	119.4	1,543
1981	50.2	160	234	46.1	19.9	102.4	182	243.6	235.9	30.8	41.1	303.4	1,649
1982	304.2	68.3	131.7	30.9	61.9	30.1	111.7	236.3	393.4	560.4	431.1	60.1	2,420
1983	175.7	4.2	146.2	57.3	53.6	92	45.4	157	217.1	229.2	154.7	234	1,566
1984	120.6	225.7	76.1	34.3	63.6	8.3	3.1	162	58.8	357.7	473	360	1,943
1985	104.1	113.2	153.8	16.2	10.3	10	55.7	8.9	241.5	548.4	251	274.3	1,787
1986	152.1	86.8	111.7	22	52.2	191.3	8.7	58	206.7	231	513.1	464.8	2,098
1987	47.7	110.5	91.3	43.4	6.3	0.1	48.7	308	172.3	564.3	167.4	194.3	1,754
1988	178.6	103.8	54.2	62.6	51.2	49.4	44.5	361.3	287.1	268.6	137.1	103.5	1,702
1989	199.6	147	99.8	72.5	49	1.4	116.9	49.3	59	426.8	64.3	307.7	1,593
1990	57	127.2	136.6	10.6	55.2	0.1	60.7	41.6	196.4	76.7	305.5	170	1,238
1991	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	212.1	118.2	89.8	140.9	83.9	31.4	144.5	143.7	347.2	198	103.8	173.4	1,787
1993	-	-	-	-	-	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	-	-	-	-	-	-	-	-	442.5	79	370	191	-
1996	126	133	101	33.5	53.2	6.4	2	142.5	422.5	337	57.6	113.2	1,528
1997	212	174.5	62.5	9	92.2	157.2	80.5	597.5	-	-	-	-	-
1998	-	-	-	-	-	-	-	-	-	-	-	-	-
1999	-	-	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	171.1	129.7	64.3	49.2	58.1	37.7	64.8	177.2	306.4	332.7	190.6	197.0	1,803
Maximum	353.1	232.8	123.2	84.8	207.2	153.1	149.7	414.1	676.1	921.9	437.1	408.4	2,420
Minimum	55.6	35.8	4.0	20.9	10.8	0.0	0.0	0.3	26.4	113.4	11.2	32.5	1,238

- no data

Table 3.1.3 Mean Monthly Rainfall (2/12)

Station Rasht MOE Code 17082 Latitude 37-15
Longitude 49-36 (Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1966	-	-	-	-	-	-	-	-	376.6	132.8	9.6	49.6	-
1967	169.2	152	148	36.2	54	25.2	44	155.1	290.8	120.6	87.8	66.7	1,350
1968	251.9	133.2	221.3	64.6	111.3	76.1	30.8	40.4	124	202.9	112.6	63.6	1,433
1969	93.9	142.9	145	24.9	118	44.4	39.4	217.3	193.9	226.1	40.8	98	1,385
1970	97.1	68.1	28.6	68.2	51.3	2	115.9	105.4	87.6	98.6	363.8	83.8	1,170
1971	113.3	36.6	86.7	29.7	19.4	0	8.6	0.7	90.8	109.9	79	259.2	834
1972	318.9	159.2	66	83.5	12.3	28	77.6	91	137.6	201.6	234.3	84.7	1,495
1973	85.4	67.4	77.1	55.2	46.2	20.9	22.2	234.2	18.9	158	186.2	197.1	1,169
1974	228.6	149.7	141	18.1	23.7	151.6	63.9	109.9	5.8	93.9	55.6	80.5	1,122
1975	101	111.4	4	65.8	35	0	61.3	150	287.8	176	212.7	91.7	1,297
1976	76.4	78.5	33.2	57.8	48	16.5	6.5	144.3	173.2	171	272.3	201	1,279
1977	66.5	34.5	35	104.6	36.8	129.5	69.9	40.9	286.5	263.5	12.9	59.5	1,140
1978	63.1	117.5	59.5	47.5	98.8	56.5	66.8	20	122	471	72.5	138.5	1,334
1979	103	127	60.5	102	49.5	1	19.5	43	133.5	149.5	188.5	89	1,066
1980	180.5	166	30.5	83	10.5	0	38.8	146.5	191.5	160.5	70	65.5	1,143
1981	46.5	152	172	76.5	41	79	72.6	170.1	144	56	31.5	209.5	1,251
1982	312	57	93.5	41.5	53.3	60	72	32.5	223.5	352.6	263.9	39	1,601
1983	38.2	108.5	5	94.4	31.8	40.5	29.5	136.3	82	52.3	221	46.5	886
1984	216.5	105	56.2	120.5	7.5	2.7	140.2	45	156.1	176	272.5	110	1,408
1985	97	289	37	11.5	14	22.5	29.5	190	381	137.5	157.3	83.5	1,450
1986	58	95	66.1	35	104	20	7.5	60.5	198.4	240.5	266.5	16	1,168
1987	48	77.5	71.5	11	16	31.5	51	196	339.5	140.4	115.5	240.5	1,338
1988	120.7	36.5	88.1	87	23.5	31.5	243.6	157	-	-	-	-	-
1989	-	-	-	-	-	-	-	-	246.5	104.5	128.5	153	-
1990	145	202.8	87.3	56	13	9.3	71.1	71.4	374.2	89.5	108.1	168.3	1,396
1991	92	229.1	62	29	25	68.5	6.8	31.5	107.8	186.7	144.5	134	1,117
1992	127.5	163	186.5	111.5	44.5	127	50	99.5	258.5	63.5	170	161	1,563
1993	183.5	74.5	15.5	69	147	29.9	48.5	236.7	147	391	249.5	51	1,643
1994	182.5	90.9	32.9	78	37.5	32.5	32.5	67.7	235	275.5	201.5	53	1,320
1995	60.7	55.2	21	63	28.7	33	20.5	177.2	313	84.2	114.4	178	1,149
1996	120.4	177.9	125	36.7	55.7	8.4	10.7	94.5	124.5	229	63.7	52.8	1,099
1997	144	193.5	43	7.2	32	190.7	51.2	321.7	-	-	-	-	-
1998	-	-	-	-	-	-	-	-	-	-	-	-	-
1999	-	-	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	131.4	121.7	76.6	59.0	46.3	44.6	53.4	119.5	195.1	177.2	150.2	110.8	1,272
Maximum	318.9	289	221.3	120.5	147	190.7	243.6	321.7	381	471	363.8	259.2	1,643
Minimum	38.2	34.5	4.0	7.2	7.5	0.0	6.5	0.7	5.8	52.3	9.6	16.0	834

- no data

Table 3.1.3 Mean Monthly Rainfall (3/12)

Station Ghalehroudkhan MOE Code 18003 Latitude 37-05
Longitude 49-15 (Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1966	-	-	-	-	-	-	-	-	409.7	192.3	7.7	58.2	-
1967	110.9	107.5	162	89.8	127.9	60.7	40.1	252.4	267.7	171.7	95	50.6	1,536
1968	176.1	97.5	237.6	100.9	202.8	127	109.6	134.9	-	-	-	-	-
1969	-	-	-	-	-	-	-	-	308.4	280.5	40.5	84.8	-
1970	115.4	111.3	74.4	89.5	88.8	42.8	192.6	363.4	145.8	148.9	197.3	175.1	1,745
1971	91.4	69.7	151.9	89.7	62.5	22.7	59.6	44.7	58.1	42.2	38.7	19.9	751
1972	7.3	21	92.4	105.4	117.7	183.1	148.8	110.9	59.5	165.5	226.7	16	1,254
1973	31.9	91.5	109.1	83.4	192.5	52.8	68	540.4	75	128	159	134	1,666
1974	180	159	189.5	72	91	272.5	141	239.5	76.8	75	62	94	1,652
1975	83	171	20	121.5	85.5	2	148.5	264.5	430.6	165.5	27.9	9	1,529
1976	128.5	201.5	53	114	110.5	173.5	22	259	235.5	178.5	86.5	241.5	1,804
1977	48	76	63	91.5	78	213.5	65	273	285	214	95	66.5	1,569
1978	63	120.5	27.5	124.5	197	97	145	193.5	232	392	118.5	108.5	1,819
1979	122.5	108	83	184	126.5	25	76.5	126	89	92	138.5	155	1,326
1980	208	182	35	114.5	58	4.5	129.5	243	260.5	165.5	155.5	114.5	1,671
1981	41.5	105.5	203.5	158.5	76.5	119	169.5	283	181.5	58	25	204.5	1,626
1982	171	82	135.5	60.5	144	76.5	143.5	126.5	178.5	285	271.5	28	1,703
1983	23.5	109	23.5	94	81	112.5	99.5	295	226	114	180.6	46	1,405
1984	141	100.1	68	141	70	30	211.5	227	176.5	95	261	90	1,611
1985	79	6	64.5	66.5	61	106.5	51	271.5	27.6	166.5	140.5	77.5	1,118
1986	103.5	123	61	48.5	201	59.5	7.5	167	331.5	220.8	260	28	1,611
1987	68.5	108	173	27.5	39.5	130	135.5	395	384	160.5	134.5	254.8	2,011
1988	127.5	61	146.5	95.5	48	87.5	251.5	101.5	-	-	-	-	-
1989	-	-	-	-	-	-	-	-	-	-	-	-	-
1990	-	-	-	-	-	-	-	-	-	-	-	-	-
1991	-	-	-	-	-	-	-	-	293.5	177.5	155.5	125.5	-
1992	176.1	207	262.5	181.5	73	203	102.5	229	436	191.5	189.5	126	2,378
1993	107.5	116.5	37	173.5	258.5	245	128	443	305	314.5	230	56.5	2,415
1994	214	146	71	139	111	79	79	84.5	224	244.5	120.5	55	1,568
1995	86.5	86	23	133	52	83.5	57.5	141	290	131.5	90.5	148	1,323
1996	88	198.5	154.5	86	109	22.5	319.5	241	277.5	165.5	84.5	63	1,810
1997	150.5	171	45	42	87	210.5	108	430	-	-	-	-	-
1998	-	-	-	-	-	-	-	-	-	-	-	-	-
1999	-	-	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-	-	-
2001	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	106.3	117.2	94.7	105.5	104.8	106.2	122.4	243.7	220.0	170.5	143.7	101.5	1,624
Maximum	214	207	262.5	184	258.5	272.5	319.5	540.4	436	392	271.5	254.8	2,415
Minimum	7.3	6.0	20.0	27.5	39.5	2.0	7.5	44.7	27.6	42.2	25.0	9.0	751

- no data

Table 3.1.3 Mean Monthly Rainfall (4/12)

Station Kasma MOE Code 18007 Latitude 37-19
Longitude 49-17 (Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1966	-	-	-	-	-	-	-	-	248.9	89.6	11.3	50.3	-
1967	95.2	101.8	103.9	62.4	88.4	16.3	40.4	171.6	249.4	96.3	62.6	71.4	1,160
1968	122.6	107.8	51.7	28.9	114.6	65.1	17.9	71.4	54.5	291.3	105.2	38.1	1,069
1969	65.9	98	116.4	27.4	167.8	77.9	41.6	385.1	258.5	240.1	51.8	88.1	1,619
1970	92.2	50.7	24.2	60.4	52	7.4	89.1	140.5	71.8	76.7	205.2	142	1,012
1971	73.7	35.6	5.8	8.4	6.6	10.2	44.4	0	107.1	83.7	47	167.7	590
1972	117.2	121.9	53.7	94.4	10.6	10	106.9	101.2	178.2	169.8	234.7	200.8	1,399
1973	30	79.6	70.2	61.2	69	18.5	37.1	323.9	16.4	98.1	143.6	97.1	1,045
1974	84	80.7	116.9	95	49.9	141.5	102.1	130.1	3.2	78.6	62.8	76.7	1,022
1975	51.3	144	15.3	84.2	44.5	0	190.5	385	24.7	259	285	68	1,552
1976	100	116	30	61.5	56.5	65	15.5	122.7	177.5	152.9	112.5	144	1,154
1977	40.6	29.4	18.8	69.9	55	101	54.7	135.7	136.5	99.6	58.2	40.5	840
1978	26.6	82.6	27.5	58.2	103.2	53.8	23.6	44.8	142.5	333.5	-62	101.6	936
1979	97.4	86.8	61.6	118.2	62.6	9.1	78.4	119.4	87.2	74.6	142.7	80	1,018
1980	145.3	134.6	35.2	77.2	36.4	0	58.2	118.2	218.4	136.6	154.6	66	1,181
1981	36.4	94.8	161	78.5	29.8	31.8	154.6	181.8	106.4	5.6	-	115.4	-
1982	92.8	67.2	74.3	32.1	42.8	39.2	8	-	164.4	193.1	267.6	33.4	-
1983	20.3	82.8	6.4	71.7	73.7	71.9	50.8	161.1	142.5	106	117.9	26.8	932
1984	62.8	-	69.5	94.5	39.5	11.5	79.5	96.2	204.5	98.5	194	84.5	-
1985	52	167	31.5	27.5	36.5	21.1	1	191.1	273.5	160.5	117	74.5	1,153
1986	73.5	58	46.5	44	95	26	10	204.5	213	246	268	23.5	1,308
1987	49.2	57.8	60.5	20	12	53	-	179	248	101.5	99	162	-
1988	87	22.5	78.5	60	47.5	42	175.5	102.5	-	-	-	-	-
1989	-	-	-	-	-	-	-	-	141	92	70.5	61	-
1990	119	134.5	69	66	9	1.5	71	87.5	303.5	54.5	69.5	89.5	1,075
1991	45.6	113	45.5	21	31	136.2	3	71	108	154	111.5	74.5	914
1992	144	89	147.5	93	24.5	125	39	166.5	286.5	77.5	117.5	119.5	1,430
1993	78.5	54	6.5	64	129	29.5	70.5	237	310.5	193.5	153.5	36	1,363
1994	152	80	23	63.5	84	27	27	26	155	181.5	102	33	954
1995	65.5	38	9	62	16	20	19	91	232	130	63	93.5	839
1996	65.5	114	90	18	25.5	7	46	95	130	132.5	62	36	822
1997	98	77	39	18	68	108	42	284	-	-	-		-
1998	-	-	-	-	-	-	-	-	-	-	-	-	-
1999	-	-	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-	-	-
2001	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	77.8	85.1	52.5	60.1	48.5	43.2	61.4	146.0	160.9	134.2	127.9	86.4	1,073
Maximum	152	167	161	118.2	129	141.5	190.5	385	310.5	333.5	285	200.8	1,619
Minimum	20.3	22.5	5.8	8.4	6.6	0.0	1.0	0.0	3.2	5.6	-62.0	23.5	590

- no data

Table 3.1.3 Mean Monthly Rainfall (5/12)

Station Shanderman MOE Code 18017 Latitude 37-26
Longitude 49-08 (Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1966	-	-	-	-	-	-	-	-	230.6	225.8	8	29.4	-
1967	68.1	67.2	80.7	58.7	58.8	15.4	56.6	138.5	179.7	100.6	64	48.1	936
1968	108.9	58.6	85	37.1	89.7	54.2	14	70.7	72.1	270.9	52.8	20.6	935
1969	66.8	87.2	105.7	23.4	120.3	154.7	48	371.4	213.1	213.8	86.4	69.2	1,560
1970	56.7	36.3	31.2	63.1	30.5	3	65.7	190.7	77.9	41.3	132.7	125.8	855
1971	52.3	47.9	70	41.5	19.5	15.2	36.2	1.5	75.3	59.8	31.2	122.8	573
1972	88.4	86	47.3	91.2	28.4	11.8	124.5	102.8	203.8	140.6	166.2	97.5	1,189
1973	29.5	59.6	66.6	49.9	77.2	14.6	56.7	308.8	-	-	-	-	-
1974	-	-	-	-	-	-	-	-	71.4	69.5	59.4	73.8	-
1975	33.7	122.8	7.5	113.5	38.9	0	115.5	180	168.4	131.4	163.9	54.7	1,130
1976	60	68.5	31.3	51.7	47.6	50.8	44.7	129	100.4	100	31.6	98.8	814
1977	36.6	44.4	33.5	52	31.5	95.4	47.5	142.5	116.7	151.9	1.8	13.2	767
1978	28.1	90.2	16.4	78.6	111.5	68.3	9.4	47.2	160	282.4	68.2	86.5	1,047
1979	81.9	78.1	80.6	106.4	97.7	5.4	47	101.7	70.6	51	80.3	61.3	862
1980	94.3	114.7	47.1	101	37.1	0	69.9	114.6	176.6	134.2	115.6	60.6	1,066
1981	19.7	75.6	121.6	117.7	29.6	27.8	149.9	117.9	170.5	26.8	14.2	70.8	942
1982	101.6	61.8	61.6	41.7	82.2	40.3	64.6	7.2	178.2	233.3	183.5	25.8	1,082
1983	38.3	57.7	17.5	73.2	60.9	108	70.6	149.7	184.6	22.5	87	25	895
1984	36	83	40.7	97	53.5	23.5	98.2	106	195	35.8	129	81.5	979
1985	53.5	90.7	50.5	28	57	27	14	191.5	277	137.5	112.5	62	1,101
1986	59.5	57	53.5	63	112.8	10	0.5	195.5	106	255.5	191	18	1,122
1987	23.7	59.5	50	11.5	28	46	118	129	183.5	69	52.5	113	884
1988	66.5	22	87	69.4	27	29.5	84.5	139.5	-	-	-	-	-
1989	-	-	-	-	-	-	-	-	142.5	101	75	85	-
1990	106	146.5	63.5	104.9	9.4	4.5	114	44.5	132.5	56	43	96	921
1991	59	138.5	78.5	30	17	88.5	10.5	100.5	157.5	67.6	70.5	60.5	879
1992	131.5	128.5	149.4	114	38.5	108.5	41.5	156.5	157.5	79.7	107.5	88.5	1,302
1993	63	62	23.5	59.5	111.5	46	76	210.2	347	164	134	32	1,329
1994	119	109	33.5	70	69	30.5	30.5	29	72	195	84	50.5	892
1995	69.5	49.5	11.5	55.5	14	49.5	61.5	57	216.5	72.5	57.5	50.5	765
1996	56	95.5	80	50.5	62	14.5	121	123.5	186	76	47	49	961
1997	84.9	133	39	22	58	66.5	34	226.5	-	-	-	-	-
1998	-	-	-	-	-	-	-	-	-	-	-	-	-
1999	-	-	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-	-	-
2001	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	63.4	81.5	53.6	67.6	51.9	37.9	65.6	127.0	157.1	110.2	89.6	68.1	972
Maximum	131.5	146.5	149.4	117.7	112.8	108.5	149.9	308.8	347	282.4	191	125.8	1,560
Minimum	19.7	22.0	7.5	11.5	9.4	0.0	0.5	1.5	70.6	22.5	1.8	13.2	573

- no data

Table 3.1.3 Mean Monthly Rainfall (6/12)

Station Masuleh MOE Code 18105 Latitude 37-09
Longitude 48-49 (Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1992	-	-	-	-	-	-	-	-	69	59	113	89.5	-
1993	32	107	31.5	120.5	149.5	34.5	40.5	113	62.5	157	124	71.5	1,044
1994	158.5	100	71.5	137.5	38	33	33	50	61	240.5	113.5	26	1,063
1995	78	49	57.5	87.5	61.5	19	73	65.5	110.5	38.5	51.5	128	820
1996	51	138	208	83	47	22	88	49	107.5	90.5	37	44	965
1997	103	180	39	15.5	30	96.5	43	104	-	-	-		-
1998	-	-	-	-	-	-	-	-	-	-	-	-	-
1999	-	-	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-	-	-
2001	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	84.5	114.8	81.5	88.8	65.2	41.0	55.5	76.3	82.1	117.1	87.8	71.8	973
Maximum	158.5	180	208	137.5	149.5	96.5	88	113	110.5	240.5	124	128	1,063
Minimum	32.0	49.0	31.5	15.5	30.0	19.0	33.0	49.0	61.0	38.5	37.0	26.0	820

