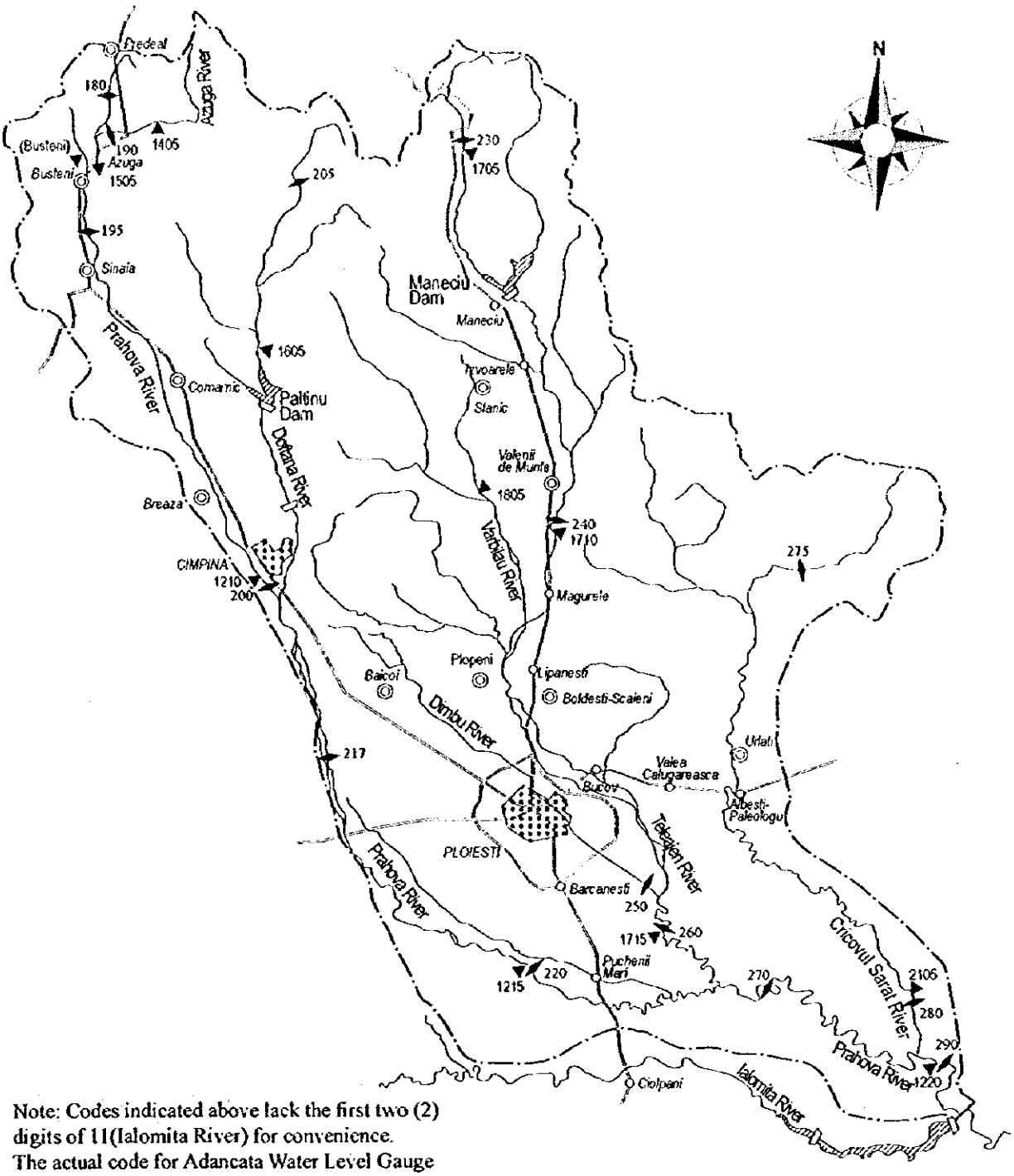
FIGURES



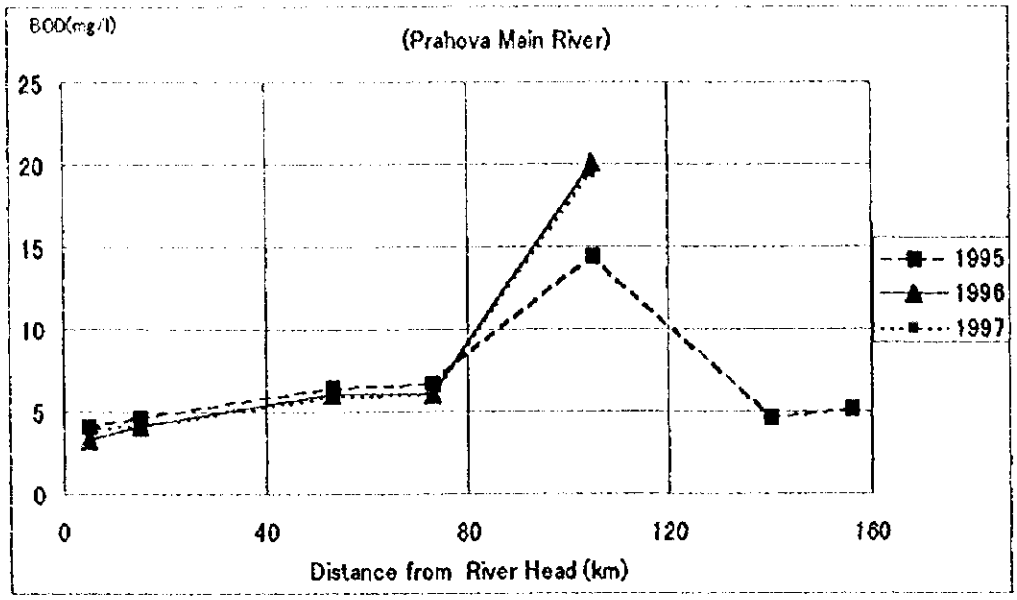
Note: Codes indicated above lack the first two (2) digits of 11(Ialomita River) for convenience. The actual code for Adancata Water Level Gauge Station is 111220.

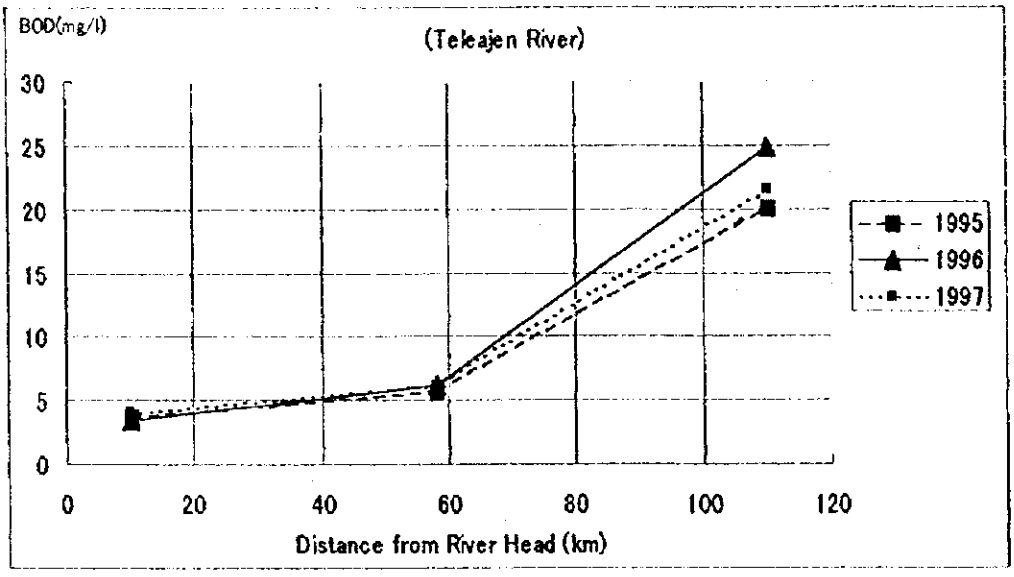
Legend

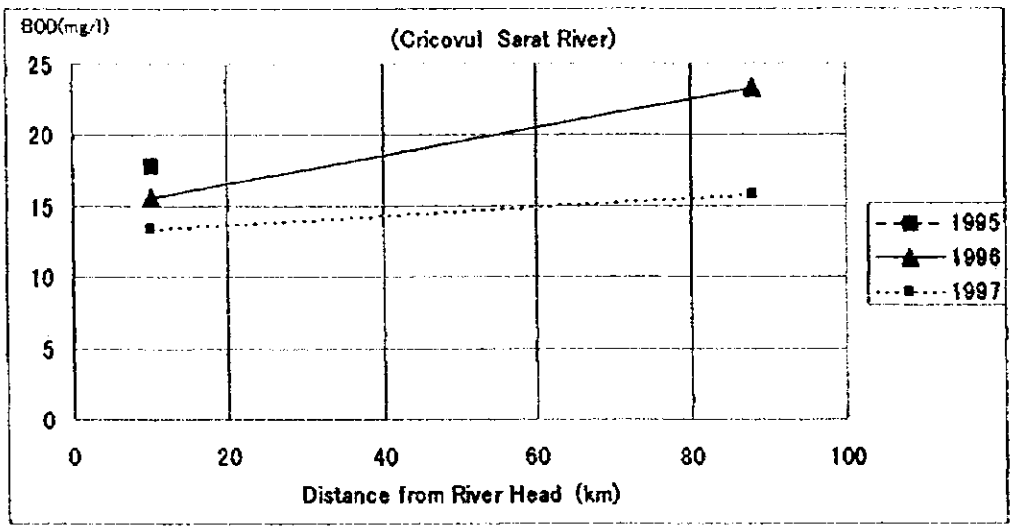
- : River
- : Road
- : City/Town
- : Dam
- : Reservoir
- : Basin Boundary
- ▲ : Water Level Gauge Station
- ◆ : Water Quality Monitoring Point

0 5 10 15 20km

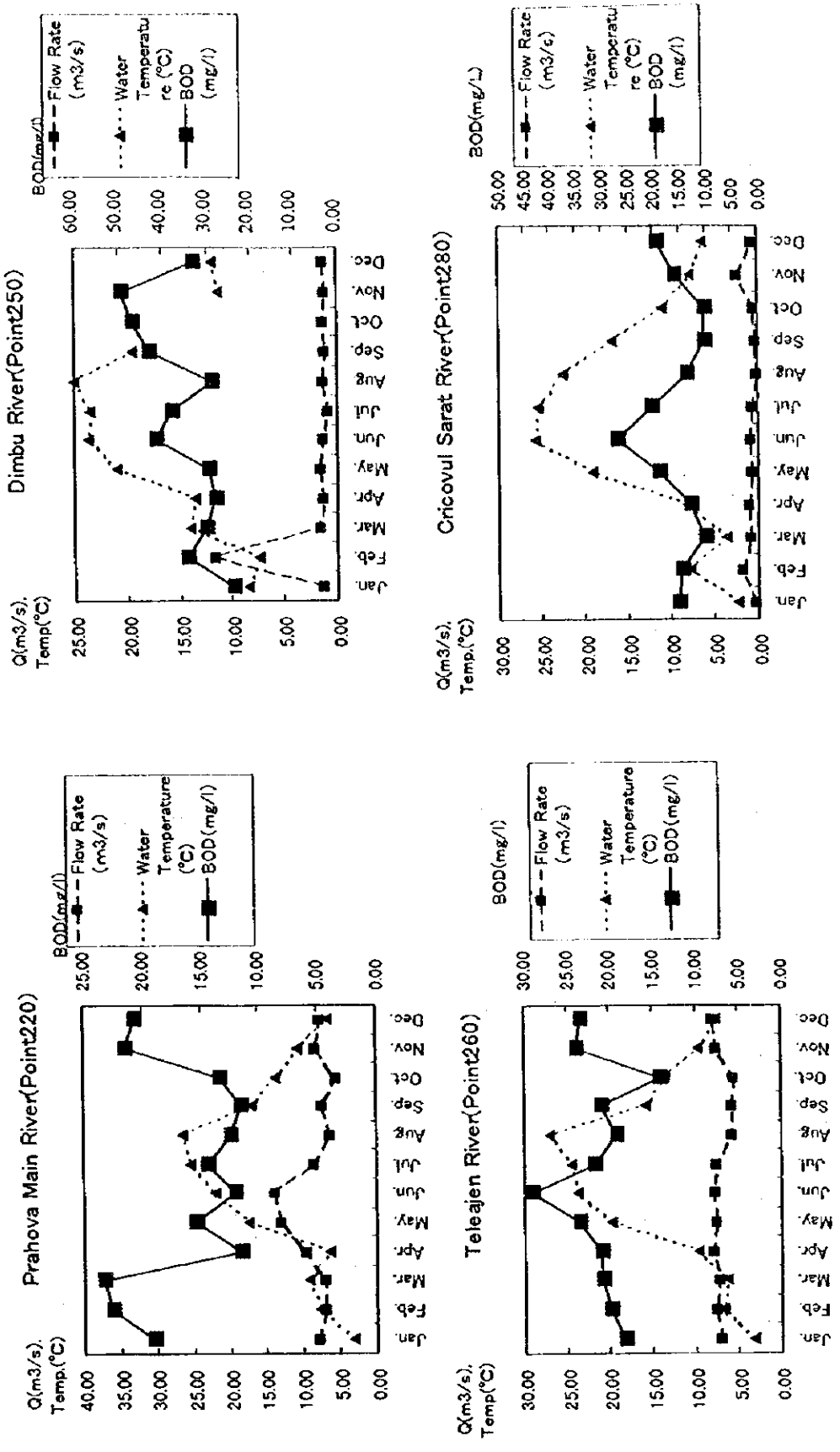
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN	**Fig. C.1.1 River System and Periodical Observation Points**
JAPAN INTERNATIONAL COOPERATION AGENCY	



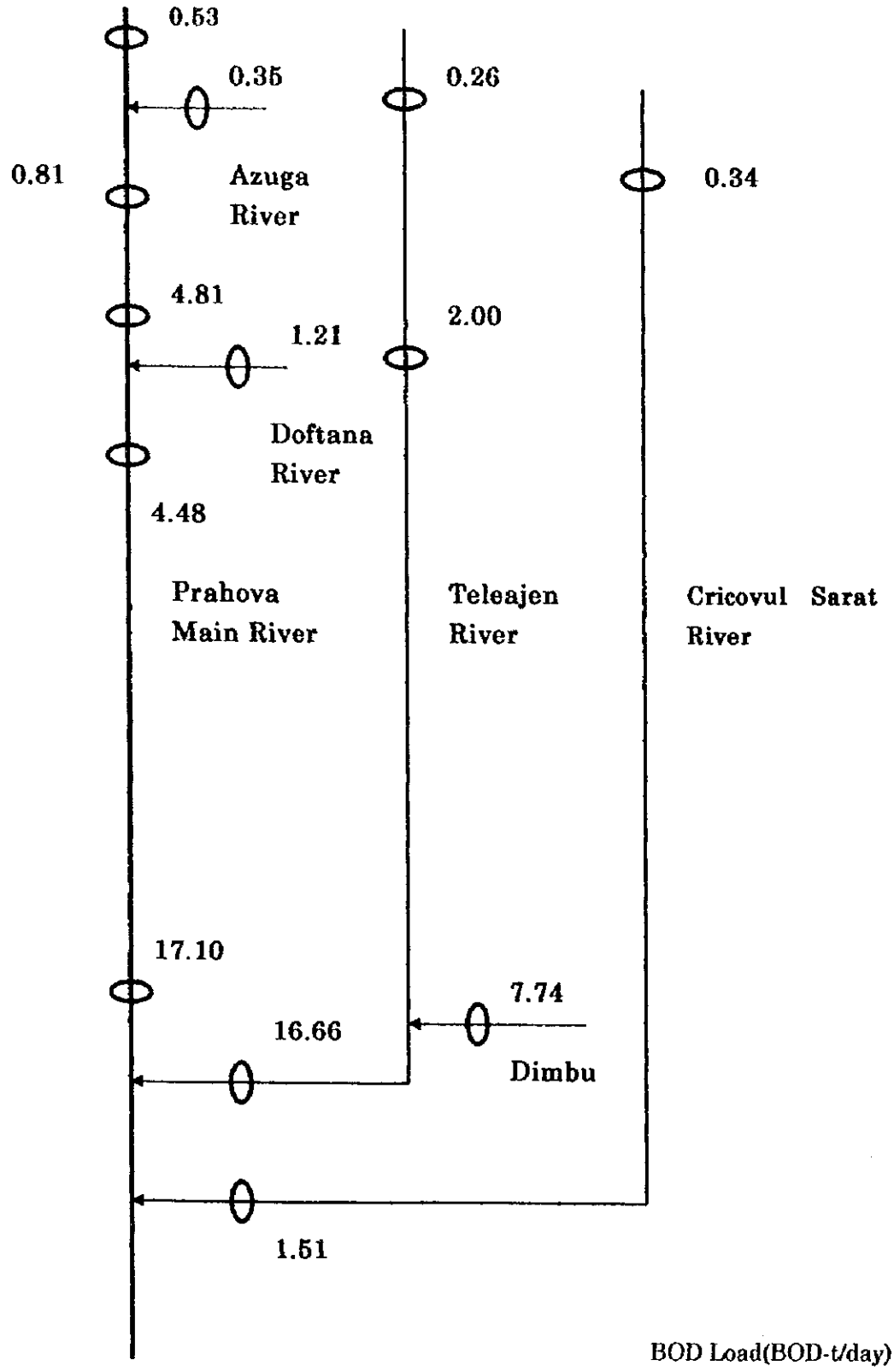




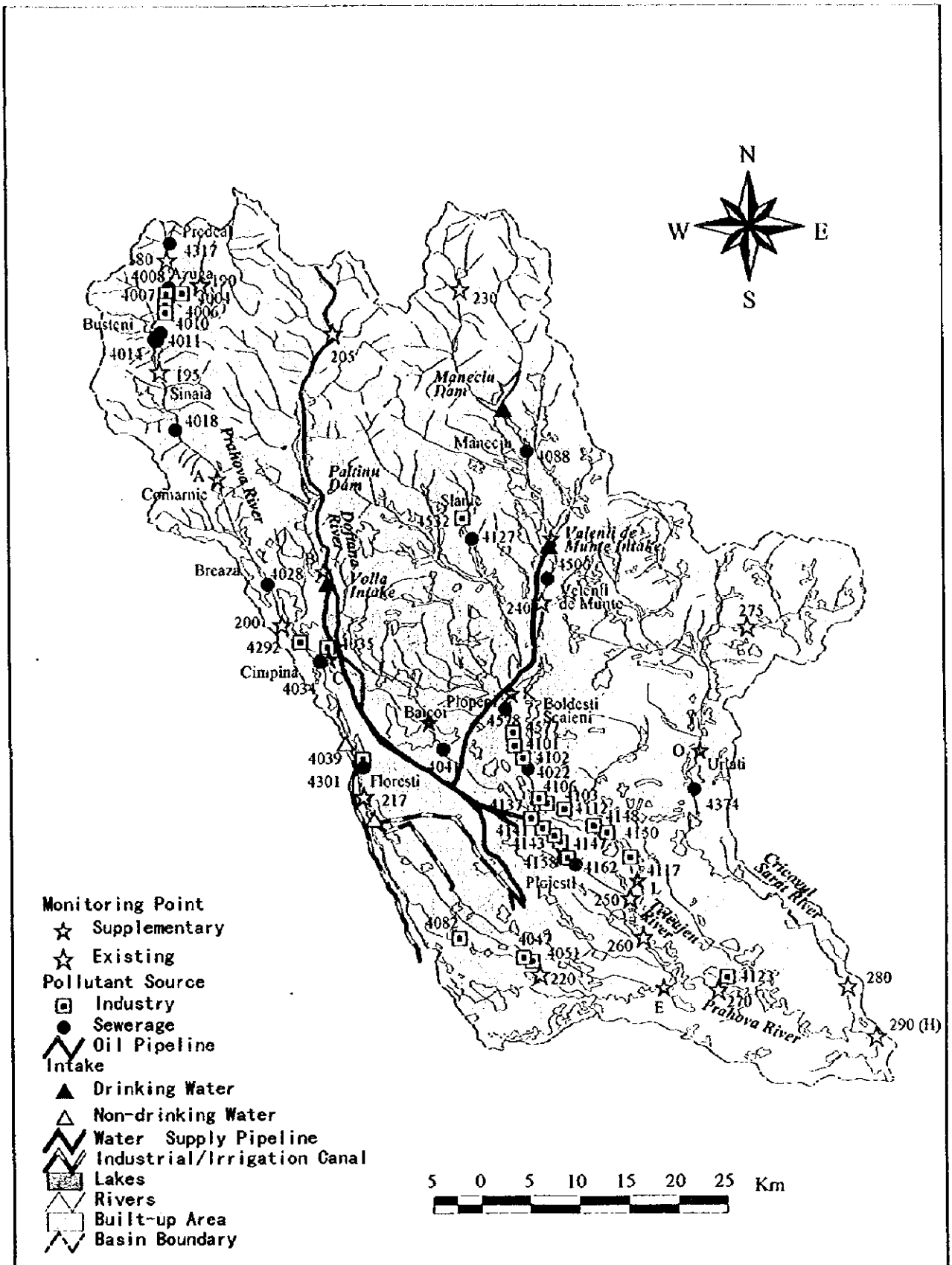
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN JAPAN INTERNATIONAL COOPERATION AGENCY	**Fig. C.1.2 Longitudinal Variation of Water Quality of Prahova River**