- no data

Table 3.1.3 Mean Monthly Rainfall (7/12)

Station Charparparzaman MOE Code 18108 Latitude 37-26
Longitude 48-28 (Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1992	-	-	-	-	-	-	-	-	216	525	284	46	-
1993	159	73	8	51	19	8	8	70	170	308	169	69	1,112
1994	65	36	-	47.5	6	10	8.5	204	276.5	63	251	163	-
1995	87	106	73	5	28	-	-	117.5	164	336.8	29	58	-
1996	126	148	29	3	7	156	72	277	70	328	211	196	1,623
1997	211	53	10	5	9	39	84	278	181	136	188	155.5	1,350
1998	47	69	34	126	0	50	17	-	126	344	95	210	-
1999	144.5	101	49	32.5	18.5	10	8	272	320	346.5	260.5	55.5	1,618
2000	170	37.5	49	7.5	37.5	13	7	290	189	397	84.5	69.5	1,352
2001	99.5	65	72	54	-	5	10	192.5	-	-	-	-	-
Average	123.2	76.5	40.5	36.8	15.6	36.4	26.8	212.6	190.3	309.4	174.7	113.6	1,411
Maximum	211	148	73	126	37.5	156	84	290	320	525	284	210	1,623
Minimum	47.0	36.0	8.0	3.0	0.0	5.0	7.0	70.0	70.0	63.0	29.0	46.0	1,112

- no data

Table 3.1.3 Mean Monthly Rainfall (8/12)

Station - MOE Code 18059 Latitude 36-59
Longitude 49-33 (Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1986	-	-	-	-	-	-	-	-	235	187	215	35	-
1987	39	94	52	7	17	101	102	251	395	62	44	26	1,190
1988	3	3	18	86	3	3	50	151	91	74	9	25	-
1989	11	-	20	-	-	-	6	140	148	141	179	91	-
1990	15	202	49	27	5	39	0	168	253	139	94	6	997
1991	8	138	115	102	64	109	14	127	319	92	112	49	1,249
1992	54	63	32	25	135	7	68	265	174	193	135	10	1,161
1993	68	67	28	104	55	72	74	15	64	209	118	52	926
1994	71	88	27	21	33	5	69	170	213	220	133	145	1,195
1995	138	126.5	92	49.5	46.5	0	102	228.5	-	-	-	-	-
1996	-	-	-	-	-	-	-	-	-	-	-	-	-
1997	-	-	-	-	-	-	-	-	-	-	-	-	-
1998	-	-	-	-	-	-	-	-	-	-	-	-	-
1999	-	-	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	45.2	97.7	48.1	52.7	44.8	42.0	53.9	168.4	210.2	146.3	115.4	48.8	1,120
Maximum	138	202	115	104	135	109	102	265	395	220	215	145	1,249
Minimum	3.0	3.0	18.0	7.0	3.0	0.0	0.0	15.0	64.0	62.0	9.0	6.0	926

- no data

Table 3.1.3 Mean Monthly Rainfall (9/12)

Station Ponel MOE Code 18021 Latitude 37-32
Longitude 49-05 (Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1966	-	-	-	-	-	-	-	-	292	148	16	37	-
1967	110	122	118	83	101	0	85	216	270	121	104	71	1,401
1968	157	134	96	56	186	119	39	77	42	300	55	36	1,297
1969	190.5	115	152	13	155	47	49	248	188	147	46	118	1,469
1970	109	188	68	109	77	20	178	363	260	100	240	149	1,861
1971	95.5	66.5	91	59	50	12	78.5	0	152.5	140	75	186	1,006
1972	145.5	133	39	166	59	8	95	122	135	160	275	90	1,428
1973	93	109	135	59	116	66	76	487.5	247	304	204	248	2,145
1974	211	235	178	78	78	271	35	231	79	35	179	150	1,760
1975	146	151	2	60	0	0	31	164	-	-	-	-	-
1976	-	-	-	-	-	-	-	-	-	-	-	-	-
1977	-	-	-	-	-	-	-	-	-	-	-	-	-
1978	-	-	-	-	-	-	-	-	-	-	-	-	-
1979	-	-	-	-	-	-	-	-	-	-	-	-	-
1980	-	-	-	-	-	-	-	-	-	-	-	-	-
1981	-	-	-	-	-	-	-	-	-	-	-	-	-
1982	-	-	-	-	-	-	-	-	-	-	-	-	-
1983	-	-	-	-	-	-	-	-	-	-	-	-	-
1984	-	-	-	-	-	-	-	-	251	104	395	172	-
1985	164	107	37	24	57	38.5	32.5	248.5	326	213.5	127.5	48	1,424
1986	66	47.5	14.5	38	95.5	14	0	224	187.5	272	146	28	1,133
1987	51	92.5	73	28	42	55	160	113	221	132	97	220	1,285
1988	106.5	33	95	107	59	74	155	196	109	166	62	114	1,277
1989	76	24	72	42	11	18	83	128.5	299	94.5	65	96	1,009
1990	117.5	53.5	102.5	121	0	15.5	65	83.5	269	73.5	83.5	57	1,042
1991	45.5	117	34	50	29	119	57	108.5	201.5	131	82	48	1,023
1992	36	134	151.5	214	30	149	36	104	374	121	149	96.5	1,595
1993	64	94	11	44.5	154	53.5	82	240	308	213	149.5	19	1,433
1994	93	79	38	62	95	89	51	11.5	63.5	217.5	77	52	929
1995	61.5	69.5	9	56	14.5	56.5	132.5	98	244.5	95	67	81	985
1996	106.5	108.5	94	59	58	9.5	152	175.5	285.5	128	71.5	62	1,310
1997	97.5	181.5	43	64.5	93	96.5	25	289.5	-	-	-	-	-
1998	-	-	-	-	-	-	-	-	-	-	-	-	-
1999	-	-	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	139.7	139.3	97.7	75.9	91.3	60.3	74.1	212.1	185.1	161.7	132.7	120.6	1,546
Maximum	211	235	178	166	186	271	178	487.5	292	304	275	248	2,145
Minimum	93.0	66.5	2.0	13.0	0.0	0.0	31.0	0.0	42.0	35.0	16.0	36.0	929

- no data

Table 3.1.3 Mean Monthly Rainfall (10/12)

Station Sarvan MOE Code 17089 Latitude 37-01
Longitude 49-40 (Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1984	-	-	-	-	-	-	-	-	137	80	255	73	-
1985	64	158	36	28	13	47	49	169	213	148	138	65	1,128
1986	124	98	63	53	77	58	26	128	175	181	207	20	1,210
1987	51	78	111	26	23	53	87	209	305	125	114	225	1,407
1988	97	42	112	60	56	100	232	130	152	56	27	262	1,326
1989	134	46	83	19	6	26	105	217	145	120	128	126	1,155
1990	107	187	88	90	40	33	82	123	227	70	76	98	1,221
1991	53	172	84	53	33	50	30	89	46	96	79	111	896
1992	129	141	226	118	45	90	79	163	260	84	155	106	1,596
1993	99	68	22	107	206	123	61	306	144	309	188	42	1,675
1994	77	77	40	99	75	143	101	83	201	250	100	45	1,291
1995	67	89	21	102	59	77	45	107	200	53	122	153	1,095
1996	84	212	152	49	95	43	188	129	107	130	45	64	1,298
1997	86	143	78	26	50	176	69	293	-	-	-	-	-
1998	-	-	-	-	-	-	-	-	-	-	-	-	-
1999	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	90.2	116.2	85.8	63.8	59.8	78.4	88.8	165.1	177.8	130.9	125.7	106.9	1,275
Maximum	134	212	226	118	206	176	232	306	305	309	255	262	1,675
Minimum	51.0	42.0	21.0	19.0	6.0	26.0	26.0	83.0	46.0	53.0	27.0	20.0	896

- no data

Table 3.1.3 Mean Monthly Rainfall (11/12)

Station Baragvar MOE Code 17049 Latitude 37-00
Longitude 49-38 (Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1969	-	-	-	-	-	-	-	-	106.5	131.3	14	61	-
1970	58.4	47.4	30.2	41.8	26.6	32.3	108.8	162.7	77.9	87.3	118.6	82.6	875
1971	63.9	38	71.4	37.3	31	2.2	37.7	10.1	46.1	95.8	96	214.2	744
1972	366	182.7	54.2	217.4	20.8	29.2	66.6	93.1	56	179.3	284.4	217.6	1,767
1973	26.5	82.6	76	92	90	42.3	27.3	273.2	54.9	140.1	113.1	167.6	1,186
1974	198.4	100.5	200	28	52.6	276.4	114.7	221.3	21.8	57.8	64	97.7	1,433
1975	95.4	126.1	0	105.7	99	0	82.5	125.4	215.8	153.8	216.7	83.7	1,304
1976	112.9	93	49.4	123.7	68.5	184.7	2.5	127.8	115.8	122	167	0	1,167
1977	0	16	43.6	96	52.2	150	51	0	-	-	-	-	-
1978	-	-	-	-	-	-	-	-	128	213	27	121	-
1979	85	80	65	144	53	0	52	127	60	121	87	54.8	929
1980	181	135	32	72	11	0	44	81	140	131	149	102	1,078
1981	7	82	145	110	23	100	75	123	142	75	43	185	1,110
1982	136	36	93	64	96	55	135	92	-	-	-	-	-
1983	-	-	-	-	-	-	-	-	-	-	-	-	-
1984	-	-	-	-	-	-	-	-	-	-	-	-	-
1985	-	-	-	-	-	-	-	-	-	-	-	-	-
1986	-	-	-	-	-	-	-	-	-	-	-	-	-
1987	-	-	-	-	-	-	-	-	-	-	-	-	-
1988	-	-	-	-	-	-	-	-	-	-	-	-	-
1989	-	-	-	-	-	-	-	-	-	-	-	-	-
1990	-	-	-	-	-	-	-	-	-	-	-	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	-	-	-	-	-	-	-	-	-	-	-	-	-
1996	-	-	-	-	-	-	-	-	-	-	-	-	-
1997	-	-	-	-	-	-	-	-	-	-	-	-	-
1998	-	-	-	-	-	-	-	-	-	-	-	-	-
1999	-	-	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-	-	-
2001	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	110.9	84.9	71.7	94.3	52.0	72.7	66.4	119.7	97.1	125.6	115.0	115.6	1,159
Maximum	366	182.7	200	217.4	99	276.4	135	273.2	215.8	213	284.4	217.6	1,767
Minimum	0.0	16.0	0.0	28.0	11.0	0.0	2.5	0.0	21.8	57.8	14.0	0.0	744

- no data

Table 3.1.3 Mean Monthly Rainfall (12/12)

Station Tarikroud MOE Code 17047 Latitude 36-59
Longitude 49-33 (Unit: mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1967	-	-	-	-	-	-	-	-	124.7	55.6	38.7	27.4	-
1968	57.6	69.1	131	76.8	51.5	63.4	22.9	46	44.5	222.7	60.3	12.7	859
1969	54.5	94.3	129	29.8	52.6	63.5	83.1	80.4	141.9	185.9	11.1	67.6	994
1970	55.7	57.4	57.2	54.7	56.5	4	116.2	109.8	39.1	86.4	192.2	87.8	917
1971	77.2	45.8	97	53.8	16.8	8.9	27.8	12.3	53	83.7	66.7	192.4	735
1972	219.3	82.5	29.4	105.7	18.2	13.1	50.6	57.2	25.4	97.3	177.9	155.3	1,032
1973	18	65.5	71.7	54.6	73.3	37.5	21.4	175.8	34.2	78.9	68.4	76.5	776
1974	112.9	83.6	154	34.5	21.1	163.2	98.3	150.1	24.5	58.8	45.4	79.3	1,026
1975	66.9	119	9.5	112.5	65	0	63	103.5	137	103	148.9	63	991
1976	51.2	26.4	41	99.5	42.5	96.5	28	101	111	80.5	109.5	86.5	874
1977	27	19.5	41	102.5	81	37	36	67	64.6	151	67	61.5	755
1978	44	81	20.5	51	89	76	56.5	28.5	63.5	172	55	33.5	771
1979	60	64.5	59.5	115.5	5	20	41.5	56	41	61	138.5	75.6	738
1980	180.5	132.8	20	62	14.5	4.5	58	114.5	115	115.5	101	135.2	1,054
1981	163.2	124.5	156.1	122.5	43.5	101	62	100.5	155.5	41.5	26.5	90	1,187
1982	69.5	50	59.5	65	76.5	62	123.5	44	119.1	200	171.5	24.5	1,065
1983	12	67	7	79.1	53.5	55	76.5	202.5	81	35.5	146.5	24	840
1984	46.5	71.5	52	111	29	15	106.5	77.5	159	62	171	77.5	979
1985	47.5	193.4	37.5	29	10	68.5	30.5	104	133.5	93.5	83.5	35.5	866
1986	78.5	76	84.5	36	62.5	42	18.5	134.5	79.6	131.3	162.3	21.3	927
1987	34.3	74.8	63	21.5	16	37.5	49.2	148.1	-	-	-	-	-
1988	-	-	-	-	-	-	-	-	-	-	-	-	-
1989	-	-	-	-	-	-	-	-	-	-	-	-	-
1990	-	-	-	-	-	-	-	-	-	-	-	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-	-
1992	-	-	-	-	-	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	-	-	-	-	-	-	-	-	-	-	-	-	-
1996	-	-	-	-	-	-	-	-	-	-	-	-	-
1997	-	-	-	-	-	-	-	-	-	-	-	-	-
1998	-	-	-	-	-	-	-	-	-	-	-	-	-
1999	-	-	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-	-	-
2001	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	84.9	76.1	72.6	76.8	45.0	49.2	54.7	85.9	78.3	106.3	87.1	83.0	908
Maximum	219.3	132.8	156.1	122.5	89	163.2	116.2	175.8	155.5	222.7	192.2	192.4	1,187
Minimum	18.0	19.5	9.5	29.8	5.0	0.0	21.4	12.3	24.5	41.5	11.1	12.7	735

- no data

3.2 Monthly Discharge Data

Discharge data for the following 21 discharge monitoring stations (Table 3.2.1) in the Anzali watershed are presented in this section. Their locations are shown in Figure 3.2.1 and their coordinates and availability are given in Table 3.2.2. The mean monthly discharge is shown in Table 3.2.3.

Table 3.2.1 Discharge Monitoring Stations in the Anzali Watershed

No.	River	Name	MOE Station ID.
1	Chafroud	Roudbarsara	18019
2	Bahmbar	Aghamahaleh	18095
3	Morghak	Imamzadeh Shafee	18067
4	Morghak	Kotemjan-M	18093
5	Khalkai	Taskooh	18065
6	Khalkai	Kotemjan -K	18091
7	Tanianroud	Mianbar	18921
8	Siavaroud	Siavaroud Alian	18923
9	Palangvar	Masjed Pish Alian	18920
10	Palangvar	Kalsar	18089
11	Masulehroudkhan	Kamadol	18063
12	Masulehroudkhan	Chomesghal	18087
13	Gashteroudkhan	Pirsara	18061
14	Nazaralat	Ghaleroudkhan	18059
15	Ghaleroudkhan	Ghaleroudkhan	18030
16	Shakhazar	Laksar	18083
17	Imamzadeh Ibrahim	Mobarakabad	18106
18	Pasikhan	Nokhaleh	18081
19	Goharroud	Lakan	17967
20	Siahroud	Behdan	17111
21	Siahroud	Polesazeman	17053

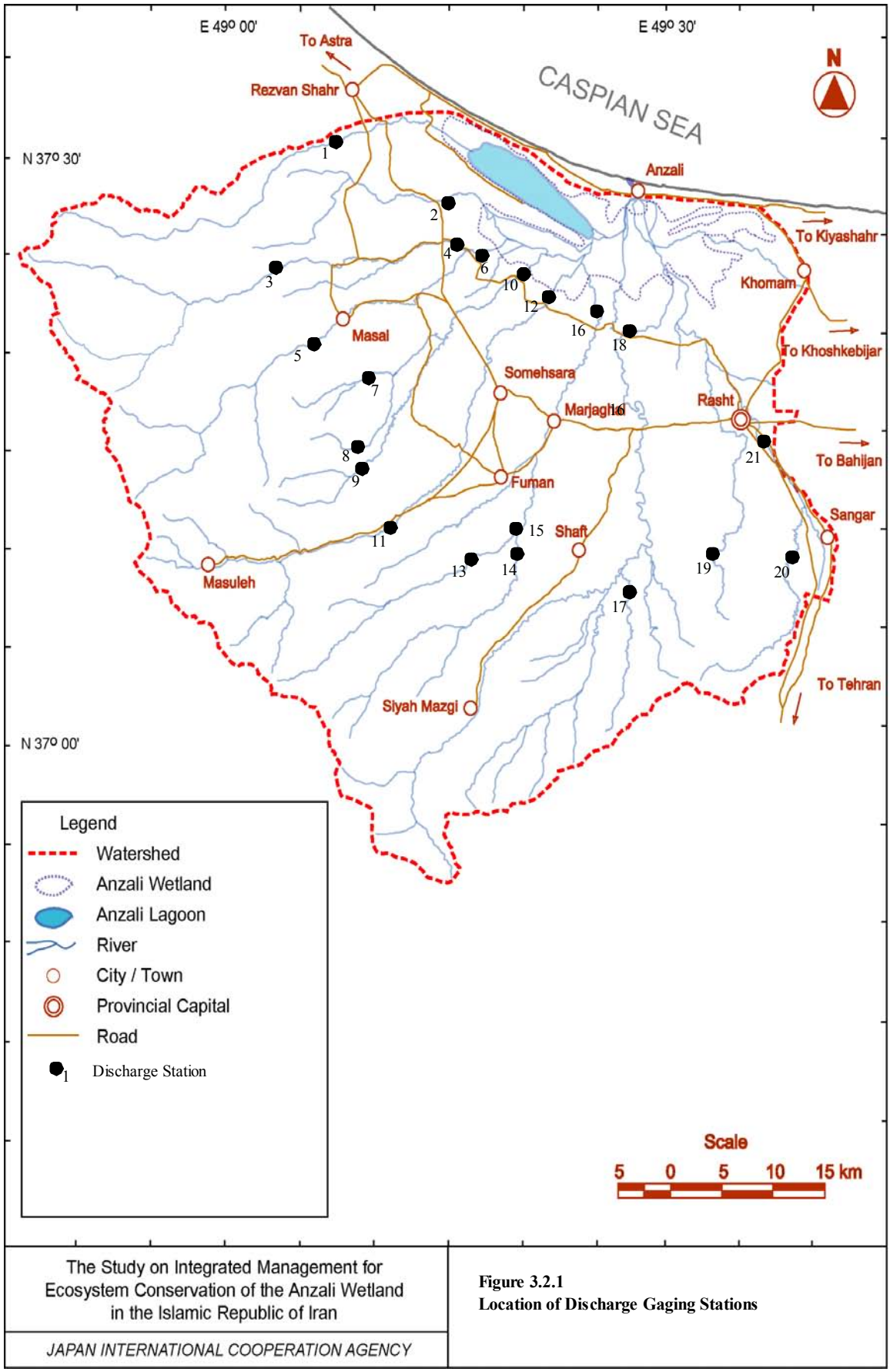

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Figure 3.2.1
Location of Discharge Gaging Stations

Table 3.2.2 Discharge Data Availability

No.	River	Station	MOE Code	Northing	Easting	Elevation (m)	Catchment Area (km^2)	Year																																		No. Years *
								49	50	51		74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	
1	Chafroud	Roudbarsara	18019	37-29-19	49-05-51	135	131.7					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■	■	■	■	■	■	■	■	■	■	■			27
2	Bahmbar	Aghamahaleh	18095	37-27-41	49-14-02	-15	150.6																	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			16
3	Morghak	Imamzadeh Shafee	18067	37-24-16	49-03-27	160	235.7															■	■		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			17
4	Morghak	Kotemjan	18093	37-27-15	49-16-24	-19	328.4																	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			16
5	Khalkai	Taskooh	18065	37-19-56	49-04-25	190	215.9													■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			20
6	Khalkai	Kotemjan	18091	37-25-12	49-16-41	-19	310.8																	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			16
7	Tanianroud	Mianbar	18921	37-19-06	49-10-07	68	39.8																													■	■	■	■			4
8	Siavaroud	Siavaroud Alian	18923	37-15-16	49-08-57	100	12.5																													■	■	■	■			4
9	Palangvar	Masjed Pish Alian	18920	37-18-57	49-09-03	54	48.3																														■	■	■			3
10	Palangvar	Kalsar	18089	37-23-48	49-19-52	-23	227																■	■			■	■	■	■	■	■	■	■	■	■	■	■	■			15
11	Masulehroudkhan	Kamadol	18063	37-10-30	49-07-45	240	223.7	■	■	■												■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			18
12	Masulehroudkhan	Chomesghal	18087	37-22-23	49-21-52	-22	406.8																	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■				15
13	Gashteroudkhan	Pirsara	18061	37-08-06	49-12-34	200	72.5															■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			18
14	Nazaralat	Ghaleroudkhan	18059	37-06-21	49-16-16	140	83.8															■	■	■	■	■	■	■	■	■	■			■	■	■	■	■	■			17
15	Ghaleroudkhan	Ghaleroudkhan	18030	37-06-25	49-16-35	140	112																													■	■	■	■			4
16	Shakhraz	Laksar	18083	37-21-12	49-25-17	-20	429.3															■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			15
17	Imamzadeh Ibrahim	Mobarakabad	18106	37-04-04	49-24-58	60	118.8	■	■	■																						■	■	■	■	■	■	■	■			7
18	Pasikhan	Nokhaleh	18081	37-20-59	49-27-09	-20	751.2																	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			15
19	Goharroud	Lakan	17967	37-10-56	49-34-04	40	29.2																					■	■	■	■	■	■	■	■	■	■	■	■			12
20	Siahroud	Behdan	17111	37-10-15	49-38-53	40	93.1																			■	■	■	■	■	■			■	■	■	■	■	■			12
21	Siahroud	Polesazeman	17053	37-15-28	49-36-46	4	147.2					■	■	■	■	■	■	■	■	■	■	■		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			27

■ each year refers to September of indicated year to August of following year

* records prior to 1974 are not included in the total

Source: MOE

Table 3.2.3 Mean Monthly Discharge (1/21)

River: Chafroud Station: Roudbarsara Gage No: 18019 Area(km2): 131.7 (Unit: m^3/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1974	-	-	-	-	-	-	-	-	-	0.78	0.40	0.83
1975	0.71	1.27	4.77	1.48	1.65	0.95	0.46	1.21	2.77	7.15	2.73	1.22
1976	1.58	1.69	5.47	3.20	1.73	0.84	0.68	0.44	2.85	1.94	1.81	2.77
1977	1.99	2.54	2.31	2.14	5.04	2.10	1.38	0.92	3.69	1.26	1.38	1.23
1978	0.98	1.86	3.01	1.35	4.47	3.51	0.88	0.42	0.48	0.67	1.62	0.29
1979	0.33	1.65	1.01	0.77	0.60	0.45	0.21	0.21	0.39	1.05	1.03	0.73
1980	1.60	1.47	2.16	1.55	1.29	0.91	0.43	0.74	1.07	2.90	2.09	2.57
1981	1.93	1.19	3.07	5.15	3.03	3.02	1.33	1.65	1.90	1.67	1.13	0.72
1982	1.38	2.71	4.56	3.31	3.89	1.46	0.99	2.32	2.94	6.80	7.84	4.52
1983	2.55	2.04	2.43	1.90	1.12	2.29	1.37	1.47	1.97	4.38	2.14	2.21
1984	1.21	2.43	4.17	1.34	1.70	0.95	0.66	2.28	0.99	3.46	3.71	3.49
1985	3.00	2.39	6.03	2.18	1.09	0.70	0.67	0.52	0.87	3.46	3.30	3.09
1986	1.41	2.10	2.63	2.48	1.25	1.24	0.65	0.44	1.32	2.00	5.18	5.80
1987	1.19	1.24	2.01	1.50	0.79	0.45	0.36	5.76	1.79	5.21	2.16	1.91
1988	3.44	4.12	2.98	2.41	2.11	1.04	0.73	1.19	2.11	3.47	2.21	1.28
1989	2.38	3.54	4.39	2.24	1.09	0.65	0.46	0.41	-	-	-	-
1990	-	-	-	-	-	-	-	-	-	1.64	1.40	1.12
1991	1.95	1.56	4.10	1.62	1.10	0.55	0.42	0.32	2.03	1.37	1.56	1.37
1992	1.32	2.27	4.39	6.19	4.08	1.14	1.66	1.16	1.41	3.14	2.63	1.99
1993	2.46	1.62	2.84	1.45	1.57	2.37	2.24	0.88	3.40	4.49	6.15	4.75
1994	2.29	2.54	5.06	2.04	2.10	2.61	1.25	1.02	1.00	0.91	6.09	1.08
1995	1.59	1.39	1.48	1.34	0.72	0.42	0.27	0.72	0.65	3.53	0.57	1.02
1996	1.22	2.63	3.58	5.14	1.08	0.98	1.19	0.57	1.13	17.81	9.32	1.04
1997	0.87	2.46	4.05	1.28	0.94	0.69	1.02	0.49	5.04	0.21	2.81	1.30
1998	2.36	2.86	4.13	2.19	1.19	0.61	0.63	0.51	1.96	3.57	1.32	2.63
1999	1.65	0.52	0.65	1.97	2.02	0.43	0.66	0.43	1.96	1.25	3.00	2.47
2000	2.56	2.32	5.12	2.28	1.75	1.61	0.86	0.57	0.71	2.24	3.75	3.39
2001	1.53	2.79	1.89	1.55	1.10	0.69	0.39	0.20	0.80	2.77	4.33	2.82
2002	2.51	1.60	7.75	4.89	3.48	1.58	1.64	2.76	-	-	-	-
Average	1.78	2.10	3.56	2.40	1.93	1.27	0.87	1.10	1.81	3.40	3.13	2.18

- no data

Table 3.2.3 Mean Monthly Discharge (2/21)

River: Bahmbar Station: Aghamahaleh Gage No: 18095 Area(km2): 150.6 (Unit: m^3/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1986	-	-	-	-	-	-	-	-	-	3.16	4.40	4.81
1987	0.92	1.30	3.02	2.29	1.13	0.33	1.28	3.62	1.30	3.84	1.24	2.57
1988	3.89	3.08	2.39	3.42	2.49	0.97	0.81	1.79	2.26	1.68	1.45	1.02
1989	2.56	3.16	2.34	1.77	1.73	0.53	0.59	0.49	0.96	2.39	2.41	1.33
1990	2.26	2.36	3.31	2.87	2.90	0.80	0.50	1.06	1.23	2.56	1.16	2.91
1991	1.27	1.08	3.42	1.78	1.78	0.36	0.75	0.33	2.40	0.83	1.41	2.04
1992	2.47	1.94	2.60	4.51	2.63	0.83	2.26	0.55	2.55	4.39	2.56	2.46
1993	1.83	1.32	1.76	2.32	4.48	3.87	2.06	0.86	1.76	5.95	5.87	1.92
1994	1.17	1.70	3.27	1.83	2.05	2.38	1.29	1.13	0.92	1.15	2.81	0.46
1995	0.76	1.06	0.58	1.03	0.48	0.66	0.51	1.06	0.50	4.00	0.42	0.86
1996	0.93	1.97	4.61	3.93	1.18	0.08	1.63	0.21	0.39	4.37	2.30	1.42
1997	1.60	3.37	4.14	1.71	0.77	2.08	0.92	0.42	3.08	0.73	4.21	0.98
1998	2.67	5.06	2.83	3.33	1.31	0.73	1.13	0.61	1.81	4.93	1.70	3.64
1999	3.28	1.41	0.75	1.00	2.14	0.09	1.12	0.43	1.77	4.05	1.65	1.38
2000	4.52	2.89	5.76	1.92	1.84	1.23	0.36	0.45	0.97	2.03	2.11	1.76
2001	1.64	0.98	1.87	1.85	0.53	0.25	0.41	0.32	0.52	3.67	1.82	0.87
2002	0.53	0.71	2.03	3.13	3.16	0.67	0.38	0.79	-	-	-	-
Average	2.02	2.09	2.79	2.42	1.91	0.99	1.00	0.88	1.49	3.11	2.34	1.90

- no data

Table 3.2.3 Mean Monthly Discharge (3/21)

River: Morghak Station: Imamzadeh Shafee Gage No: 18067 Area(km2): 235.7 (Unit: m^3/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1984	-	-	-	-	-	-	-	-	-	4.94	9.52	7.42
1985	6.17	6.21	14.07	10.32	4.57	2.85	2.05	1.68	1.67	6.41	5.46	5.56
1986	3.47	3.49	4.81	7.84	4.76	3.48	2.29	1.51	-	-	-	-
1987	-	-	-	-	-	-	-	-	-	10.42	5.80	5.11
1988	5.07	6.31	8.10	7.39	5.26	2.97	2.09	4.15	5.47	6.28	6.48	3.85
1989	4.09	6.41	11.08	8.55	5.13	2.65	1.60	1.37	1.97	5.29	2.75	2.96
1990	3.27	4.75	8.53	10.01	8.06	4.21	2.89	3.20	2.76	4.88	3.30	3.33
1991	3.02	2.87	6.47	5.32	3.91	2.12	1.63	1.02	2.91	3.58	3.01	3.40
1992	2.85	3.93	7.16	13.62	10.72	4.98	4.62	3.31	3.55	7.76	5.39	5.67
1993	4.76	3.84	5.32	5.47	5.03	5.74	4.16	2.98	7.28	8.93	10.96	10.90
1994	7.73	6.02	8.20	6.16	5.25	6.00	4.19	2.42	3.17	3.33	10.32	4.64
1995	2.83	2.91	3.42	3.42	2.68	2.37	1.74	2.44	1.54	3.62	2.47	1.97
1996	2.27	4.91	5.25	9.29	5.65	2.72	3.73	3.03	2.86	7.79	4.57	2.71
1997	2.14	3.78	5.86	4.95	2.64	1.85	2.76	2.33	11.42	3.06	5.18	3.87
1998	3.67	5.79	8.71	7.55	4.63	2.27	2.04	1.69	4.28	6.74	3.95	4.91
1999	4.14	2.73	2.72	4.67	4.44	1.65	1.30	1.07	4.27	2.86	6.57	5.02
2000	5.15	4.97	9.16	8.68	6.34	5.21	3.05	2.89	1.91	6.61	10.77	6.24
2001	3.27	4.67	4.92	5.19	2.76	1.69	1.22	0.82	1.51	6.27	4.44	5.13
2002	2.61	2.27	4.21	8.01	10.35	4.16	3.11	1.09	-	-	-	-
Average	3.91	4.46	6.94	7.44	5.42	3.35	2.62	2.18	3.77	5.81	5.94	4.86

- no data

Table 3.2.3 Mean Monthly Discharge (4/21)

River: Morghak Station: Kotemjan Gage No: 18093 Area(km2): 328.4 (Unit: m^3/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1986	-	-	-	-	-	-	-	-	-	3.12	8.35	10.24
1987	3.18	2.62	1.80	1.58	0.68	0.15	0.51	7.74	3.92	13.07	6.39	3.20
1988	4.43	5.22	4.91	4.52	3.84	0.71	0.76	2.63	4.12	6.41	6.32	3.20
1989	4.76	5.62	9.20	5.40	1.74	3.71	0.31	0.65	1.77	5.13	2.23	1.59
1990	3.32	4.83	7.08	8.14	5.05	0.55	1.67	1.97	1.28	5.53	2.64	2.83
1991	2.58	2.32	8.08	3.20	1.93	0.04	0.77	0.76	3.64	3.67	3.02	3.67
1992	3.42	3.70	7.38	13.78	10.35	2.19	2.75	0.73	4.14	7.89	5.43	6.21
1993	3.53	3.40	4.28	2.30	3.19	5.42	3.71	2.40	7.73	14.30	12.88	10.40
1994	6.60	4.88	5.96	3.78	3.03	4.62	1.85	1.71	0.71	1.64	15.21	5.03
1995	2.90	2.91	0.89	2.30	1.70	0.19	0.02	1.65	1.07	9.37	1.58	1.28
1996	1.62	2.90	4.56	9.96	0.94	0.98	2.14	1.95	2.11	7.87	2.94	1.99
1997	1.56	2.60	2.76	0.55	1.28	3.71	0.74	0.51	11.85	2.48	7.70	3.39
1998	4.76	5.37	5.64	5.27	0.97	0.98	0.16	1.14	5.54	8.67	3.01	3.68
1999	0.98	0.83	0.01	0.49	1.48	0.01	0.42	0.51	2.16	2.06	4.41	2.43
2000	0.45	0.30	5.49	0.56	3.92	0.26	0.03	0.02	0.59	3.72	8.04	3.54
2001	1.10	3.09	0.79	0.80	0.81	0.69	0.41	0.27	0.14	11.21	6.67	4.89
2002	2.74	6.22	8.43	2.80	5.16	0.93	0.18	0.85	0.66	-	-	-
Average	3.00	3.55	4.83	4.09	2.88	1.57	1.03	1.59	3.21	6.63	6.05	4.22

- no data

Table 3.2.3 Mean Monthly Discharge (5/21)

River: Khalkai Station: Taskooh Gage No: 18065 Area(km2): 215.9 (Unit: m^3/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1982	-	-	-	-	-	-	-	-	-	9.65	11.81	6.87
1983	2.94	3.07	4.15	6.00	4.42	5.20	2.26	3.36	6.18	8.25	5.25	4.48
1984	2.91	4.53	9.44	4.53	5.10	2.35	1.28	5.08	4.69	7.77	7.45	7.60
1985	7.40	4.90	13.63	6.74	2.97	1.83	1.29	0.95	3.08	7.87	6.90	6.56
1986	3.53	4.72	6.29	8.30	4.47	4.04	2.05	1.15	1.36	3.57	8.70	9.64
1987	3.68	3.71	4.72	4.93	2.15	1.15	0.92	6.55	6.00	14.32	6.66	4.92
1988	5.64	7.35	6.94	5.60	5.31	2.12	1.32	4.72	6.05	7.57	6.35	3.09
1989	4.14	5.13	11.31	9.02	3.58	1.46	0.98	1.64	2.93	4.83	4.10	2.56
1990	3.52	5.90	10.33	10.80	7.19	2.87	3.23	3.98	3.26	6.20	3.73	2.82
1991	3.27	3.92	8.82	6.64	3.83	1.96	1.63	1.84	4.24	3.67	3.42	2.40
1992	2.70	3.75	7.92	14.92	11.02	3.17	4.13	2.88	4.67	5.97	5.84	5.50
1993	3.90	3.82	7.26	4.49	4.27	4.99	5.29	2.17	8.49	12.16	9.47	8.96
1994	6.28	3.83	6.53	6.35	4.72	6.21	2.38	1.94	3.12	3.11	16.64	4.38
1995	3.45	3.52	3.53	3.55	2.07	1.88	1.00	1.56	2.11	7.00	2.06	1.31
1996	2.06	4.99	7.79	11.90	4.36	1.96	4.24	6.01	3.50	8.25	5.44	2.87
1997	2.14	4.14	7.19	4.58	1.87	1.40	2.45	2.07	13.21	3.25	5.67	3.97
1998	4.88	6.16	10.05	7.25	3.35	1.50	1.77	1.62	9.01	8.92	4.44	4.59
1999	3.73	2.50	2.36	3.77	4.76	1.47	2.20	0.88	6.03	3.37	5.46	3.51
2000	3.14	2.96	7.64	5.11	2.10	1.24	0.81	0.81	3.59	7.30	9.35	5.67
2001	3.16	7.26	5.87	4.34	2.41	1.03	0.72	0.86	2.53	13.83	7.93	4.15
2002	2.10	1.97	3.78	5.73	7.36	2.05	0.78	2.39	2.37	-	-	-
Average	3.73	4.41	7.28	6.73	4.37	2.49	2.04	2.62	4.82	7.34	6.83	4.79

- no data

Table 3.2.3 Mean Monthly Discharge (6/21)

River: Khalkai Station: Kotemjan Gage No: 18091 Area(km2): 310.8 (Unit: m^3/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1986	-	-	-	-	-	-	-	-	-	4.72	11.88	12.34
1987	3.37	2.97	4.38	3.91	1.74	0.86	0.95	9.18	6.57	16.98	7.41	5.40
1988	7.31	7.42	5.86	6.33	5.16	1.34	1.19	4.70	5.71	7.88	6.28	2.01
1989	4.97	5.85	10.29	6.92	2.98	1.22	0.85	0.69	2.88	4.72	4.05	2.03
1990	3.67	5.73	8.16	9.70	6.90	0.87	1.34	2.84	2.05	7.09	2.23	3.26
1991	3.09	2.58	8.81	4.17	2.95	0.56	0.63	0.41	5.05	4.31	4.36	4.78
1992	4.74	5.58	7.34	15.88	11.81	1.97	4.31	1.56	5.92	7.59	6.59	6.60
1993	4.86	2.51	4.79	3.06	4.12	6.28	6.70	2.06	9.27	15.38	17.03	11.78
1994	6.73	3.70	8.18	5.68	6.28	11.14	6.27	4.86	4.81	4.51	14.95	4.74
1995	3.09	3.57	2.78	5.44	1.26	0.60	1.07	1.56	1.98	10.30	1.49	2.10
1996	2.60	4.35	6.73	11.30	3.22	4.59	6.15	3.43	3.57	7.99	4.80	2.31
1997	1.74	2.98	4.93	4.51	5.55	2.08	1.54	0.89	11.28	3.73	8.09	5.04
1998	5.69	6.91	7.59	6.01	1.95	1.00	0.81	1.04	7.63	9.34	4.51	4.76
1999	3.28	1.58	0.51	3.20	2.45	0.01	0.68	0.67	3.30	2.16	4.89	2.86
2000	1.75	1.47	5.73	2.41	2.99	2.11	0.10	0.04	1.50	7.80	10.68	5.08
2001	2.38	5.17	1.77	0.85	2.42	1.37	0.16	0.02	0.32	11.21	9.23	5.33
2002	1.75	0.93	4.88	6.04	5.65	1.04	0.46	1.57	-	-	-	-
Average	3.81	3.96	5.80	5.96	4.21	2.31	2.08	2.22	4.79	7.86	7.40	5.03

- no data

Table 3.2.3 Mean Monthly Discharge (7/21)

River: Tanianroud Station: Mianbar Gage No: 18921 Area(km2): 39.8 (Unit: m^3/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1998	-	-	-	-	-	-	-	-	-	-	-	-
1999	0.78	0.25	0.46	0.85	1.17	0.01	0.39	0.35	1.76	0.91	1.00	0.53
2000	0.86	0.86	1.61	0.18	0.15	0.09	0.04	0.07	0.82	1.81	1.53	0.83
2001	0.65	0.93	0.67	0.70	0.23	0.08	0.06	0.03	0.20	1.96	1.29	0.73
2002	0.28	0.36	0.69	1.46	1.33	0.13	0.06	0.61	-	-	-	-
Average	0.64	0.60	0.86	0.80	0.72	0.08	0.14	0.27	0.93	1.56	1.27	0.70

- no data

Table 3.2.3 Mean Monthly Discharge (8/21)