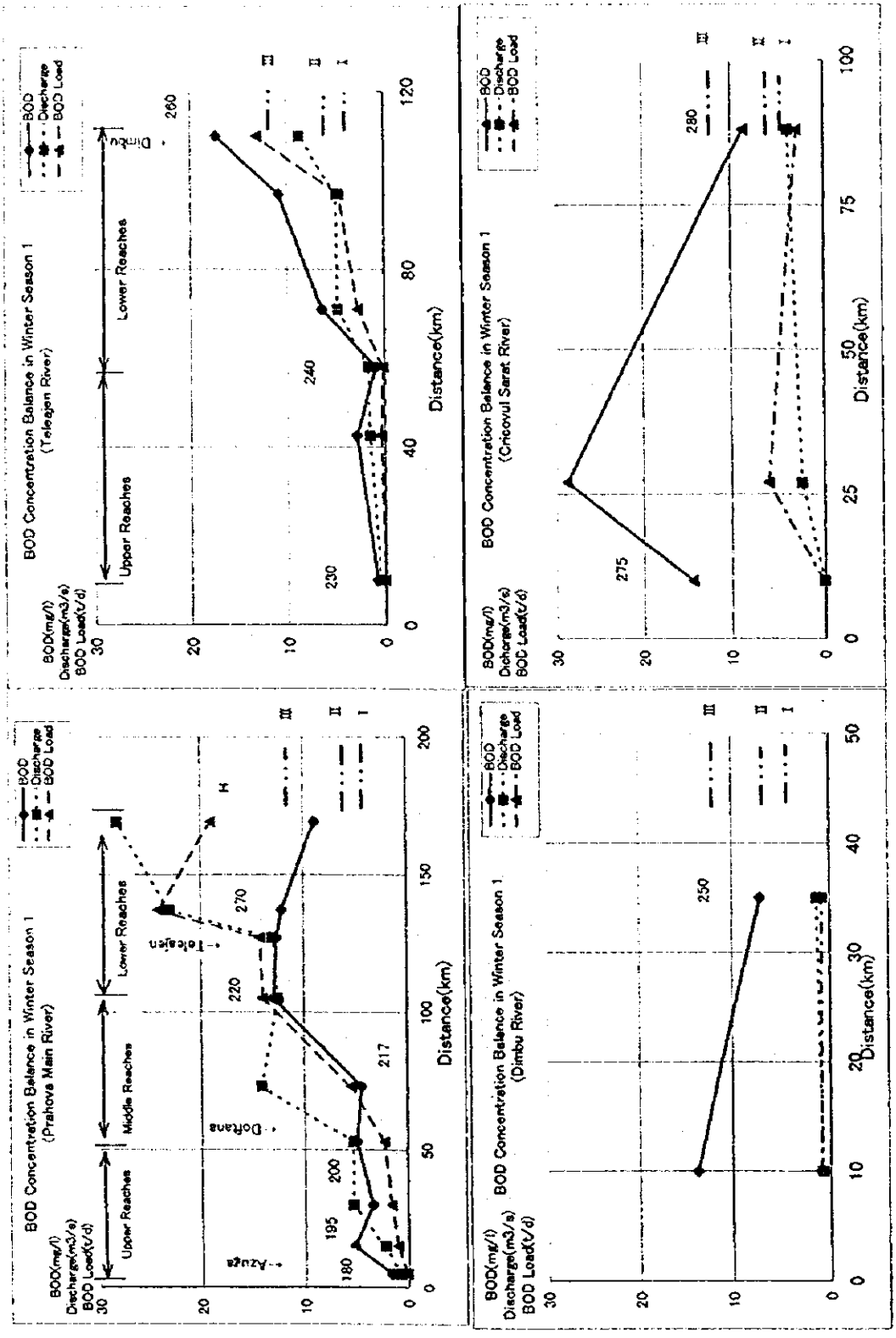
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN	**Fig. C.1.3 Seasonal Variation of River Flow Rate and Water Quality**
JAPAN INTERNATIONAL COOPERATION AGENCY	



STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN JAPAN INTERNATIONAL COOPERATION AGENCY	Fig. C.1.4 BOD Load Balance in Prahova River Basin



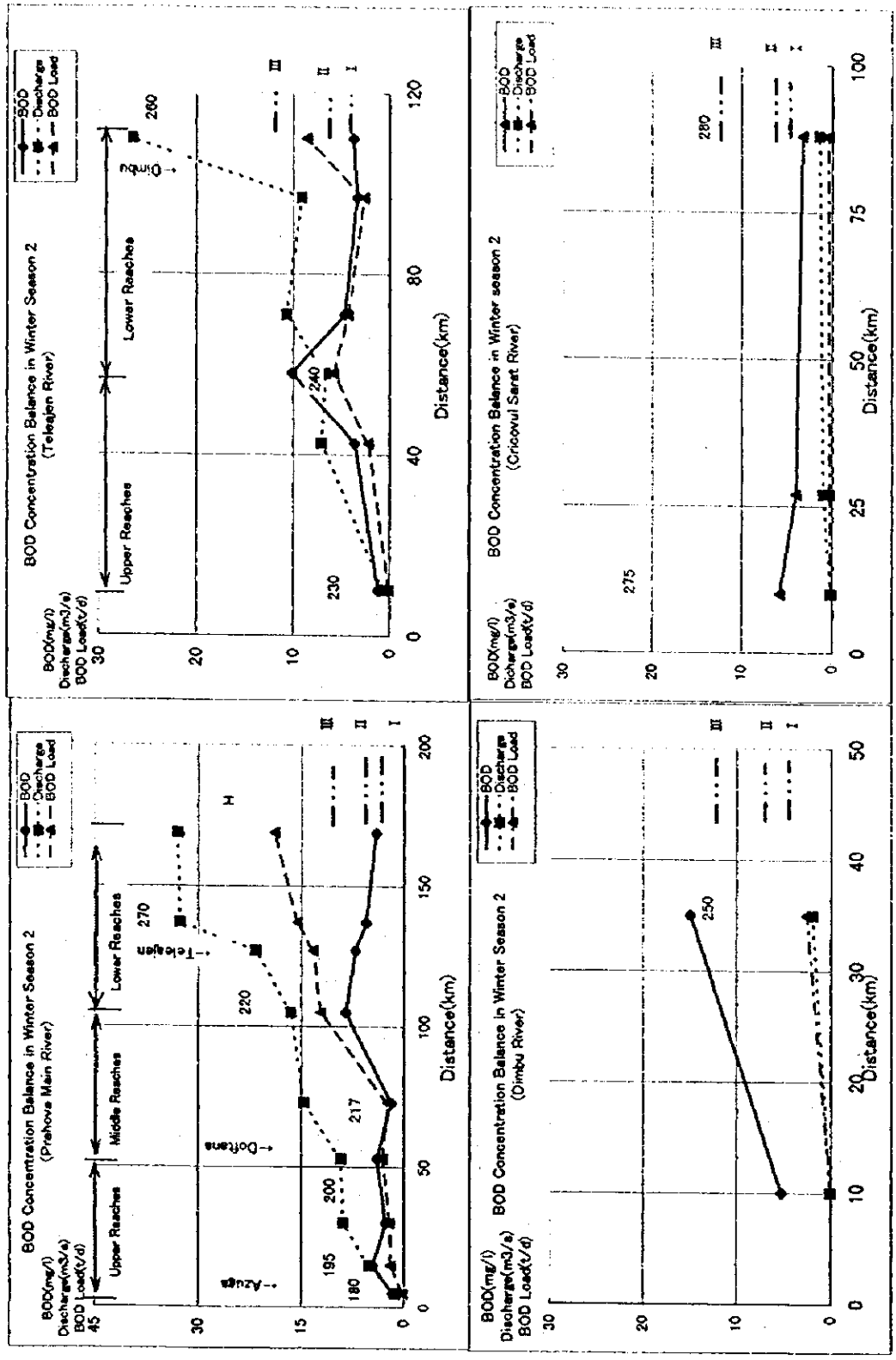
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN JAPAN INTERNATIONAL COOPERATION AGENCY	Fig. C.2.1 Supplementary Water Quality Observation Point



STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

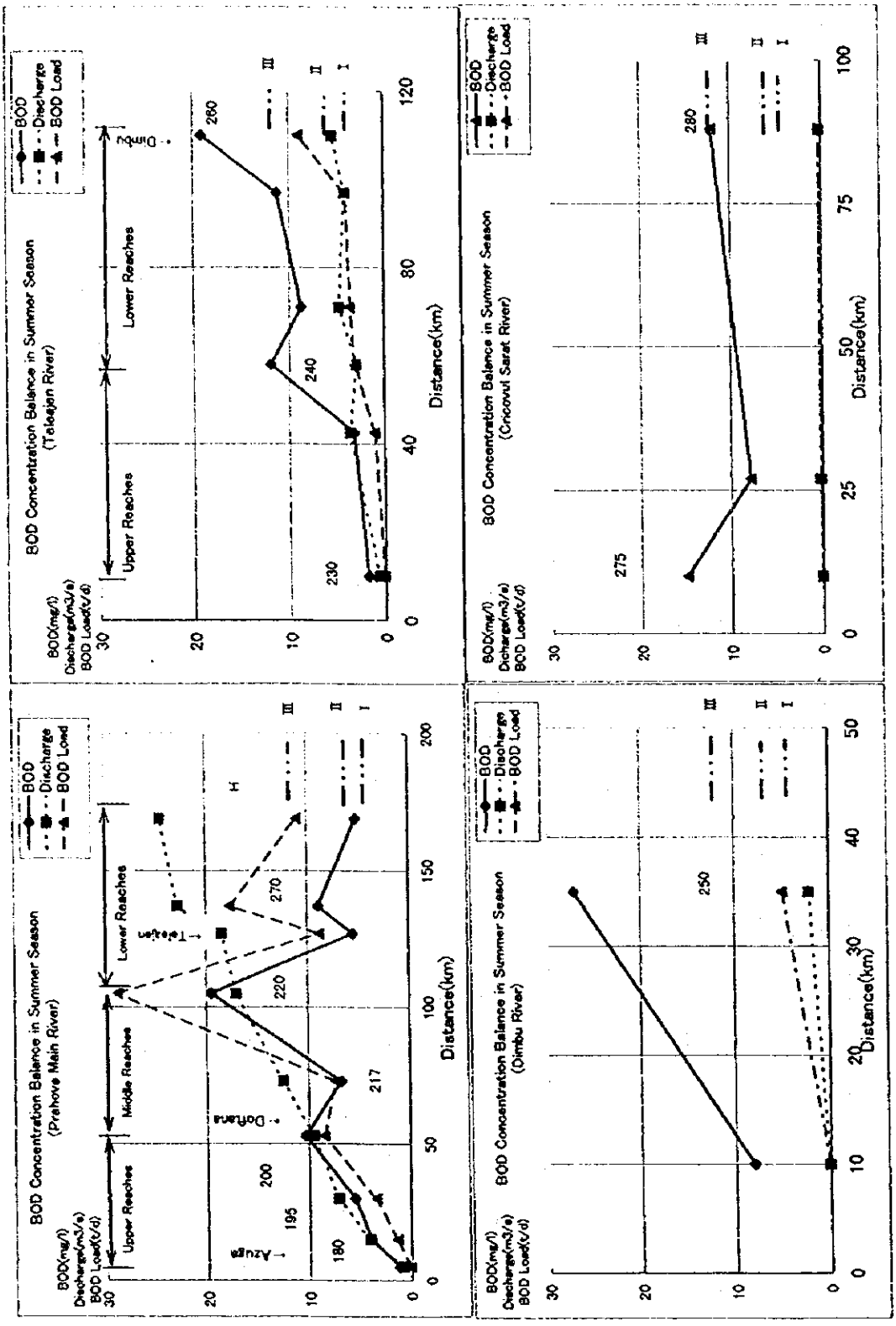
Fig C.2.2 BOD Concentration Balance in Winter Season (First Time Observation)



STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

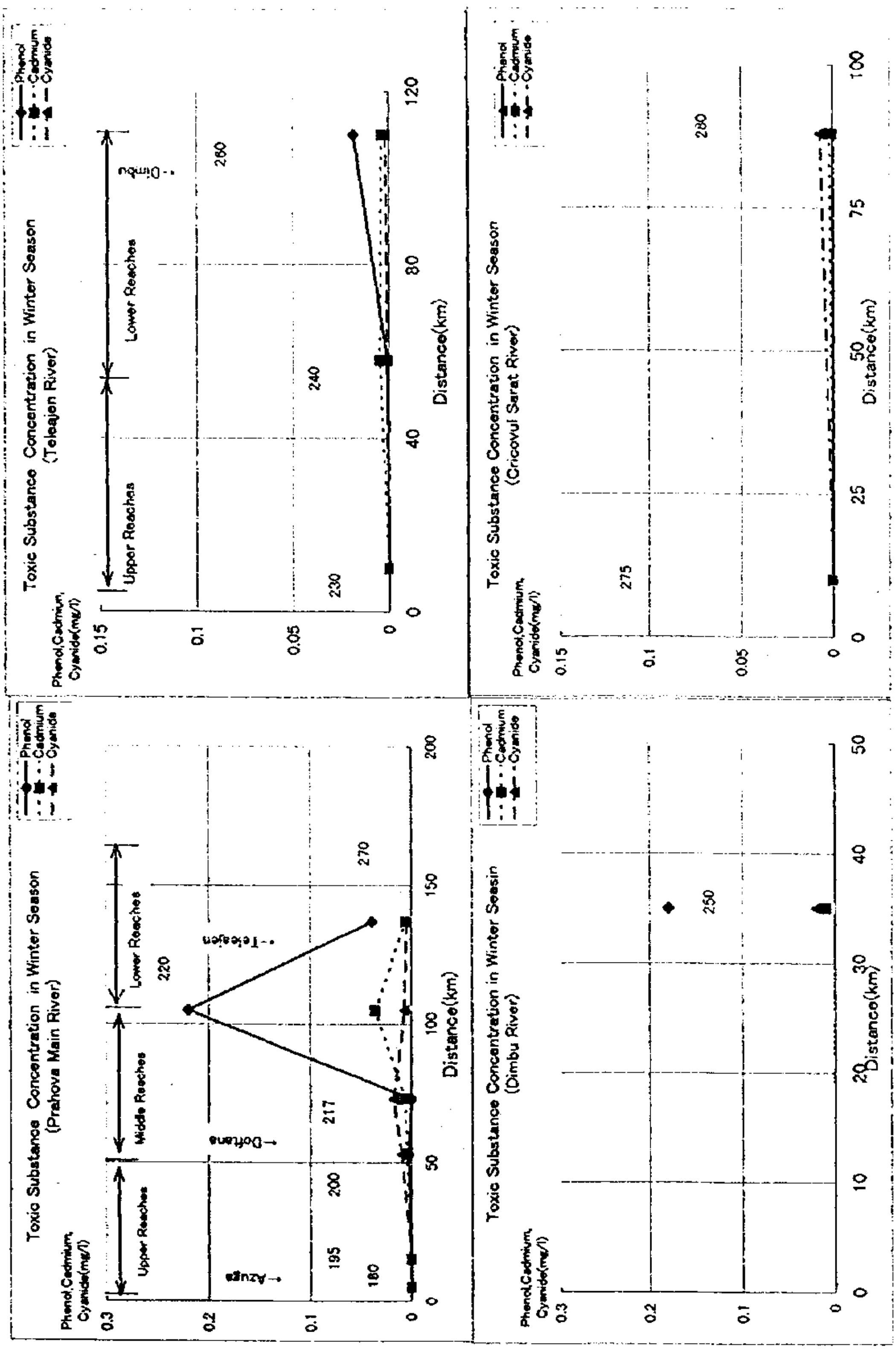
Fig C.2.3 BOD Concentration Balance in Winter Season (Second Time Observation)