River: Siavaroud Station: Siavaroud Alian Gage No: 18923 Area(km2): 12.5 (Unit: m^3/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1998	-	-	-	-	-	-	-	-	-	-	-	-
1999	0.35	0.13	0.21	0.52	0.66	0.13	0.21	0.06	1.37	0.39	0.34	0.28
2000	0.49	0.51	0.72	0.22	0.16	0.12	0.07	0.07	0.31	0.70	0.67	0.44
2001	0.13	0.36	0.19	0.18	0.10	0.14	0.08	0.10	0.11	0.93	0.70	0.49
2002	0.38	0.43	0.66	0.95	0.99	0.31	0.13	0.31	-	-	-	-
Average	0.34	0.36	0.45	0.47	0.48	0.18	0.12	0.13	0.59	0.67	0.57	0.41

- no data

Table 3.2.3 Mean Monthly Discharge (9/21)

River: Palangvar Station: Masjed Pish Alian Gage No: 18920 Area(km2): 48.3 (Unit: m^3/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1999	-	-	-	-	-	-	-	-	-	-	-	-
2000	1.01	1.26	2.20	0.82	0.43	0.39	0.21	0.17	-	-	-	-
2001	-	-	1.17	1.04	0.39	0.29	0.14	0.17	0.74	2.99	1.79	1.31
2002	0.86	0.98	1.51	2.02	1.98	0.94	0.59	0.95	-	-	-	-
Average	0.94	1.12	1.63	1.29	0.93	0.54	0.32	0.43	0.74	2.99	1.79	1.31

- no data

Table 3.2.3 Mean Monthly Discharge (10/21)

River: Palangvar Station: Kalsar Gage No: 18089 Area(km2): 227.0 (Unit: m^3/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1985	-	-	-	-	-	-	-	-	-	17.65	14.27	11.38
1986	7.84	7.43	9.47	6.71	7.12	6.16	2.84	2.35	3.98	9.43	17.64	19.20
1987	2.44	4.17	6.91	7.86	4.09	2.30	2.50	17.54	-	-	-	-
1988	-	-	-	-	-	-	-	-	-	-	-	-
1989	-	-	-	-	-	-	-	-	-	8.53	7.32	5.33
1990	11.06	10.49	8.92	10.00	10.80	2.22	3.68	4.18	2.62	11.72	3.02	6.87
1991	4.48	5.07	13.90	4.29	7.51	1.48	2.50	1.12	9.30	4.35	6.99	8.04
1992	10.28	10.43	11.41	19.09	11.62	3.67	11.16	4.80	9.92	13.72	9.81	7.51
1993	5.02	4.69	5.22	4.86	7.43	9.97	11.31	6.20	12.77	25.80	18.15	8.29
1994	4.34	4.87	6.66	4.95	5.27	9.28	2.71	2.54	1.97	4.48	14.03	5.13
1995	3.58	5.88	3.91	5.80	4.69	5.76	2.26	3.47	4.22	13.42	3.52	3.00
1996	5.14	7.57	13.76	9.31	5.44	3.86	5.46	5.93	5.53	11.78	8.05	6.67
1997	7.28	13.23	13.85	4.89	2.59	5.18	5.98	2.24	18.60	3.89	12.55	6.06
1998	9.39	10.84	7.02	6.52	3.72	1.77	3.27	2.07	10.29	15.83	5.82	6.59
1999	6.21	1.76	3.69	8.45	8.97	0.18	4.23	1.08	6.97	3.95	6.01	4.55
2000	6.85	7.00	11.02	3.71	3.69	2.76	0.28	0.53	3.47	8.66	14.27	7.70
2001	4.37	4.63	3.69	4.04	2.64	0.79	0.23	0.37	2.37	22.09	12.48	9.77
2002	5.30	2.87	11.32	15.63	17.34	3.44	3.63	4.53	-	-	-	-
Average	6.24	6.73	8.72	7.74	6.86	3.92	4.14	3.93	7.08	11.69	10.26	7.74

- no data

Table 3.2.3 Mean Monthly Discharge (11/21)

River: Masulehroudkhan Station: Kamadol Gage No: 18063 Area(km2): 223.7 (Unit: m^3/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1949	-	-	-	-	-	-	-	-	-	-	2.90	3.04
1950	2.81	4.50	5.37	4.91	2.94	2.32	1.80	4.25	2.20	1.66	1.76	1.95
1951	1.79	3.17	8.21	4.32	3.34	1.34	0.83	0.80	2.77	7.72	3.46	2.35
1952	1.81	3.62	4.89	7.65	6.15	3.78	4.96	1.81	-	-	-	-
1984	-	-	-	-	-	-	-	-	-	5.69	7.09	5.85
1985	6.96	5.20	9.17	8.46	3.03	1.30	1.63	0.90	1.76	6.33	6.11	5.66
1986	2.64	5.88	6.20	11.25	4.66	3.54	1.06	0.71	1.31	2.83	6.87	7.44
1987	2.63	2.84	4.17	5.22	1.96	0.76	0.58	4.24	4.07	13.68	5.59	4.33
1988	4.64	6.62	11.95	10.58	4.83	1.41	0.98	4.47	4.56	6.51	3.71	1.42
1989	3.08	5.03	11.05	9.91	3.69	1.19	0.71	0.94	2.42	5.28	3.47	2.25
1990	2.24	4.63	9.01	13.23	8.08	1.78	2.19	3.90	2.83	5.09	2.10	1.28
1991	2.67	3.90	9.13	7.02	3.08	1.52	1.10	0.87	4.53	3.05	2.51	2.24
1992	2.70	4.47	8.17	13.53	12.35	3.79	3.32	3.58	3.12	5.59	4.51	4.41
1993	3.29	3.07	6.90	6.98	6.11	4.62	3.50	2.23	5.81	7.14	12.42	9.34
1994	5.73	4.55	9.40	6.69	4.90	5.38	2.42	2.09	3.83	2.70	16.24	3.20
1995	2.02	2.78	3.54	4.63	2.64	2.11	0.84	1.63	2.51	8.13	1.40	1.30
1996	2.65	6.36	10.75	16.80	5.63	2.32	3.31	1.74	1.49	5.94	4.49	2.12
1997	1.34	3.59	7.26	6.73	2.84	1.59	5.74	2.31	12.44	2.46	5.61	3.88
1998	2.92	6.80	13.87	10.77	4.31	2.02	2.20	1.66	7.45	7.47	2.68	3.33
1999	2.82	2.73	2.99	5.32	4.36	1.51	1.44	1.01	3.54	3.09	4.98	4.02
2000	4.03	5.67	11.05	5.97	1.91	0.97	0.52	0.14	-	-	-	-
2001	2.03	4.25	5.17	3.95	1.95	1.17	0.89	0.95	1.91	2.72	2.25	1.44
2002	0.81	1.25	2.09	4.25	4.39	0.71	0.43	1.70	-	-	-	-
Average	3.07	4.42	7.88	8.40	4.49	2.09	1.83	1.95	3.97	5.51	5.41	3.74

* 'Average' not inclusive of 1949, 50, 51, 52 data.
- no data

Table 3.2.3 Mean Monthly Discharge (12/21)

River: Masulehroudkhan Station: Chomesghal Gage No: 18087 Area(km2): 406.8 (Unit: m^3/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1986	-	-	-	-	-	-	-	-	-	4.74	11.00	12.44
1987	3.26	3.41	4.38	6.25	2.70	1.08	1.15	10.58	6.81	19.41	6.24	5.24
1988	8.14	8.57	7.79	9.43	6.01	1.68	2.02	5.42	5.76	8.62	5.57	2.62
1989	6.80	8.66	15.03	7.82	3.19	0.72	1.07	1.15	3.66	3.63	4.53	3.02
1990	4.65	6.75	12.89	15.50	8.38	0.86	1.70	3.51	1.75	10.82	2.19	4.04
1991	3.75	4.54	15.75	6.88	3.29	1.03	1.96	1.66	6.19	4.18	5.94	6.17
1992	4.99	6.34	10.77	21.36	15.13	2.53	5.98	6.43	5.32	11.47	8.34	7.37
1993	5.04	3.81	7.35	5.11	5.74	6.33	8.12	6.34	11.64	16.44	22.53	14.75
1994	8.66	6.15	13.01	5.90	5.62	10.14	1.98	2.85	2.58	3.50	19.78	4.46
1995	2.03	3.33	1.86	4.36	1.78	1.38	0.53	2.48	1.71	9.17	1.48	1.76
1996	2.90	5.82	9.04	25.59	5.14	2.05	4.61	4.10	3.03	9.82	10.70	1.66
1997	1.13	2.33	7.26	3.67	1.90	2.41	3.91	2.08	22.35	2.95	10.00	4.72
1998	5.46	8.86	11.52	8.74	3.18	1.11	2.47	1.46	12.21	19.81	3.66	5.27
1999	5.58	2.16	2.72	4.34	5.45	0.00	1.79	0.12	10.85	3.83	5.50	3.69
2000	1.32	1.07	5.60	2.19	1.81	0.48	0.64	0.74	2.61	12.59	14.44	6.76
2001	4.17	3.97	2.97	2.17	2.08	0.16	0.14	0.22	-	-	-	-
2002	-	-	-	-	-	-	-	-	-	-	-	-
Average	4.52	5.05	8.53	8.62	4.76	2.13	2.54	3.28	6.89	9.40	8.79	5.60

- no data

Table 3.2.3 Mean Monthly Discharge (13/21)

River: Gashteroudkhan Station: Pirsara Gage No: 18061 Area(km2): 72.5 (Unit: m^3/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1984	-	-	-	-	-	-	-	-	-	5.70	3.99	3.35
1985	3.58	2.06	5.07	2.26	0.91	0.43	0.79	0.37	3.22	5.79	3.04	2.68
1986	1.50	2.50	3.11	3.54	1.42	2.12	0.60	0.29	0.95	2.11	4.69	4.41
1987	1.14	1.55	2.31	2.95	0.61	0.30	0.47	3.50	3.88	6.26	2.41	1.97
1988	2.68	2.90	3.79	2.62	1.70	0.44	0.39	2.68	2.76	2.77	1.85	0.78
1989	2.06	2.98	4.86	2.56	0.96	0.40	0.32	0.37	2.08	3.75	3.02	1.49
1990	1.87	2.43	4.84	4.87	2.75	0.62	0.89	2.09	1.53	5.13	1.01	1.07
1991	2.40	2.65	6.41	2.47	1.06	0.51	0.60	0.43	2.80	1.67	2.34	2.21
1992	1.75	2.28	3.58	5.95	3.46	0.79	1.68	1.57	2.13	4.46	2.40	2.07
1993	1.58	1.57	3.36	1.80	1.64	1.87	4.23	1.49	5.87	4.16	6.50	4.42
1994	1.81	2.37	3.30	1.77	1.21	3.87	0.68	0.50	2.13	1.54	6.48	1.59
1995	1.02	1.34	1.43	1.78	0.72	0.78	0.40	0.74	1.27	5.24	0.50	0.60
1996	1.11	3.04	6.02	7.73	1.58	1.11	5.63	4.90	10.67	4.85	2.90	1.31
1997	1.11	1.98	3.15	1.82	0.68	0.76	1.83	1.18	11.13	2.00	2.63	1.89
1998	2.48	4.22	5.09	2.28	1.26	0.69	1.60	0.85	8.69	1.93	2.08	1.80
1999	2.48	3.70	3.37	2.28	1.26	0.70	0.99	0.85	4.21	1.56	2.95	2.35
2000	2.73	3.65	5.70	2.02	0.91	0.89	0.69	0.45	3.32	6.53	5.74	2.71
2001	0.86	2.75	3.11	1.88	1.10	0.46	0.33	0.60	2.47	5.36	2.25	1.98
2002	0.42	0.68	2.06	5.05	3.37	3.50	6.29	8.96	-	-	-	-
Average	1.81	2.48	3.92	3.09	1.48	1.12	1.58	1.77	4.07	3.94	3.15	2.15

- no data

Table 3.2.3 Mean Monthly Discharge (14/21)

River: Nazaralat Station: Ghaleroudkhan Gage No: 18059 Area(km2): 83.8 (Unit: m^3/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1984	-	-	-	-	-	-	-	-	-	5.32	3.81	2.69
1985	1.45	2.70	3.07	4.41	1.16	1.90	0.50	0.24	0.37	3.74	3.53	2.99
1986	2.83	2.06	5.09	2.24	0.62	0.21	0.60	0.36	2.97	2.83	5.21	4.36
1987	1.28	1.41	2.20	2.25	0.49	0.12	0.26	4.27	4.25	9.12	3.57	2.03
1988	2.89	3.04	3.29	2.95	1.51	0.20	0.44	3.87	2.55	2.41	1.66	1.13
1989	2.06	2.77	4.52	4.08	1.04	0.20	0.13	0.59	2.44	4.02	2.90	1.39
1990	1.83	2.52	5.34	5.89	2.58	0.47	0.94	2.24	1.59	4.27	1.17	1.16
1991	1.80	2.85	5.84	3.01	1.36	0.30	0.87	0.39	4.04	1.95	2.95	2.26
1992	1.39	3.11	3.79	8.37	3.67	0.66	2.40	1.59	2.81	5.93	3.67	3.17
1993	1.90	1.59	3.51	2.08	2.41	2.91	3.30	1.22	-	-	-	-
1994	-	-	-	-	-	-	-	-	-	1.70	7.77	1.56
1995	1.05	1.40	1.47	2.13	0.50	0.79	0.11	0.48	1.37	5.45	0.61	0.60
1996	1.32	3.03	4.28	7.06	1.46	0.63	6.08	2.58	3.53	8.03	5.42	2.83
1997	1.16	2.39	4.11	2.41	0.35	0.36	2.22	1.02	10.41	1.06	3.09	1.72
1998	2.05	3.90	5.28	3.59	1.37	0.44	1.65	0.66	6.00	8.51	1.73	2.43
1999	2.38	1.32	1.70	2.49	2.14	0.13	1.71	0.35	5.65	2.01	3.07	2.12
2000	1.81	2.48	5.31	1.76	0.80	0.48	0.14	0.72	3.18	5.62	5.96	2.43
2001	0.90	2.75	3.00	1.40	0.67	0.16	0.26	0.51	1.90	5.09	2.69	1.75
2002	0.77	1.10	2.37	3.85	3.47	0.34	0.25	2.33	-	-	-	-
Average	1.70	2.38	3.77	3.53	1.51	0.61	1.29	1.38	3.54	4.53	3.46	2.15

- no data

Table 3.2.3 Mean Monthly Discharge (15/21)

River: Ghaleroudkhan Station: Ghaleroudkhan Gage No: 18030 Area(km2): 112.0 (Unit: m^3/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1996	-	-	-	-	-	-	-	-	-	5.39	5.05	1.89
1997	2.35	3.92	6.22	1.93	0.35	0.76	3.12	0.64	7.82	2.97	5.40	2.76
1998	5.89	7.71	4.79	1.78	0.89	0.44	0.82	0.53	2.34	3.01	1.49	1.70
1999	1.01	0.98	1.05	1.41	2.72	0.84	0.79	0.60	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-	-
2001	-	-	-	-	-	-	-	-	-	-	3.30	3.42
2002	1.25	1.90	3.19	5.68	4.46	1.20	0.79	1.80	-	-	-	-
Average	2.62	3.63	3.81	2.70	2.11	0.81	1.38	0.89	5.08	3.79	3.81	2.44

- no data

Table 3.2.3 Mean Monthly Discharge (16/21)

River: Shakhazar Station: Laksar Gage No: 18083 Area(km2): 429.3 (Unit: m^3/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1984	-	-	-	-	-	-	-	-	-	-	3.19	7.77
1985	3.37	2.21	4.14	4.70	6.74	5.63	5.33	3.09	-	-	-	-
1986	-	-	15.28	12.22	6.13	10.44	2.45	2.90	8.87	14.73	23.75	24.16
1987	3.36	6.17	9.45	12.62	4.60	1.56	2.37	21.60	16.41	33.67	11.16	10.18
1988	17.78	16.22	12.53	11.56	8.22	3.13	3.99	13.13	11.14	15.04	9.95	4.56
1989	16.03	18.28	22.15	11.41	4.11	0.77	0.87	5.44	10.47	10.05	12.86	8.60
1990	13.40	16.40	19.97	21.27	13.45	1.77	3.21	5.73	4.26	22.79	4.38	9.96
1991	8.84	9.83	21.51	8.14	6.17	2.01	3.99	2.07	12.00	5.45	10.98	9.81
1992	11.49	15.69	18.32	30.50	16.94	4.81	11.33	8.30	12.56	24.59	14.95	12.42
1993	9.59	8.65	12.67	8.09	9.11	16.40	17.52	8.46	24.93	27.60	31.96	16.05
1994	7.88	10.74	14.72	7.82	9.23	18.38	5.44	4.52	4.37	10.05	26.16	7.04
1995	5.09	7.80	5.75	9.27	3.22	3.69	0.66	2.65	5.81	21.91	1.13	3.20
1996	9.91	13.56	19.89	20.53	6.58	4.97	10.42	6.89	-	-	-	-
1997	-	-	-	-	-	-	-	-	-	4.47	15.77	8.50
1998	14.02	16.86	13.65	10.47	4.77	1.91	4.94	2.76	22.93	22.09	7.55	9.93
1999	7.95	3.48	4.00	7.36	8.84	0.15	4.77	3.03	16.93	7.03	12.51	8.48
2000	11.65	13.76	17.70	3.29	6.14	3.85	0.24	1.23	11.03	22.65	22.99	9.92
2001	7.71	11.38	10.60	6.16	7.91	6.83	9.08	11.38	-	-	-	-
2002	-	-	-	-	-	-	-	-	-	-	-	-
Average	9.87	11.40	13.90	11.59	7.63	5.39	5.41	6.45	12.44	17.29	13.95	10.04

- no data

Table 3.2.3 Mean Monthly Discharge (17/21)

River: Imamzadeh Ibrahim Station: Mobarakabad Gage No: 18106 Area(km2): 118.8 (Unit: m^3/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1949	-	-	-	-	-	-	-	-	-	-	-	3.55
1950	2.35	4.82	4.34	2.81	1.37	2.94	1.72	5.27	3.61	2.77	4.02	3.54
1951	2.27	4.41	5.03	2.27	1.43	2.78	1.49	1.49	5.91	6.50	4.41	2.96
1952	2.14	4.19	6.25	5.51	4.49	3.44	3.31	0.92	-	-	-	-
1994	-	-	-	-	-	-	-	-	-	4.77	9.02	2.96
1995	2.11	4.96	3.37	3.03	0.63	0.88	0.32	1.05	2.43	9.63	0.86	1.96
1996	4.79	6.18	9.90	7.22	1.48	1.60	6.25	2.12	3.32	8.01	3.70	2.16
1997	2.68	4.84	5.25	2.30	0.55	0.66	4.14	2.44	16.94	2.51	5.51	3.08
1998	5.17	6.02	5.88	3.05	1.80	0.95	2.06	1.52	-	-	-	-
1999	-	-	-	-	-	-	-	-	-	4.13	6.30	4.68
2000	6.46	6.53	9.18	1.98	1.78	1.36	0.57	0.53	4.90	12.13	14.80	6.73
2001	4.13	9.24	5.02	3.09	3.17	0.49	0.43	1.15	2.59	7.13	5.73	4.83
2002	2.05	1.70	4.69	6.09	4.29	0.89	0.64	4.28	-	-	-	-
Average	3.91	5.64	6.19	3.82	1.96	0.98	2.06	1.87	6.03	6.90	6.56	3.77

* 'Average' not inclusive of 1949, 50, 51, 52 data.
- no data

Table 3.2.3 Mean Monthly Discharge (18/21)

River: Pasikhan Station: Nokhaleh Gage No: 18081 Area(km2): 751.2 (Unit: m^3/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1985	-	-	-	-	-	-	-	-	-	-	-	-
1986	-	19.93	25.26	18.29	13.39	19.08	7.56	8.82	17.87	38.00	42.68	51.70
1987	6.73	11.54	20.39	20.95	7.58	2.97	6.73	28.24	36.65	68.46	24.21	19.40
1988	39.77	27.94	16.87	19.57	15.00	7.16	8.48	24.07	25.77	26.59	18.73	8.96
1989	43.01	47.69	36.41	14.85	9.13	2.21	3.36	4.81	21.08	34.04	32.19	22.43
1990	31.04	31.58	40.04	35.95	25.99	4.84	8.71	14.02	18.71	51.31	11.73	25.62
1991	20.00	21.15	40.40	15.50	11.07	3.17	7.27	5.55	12.64	8.95	26.37	22.05
1992	26.61	28.96	36.10	56.26	33.23	8.79	22.94	17.77	24.97	47.50	29.50	28.37
1993	25.12	27.11	24.76	18.40	20.19	29.33	28.36	18.40	53.84	58.71	91.96	33.65
1994	19.14	27.60	29.95	15.64	19.64	57.21	12.67	9.48	9.52	31.06	48.75	13.94
1995	10.10	16.22	10.15	17.44	6.97	9.03	3.25	9.18	15.98	59.44	8.85	16.42
1996	32.36	25.58	44.60	32.12	11.96	11.62	15.70	12.99	15.17	38.80	26.83	11.18
1997	15.85	25.58	33.07	13.39	7.56	9.61	21.55	8.46	86.23	12.36	40.05	20.89
1998	38.24	51.52	22.45	19.91	10.21	4.46	11.16	6.05	58.69	52.35	20.86	27.45
1999	24.65	5.54	8.24	13.69	18.57	0.15	8.55	0.83	42.22	18.47	27.84	19.08
2000	26.92	28.54	33.25	5.64	8.08	3.98	0.36	1.55	19.58	61.59	81.76	26.66
2001	25.81	28.69	12.49	5.20	9.56	1.22	1.16	1.77	-	-	-	-
2002	-	-	-	-	-	-	-	-	-	-	-	-
Average	25.69	26.57	27.15	20.18	14.26	10.93	10.49	10.75	30.59	40.51	35.49	23.19

- no data

Table 3.2.3 Mean Monthly Discharge (19/21)

River: Goharroud Station: Lakan Gage No: 17967 Area(km2): 29.2 (Unit: m^3/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1990	-	-	-	-	-	-	-	-	-	2.14	0.66	1.44
1991	0.98	1.13	1.82	0.24	0.12	0.06	0.06	0.04	0.10	0.07	0.70	1.12
1992	1.51	1.58	1.25	1.75	0.72	0.07	0.47	0.11	0.85	1.98	0.78	0.74
1993	0.92	1.01	0.68	0.11	0.22	1.70	0.30	0.36	2.37	3.25	4.31	0.80
1994	0.73	1.37	0.98	0.34	0.43	1.73	0.13	0.22	0.09	1.43	2.16	0.74
1995	0.66	1.15	0.66	0.70	0.06	0.04	0.04	0.04	0.46	1.08	0.08	0.69
1996	1.45	1.79	2.63	0.89	0.11	0.12	0.04	0.03	0.26	0.67	0.80	0.18
1997	0.71	1.31	1.58	0.16	0.11	0.07	0.67	0.10	3.88	0.29	1.20	1.20
1998	2.00	2.02	0.51	0.30	0.26	0.09	0.04	0.50	3.66	4.18	1.21	1.33
1999	1.66	0.26	0.69	0.63	0.43	0.03	0.04	0.07	1.57	1.52	4.88	1.72
2000	1.42	1.06	0.98	0.09	0.13	0.14	0.11	0.12	0.21	2.24	1.70	1.05
2001	1.04	1.08	0.51	0.17	0.61	0.05	0.04	0.11	0.22	1.40	1.22	0.97
2002	0.41	0.53	0.65	1.48	1.11	0.11	0.06	0.42	-	-	-	-
Average	1.12	1.19	1.08	0.57	0.36	0.35	0.17	0.18	1.24	1.69	1.64	1.00

- no data

Table 3.2.3 Mean Monthly Discharge (20/21)

River: Siahroud Station: Behdan Gage No: 17111 Area(km2): 93.1 (Unit: m^3/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1987	-	-	-	-	-	-	-	-	-	8.63	2.33	1.93
1988	5.23	3.00	1.50	1.49	0.74	0.25	0.28	1.60	2.11	2.03	1.43	0.51
1989	3.65	3.75	3.36	0.50	0.21	0.05	0.05	0.13	1.99	6.56	1.53	1.85
1990	2.74	3.00	3.21	2.03	1.24	0.75	0.68	0.90	0.59	2.83	0.71	2.90
1991	2.43	2.58	4.91	1.47	0.50	0.14	0.07	0.18	0.30	0.17	1.50	1.71
1992	2.46	2.90	2.82	3.52	1.52	0.23	1.66	0.33	-	-	-	-
1993	-	-	-	-	-	-	-	-	-	4.37	8.36	2.61
1994	1.62	3.52	2.96	1.37	1.13	2.03	0.90	0.67	-	-	-	-
1995	-	-	-	-	-	-	-	-	-	-	-	-
1996	-	-	-	-	-	-	-	-	-	1.04	4.63	0.74
1997	1.19	2.48	2.98	0.29	0.12	0.11	1.33	0.13	5.95	2.44	3.19	2.78
1998	4.53	5.47	1.99	0.37	0.45	0.12	0.22	0.38	3.61	6.32	2.15	2.90
1999	3.33	0.42	1.43	1.20	1.26	0.06	0.96	0.05	2.23	1.36	3.00	1.42
2000	3.62	4.22	3.68	0.55	0.60	0.58	0.26	0.19	1.01	11.02	6.45	4.55
2001	3.46	3.79	1.68	0.36	0.58	0.14	0.17	0.33	0.60	5.60	4.40	4.24
2002	2.59	2.74	1.70	3.64	2.83	0.54	0.33	1.30	-	-	-	-
Average	3.07	3.16	2.68	1.40	0.93	0.42	0.58	0.52	2.04	4.36	3.31	2.34

- no data

Table 3.2.3 Mean Monthly Discharge (21/21)

River: Siahroud Station: Polesazeman Gage No: 17053 Area(km2): 147.2 (Unit: m^3/s)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1974	-	-	-	-	-	-	-	-	-	1.15	2.17	4.31
1975	2.09	5.87	5.43	2.01	2.70	1.92	2.18	2.22	3.86	7.10	7.99	11.26
1976	4.78	7.88	13.00	4.10	4.32	2.36	4.03	2.59	2.97	10.73	11.12	6.29
1977	9.82	8.03	4.09	2.54	4.19	2.92	3.56	3.06	3.43	8.33	10.49	5.80
1978	2.94	5.18	5.55	4.59	5.74	8.43	3.65	5.15	2.96	4.22	24.78	8.78
1979	11.52	7.79	6.70	4.92	8.78	5.91	4.60	4.17	3.63	3.61	6.16	8.02
1980	10.58	15.71	11.12	6.82	8.05	5.89	5.43	4.83	2.60	4.30	3.33	2.76
1981	2.46	6.27	7.48	11.33	5.51	4.77	5.64	4.50	4.22	3.89	0.98	2.00
1982	8.12	10.11	5.58	3.13	6.84	4.37	3.86	3.70	1.88	9.21	18.00	5.60
1983	2.37	3.14	8.37	3.66	4.59	4.26	3.56	3.23	4.99	3.34	3.57	7.25
1984	3.90	13.02	8.44	4.24	6.48	2.47	2.96	4.61	-	-	-	-
1985	-	-	-	-	-	-	-	-	-	9.01	8.56	6.87
1986	5.73	4.87	5.58	3.23	4.76	4.65	3.75	4.03	3.65	7.01	7.79	8.80
1987	0.94	1.73	3.81	5.84	3.73	4.31	3.96	4.55	5.92	14.52	5.68	4.73
1988	10.95	4.64	2.79	4.91	5.87	4.02	4.47	6.16	6.54	5.56	3.23	1.82
1989	11.64	9.61	5.54	3.89	4.22	3.23	3.03	2.60	3.97	9.58	4.64	5.71
1990	9.25	8.44	10.19	7.30	8.24	4.39	5.40	4.45	3.15	8.34	2.62	5.84
1991	4.36	5.06	9.56	3.95	3.86	3.26	3.38	2.50	2.40	2.11	3.85	4.33
1992	6.36	6.14	5.37	7.73	6.46	4.40	5.24	4.66	4.39	7.99	3.62	4.83
1993	4.92	7.64	4.08	3.70	4.75	9.93	6.54	3.87	8.21	7.28	23.53	5.39
1994	4.41	5.61	4.59	4.02	6.09	13.41	6.72	4.51	4.48	10.22	14.47	4.44
1995	2.20	4.59	3.06	5.66	5.16	5.50	4.42	5.24	5.96	9.49	0.94	4.02
1996	7.54	8.02	10.93	7.33	4.00	4.61	4.07	3.76	3.87	4.17	6.27	1.41
1997	3.18	6.41	7.77	2.42	3.26	3.57	4.61	2.40	16.84	2.28	7.48	5.69
1998	9.12	11.45	2.08	3.93	4.92	4.06	3.91	4.70	10.14	10.36	4.83	8.60
1999	9.90	1.01	3.06	3.61	3.86	1.21	0.70	0.67	4.69	4.47	6.73	4.28
2000	5.92	6.30	9.27	2.42	4.73	3.93	1.87	1.48	1.57	7.33	13.38	7.95
2001	7.00	6.95	2.03	1.57	2.48	1.94	1.14	1.16	1.54	11.76	9.82	6.47
2002	3.12	3.04	2.73	6.94	7.11	2.19	1.60	3.00	-	-	-	-
Average	6.12	6.83	6.23	4.66	5.21	4.51	3.86	3.62	4.72	6.94	8.00	5.68

- no data

3.3 Bathymetric Survey of Wetland

Bathymetric survey for the wetland was conducted during the Study. The collected data is presented in this section.

3.3.1 Objective

Topographical data covering the Anzali wetland was not available. A few (at least three) bathymetric surveys of the lagoon only had been conducted in the past with the goal of determining the potential for fish cultivation however the remainder of the wetland (ie. channels) have not been measured. Without topographical data for the wetland, a detailed analysis of they hydraulics of the wetland can not be made. Therefore, Iranian surveying firm, Dastoor-el Novin Consulting Engineers, was retained to carry out a bathymetric survey of the wetland under the supervision of the JICA Study Team. The purpose of the survey was to grasp the bathymetric condition of the lagoon and channels of the Anzali wetland.

3.3.2 Scope of Work

The survey covered the following work items.

(1) Establishment of Temporary Benchmarks

Prior to the survey of the wetland, four (4) temporary concrete bench marks (TBMs) were established in order to make accurate sounding measurements. Land survey was conducted to determine the location and elevation of the TBMs using national benchmarks as the starting reference.

(2) Installation of Staff Gages

Four sets of water level staff gage were procured and installed close to each TBM in the wetland. The purpose of installing the gages was to measure the depth of water during the survey. Three gages were established in the wetland and one gage was established in the lagoon area.

(3) Sounding Survey of Lagoon and Channels

8 survey lines across the width of the lagoon and 5 longitudinal survey lines along the channels of the wetland were measured by sounding survey. The cumulative length of the lines is approximately 50km.

(4) Spot Depth Survey

25 spot depths were measured in the wetland. The purpose of these measurements was to measure the depth of the wetland in locations where access for normal survey was difficult, due to excessive reed growth.

(5) Cross Section Survey

18 cross sections in the channels of the wetland were measured manually. They were measured to provide additional hydraulic information.

The locations of the surveyed area and the position of the staff gages are shown in Figure 3.3.1. All measurement results were submitted in text file and stored on a CD-ROM.

3.3.3 Results

(1) Establishment of Temporary Benchmarks

The four TBMs were established with coordinates and elevation as shown below.

Table 3.3.1 Elevations of Temporary Benchmarks

No.	Name	Northing	Easting	Elevation
TB1	Pirbazar	4140901	367320	-24.80m
TB2	Talebabad	4145234	367633	-25.30m
TB3	Shiakeshim out	4142388	359405	-25.03m
TB4	Abkenar	4147489	352764	-25.08m

The above TBMs were used to determine the zero elevation during installation of staff gages. (note: northing and easting are expressed in UTM coordinate system)

(2) Installation of Staff Gages

Staff gages were installed in the wetland, close to each TBM. The TBM was used to determine the zero level for each gage as follows.

Table 3.3.2 Zero Levels of Temporary Benchmarks

No.	Name	Northing	Easting	Zero
1	Pirbazar	4140909	367321	-26.98m
2	Talebabad	4145219	367570	-26.99m
3	Shiakeshim out	4142427	359376	-27.15m
4	Abkenar	4147465	352797	-26.59m

The water level was measured twice each day in order to calibrate the sounding equipment. The water level was measured at all four gages for 40 days (August 8, 2003 to September 15,

2003) and the trends are shown in Figure 3.3.2 and raw data is shown in Tables 3.3.1 and 3.3.3. For reference, the water level of the Caspian Sea at the Anzali port is also shown. They show that the water level at all four gages are generally the same and that they fluctuate closely with the Caspian Sea.

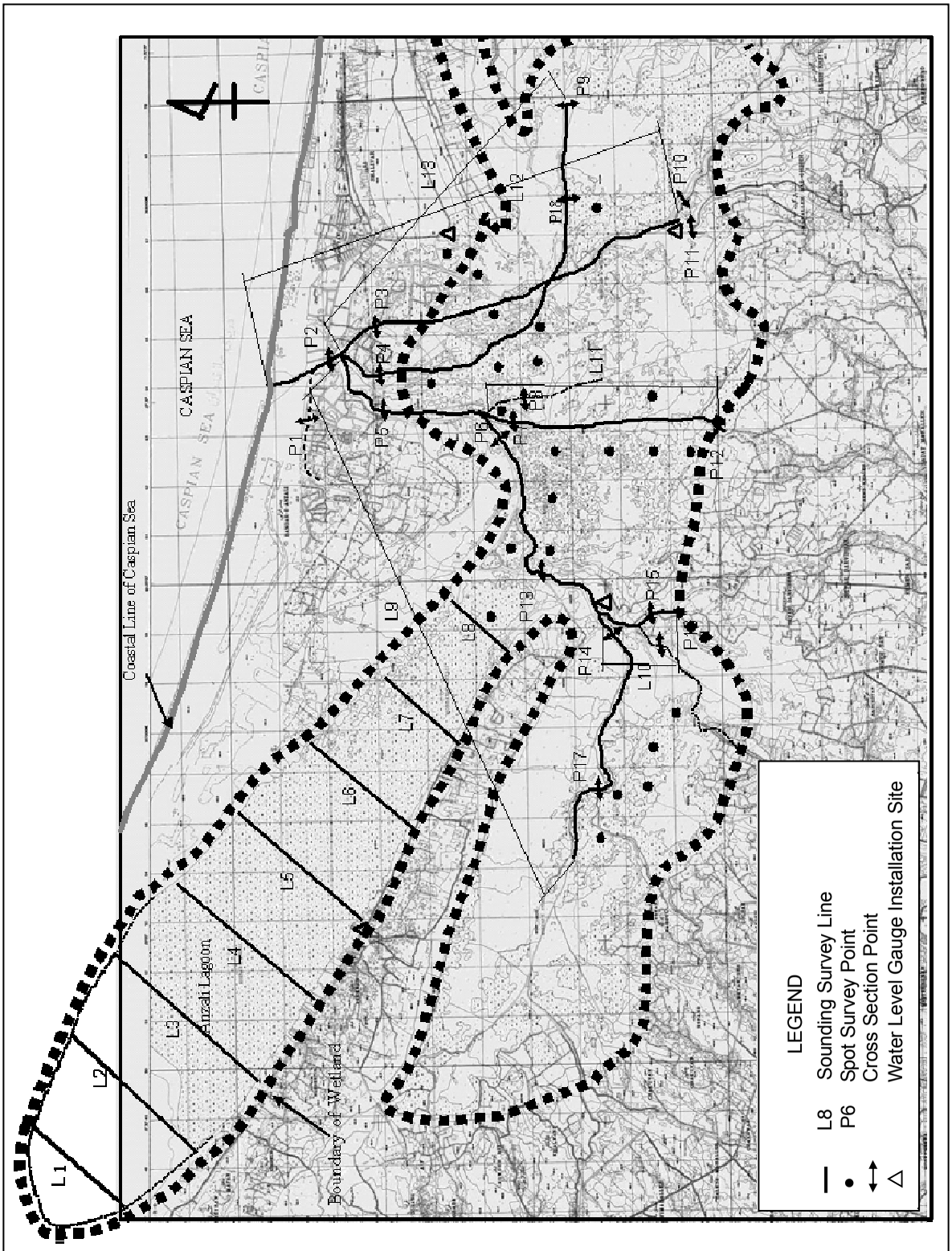
(3) Bathymetric Survey

All bathymetric measurements (sounding, channel cross section and spot depth) were completed within the month of August, 2003. A summary of the distance, width and depth of the various measured areas are shown in Table 3.3.2. It was found that generally, the water depth of the wetland ranged between 1-3m throughout.

The elevations of the channels are shown in Figure 3.3.3. The figure confirms that the lagoon and Shiakeshim are depressions before continuing downstream to the Anzali outlet. This explains the slow velocity in these sections of the wetland. Conversely, the channels (locally referred to as *rogas*) are sloped towards the Caspian Sea and therefore, result in swifter velocities. A drastic drop in depth is seen at the Anzali port, due to the dredging activity of the Anzali Port Authority.

The cross sections and the survey area are shown below, together with a sample of the bathymetric data.

Detailed results of the survey were combined as a Final Report with complete set of the drawings, which is available in DOE Guilan.