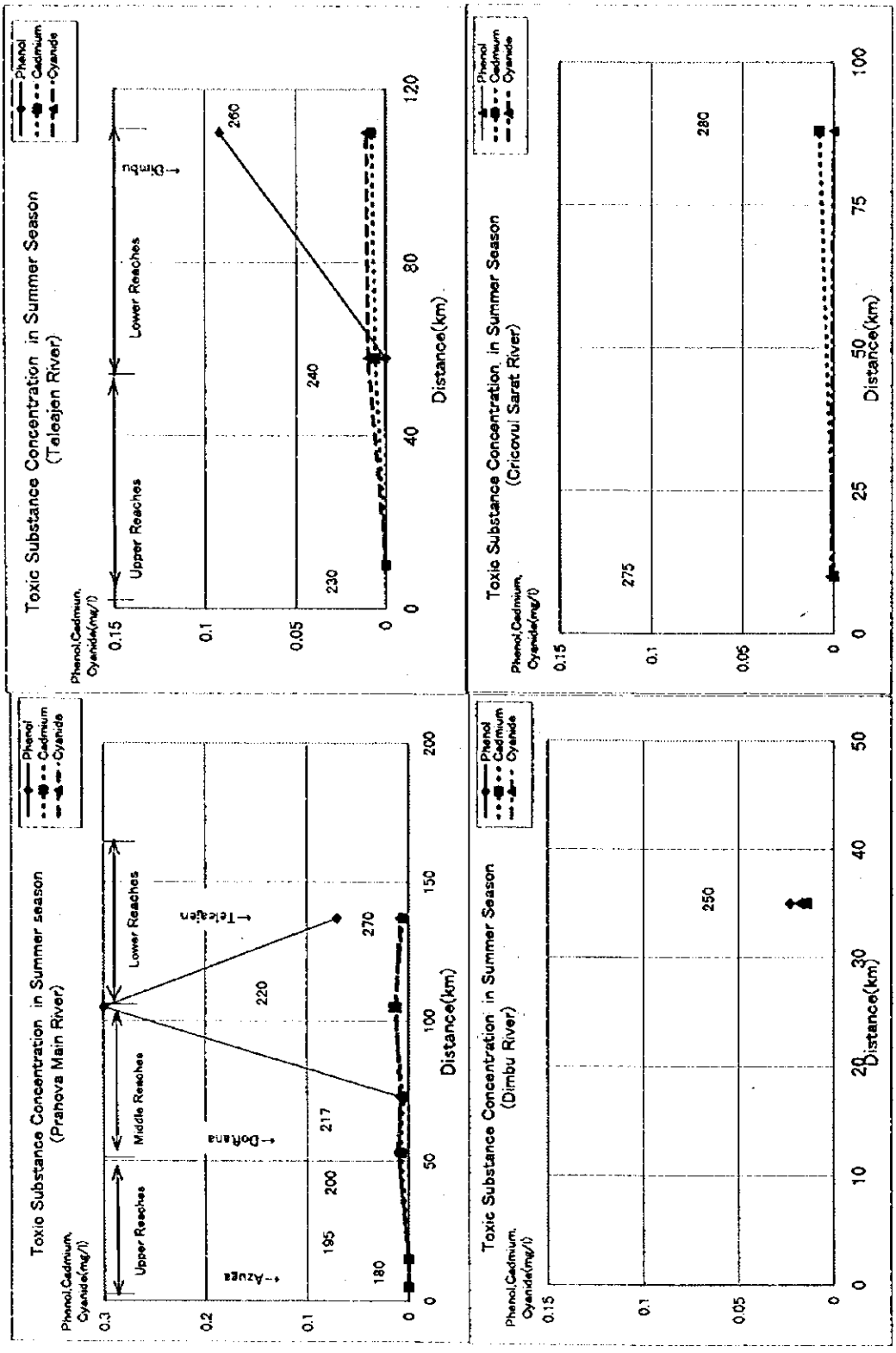
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

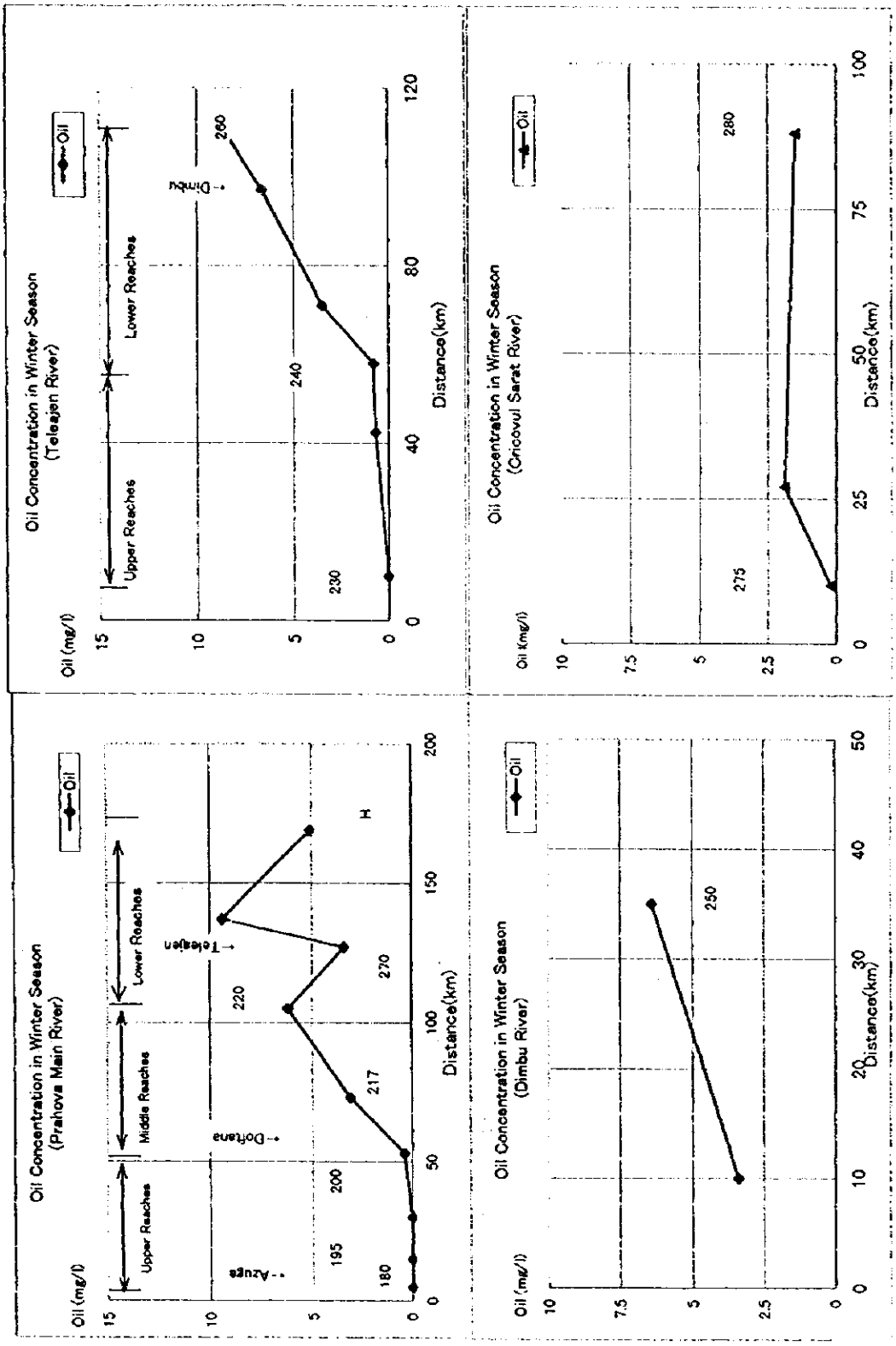
Fig C.2.4 BOD Concentration Balance in Summer Season (Third Time Observation)



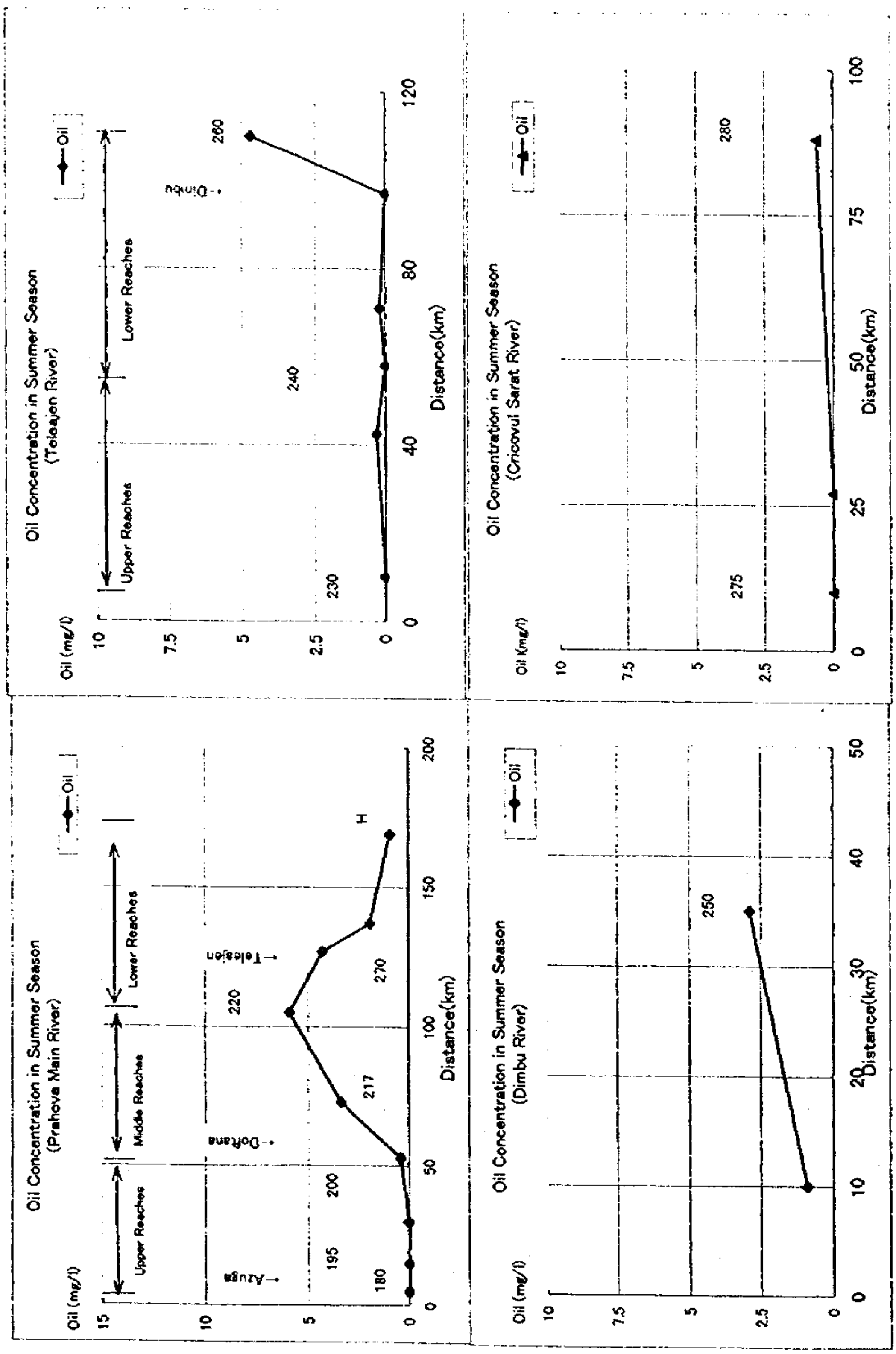
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN	Fig C.2.5 Toxic Substance Concentration in Winter Season (Second Time Observation)
JAPAN INTERNATIONAL COOPERATION AGENCY	



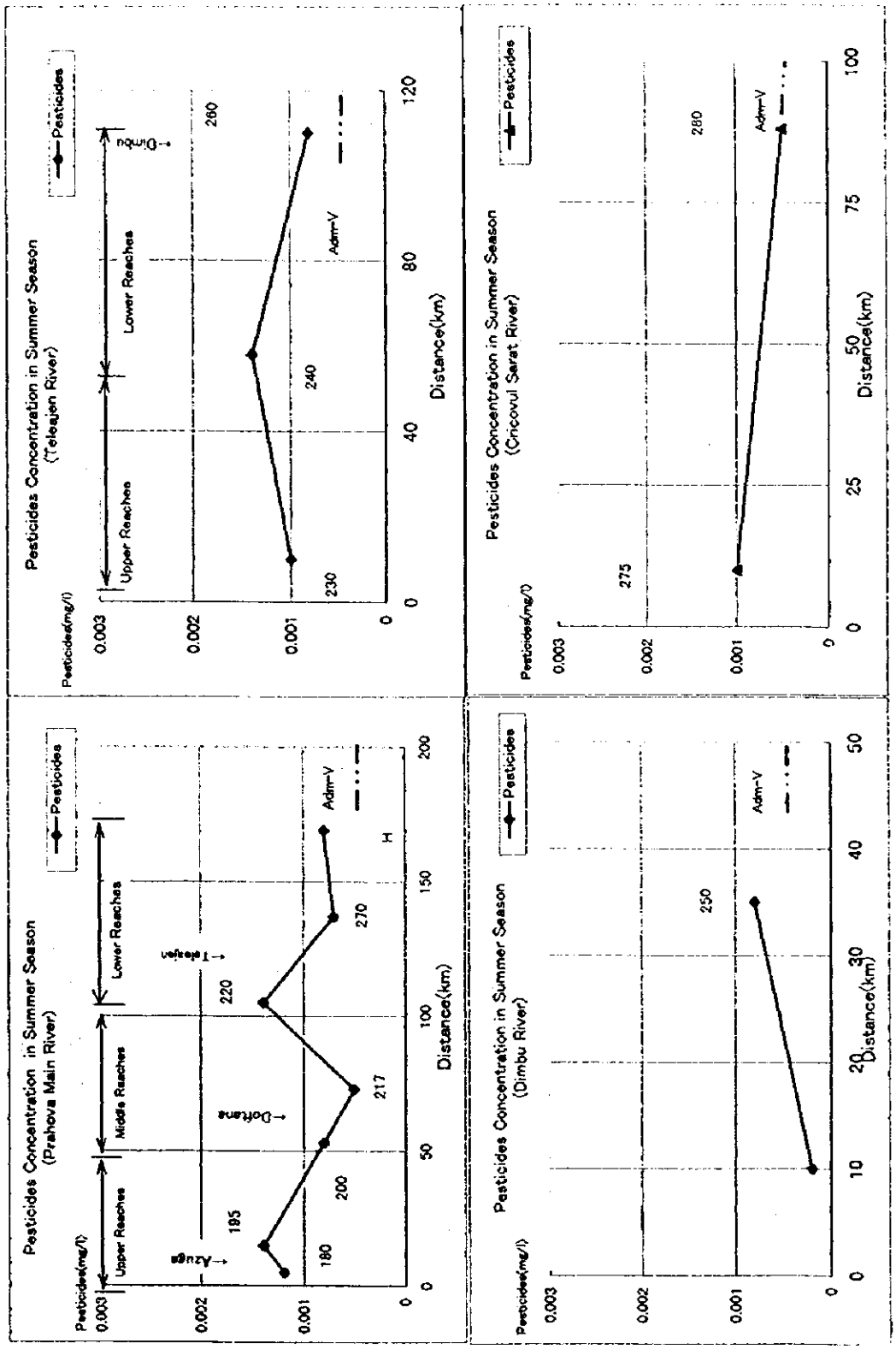
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN	**Fig. C.2.6 Toxic Substance Concentration in Summer Season (Third Time Observation)**
JAPAN INTERNATIONAL COOPERATION AGENCY	



STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN	**Fig C.2.7 Oil Concentration in Summer Season (Second Time Observation)**
JAPAN INTERNATIONAL COOPERATION AGENCY	



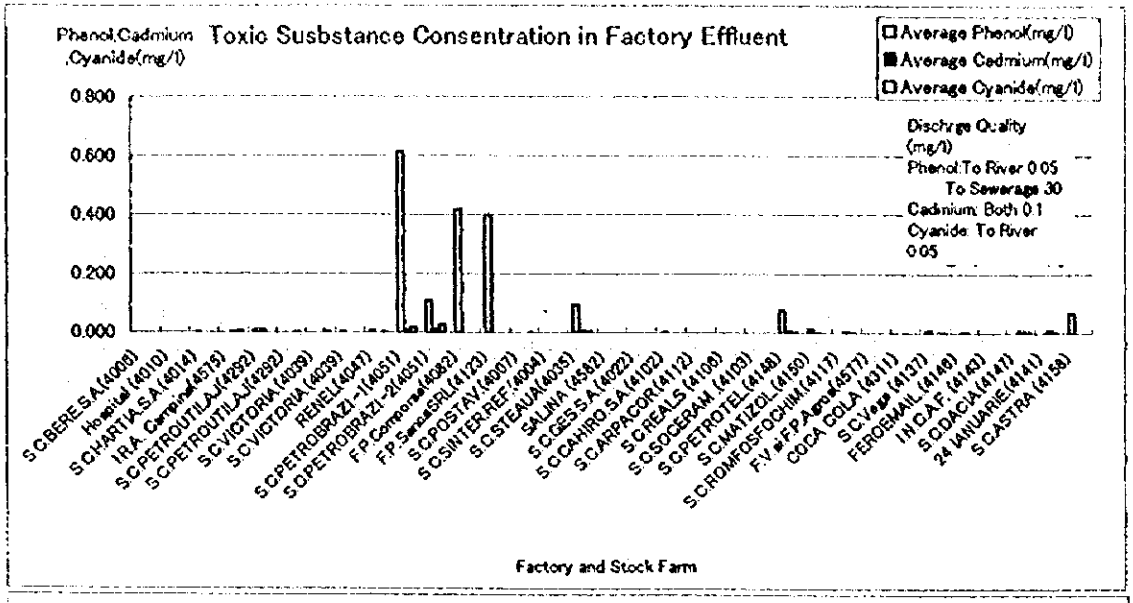
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN	Fig C.2.8 Oil Concentration in Summer Season (Third Time Observation)
JAPAN INTERNATIONAL COOPERATION AGENCY	