The Study on Integrated Management for Ecosystem Conservation of the Anzali Wetland in the Islamic Republic of Iran	**Figure 3.3.1** **Extent of Bathymetrical Survey**
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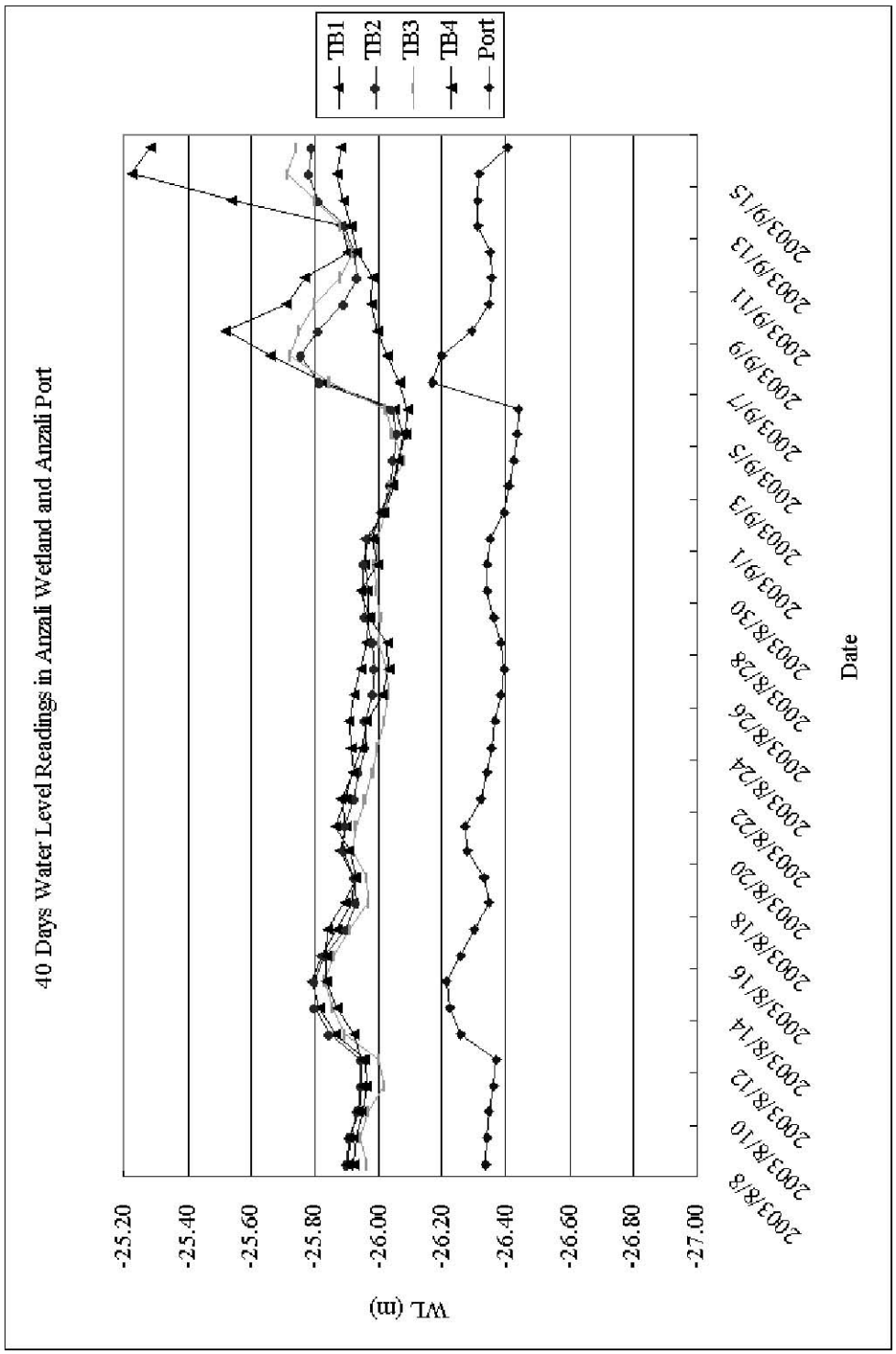

The Study on Integrated Management for Ecosystem Conservation of the Anzali Wetland in the Islamic Republic of Iran

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Figure 3.3.2
Recorded Daily Water Level during Sounding Survey

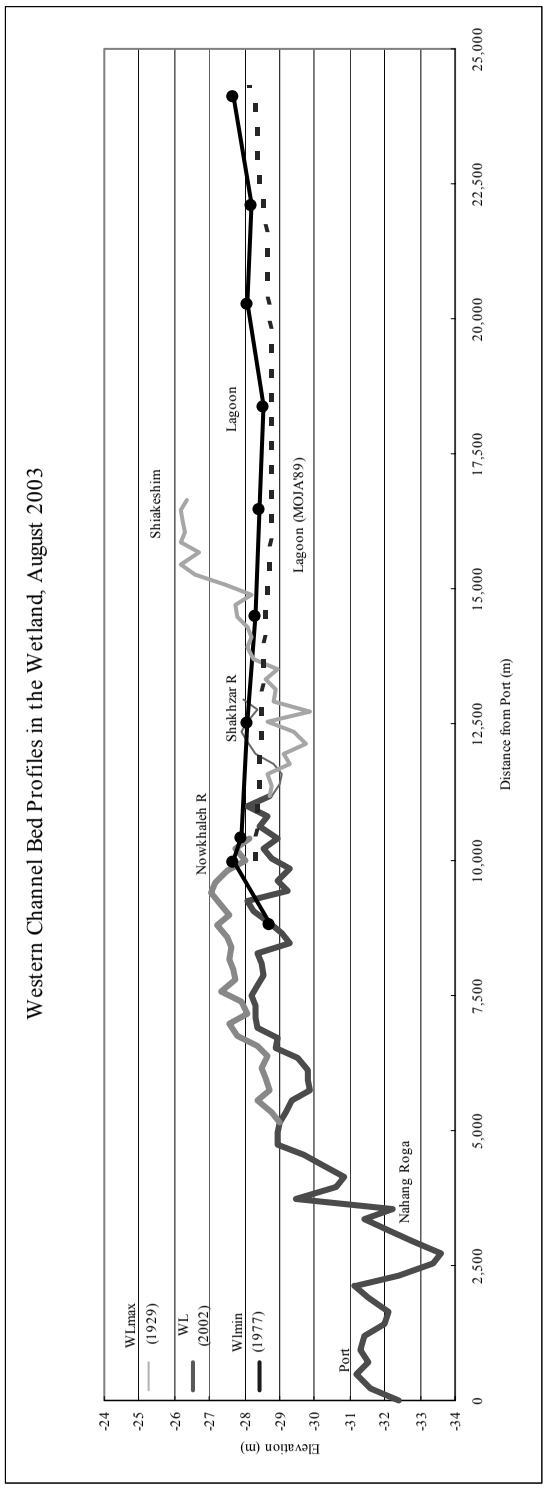
Table 3.3.1 Wetland Water Level for 40 Days Between August 8 to September 16, 2003

Date	Water Level Gage Name															
	TB1			TB2			TB3			TB4			Anzali Port**			
	am	pm	WL	am	pm	avg	am	pm	avg	am	pm	avg	am	noon	pm	avg
2003/8/8	3.08	3.09	-25.93	2.87	2.89	-25.90	0.70	0.72	-25.96	2.71	2.70	-25.91	2	4	4	-26.34
2003/8/9	3.08	3.08	-25.93	2.87	2.87	-25.91	0.72	0.73	-25.95	2.70	2.70	-25.91	2	2	4	-26.34
2003/8/10	3.05	3.07	-25.95	2.83	2.86	-25.94	0.70	0.71	-25.97	2.68	2.66	-25.94	2	1	4	-26.35
2003/8/11	3.05	3.05	-25.96	2.83	2.84	-25.95	0.63	0.68	-26.02	2.66	2.66	-25.95	2	0	1	-26.36
2003/8/12	3.05	3.06	-25.96	2.82	2.85	-25.95	0.65	0.69	-26.00	2.66	2.66	-25.95	0	-2	2	-26.37
2003/8/13	3.15	3.14	-25.87	2.94	2.93	-25.85	0.77	0.78	-25.90	2.67	2.70	-25.93	14	7	13	-26.26
2003/8/14	3.18	3.21	-25.82	2.97	2.99	-25.80	0.80	0.83	-25.86	2.73	2.75	-25.87	14	12	18	-26.22
2003/8/15	3.22	3.22	-25.79	2.99	2.97	-25.80	0.84	0.84	-25.83	2.77	2.78	-25.84	18	14	15	-26.21
2003/8/16	3.20	3.18	-25.82	2.97	2.93	-25.83	0.82	0.80	-25.86	2.78	2.77	-25.84	14	10	10	-26.26
2003/8/17	3.14	3.14	-25.87	2.89	2.87	-25.90	0.78	0.74	-25.91	2.76	2.78	-25.84	8	6	6	-26.30
2003/8/18	3.10	3.08	-25.92	2.86	2.84	-25.93	0.71	0.70	-25.97	2.73	2.70	-25.90	4	1	2	-26.35
2003/8/19	3.07	3.10	-25.93	2.83	2.88	-25.93	0.69	0.73	-25.96	2.68	2.68	-25.93	2	3	7	-26.33
2003/8/20	3.11	3.15	-25.88	2.89	2.89	-25.89	0.74	0.76	-25.92	2.70	2.70	-25.91	10	9	8	-26.28
2003/8/21	3.11	3.11	-25.90	2.89	2.88	-25.90	0.75	0.73	-25.93	2.78	2.71	-25.87	9	12	8	-26.27
2003/8/22	3.10	3.15	-25.89	2.86	2.85	-25.93	0.72	0.71	-25.96	2.72	2.70	-25.90	5	6	4	-26.32
2003/8/23	3.08	3.09	-25.93	2.84	2.84	-25.94	0.69	0.69	-25.98	2.69	2.69	-25.92	2	4	2	-26.34
2003/8/24	3.10	3.09	-25.92	2.82	2.83	-25.96	0.68	0.67	-26.00	2.66	2.66	-25.95	2	0	2	-26.36
2003/8/25	3.11	3.09	-25.91	2.83	2.82	-25.96	0.66	0.65	-26.02	2.66	2.64	-25.96	0	0	1	-26.37
2003/8/26	3.09	3.08	-25.93	2.81	2.79	-25.98	0.64	0.64	-26.03	2.61	2.59	-26.01	-2	-3	0	-26.39
2003/8/27	3.05	3.08	-25.95	2.78	2.81	-25.99	0.62	0.67	-26.03	2.58	2.58	-26.03	-4	-4	0	-26.40
2003/8/28	3.03	3.07	-25.96	2.79	2.81	-25.98	0.65	0.69	-26.00	2.59	2.58	-26.03	-2	-4	2	-26.38
2003/8/29	3.04	3.05	-25.97	2.82	2.83	-25.96	0.65	0.68	-26.01	2.60	2.68	-25.97	-2	0	4	-26.36
2003/8/30	3.04	3.05	-25.97	2.83	2.83	-25.95	0.66	0.70	-25.99	2.65	2.68	-25.95	4	-1	6	-26.34
2003/8/31	3.05	3.06	-25.96	2.83	2.83	-25.95	0.67	0.70	-25.99	2.61	2.62	-26.00	3	1	5	-26.34
2003/9/1	3.05	3.06	-25.96	2.84	2.79	-25.97	0.67	0.68	-26.00	2.63	2.63	-25.98	4	0	2	-26.35
2003/9/2	3.00	2.99	-26.02	2.78	2.76	-26.01	0.65	0.65	-26.02	2.61	2.60	-26.01	-1	-2	-4	-26.39
2003/9/3	2.97	2.96	-26.05	2.75	2.74	-26.04	0.64	0.63	-26.04	2.58	2.56	-26.04	-4	-3	-5	-26.41
2003/9/4	2.94	2.95	-26.07	2.73	2.74	-26.05	0.59	0.59	-26.08	2.56	2.54	-26.06	-6	-4	-6	-26.42
2003/9/5	2.93	2.94	-26.08	2.72	2.73	-26.06	0.61	0.65	-26.04	2.52	2.53	-26.09	-7	-5	-8	-26.44
2003/9/6	2.97	2.95	-26.05	2.74	2.74	-26.04	0.63	0.67	-26.02	2.52	2.52	-26.09	-7	-7	-7	-26.44
2003/9/7	3.11	3.25	-25.83	2.89	3.04	-25.82	0.77	0.88	-25.85	2.53	2.56	-26.07	14	20	26	-26.17
2003/9/8	3.31	3.39	-25.66	3.03	3.02	-25.76	0.91	0.99	-25.72	2.58	2.59	-26.03	20	20	12	-26.20
2003/9/9	3.52	3.46	-25.52	2.99	2.95	-25.81	0.97	0.87	-25.75	2.61	2.62	-26.00	8	7	9	-26.29
2003/9/10	3.33	3.27	-25.71	2.91	2.87	-25.89	0.88	0.86	-25.80	2.64	2.63	-25.98	4	-1	4	-26.35
2003/9/11	3.15	3.33	-25.77	2.86	2.83	-25.94	0.84	0.74	-25.88	2.62	2.64	-25.98	4	0	0	-26.36
2003/9/12	3.11	3.10	-25.91	2.84	2.87	-25.93	0.74	0.76	-25.92	2.67	2.68	-25.94	2	-2	6	-26.35
2003/9/13	3.11	3.14	-25.89	2.89	2.88	-25.90	0.78	0.80	-25.88	2.69	2.70	-25.92	6	2	10	-26.31
2003/9/14	3.29	3.65	-25.54	2.96	2.98	-25.81	0.83	0.91	-25.80	2.71	2.73	-25.89	6	8	4	-26.31
2003/9/15	3.81	3.76	-25.23	2.99	3.01	-25.78	0.93	0.99	-25.71	2.74	2.74	-25.87	8	2	6	-26.32
2003/9/16	3.74	3.71	-25.29	2.98	3.00	-25.79	0.96	0.90	-25.74	2.73	2.72	-25.89	-1	-6	-4	-26.41
Average(40day)			-25.86			-25.91			-25.93			-25.95				-26.33

Source: **- Anzali Port and Shipping Authority

Old Gage (use for 40days observation only)

Sta.	Name	Zero(m)	Correlation to Port
TB1	Pirbazar	-29.01	32%
TB2	Talebabad	-28.78	80%
TB3	Shiadarvishar	-26.67	62%
TB4	Abkenar	-28.61	44%
Anzali port		-26.37	



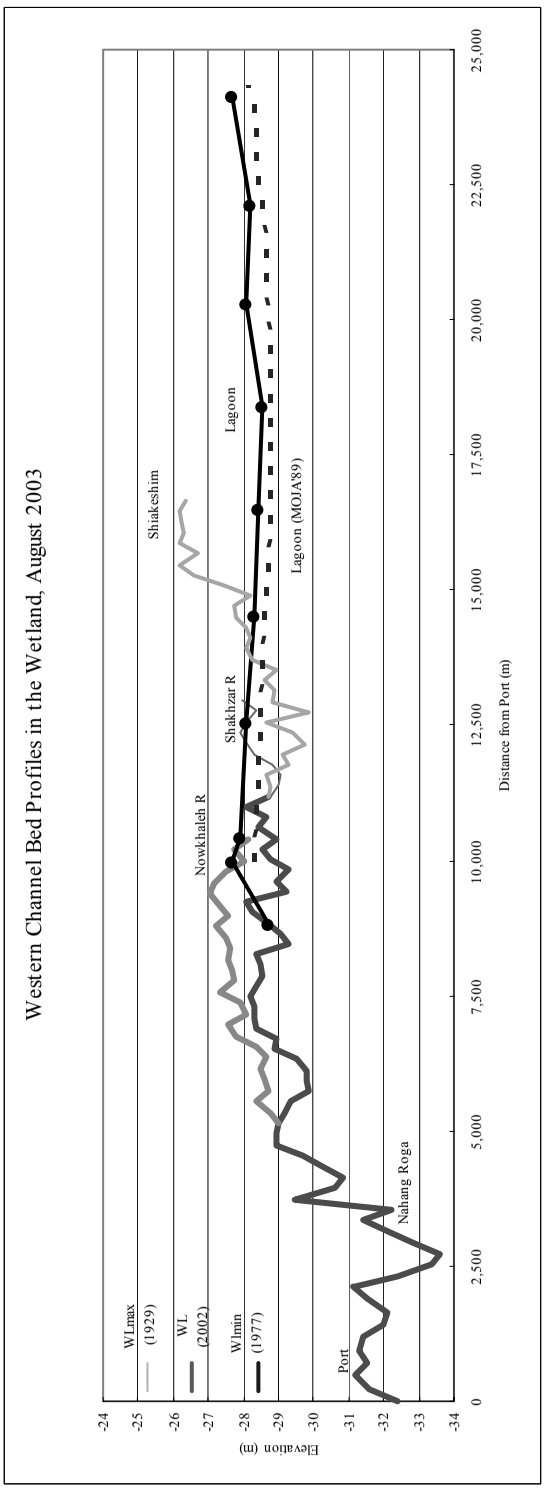


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Figure 3.3.3
Longitudinal Channel Bed Profile

Table 3.3.2 Results of Bathymetric Survey

Longitudinal Sounding Survey

No.	Length (km)	Location
L9	14.5	Shiakeshim, Nahang Roga
L10	1.8	Masulehroudkhan
L11	5.3	Nowkhaleh
L12	9.6	Pirbazar
L13	9.3	Khomamroud, Rastakhaleh Roga
total	40.5	

Spot Survey

No.	Bottom EL (m)	WL (m)	D (m)	Location
S1	-27.0	-25.95	1.05	Rastakhaleh
S2	-27.4	-25.95	1.45	Nahang
S3	-27.1	-25.95	1.15	Rastakhaleh
S4	-26.3	-25.95	0.35	Pirbazar
S5	-27.2	-25.95	1.25	Hosenbekhandeh
S6	-26.6	-25.95	0.65	Hosenbekhandeh
S7	-27.65	-25.92	1.73	Lagoon outlet
S8	-26.8	-25.92	0.88	Lagoon outlet
S9	-26.7	-25.92	0.78	Lagoon outlet
S10	-27.4	-25.92	1.48	Lagoon outlet
S11	-26.9	-25.92	0.98	Lagoon outlet
S12	-27.05	-25.93	1.12	Rastakhaleh
S13	-26.3	-25.93	0.37	Rastakhaleh
S14	-26.9	-25.83	1.07	Khomamroud
S15	-28.0	-25.96	2.04	Shiakeshim
S16	-27.4	-25.96	1.44	Shiakeshim
S17	-27.3	-25.96	1.34	Shiakeshim
S18	-26.7	-25.96	0.74	Shiakeshim
S19	-26.4	-25.92	0.48	Shiakeshim
S20	-27.3	-25.93	1.37	Hendekhaleh River
S21	-27.3	-25.95	1.35	Hendekhaleh River
S22	-27.2	-25.95	1.25	Hendekhaleh River
S23	-27.3	-25.95	1.35	Hendekhaleh River
S24	-27.0	-25.95	1.05	Hendekhaleh River
S25	-27.1	-25.9	1.2	Hendekhaleh River

Benchmark Used for Topographic Survey (A1)

Description of G.P.S. STATION & Staff gauges

Zone 39 Projection System UTM (WGS–84) Station A1

Further Information Province Town

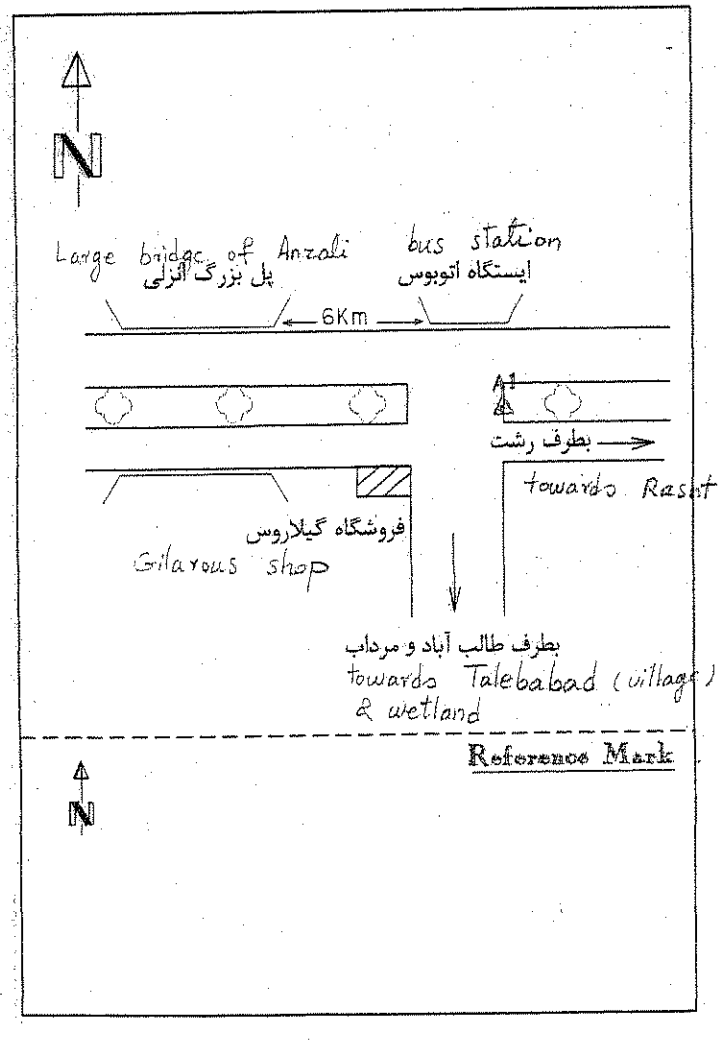
G.P.S Station

Φ	49° 31′ 48″.821	N	4147287.96	H_{sph}	Elev.	Date	
λ	37° 27′ 48″.010	E	370019.50	H GEO	-20.03		

Staff gauges

Φ		N		H_{sph}	Elev.	Date	
λ		E		H GEO		AUG. 2003	

Sketch



Description

A1 : عبارتست از نقطه ای برنگ قرمز که در داخل دایره ای قرار دارد این نقطه وسط جدول میانی بلوار رشت به انزلی انتخاب گردیده است موقعیت جغرافیائی و راه دسترسی به آن در کروکی نشان داده شده است .

A1: It's consisted of red point that it locates inside of circle. This point has selected in the middle of Rash-Anzali Blvd. The geographical situation and access way of this point is shown in the drawing.

Page No. ___

Benchmark Used for Topographic Survey (A2)

Description of G.P.S. STATION & Staff gauges

Zone 39 Projection System UTM (WGS—84) Station A2

Further Information Province Town

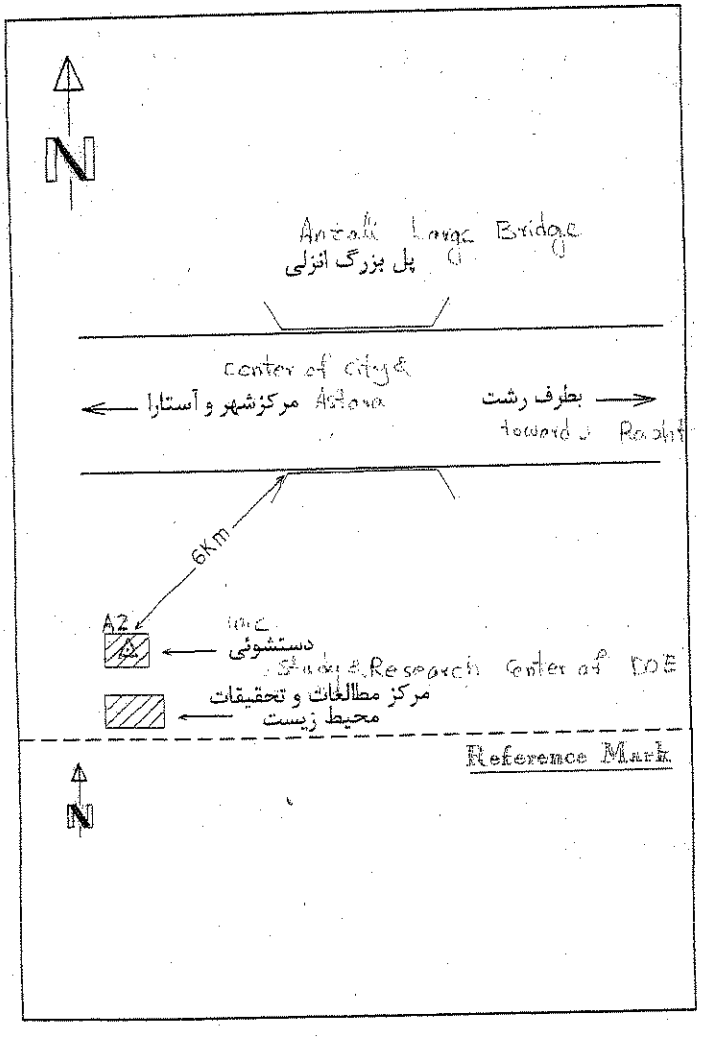
G.P.S Station

Φ	49° 25′ 08″.770	N	4143457.59	H_{sph}	Elev.	Date	
λ	37° 25′ 38″.565	E	360124.49	H_{GEO}	-23.42		

Staff gauges

Φ		N		H_{sph}	Elev.	Date	
λ		E		H_{GEO}		AUG. 2003	

Sketch



Description

A2 : عبارتست از مرکز دایره قرمز رنگ که روی پشت بام ساختمان دستشوئی مرکز مطالعات و تحقیقات سازمان محیط زیست قراردارد ، دسترسی به نقطه فقط با قایق امکان پذیر است .

موقعیت جغرافیائی آن در شکل نشان داده شده است .

A2: It's the center of red circle. That's located on the roof of WC building of Research Center of DOE. Access to this point is possible just by boat. It's geographical situation is shown in the shape.

Page No. ___

Benchmark Used for Topographic Survey (A4)

Description of G.P.S. STATION & Staff gauges

Zone 39 Projection System UTM (WGS—84) Station A4

Further Information Province Town

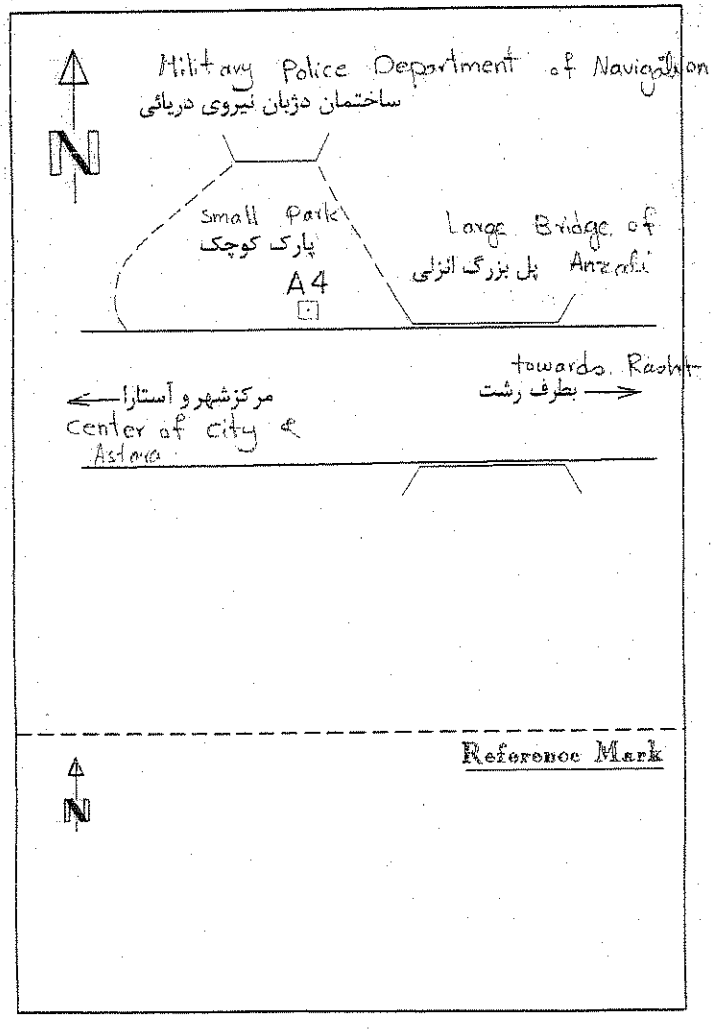
G.P.S Station

Φ	49° 27′ 59″.604	N	4147624.57	H sph	Elev.	Date	
λ	37 °27′ 56″.019	E	364392.35	H GEO	-20.26		

Staff gauges

Φ		N		H sph	Elev.	Date	
λ		E		H GEO		AUG. 2003	

Sketch



Description

A4 : این نقطه عبارتست ازیک میخ فولادی که در محل پارک کوچکی در حاشیه پل بزرگ کوبیده شده است .

موقعیت نقطه در کروکی نشان داده شده است .

A4: This point has consisted of steel nail. This nail steel has been nailed in the small park, around (border) of large bridge. Situation of this point has seen in the shape.

Page No. ___

Benchmark Used for Topographic Survey (A5)

Description of G.P.S. STATION & Staff gauges

Zone 39 Projection System UTM (WGS—84) Station A5

Further Information Province Town

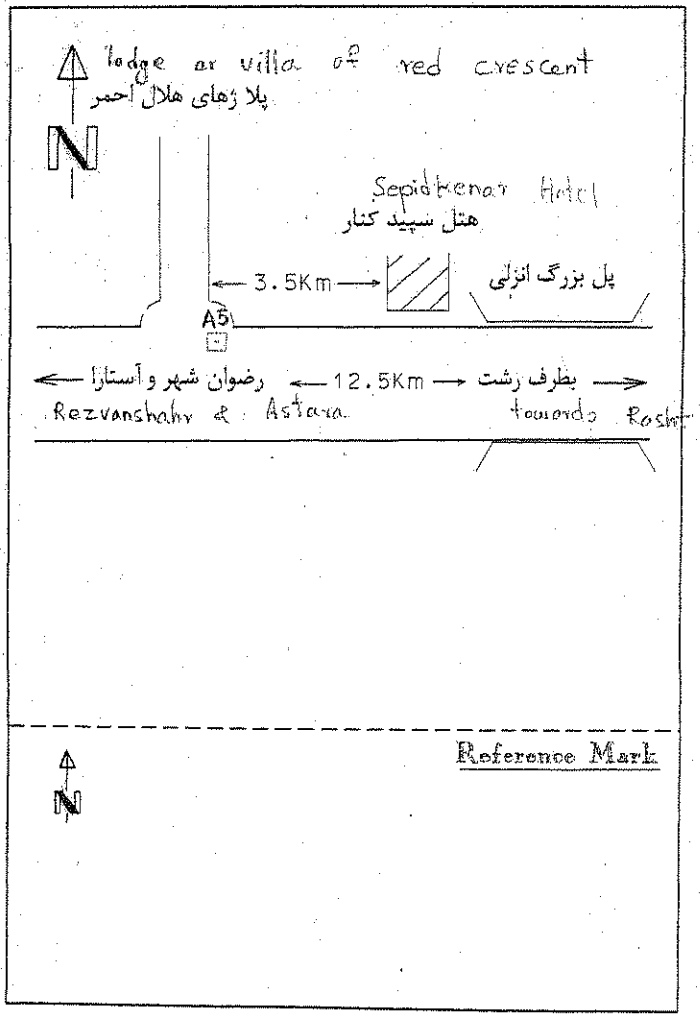
G.P.S Station

Φ	49° 19′ 37.″674	N	4152938.67	H_{sph}	Elev.	Date	
λ	37°30′41.″627	E	352152.37	H_{GEO}	-20.19		

Staff gauges

Φ		N		H_{sph}	Elev.	Date	
λ		E		H_{GEO}		AUG. 2003	

Sketch



Description

A5 : این نقطه عبارتست از مرکز یک میخ فولادی که درکنار جاده رشت - آستارا و در کنار پلاژهای جمعیت هلال احمر کوبیده شده است موقعیت جغرافیائی آن در کروکی نشان داده شده است .

As: This point's consisted of the center of a steel nail that has nailed beside Rasht-Astara Road and near (beside) lodges (villas) of red crescent. It's geographical situation has shown on the shape.

Page No. ___

Temporary Benchmark Installed in the Wetland (TB1)

Description of G.P.S. STATION & Staff gauges

Zone 39 Projection System UTM (WGS—84) Station TB1

Further Information Province Town

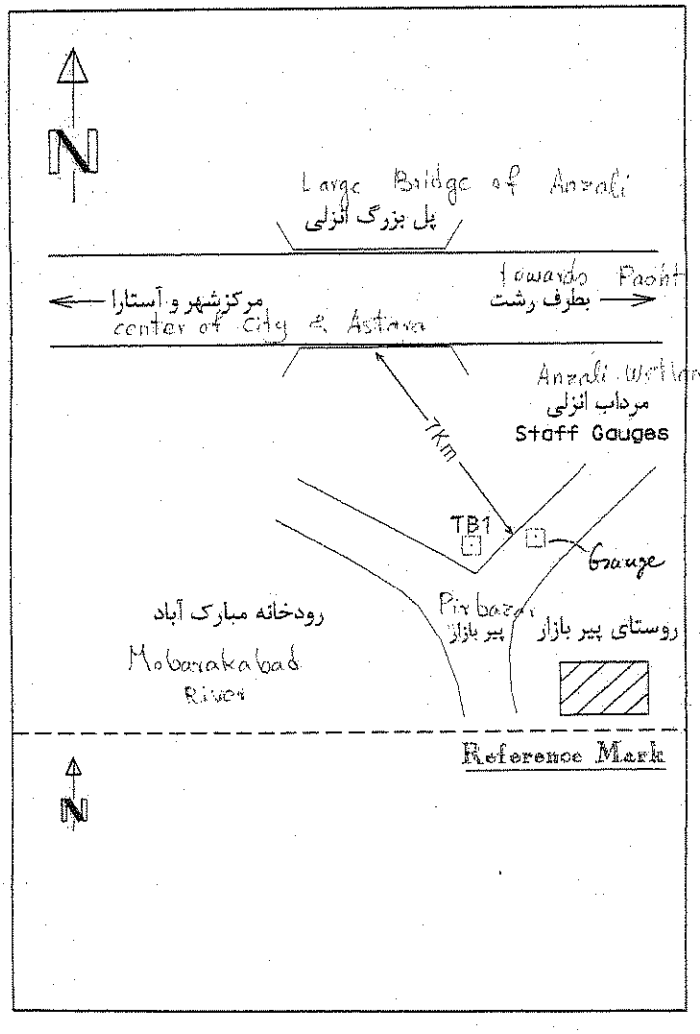
G.P.S Station

Φ	49° 30′ 03″.092	N	4140901.37	H_{sph}	Elev.	Date	
λ	37° 24′ 19″.459	E	367319.82	H_{GEO}	-24.80		

Staff gauges

Φ	49° 30′ 03″.128	N	4140909.00	H_{sph}	Elev.	Date	
λ	37° 24′ 19″.707	E	367320.82	H_{GEO}		AUG. 2003	

Sketch



Description

TB1 : عبارتست ازمرکزیک میله آهنی که در داخل یک قالب بتنی به ابعاد $30 * 30 * 60^{cm}$ قرار دارد .

نقطه در محل تلاقی رودخانه های مبارک آباد و پیر بازار قرار دارد ، راه وصول به نقطه بـا

TB1: It's consisted of the center of an iron bar that has located inside of a concrete mould with 30* 30* 60* cm. This point is located in the meeting point of 2 rivers (a point that 2 rivers join to each other): Pirbazar and Mobarakabad. The access way of this point has shown in the shape.

Page No. ___

Temporary Benchmark Installed in the Wetland (TB2)

Description of G.P.S. STATION & Staff gauges

Zone 39 Projection System UTM (WGS—84) Station TB2

Further Information Province Town

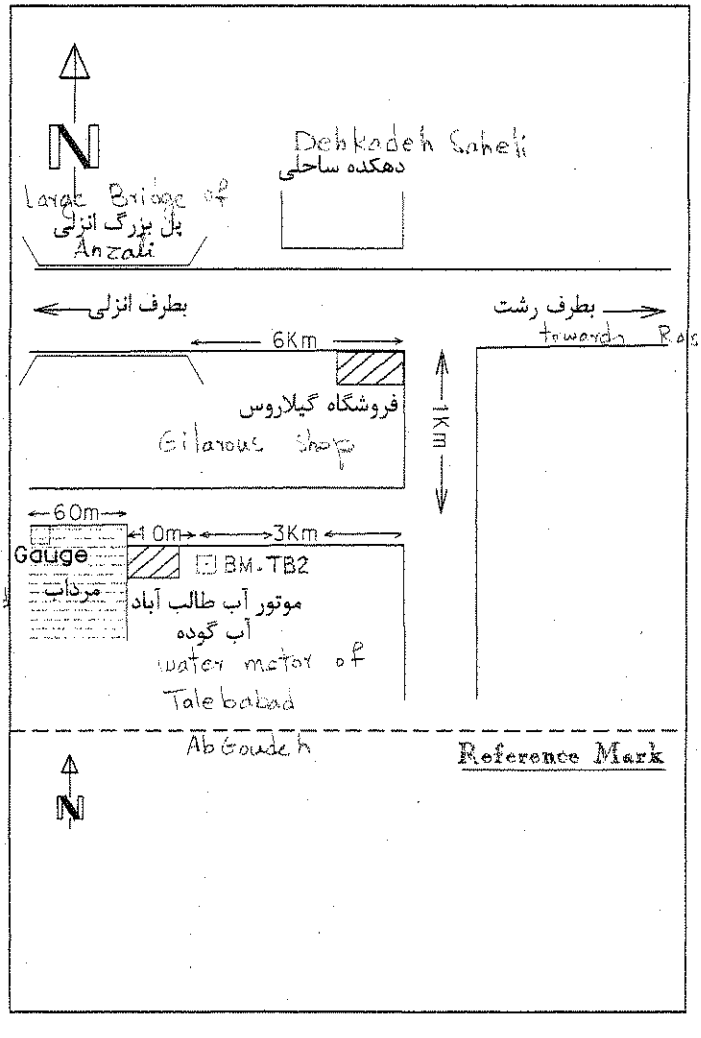
G.P.S Station

Φ	49° 30′ 13″.022	N	4145234.38	H sph	Elev.	Date	
λ	37° 26′ 40″.177	E	367632.81	H GEO	-25.30		

Staff gauges

Φ	49° 30′ 10″.477	N	4145218.60	H sph	Elev.	Date	
λ	37° 26′ 39″.632	E	367570.00	H GEO		AUG. 2003	

Sketch



Description

TB2 : عبارتست از مرکز یک میله فولادی که درداخل یک قالب بتنی بابعاد $30 * 30 * 60^{cm}$ این نقطه کنار موتور پمپ ایستگاه طالب آبادمیباشد . راه وصول به آن در کروکی نشان داده شده است .

TB_2: It's consisted of the center of a steel bar that has located inside of a concrete mould with 30* 30* 60 cm. This point has located beside of water motor of Talebabad. The access way of this point has shown in the shape.

Page No. ___

Temporary Benchmark Installed in the Wetland (TB3)

Description of G.P.S. STATION & Staff gauges

Zone 39 Projection System UTM (WGS–84) Station TB3

Further Information Province Town

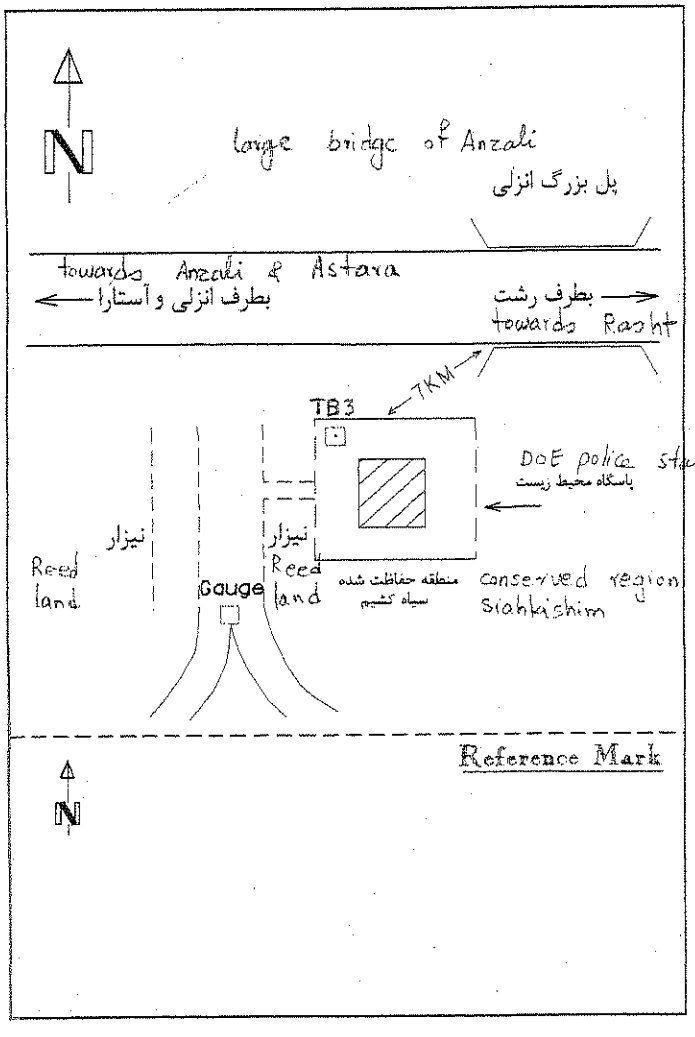
G.P.S Station

Φ	49° 24′ 40″.241	N	4142388.42	H_{sph}	Elev.	Date	
λ	37° 25′ 03″.491	E	359405.04	H_{GEO}	-25.03		

Staff gauges

Φ	49° 24′ 39″.033	N	4142427.00	H_{sph}	Elev.	Date	
λ	37° 25′ 04″.727	E	359376.00	H_{GEO}		AUG. 2003	

Sketch



Description

TB3:عبارتست ازمرکزیک میله فلزی که درداخل یک قالب بتنی به ابعاد $30 * 30 * 60^{cm}$ قرار گرفته است .
این نقطه در کنار ساختمان پاسگاه محیط زیست در منطقه سیاه کشیم قراردارد .
راه وصول به آن در کروکی نشان داده شده است .