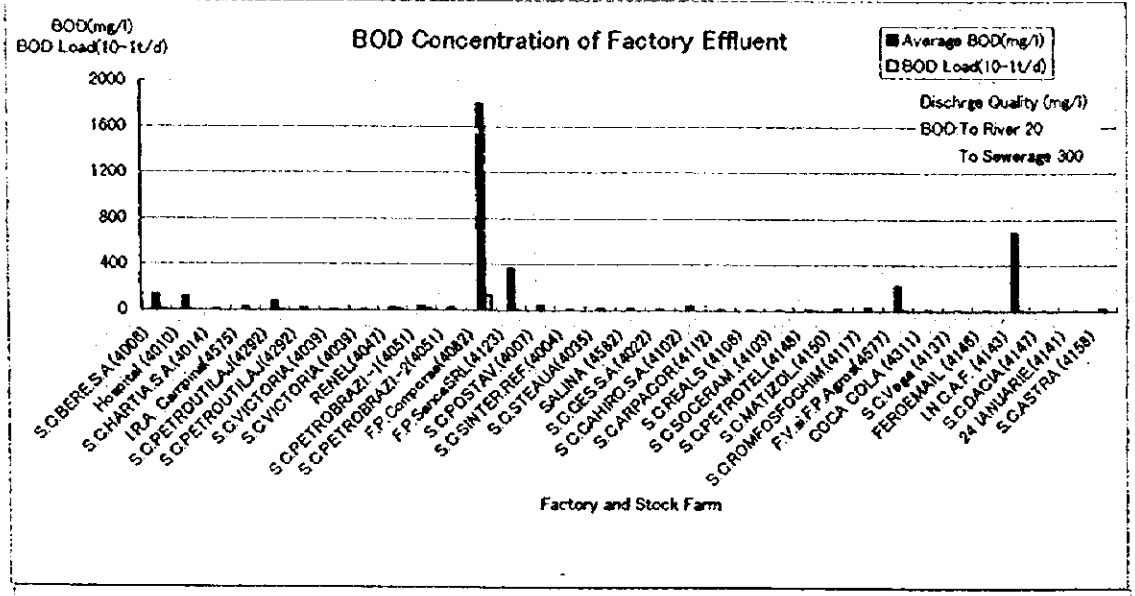


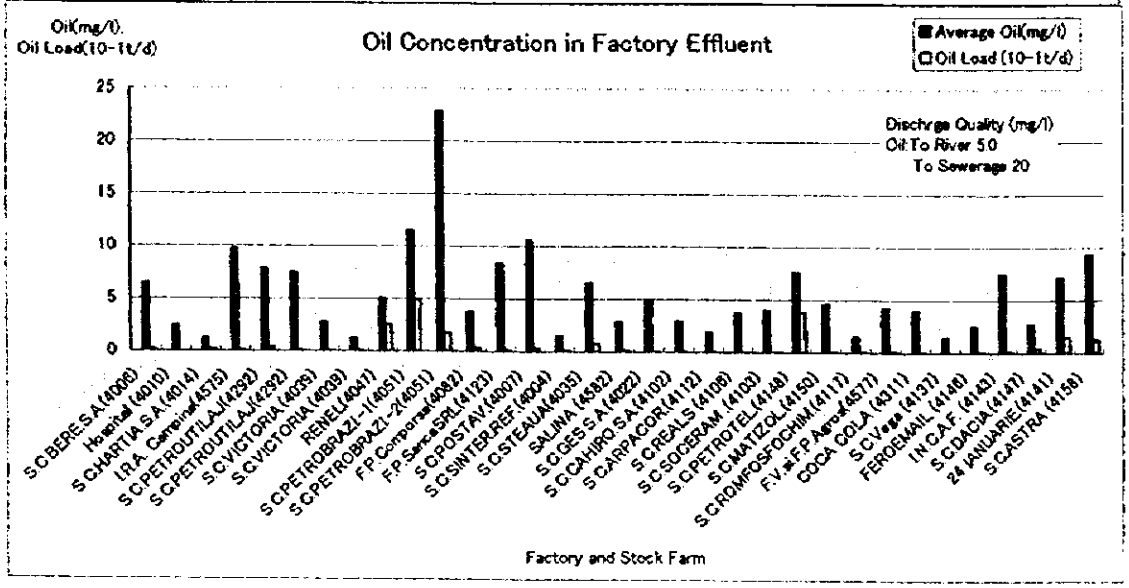
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

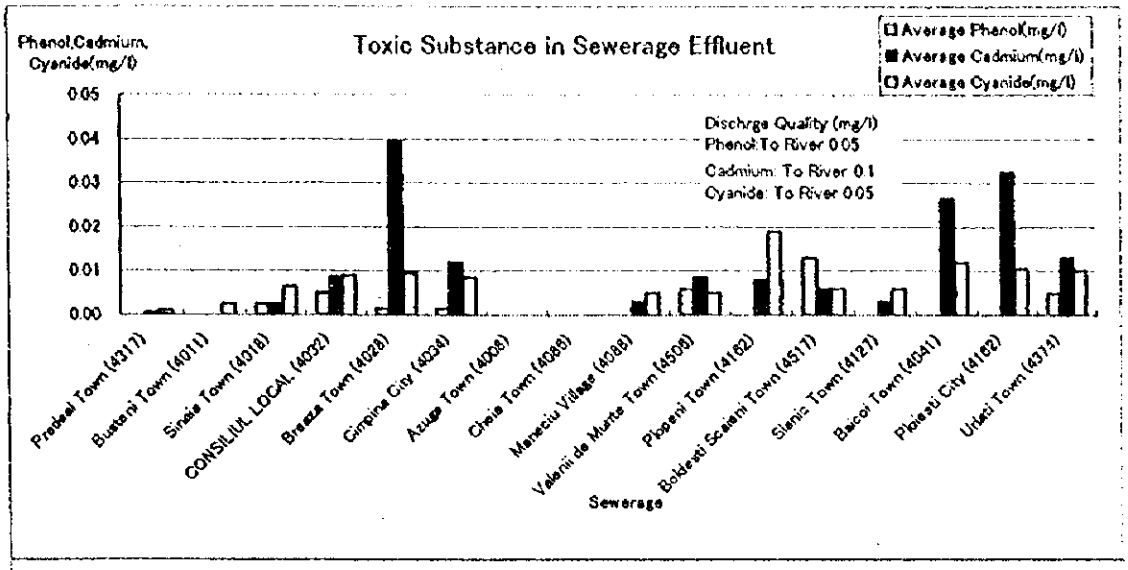
Fig C.2.9 Pesticides Concentration in Summer Season (Third Time Observation)

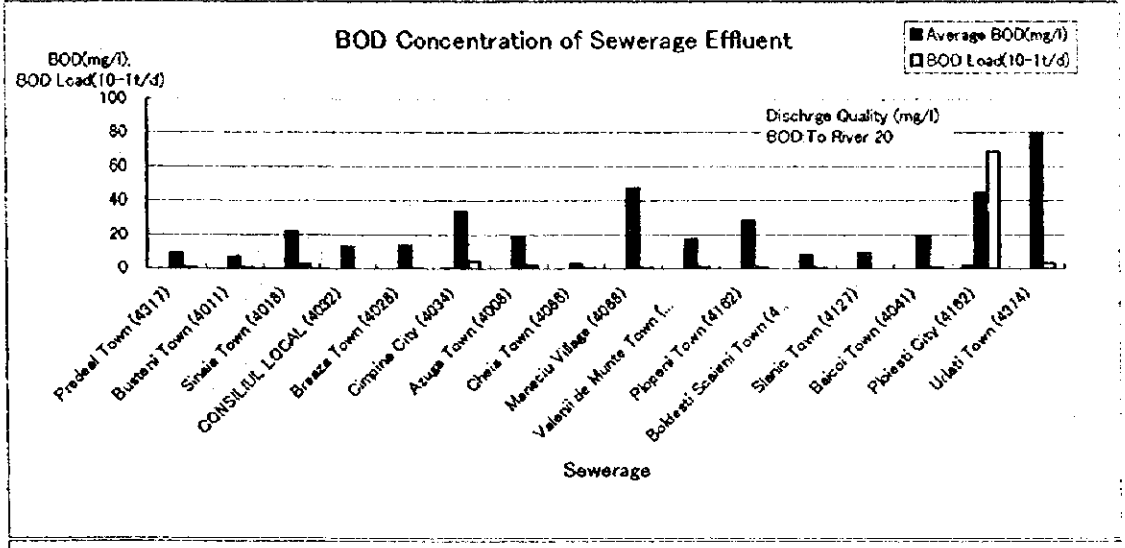


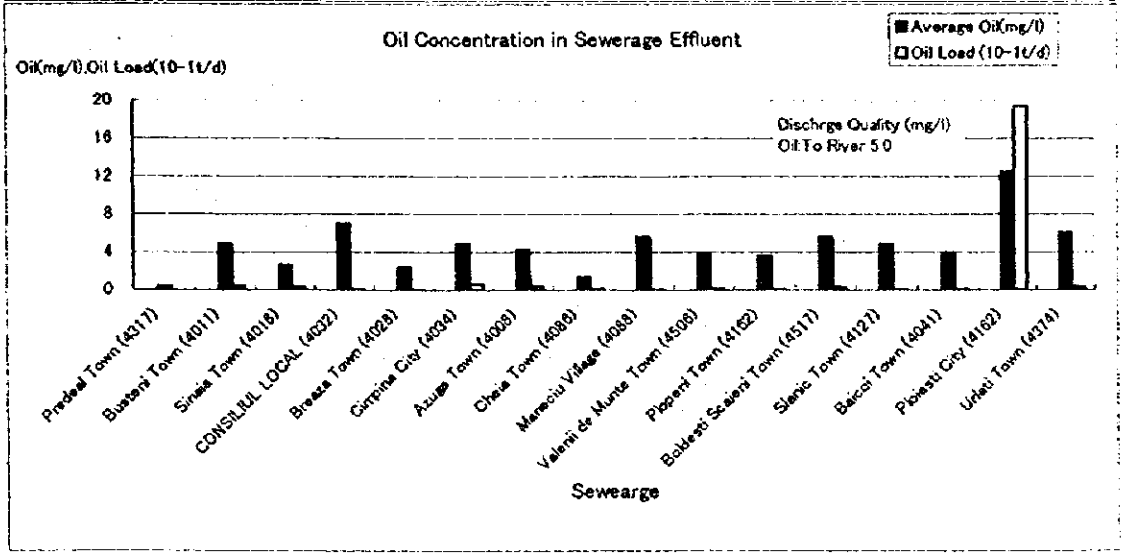




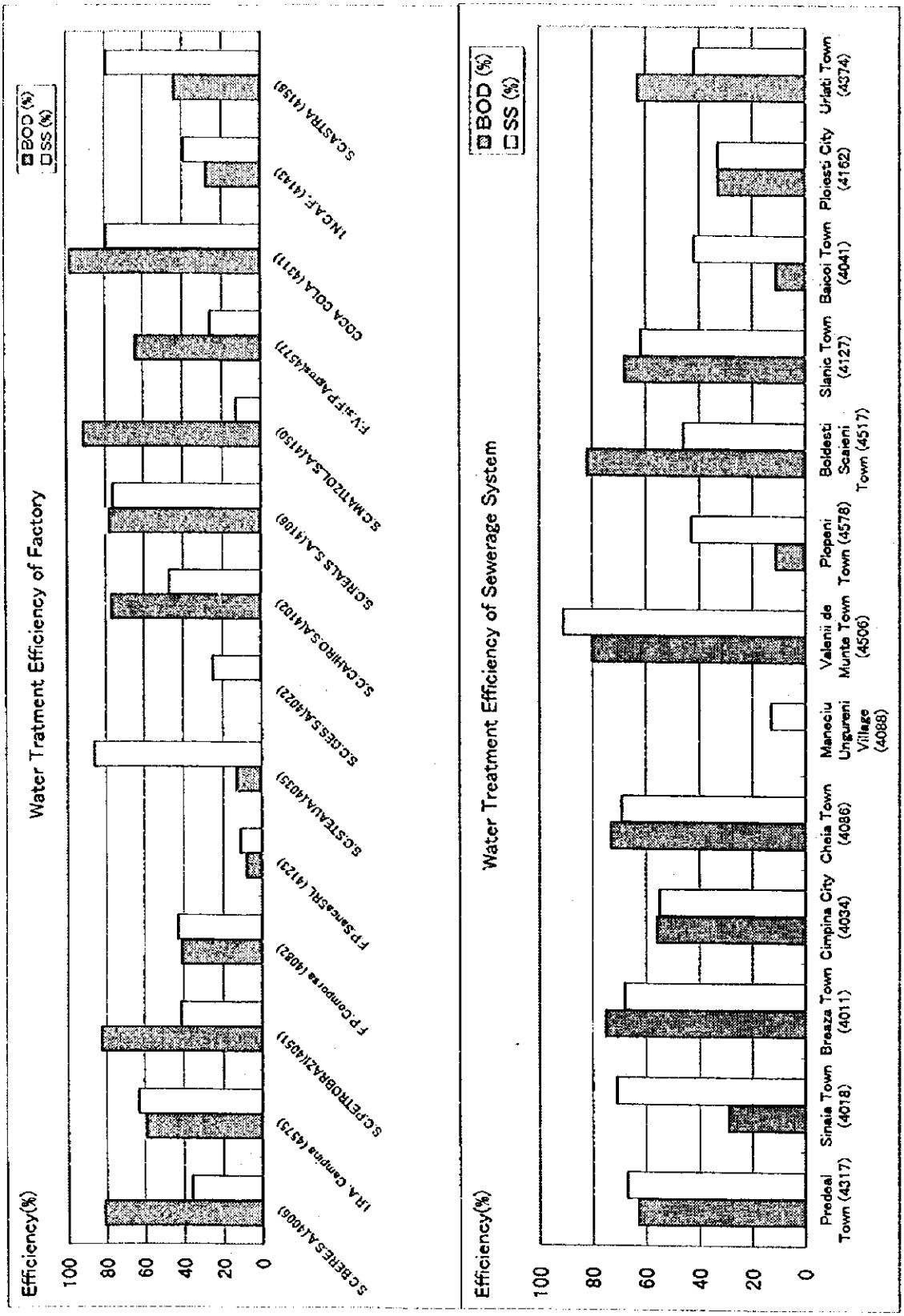
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN	Fig C.2.10 Pollutants Concentration in Factory Effluent
JAPAN INTERNATIONAL COOPERATION AGENCY	



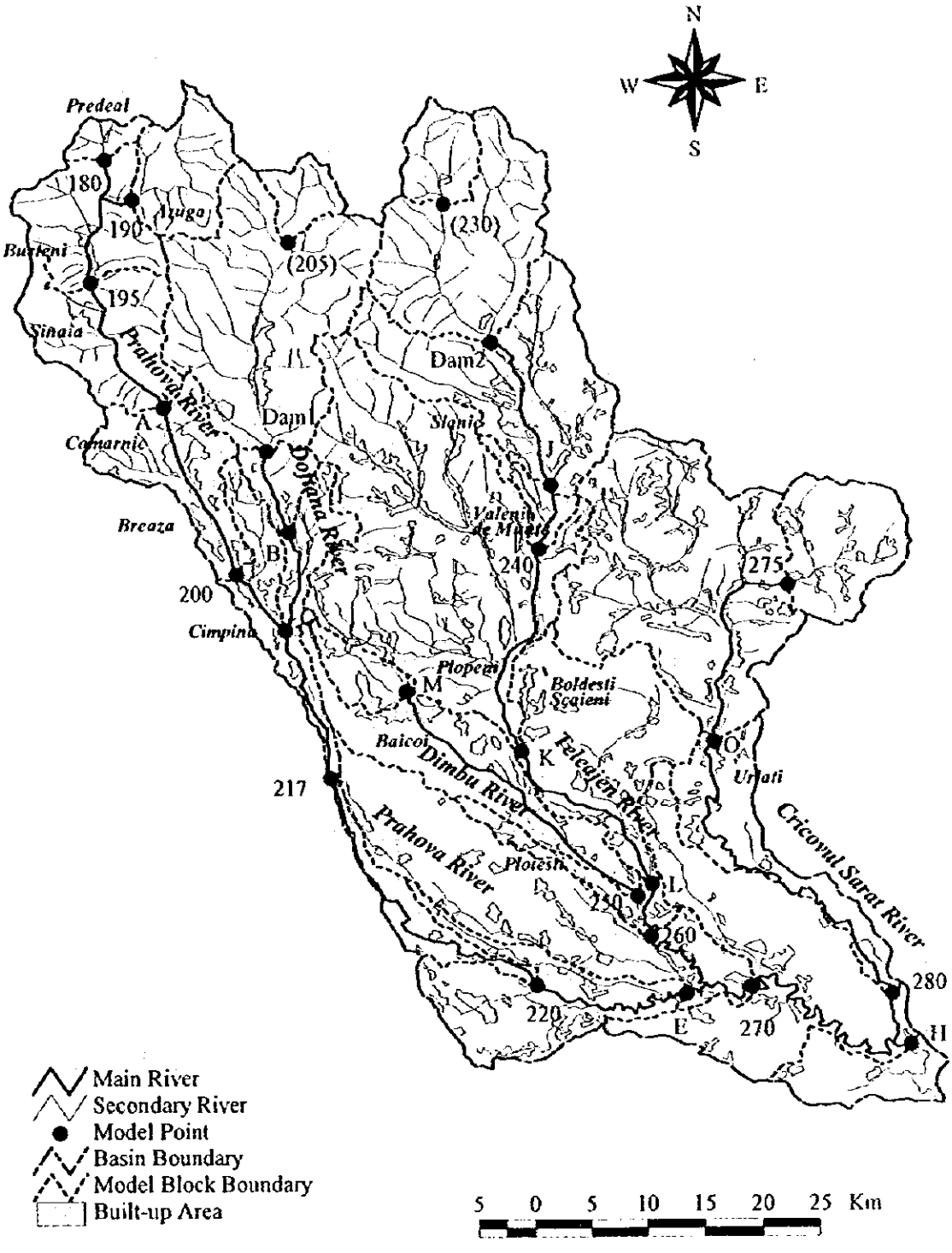




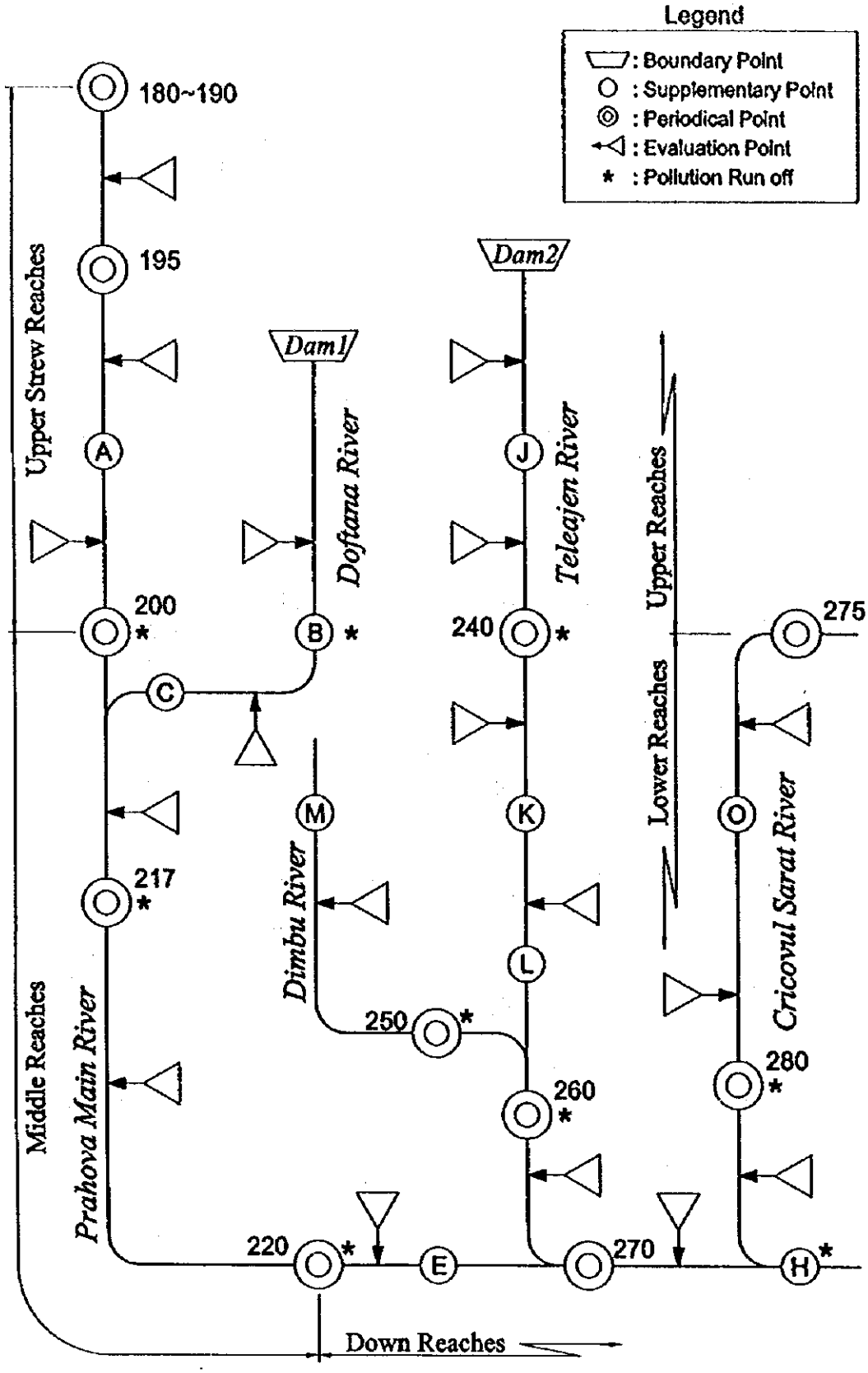
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN	Fig C.2.11 Pollutants Concentration in Sewerage Effluent
JAPAN INTERNATIONAL COOPERATION AGENCY	