TB3: It's consisted of the center of a metal bar that has located inside of a concrete mould with 30*30*60* cm. This point has located beside of DOE Police Station of Siahkishim region. The access way of this point has shown in the shape.

Page No. ___

Temporary Benchmark Installed in the Wetland (TB4)

Description of G.P.S. STATION & Staff gauges

Zone 39 Projection System UTM (WGS—84) Station TB4

Further Information Province Town

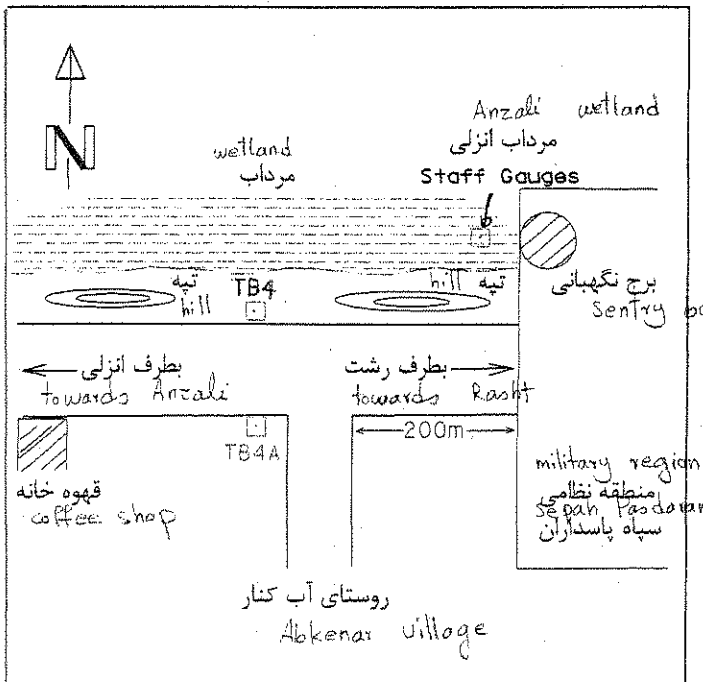
G.P.S Station

Φ	49° 20′ 06″.487	N	4147488.58	H_{sph}	Elev.	Date	
λ	37° 27′ 45″.203	E	352763.58	H_{GEO}	-25.08		

Staff gauges

Φ	49° 20′ 07″.846	N	4147465.00	H_{sph}	Elev.	Date	
λ	37° 27′ 44″.457	E	352796.58	H_{GEO}		AUG. 2003	

Sketch



Reference Mark

N

TB4: It's consisted of center of a steel bar (with one cm diameter). This steel bar has located inside of a concrete mould (with 30*30*60cm). This point has set on the border of wetland in Abkenar Village. The situation of this concrete has shown in drawing. In order to arrive Abkenar, it should be paned from Somehsara in the International Road (that goes towards Astara). Abkenar road brance to the right side of this road. In order to arrive this point; we should pan Anzali Large bridge by boat, about 2 km towards south-west, then into the wetland turn around right side (towards west side), after 10km we will arrive this point. Sentry box (tower for guard) would be seen from 5km.

Description

TB4 : عبارتست ازمرکزیک میله فولادی بقطر ۱ سانتی که در داخل یک قالب بتونیٔ به ابعاد $30 * 30 * 60^{cm}$ قرارگرفته است.

این نقطه درحاشیه مرداب در روستای آب کنار نصب گردیده است .

موقعیت بتن درکروکی نشان داده شده برای رسیدن به آب کنار پس از عبورازصومعه سرا در جاده بین المللی که به طرف آستارا میرود ، راه آب کناربه طرف راست ازاین جاده منشعب میشود.

راه وصول به نقطه با قایق ازپل بزرگ بندر انزلی ۳ کیلومتر بطرف جنوبغربی حرکت کرده و سپس در داخل مرداب ضمن گردش به راست مسیر به طرف غرب ادامه می یابد و پس از طی حدود ۱۰ کیلومتر به نقطه میرسیم .

از فاصله ۵ کیلومتری برج نگهبانی سپاه با چشم قابل روئت میباشد .

Page No. ___

DASTOOR-E NOVIN مهندسین مشاور دستورنوین

Consulting Engineers Crassing Pir Bazar & mobarak Abad Rivers

Form For Tide Gage Reading No.....in the job No.162 فرم قرائت اشل

On The ANZALI LAGOON TBI در مرداب انزلی تقاطع رودخانه پیربازار و مبارک آباد

تاریخ	READING GAGE -- قرائت روی میر مدرج		ملاحظات
DATE 1382	8. AM ۸ صبح	6. PM ۶ بعداظهر	REMARKS
۱۳۸۲/ 5/ 17	3.080	3.090	AUGUST 8th 03
۱۳۸۲/ 5/ 18	3.080	3.080	9th
۱۳۸۲/ 5/ 19	3.050	3.070	10
۱۳۸۲/ 5/ 20	3.050	3.050	11
۱۳۸۲/ 5/ 21	3.050	3.060	12
۱۳۸۲/ 5/ 22	3.150	3.140	13
۱۳۸۲/ 5/ 23	3.180	3.210	14
۱۳۸۲/ 5/ 24	3.220	3.220	15
۱۳۸۲/ 5/ 25	3.200	3.180	16
۱۳۸۲/ 5/ 26	3.140	3.140	17
۱۳۸۲/ 5/ 27	3.100	3.080	18
۱۳۸۲/ 5/ 28	3.070	3.100	19
۱۳۸۲/ 5/ 29	3.110	3.150	20
۱۳۸۲/ 5/ 30	3.110	3.110	21
۱۳۸۲/ 5/ 31	3.100	3.150	22
۱۳۸۲/ 6/ 1	3.080	3.090	23
۱۳۸۲/ 6/ 2	3.100	3.090	24
۱۳۸۲/ 6/ 3	3.110	3.090	25
۱۳۸۲/ 6/ 4	3.090	3.080	26
۱۳۸۲/ 6/ 5	3.050	3.080	27
۱۳۸۲/ 6/ 6	3.030	3.070	28
۱۳۸۲/ 6/ 7	3.040	3.050	29
۱۳۸۲/ 6/ 8	3.040	3.050	30
۱۳۸۲/ 6/ 9	3.050	3.060	Aug 31st 03

DASTOOR-E NOVIN
Consulting Engineers

مهندسین مشاور دستورنوین

Form For Tide Gage Reading No.....in the Job No.....

فرم قرائت اشل

On The **ANZALI Lagoon.** TBI

در مرداب انزلی

تاریخ	READING GAGE	قرائت روی میر مدرج	ملاحظات
DATE	8.AM ۸ صبح	6.PM ۶ بعداظهر	REMARKS
۱۳۸۲/6/10	3.050	3.060	Sep 1 TK 03
۱۳۸۲/6/11	3.000	2.990	2
۱۳۸۲/6/12	2.970	2.960	3
۱۳۸۲/6/13	2.940	2.950	4
۱۳۸۲/6/14	2.930	2.940	5
۱۳۸۲/6/15	2.970	2.950	6
۱۳۸۲/6/16	3.110	3.250	7
۱۳۸۲/6/17	3.310	3.390	8
۱۳۸۲/6/18	3.520	3.460	9
۱۳۸۲/6/19	3.330	3.270	10
۱۳۸۲/6/20	3.150	3.330	11
۱۳۸۲/6/21	3.110	3.100	12
۱۳۸۲/6/22	3.110	3.140	13
۱۳۸۲/6/23	3.290	3.650	14
۱۳۸۲/6/24	3.810	3.760	15
۱۳۸۲/6/25	3.740	3.710	Sep 16-03
۱۳۸۲/ /			
۱۳۸۲/ /			
۱۳۸۲/ /			
۱۳۸۲/ /			
۱۳۸۲/ /			
۱۳۸۲/ /			
۱۳۸۲/ /			
۱۳۸۲/ /			

DASTOOR-E NOVIN مهندسین مشاور دستورنوین

Consulting Engineers Close To The Taleb Abad water Pump St,

Form For Tide Gage Reading No.....in the job No.162 فرم قرائت اشل

On The **ANZALI LAGOON** TB2 در مرداب انزلی کنار پمپ آب طالب آباد

تاریخ	READING GAGE -- قرائت روی میر مدرج		ملاحظات
DATE	8. AM ۸ صبح	6. PM ۶ بعدازظهر	REMARKS
۱۳۸۲/5/17	2.870	2.890	August 8th 03
۱۳۸۲/5/18	2.870	2.870	9
۱۳۸۲/5/19	2.830	2.860	10
۱۳۸۲/5/20	2.830	2.840	11
۱۳۸۲/5/21	2.820	2.850	12
۱۳۸۲/5/22	2.940	2.930	13
۱۳۸۲/5/23	2.970	2.990	14
۱۳۸۲/5/24	2.990	2.970	15
۱۳۸۲/5/25	2.970	2.930	16
۱۳۸۲/5/26	2.890	2.870	17
۱۳۸۲/5/27	2.860	2.840	18
۱۳۸۲/5/28	2.830	2.880	19
۱۳۸۲/5/29	2.890	2.890	20
۱۳۸۲/5/30	2.890	2.880	21
۱۳۸۲/5/31	2.860	2.850	22
۱۳۸۲/6/1	2.840	2.840	23
۱۳۸۲/6/2	2.820	2.830	24
۱۳۸۲/6/3	2.880	2.820	25
۱۳۸۲/6/4	2.810	2.790	26
۱۳۸۲/6/5	2.780	2.810	27
۱۳۸۲/6/6	2.790	2.810	28
۱۳۸۲/6/7	2.820	2.830	29
۱۳۸۲/6/8	2.830	2.830	30
۱۳۸۲/6/9	2.830	2.830	AUGU 31 03

DASTOOR-E NOVIN مهندسین مشاور دستورنوین

Consulting Engineers TALEBABAD WATER POMP

Form For Tide Gage Reading No.....in the job No.162 فرم قرائت اشل

On The ANZALI LAGOON TB2 در مرداب انزلی

تاریخ	READING GAGE -- قرائت روی میر مدرج		ملاحظات
DATE 1382	8.AM ۸ صبح	6.PM ۶ بعداظهر	REMARKS
۱۳۸۲/ 6 / 10	2.840	2.790	Sep 1 ۲۰۰۳
۱۳۸۲/ 6 / 11	2.780	2.760	2
۱۳۸۲/ 6 / 12	2.750	2.740	3
۱۳۸۲/ 6 / 13	2.730	2.740	4
۱۳۸۲/ 6 / 14	2.720	2.730	5
۱۳۸۲/ 6 / 15	2.740	2.740	6
۱۳۸۲/ 6 / 16	2.890	3.040	7
۱۳۸۲/ 6 / 17	3.030	3.020	8
۱۳۸۲/ 6 / 18	2.990	2.950	9
۱۳۸۲/ 6 / 19	2.910	2.870	10
۱۳۸۲/ 6 / 20	2.860	2.830	11
۱۳۸۲/ 6 / 21	2.840	2.870	12
۱۳۸۲/ 6 / 22	2.890	2.880	13
۱۳۸۲/ 6 / 23	2.960	2.980	14
۱۳۸۲/ 6 / 24	2.990	3.010	15
۱۳۸۲/ 6 / 25	2.980	3.000	SEP 16 03
۱۳۸۲/ /			
۱۳۸۲/ /			
۱۳۸۲/ /			
۱۳۸۲/ /			
۱۳۸۲/ /			
۱۳۸۲/ /			
۱۳۸۲/ /			
۱۳۸۲/ /			

DASTOOR-E NOVIN مهندسین مشاور دستورنوین

Consulting Engineers Siah Darvishan Military Station

Form For Tide Gage Reading No.....in the Job No.162 فرم قرائت اشل

On The ANZALI LAGOON TOJ پاسگاه سیاه درویشان در مرداب انزلی

تاریخ	READING GAGE -- قرائت روی میر مدرج		ملاحظات
DATE	8.AM ۸ صبح	6.PM ۶ بعداظهر	REMARKS
1382	m	m	AUGUST 8TH 03
۱۳۸۲/ 5 /17	0.700	0.720	
۱۳۸۲/ 5 /18	0.720	0.730	9
۱۳۸۲/ 5 /19	0.700	0.710	10
۱۳۸۲/ 5 /20	0.630	0.680	11
۱۳۸۲/ 5 /21	0.650	0.690	12
۱۳۸۲/ 5 /22	0.770	0.780	13
۱۳۸۲/ 5 /23	0.800	0.830	14
۱۳۸۲/ 5 /24	0.840	0.840	15
۱۳۸۲/ 5 /25	0.820	0.800	16
۱۳۸۲/ 5 /26	0.780	0.740	17
۱۳۸۲/ 5 /27	0.710	0.700	18
۱۳۸۲/ 5 /28	0.690	0.730	19
۱۳۸۲/ 5 /29	0.740	0.760	20
۱۳۸۲/ 5 /30	0.750	0.730	21
۱۳۸۲/ 5 /31	0.720	0.710	22
۱۳۸۲/ 6 / 1	0.690	0.690	23
۱۳۸۲/ 6 / 2	0.680	0.670	24
۱۳۸۲/ 6 / 3	0.660	0.650	25
۱۳۸۲/ 6 / 4	0.640	0.640	26
۱۳۸۲/ 6 / 5	0.620	0.670	27
۱۳۸۲/ 6 / 6	0.650	0.690	28
۱۳۸۲/ 6 / 7	0.650	0.680	29
۱۳۸۲/ 6 / 8	0.660	0.700	30
۱۳۸۲/ 6 / 9	0.670	0.700	AUG 31 03

DASTOOR-E NOVIN مهندسین مشاور دستورنوین

Consulting Engineers SIAH DARVISHAN STATION

Form For Tide Gage Reading No.....in the job No.162 فرم قرائت اشل

On The ANZALI LAGOON TB3 در مرداب انزلی

تاریخ	READING GAGE -- قرائت روی میر مدرج		ملاحظات
DATE	8.AM ۸ صبح	6.PM ۶ بعدازظهر	REMARKS
۱۳۸۲/6/10	0.670 m	0.680 m	Sep 15th 03
۱۳۸۲/6/11	0.650	0.650	2
۱۳۸۲/6/12	0.640	0.630	3
۱۳۸۲/6/13	0.590	0.590	4
۱۳۸۲/6/14	0.610	0.650	5
۱۳۸۲/6/15	0.630	0.670	6
۱۳۸۲/6/16	0.770	0.880	7
۱۳۸۲/6/17	0.910	0.990	8
۱۳۸۲/6/18	0.970	0.870	9
۱۳۸۲/6/19	0.880	0.860	10
۱۳۸۲/6/20	0.840	0.740	11
۱۳۸۲/6/21	0.740	0.760	12
۱۳۸۲/6/22	0.780	0.800	13
۱۳۸۲/6/23	0.830	0.910	14
۱۳۸۲/6/24	0.930	0.990	15
۱۳۸۲/6/25	0.960	0.900	Sep 16th 03
۱۳۸۲/ /			
۱۳۸۲/ /			
۱۳۸۲/ /			
۱۳۸۲/ /			
۱۳۸۲/ /			
۱۳۸۲/ /			
۱۳۸۲/ /			
۱۳۸۲/ /			

DASTOOR-E NOVIN مهندسین مشاور دستورنوین

Consulting Engineers Abkenar Village

Form For Tide Gage Reading No.....in the job No.162 فرم قرائت اشل

On The ANZALI LAGOON TB4 روستای اب کنار در مرداب انزلی

تاریخ	READING GAGE -- قرائت روی میر مدرج		ملاحظات
DATE	8.AM ۸ صبح	6.PM ۶ بعداظهر	REMARKS
1382			
۱۳۸۲/ 5 / 17	2.710	2.700	AUGUST 8 -03
۱۳۸۲/ ۵ / 18	2.700	2.700	9
۱۳۸۲/ ۵ / 19	2.680	2.660	10
۱۳۸۲/ ۵ / 20	2.660	2.660	11
۱۳۸۲/ ۵ / 21	2.660	2.660	12
۱۳۸۲/ ۵ / 22	2.670	2.700	13
۱۳۸۲/ 5 / 23	2.730	2.750	14
۱۳۸۲/ 5 / 24	2.770	2.780	15
۱۳۸۲/ 5 / 25	2.780	2.770	16
۱۳۸۲/ ۵ / 26	2.760	2.780	17
۱۳۸۲/ 5 / 27	2.730	2.700	18
۱۳۸۲/ ۵ / 28	2.680	2.680	19
۱۳۸۲/ 5 / 29	2.700	2.700	20
۱۳۸۲/ ۵ / 30	2.780	2.710	21
۱۳۸۲/ 5 / 31	2.720	2.700	22
۱۳۸۲/ 6 / 1	2.690	2.690	23
۱۳۸۲/ 6 / 2	2.660	2.660	24
۱۳۸۲/ 6 / 3	2.660	2.640	25
۱۳۸۲/ 6 / 4	2.610	2.590	26
۱۳۸۲/ 6 / 5	2.580	2.580	27
۱۳۸۲/ 6 / 6	2.590	2.580	28
۱۳۸۲/ 6 / 7	2.600	2.580	29
۱۳۸۲/ 6 / 8	2.650	2.680	30
۱۳۸۲/ 6 / 9	2.610	2.620	AUGU 31 03

DASTOOR-E NOVIN مهندسین مشاور دستورنوین

Consulting Engineers AB KENAR VILLAGE

Form For Tide Gage Reading No.....in the job No.162 فرم قرائت اشل

On The ANZALI LAGOON TB4 در مرداب انزلی روستای اب کنار

تاریخ	READING GAGE -- قرائت روی میر مدرج		ملاحظات
DATE	8.AM ۸ صبح	6.PM ۶ بعداظهر	REMARKS
1382	m	m	
۱۳۸۲/6/10	2.630	2.630	Sep 1th 03
۱۳۸۲/6/11	2.610	2.600	2
۱۳۸۲/6/12	2.580	2.560	3
۱۳۸۲/6/13	2.560	2.540	4
۱۳۸۲/6/14	2.520	2.530	5
۱۳۸۲/6/15	2.520	2.520	6
۱۳۸۲/6/16	2.530	2.560	7
۱۳۸۲/6/17	2.580	2.590	8
۱۳۸۲/6/18	2.610	2.620	9
۱۳۸۲/6/19	2.640	2.630	10
۱۳۸۲/6/20	2.620	2.640	11
۱۳۸۲/6/21	2.670	2.680	12
۱۳۸۲/6/22	2.690	2.700	13
۱۳۸۲/6/23	2.710	2.730	14
۱۳۸۲/6/24	2.740	2.740	15
۱۳۸۲/6/25	2.730	2.720	Sep 16th 03
۱۳۸۲/6/26			
۱۳۸۲/ /			
۱۳۸۲/ /			
۱۳۸۲/ /			
۱۳۸۲/ /			
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