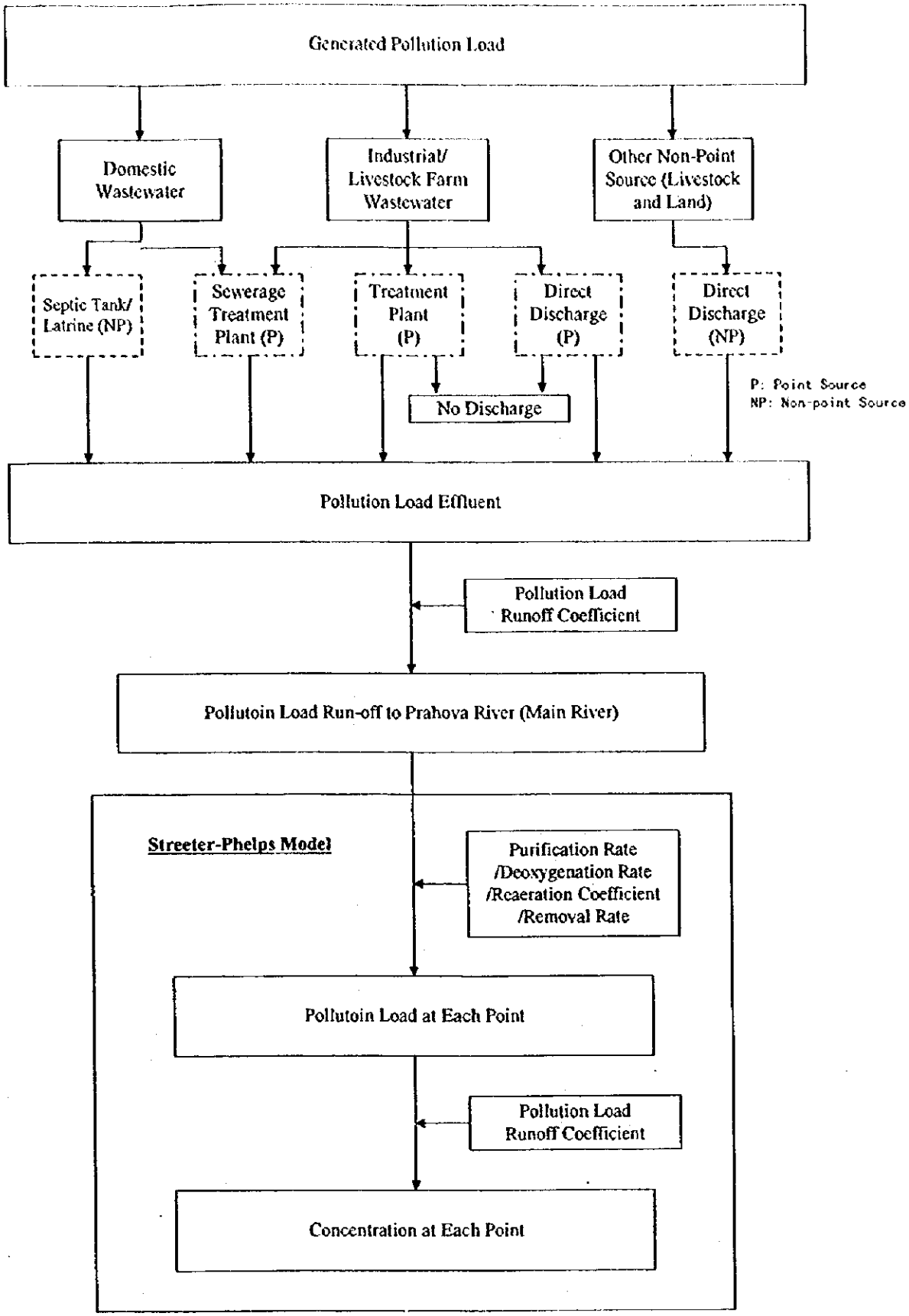
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN	**Fig. C.2.12 Water Treatment Efficiency of Factory and Sewerage System**
JAPAN INTERNATIONAL COOPERATION AGENCY	



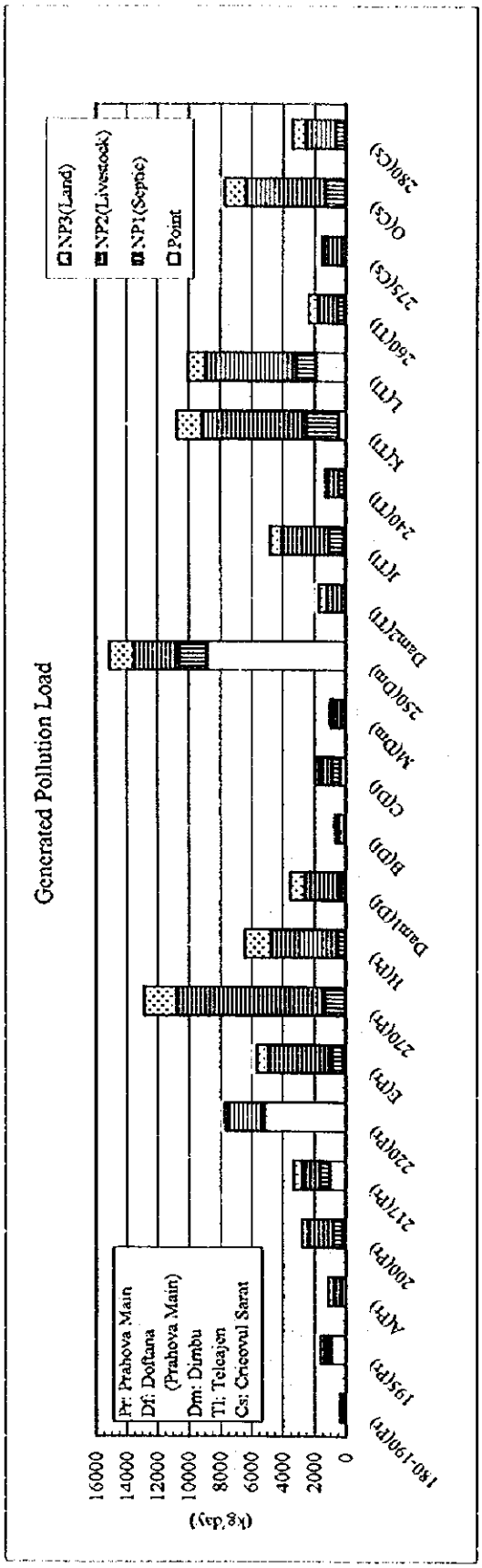
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN JAPAN INTERNATIONAL COOPERATION AGENCY	**Fig. C.3.1 Model Points and Model Blocks for Simulatoin Model**

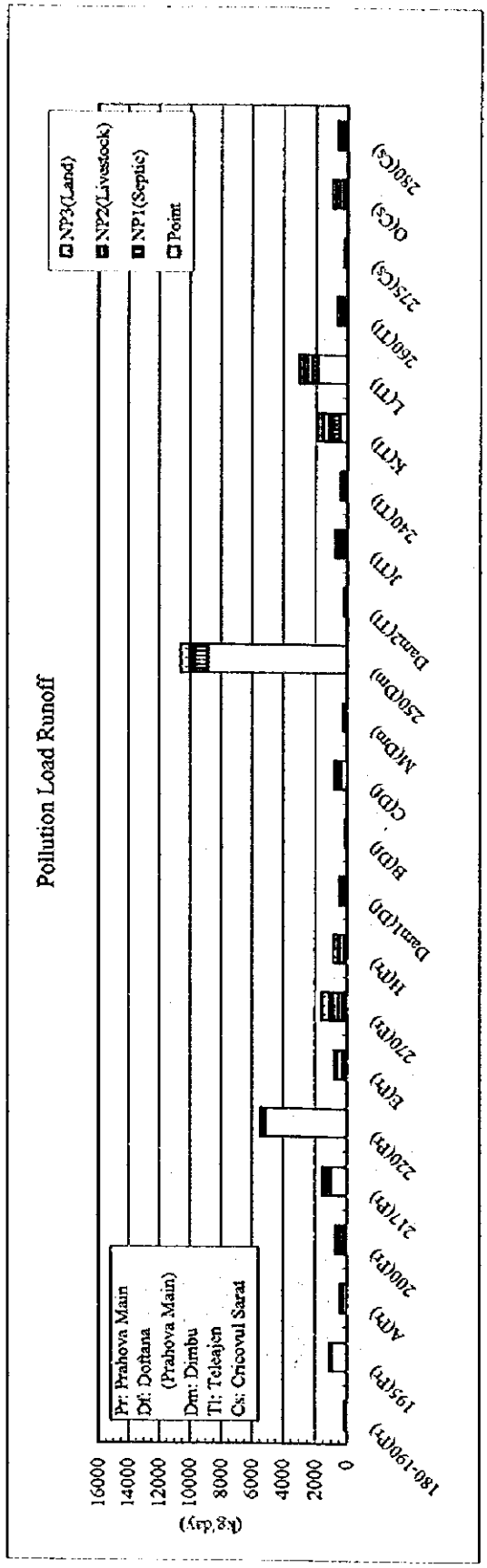


STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN JAPAN INTERNATIONAL COOPERATION AGENCY	**Fig. C.3.2 Schematic Diagram for Simulation Model**

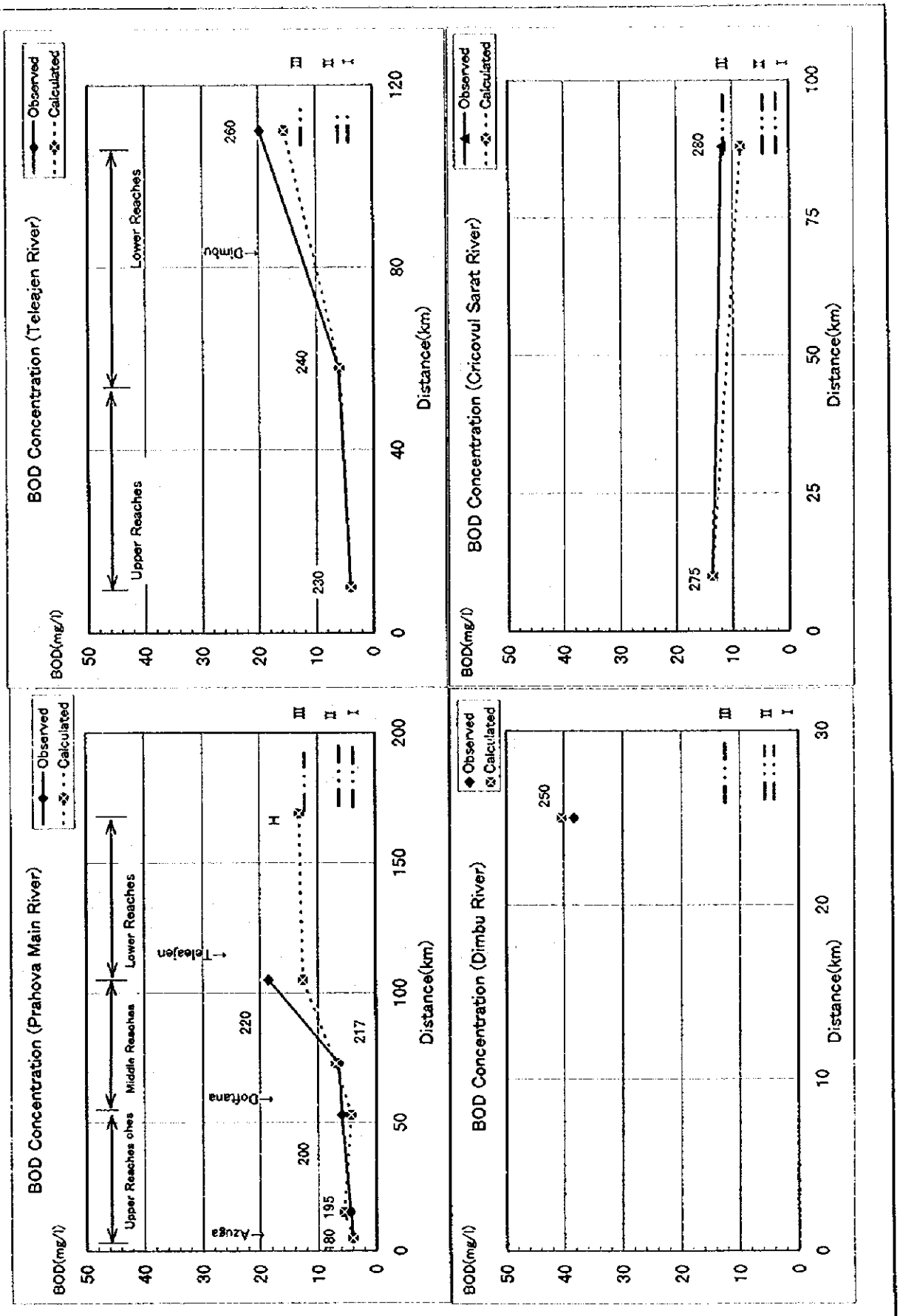


STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN JAPAN INTERNATIONAL COOPERATION AGENCY	Fig.C.3.3 Simulation Structure of Simulation Model





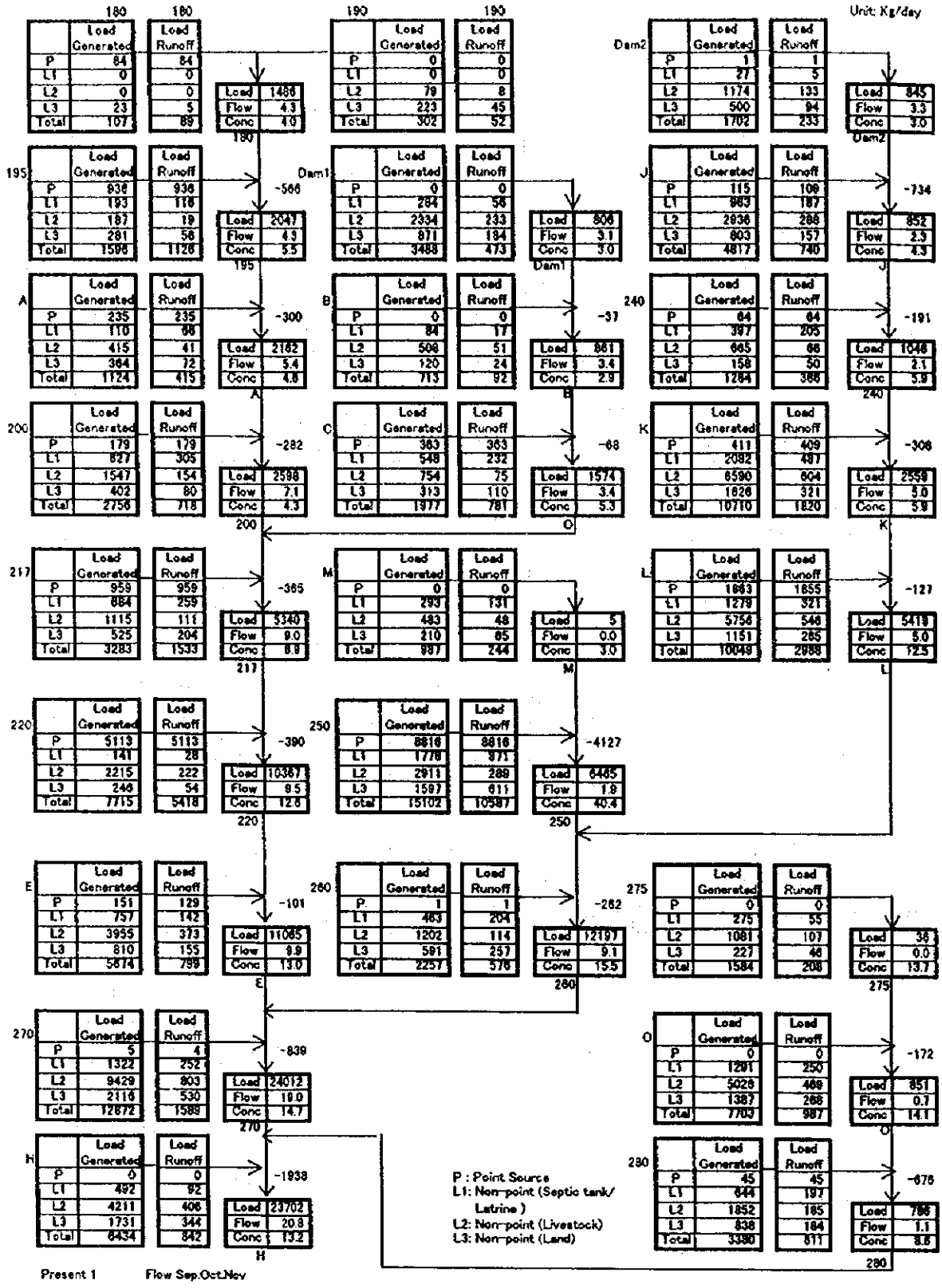
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN	**Fig.C.3.4 Present Load Generated and Load Runoff from Model Block**
JAPAN INTERNATIONAL COOPERATION AGENCY	



STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

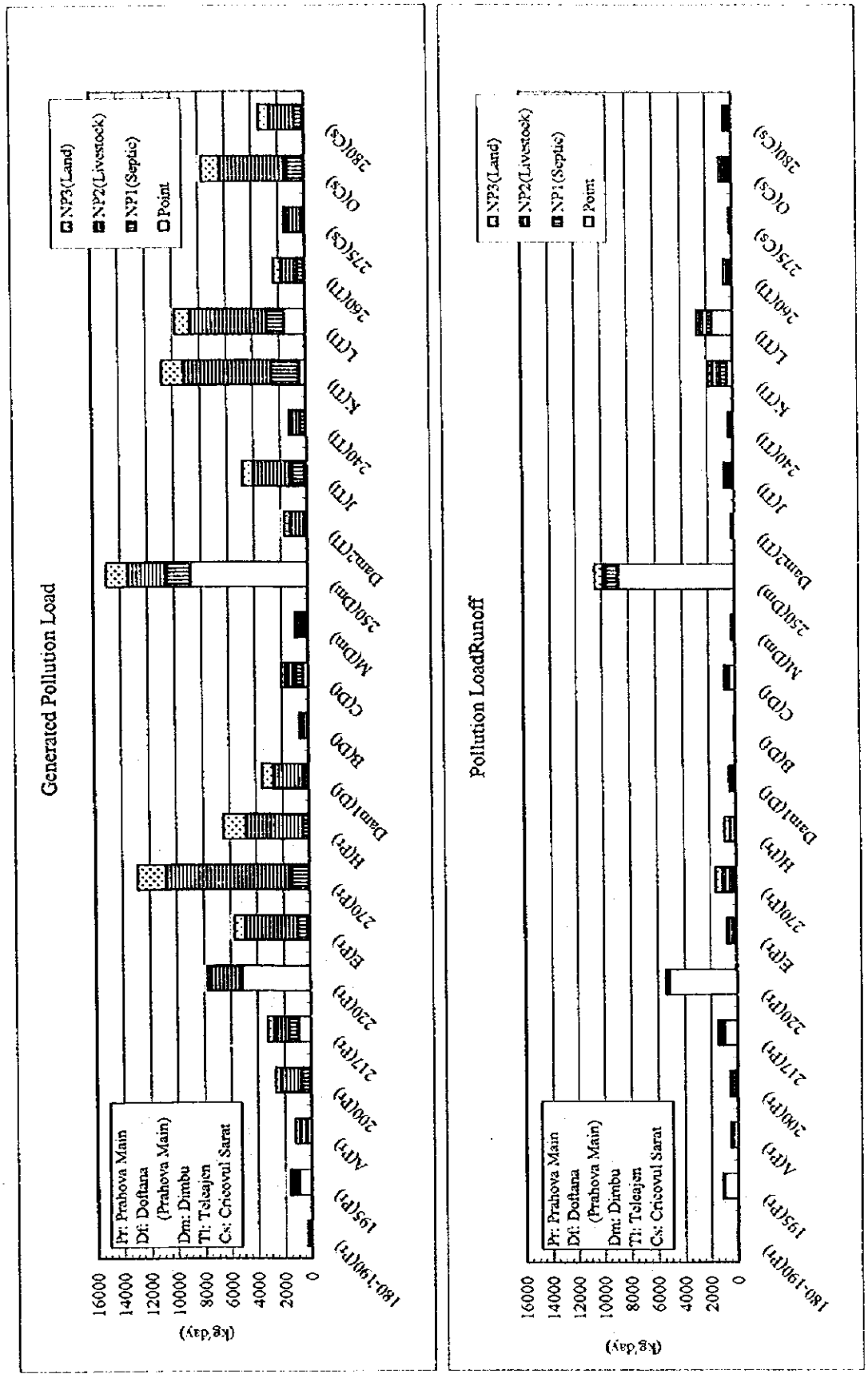
Fig.C.3.5 BOD Concentration Computed by Simulation Model



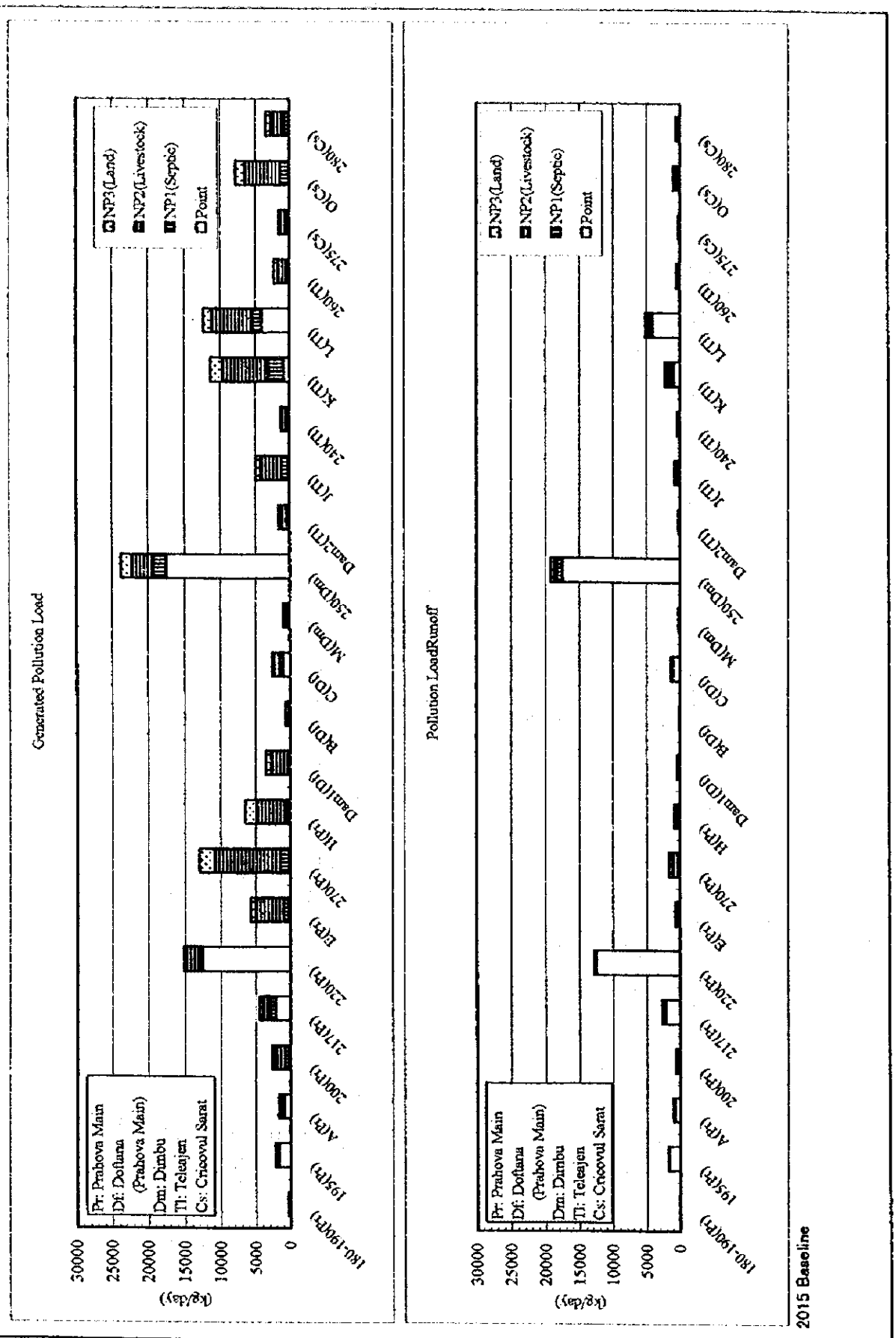
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

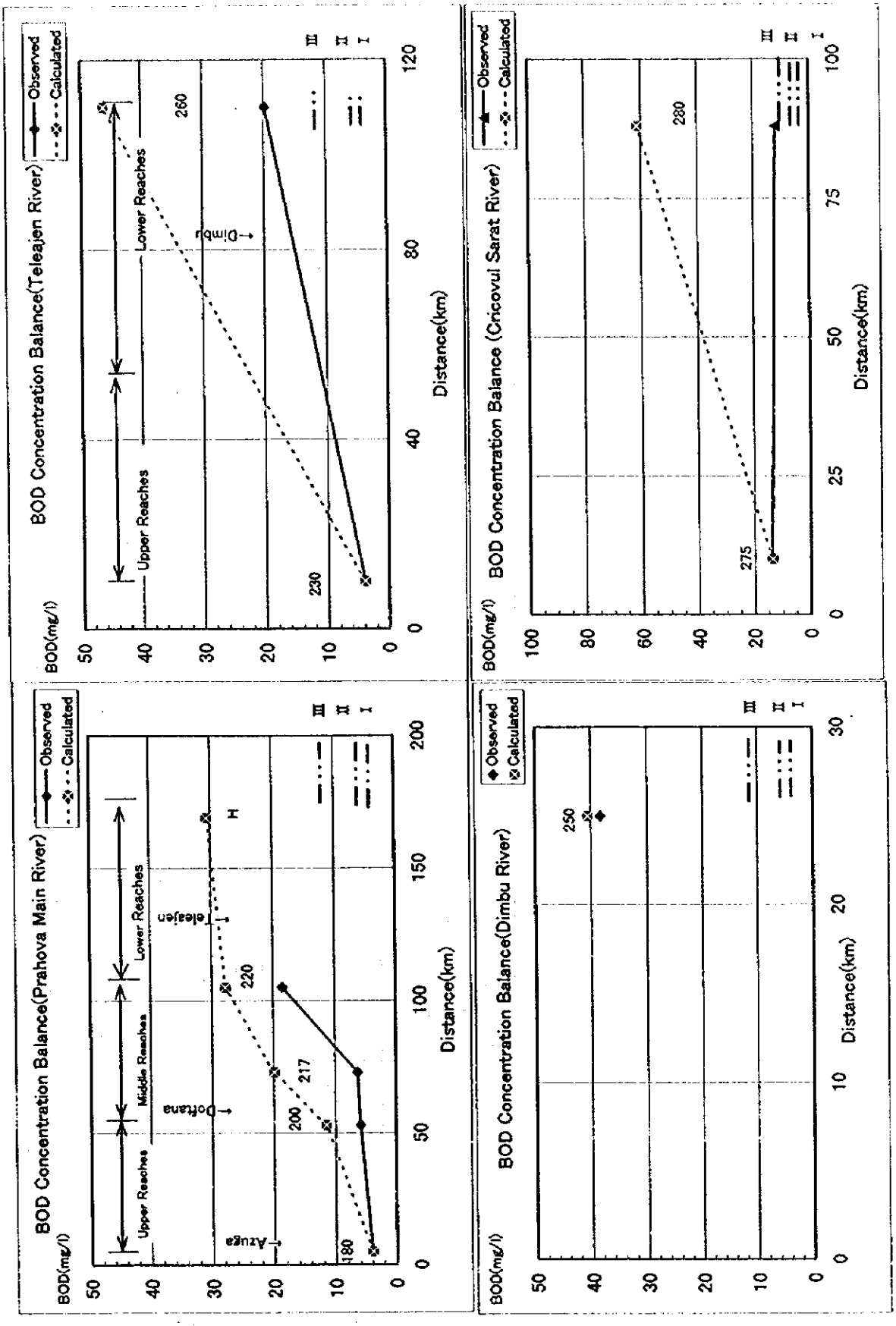
Fig.C.3.6 Present Load Balance in Prahova River



STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN	**Fig.C.4.1 Baseline Present Load Generated and Load Runoff from Model Block**
JAPAN INTERNATIONAL COOPERATION AGENCY	



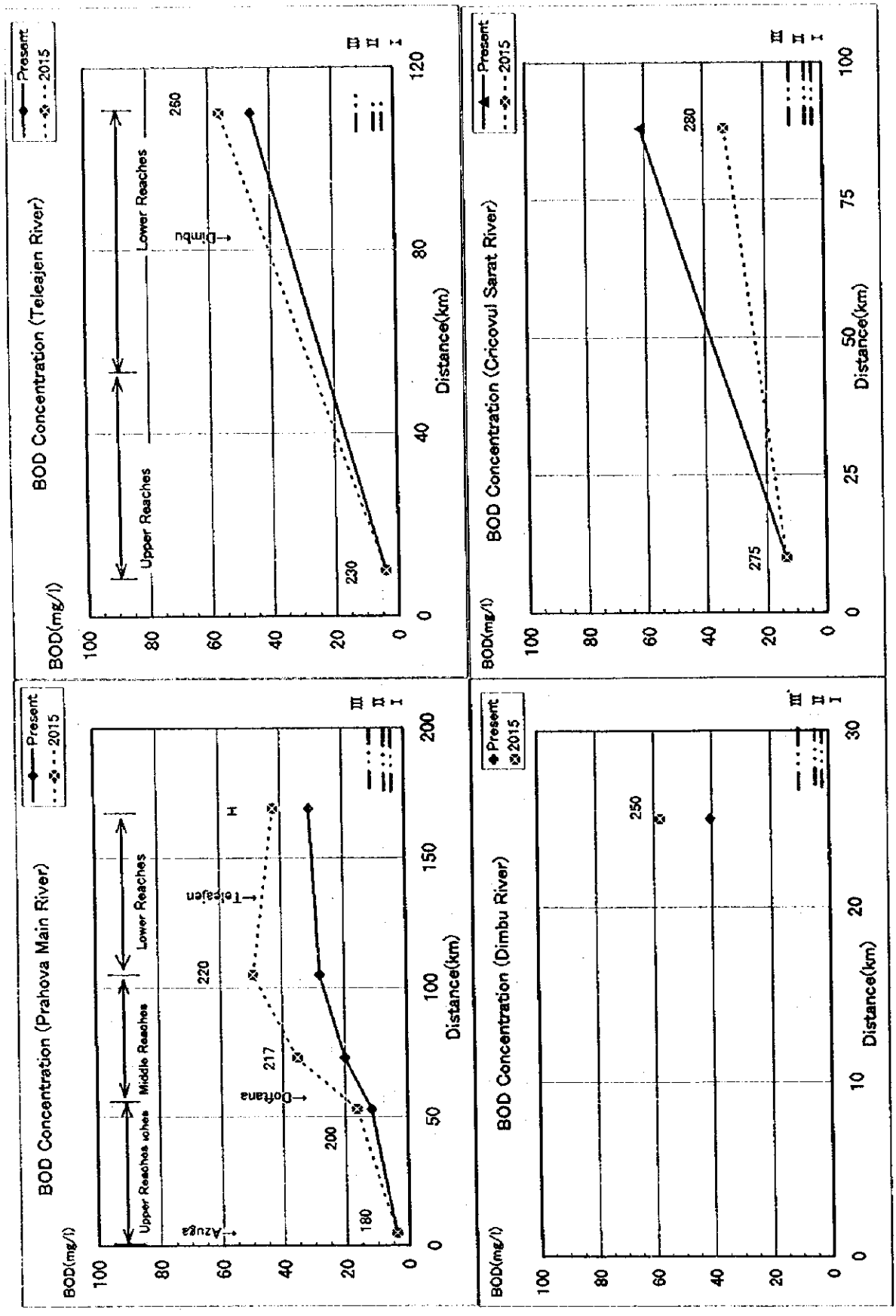
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN	**Fig. C.4.2** **Baseline Load Generated and Load Runoff in 2015 from Model Block**
JAPAN INTERNATIONAL COOPERATION AGENCY	



STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

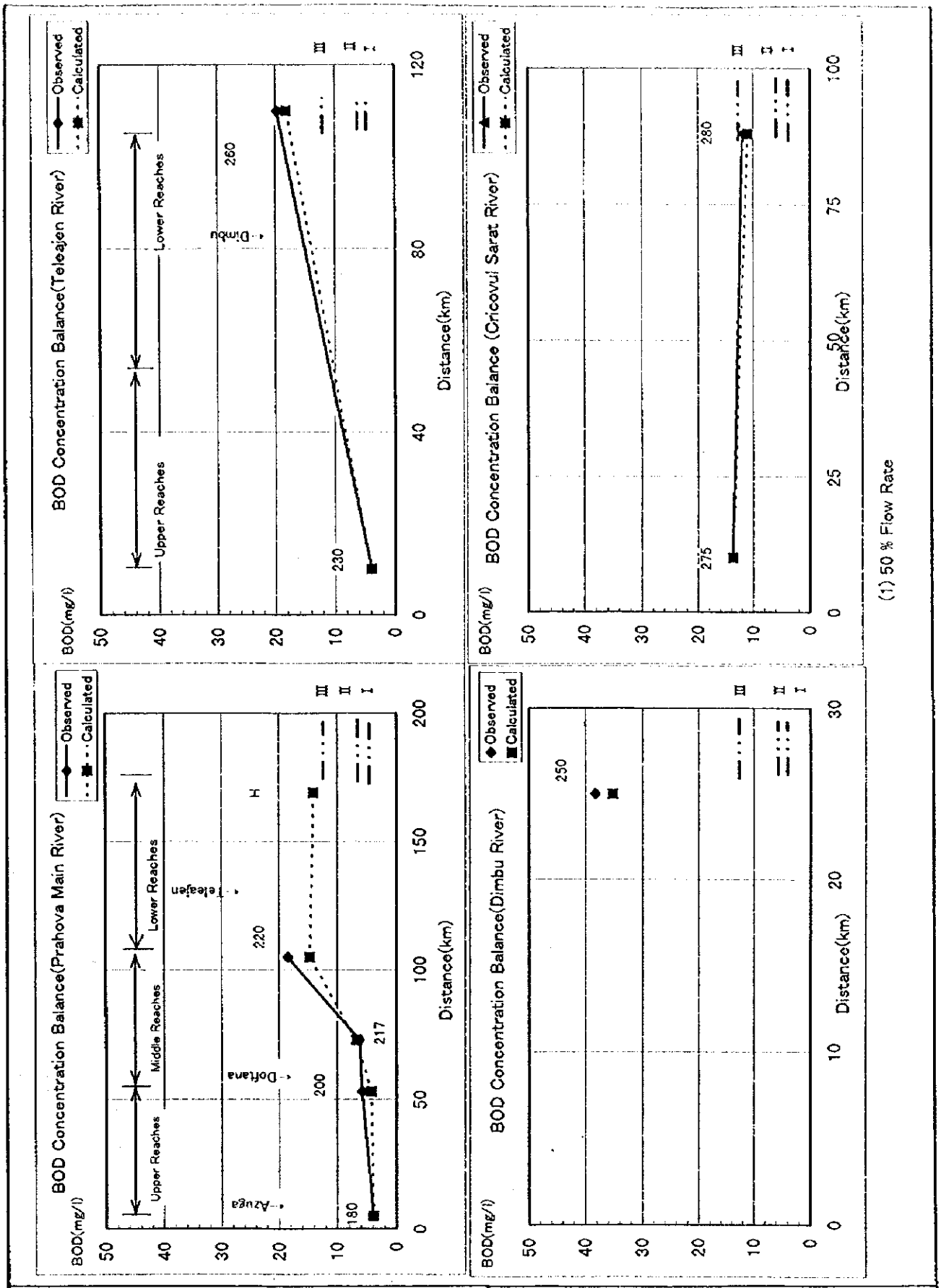
Fig. C.4.3 BOD Baseline Present Concentration under NTPA-001 95 % Discharge



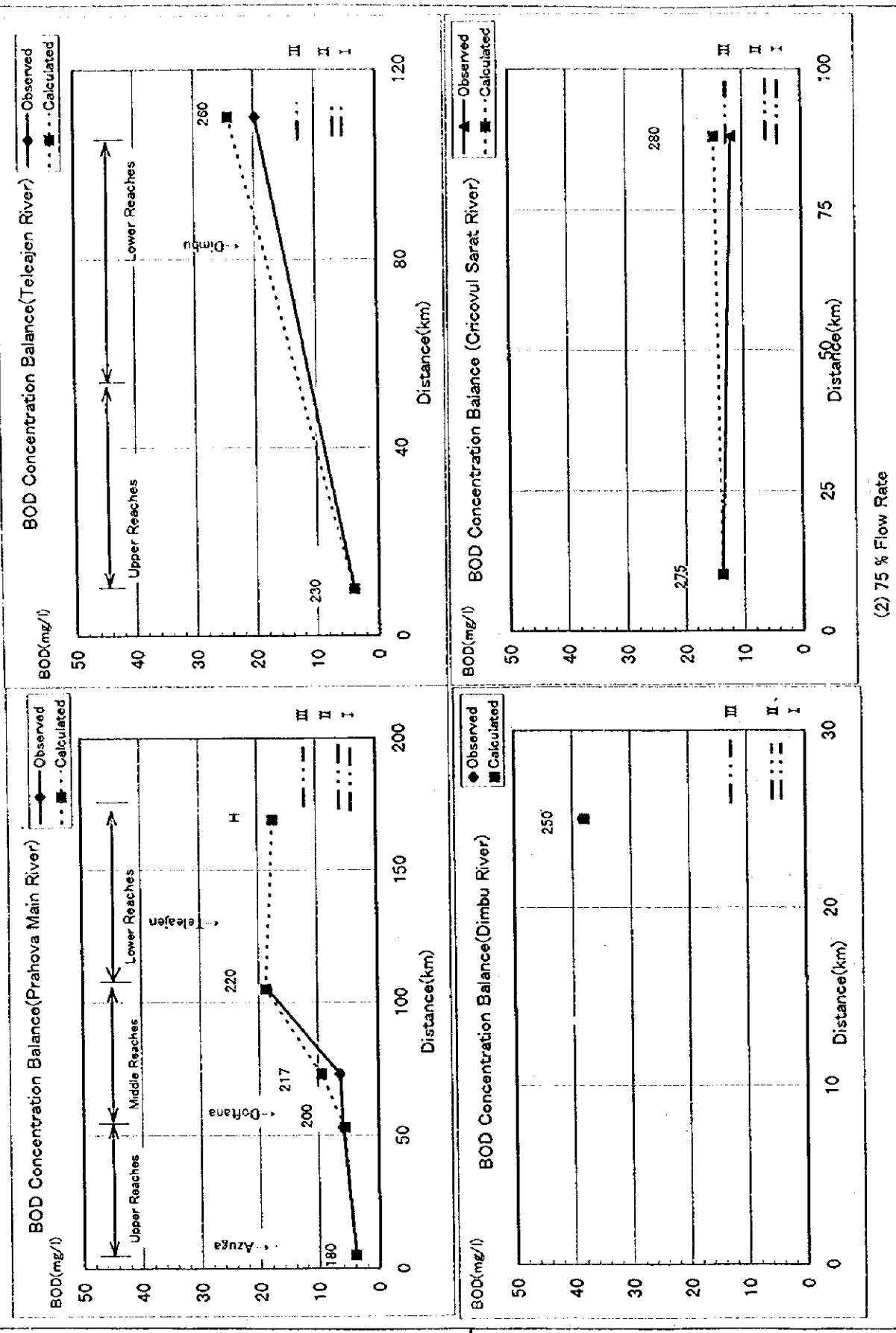
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. C.4.4 BOD Baseline Concentration in 2015 under NTPA-001 95 % Discharge



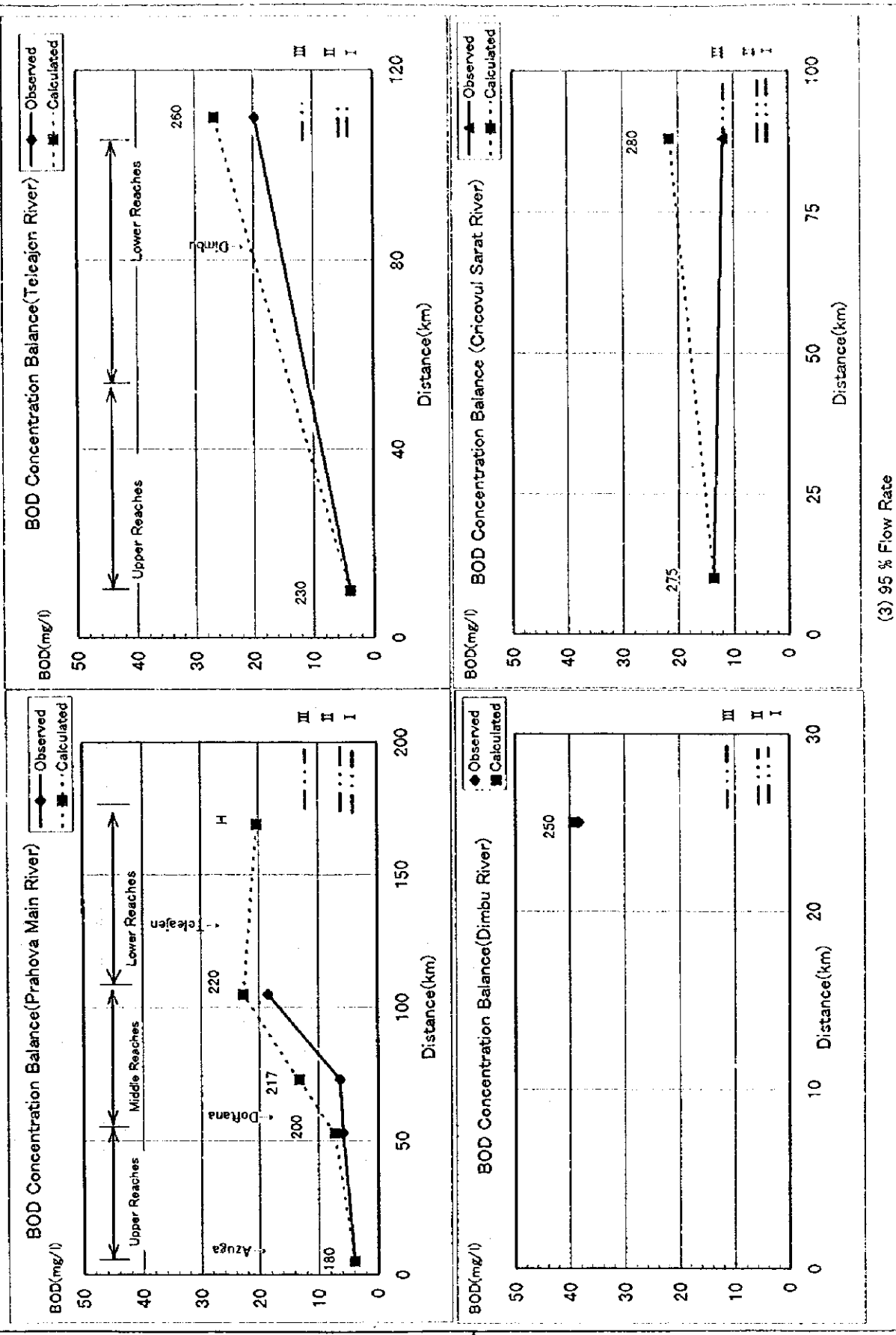
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN	**Fig. C.4.5** **BOD Baseline Present Concentration under 50 %, 75 % and 95 % Probable Discharge (1/3)**
JAPAN INTERNATIONAL COOPERATION AGENCY	



STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

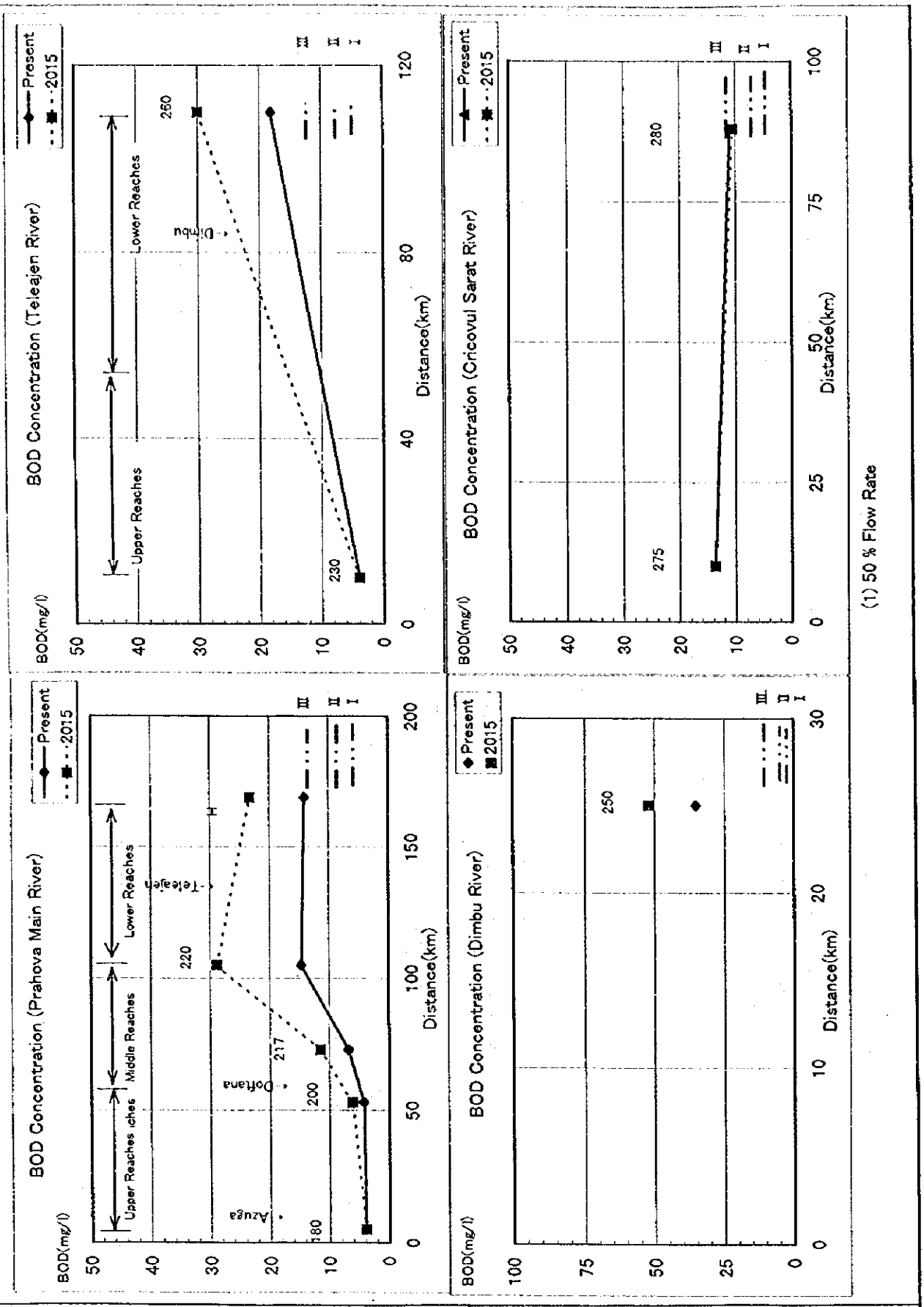
Fig. C.4.5 BOD Baseline Present Concentration under 50 %, 75 % and 95 % Probable Discharge (2/3)



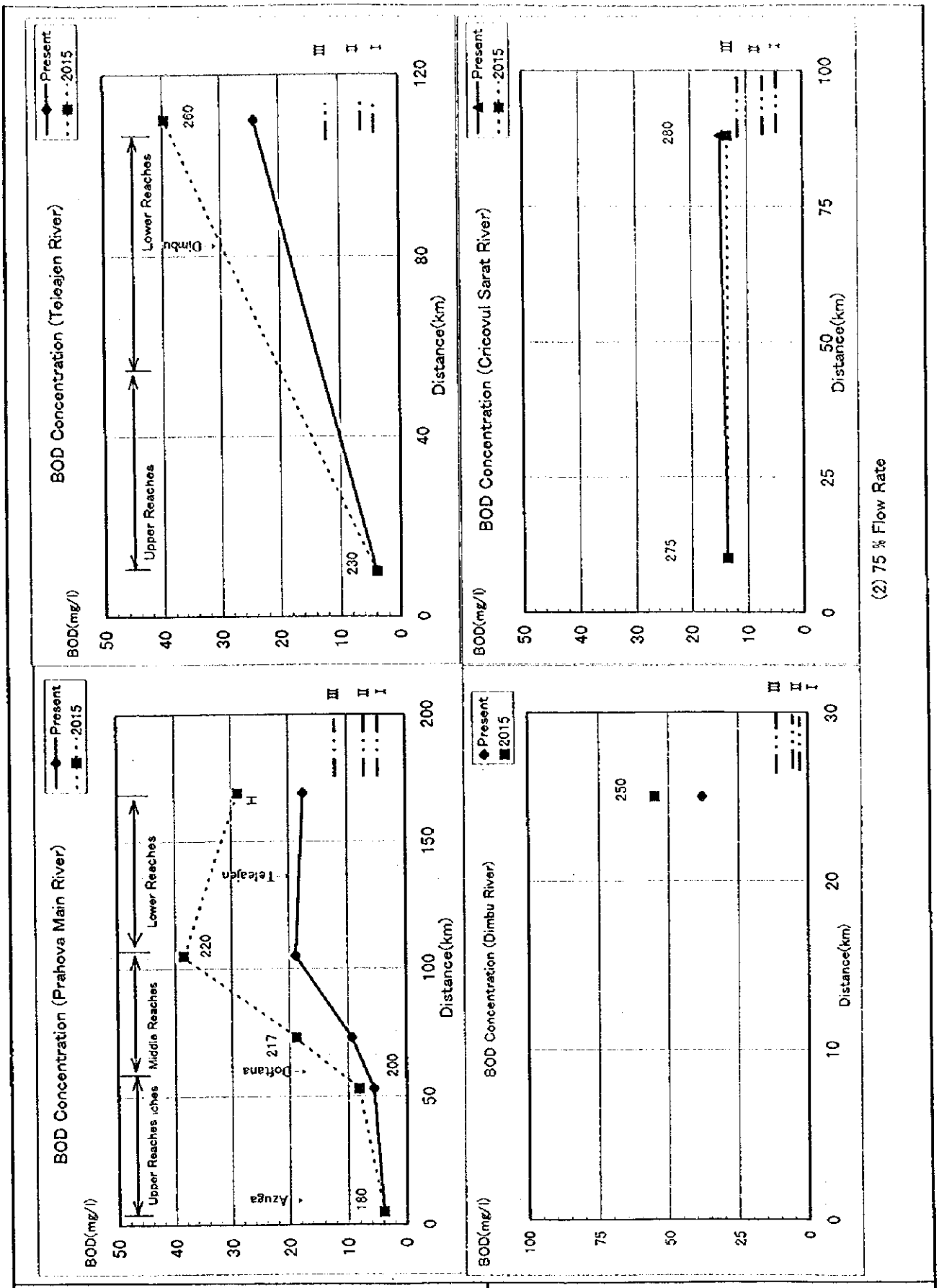
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

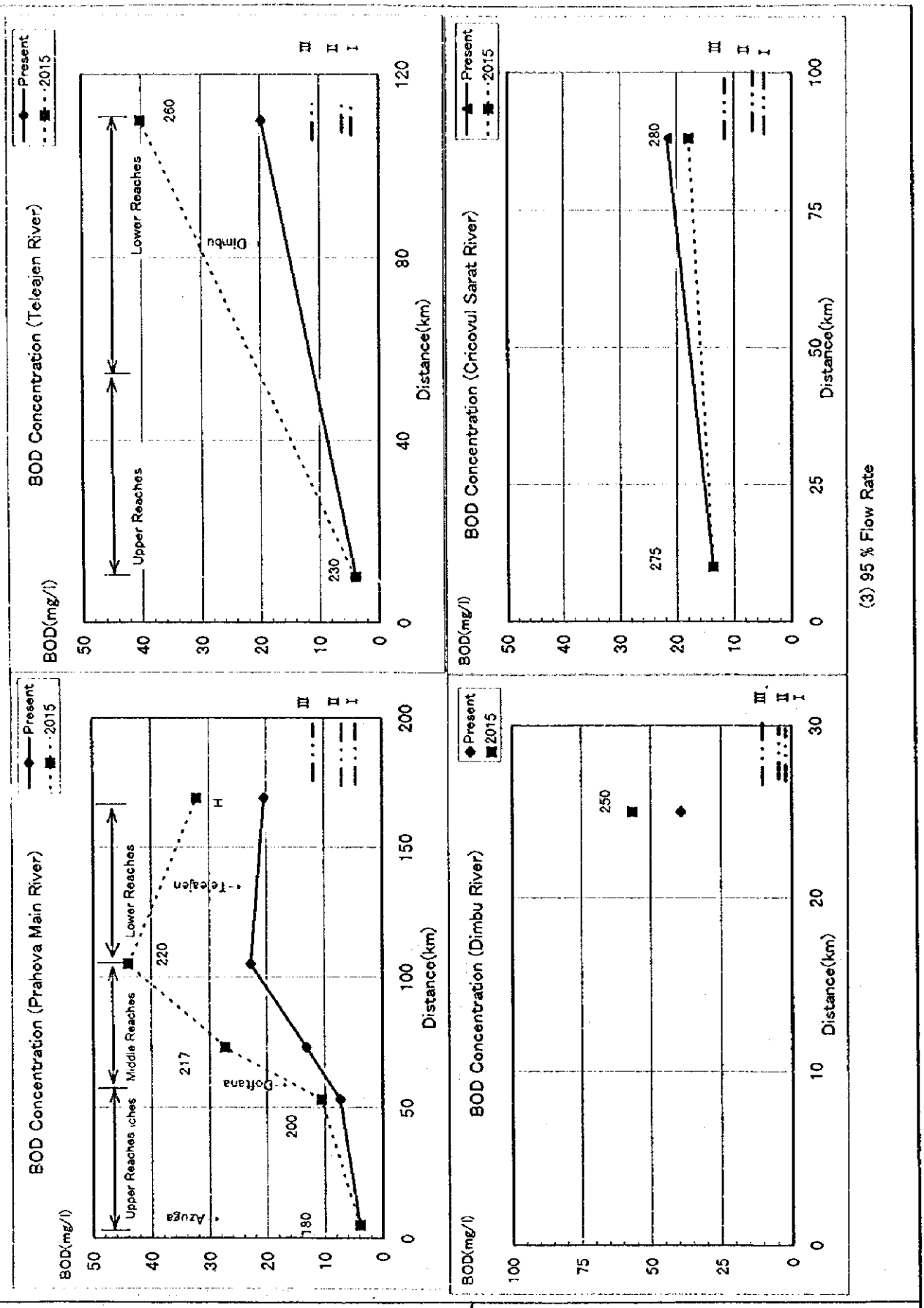
Fig. C.4.5 BOD Baseline Present Concentration under 50 %, 75 % and 95 % Probable Discharge (3/3)



STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN	**Fig. C.4.6** **BOD Baseline Concentration in 2015 under 50 %, 75 % and 95 % Probable Discharge (1/3)**
JAPAN INTERNATIONAL COOPERATION AGENCY	



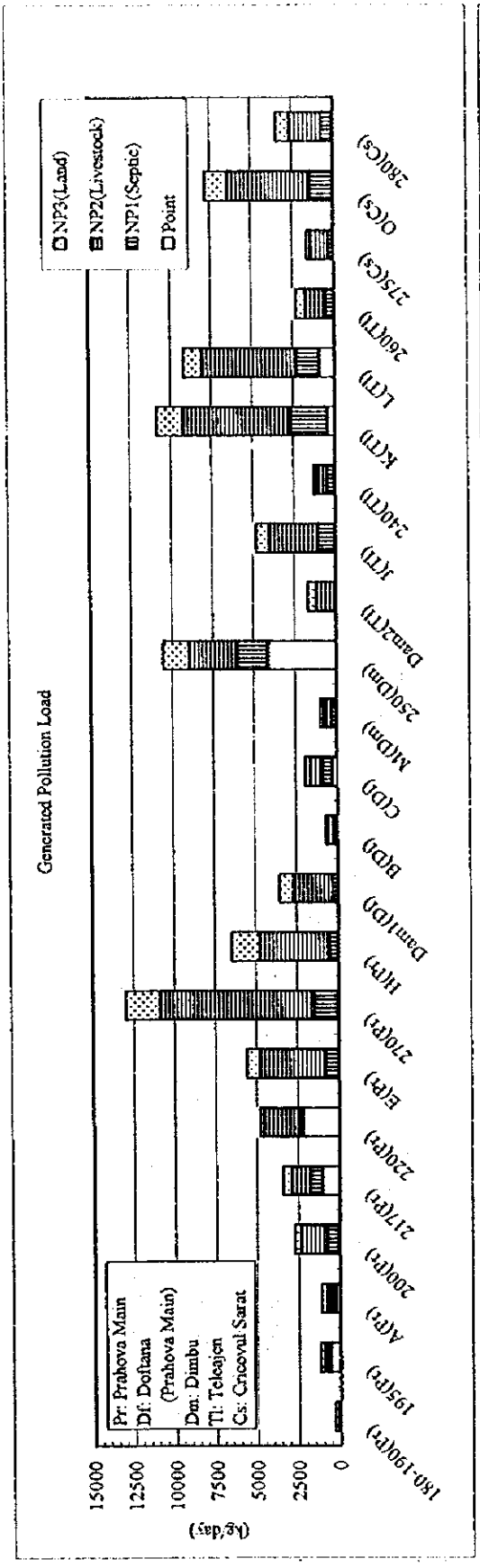
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN	**Fig. C.4.6** **BOD Baseline Concentration in 2015 under 50 %, 75 % and 95 % Probable Discharge (2/3)**
JAPAN INTERNATIONAL COOPERATION AGENCY	

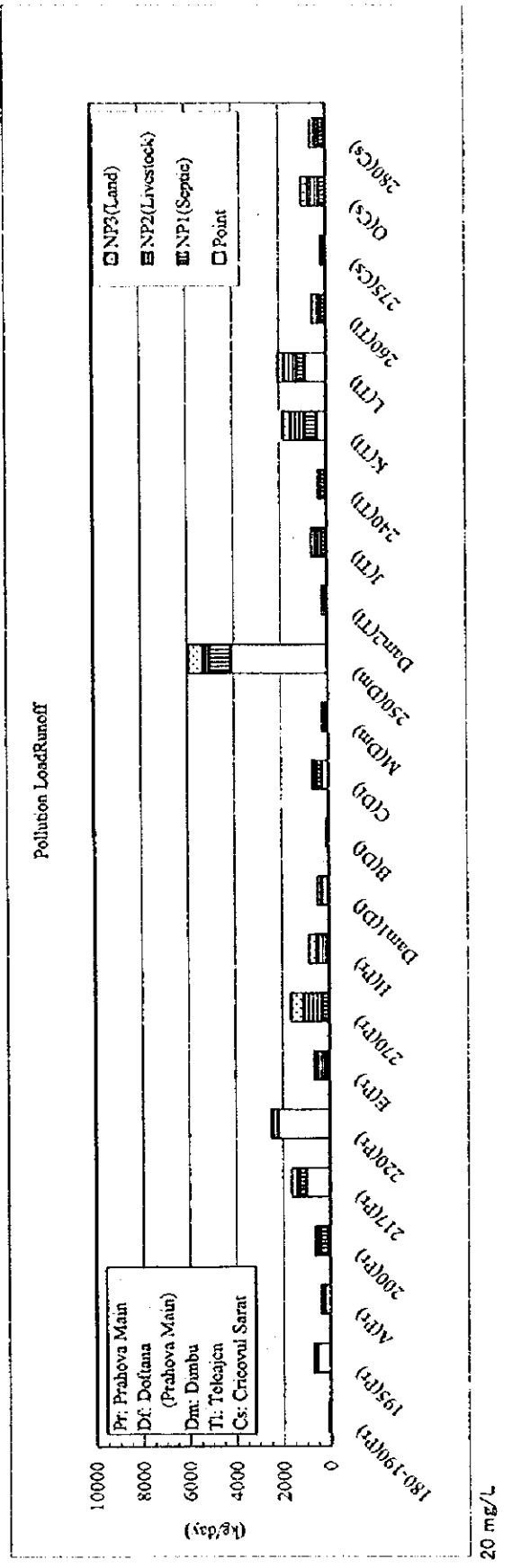


STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN

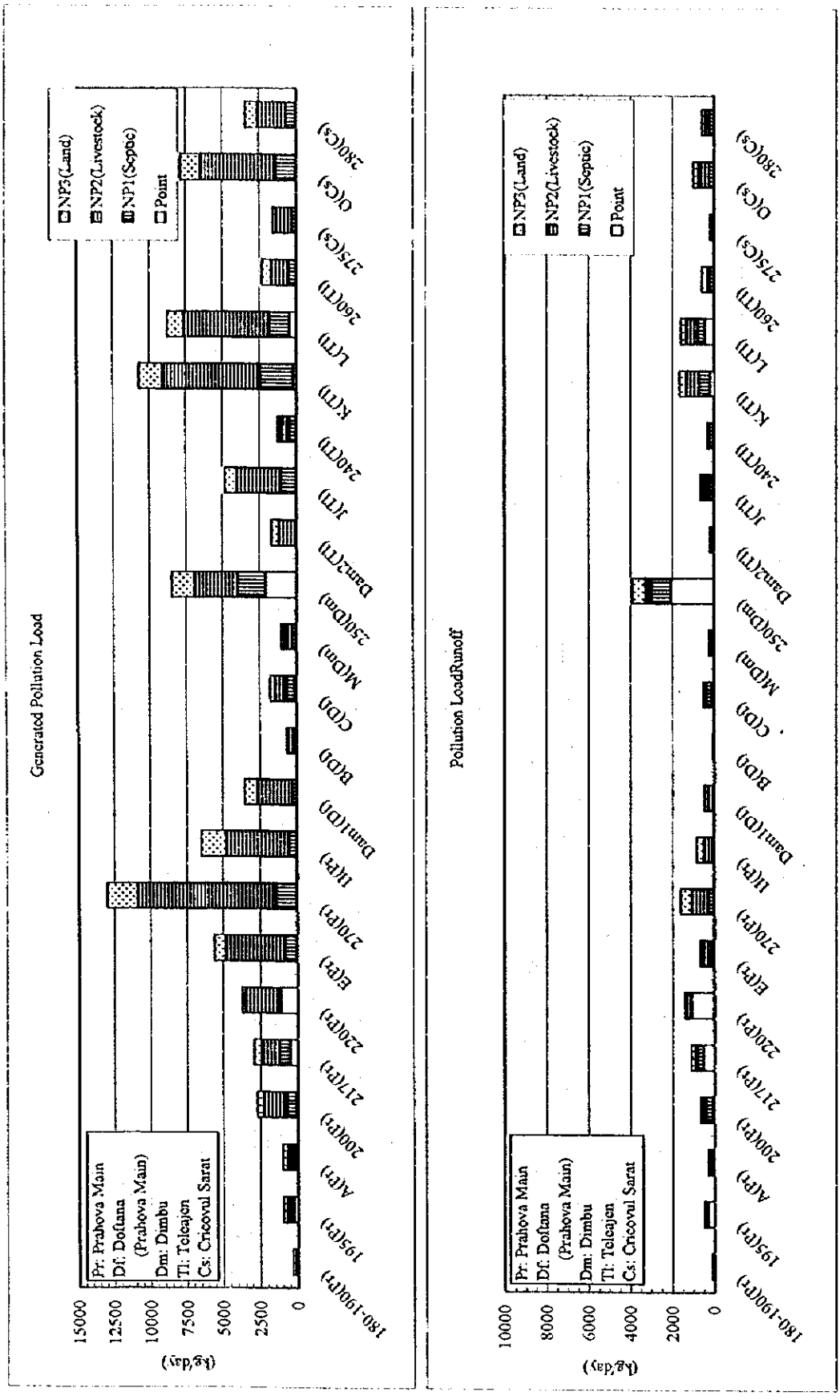
JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. C.4.6 BOD Baseline Concentration in 2015 under 50 %, 75 % and 95 % Probable Discharge (3/3)

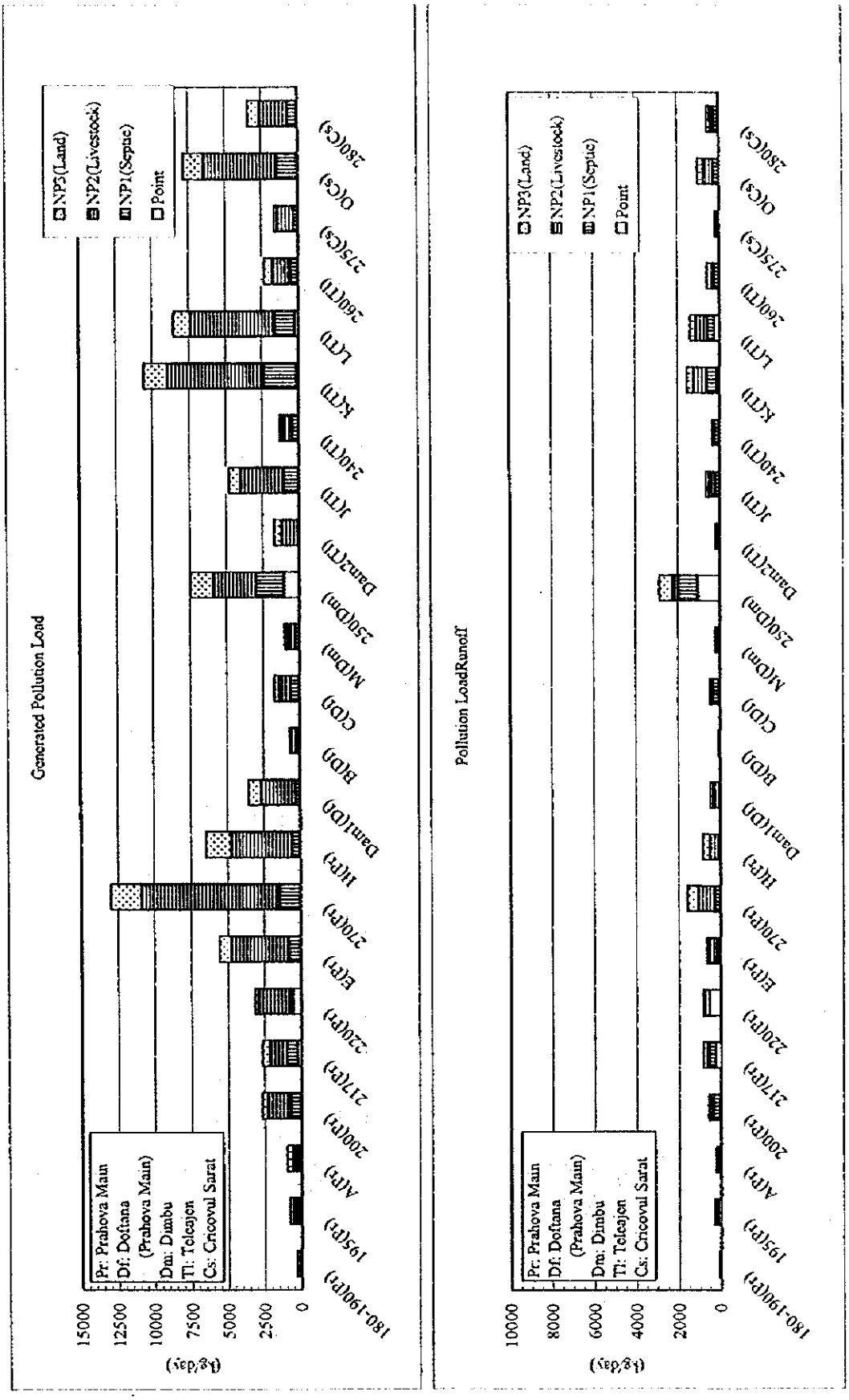




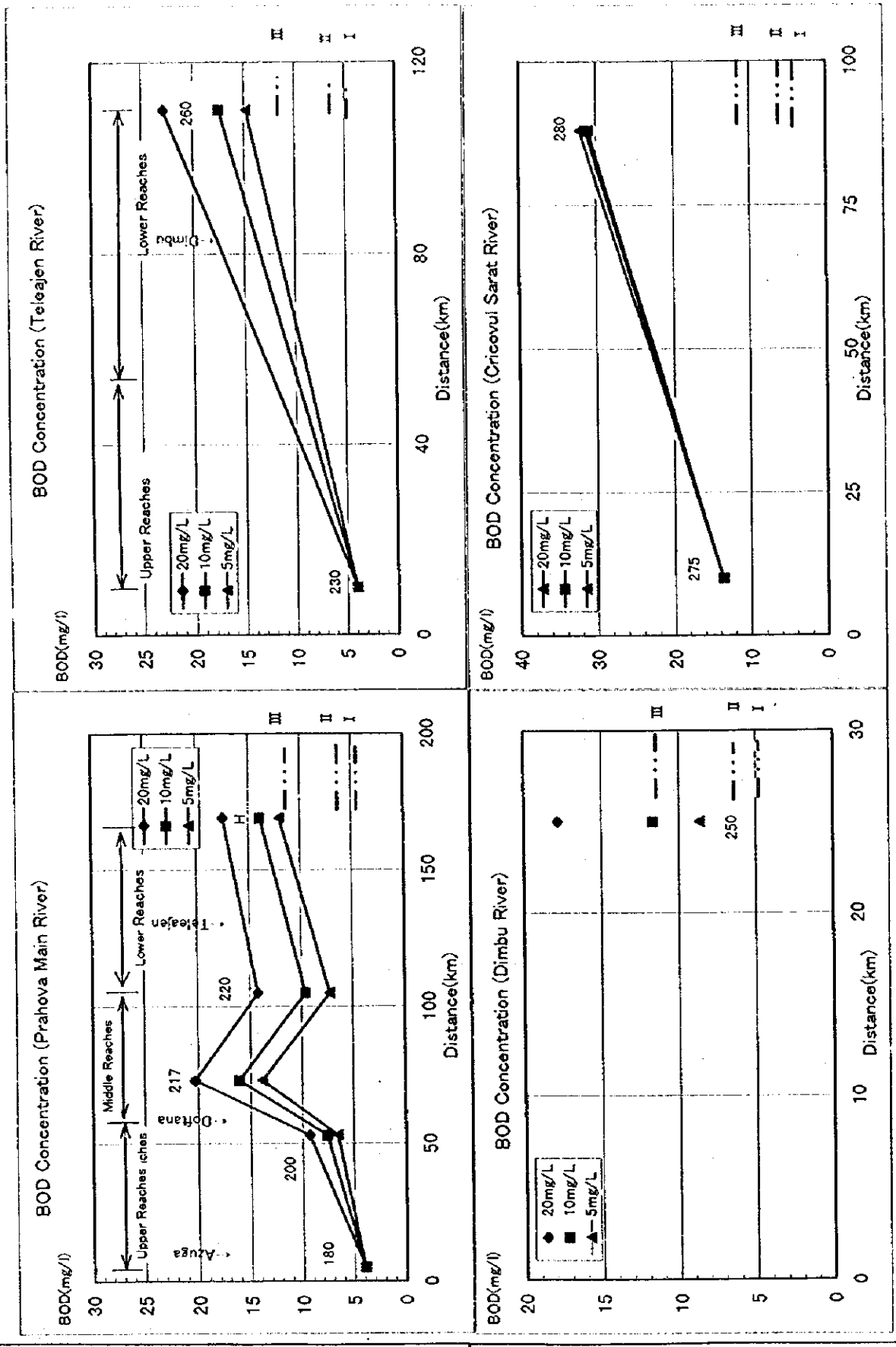
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN	**Fig. C.4.7** **Load Generated and Load Runoff in 2015 under Permissible Limit 5 mg/L, 10 mg/L and 20 mg/L (1/3)**
JAPAN INTERNATIONAL COOPERATION AGENCY	



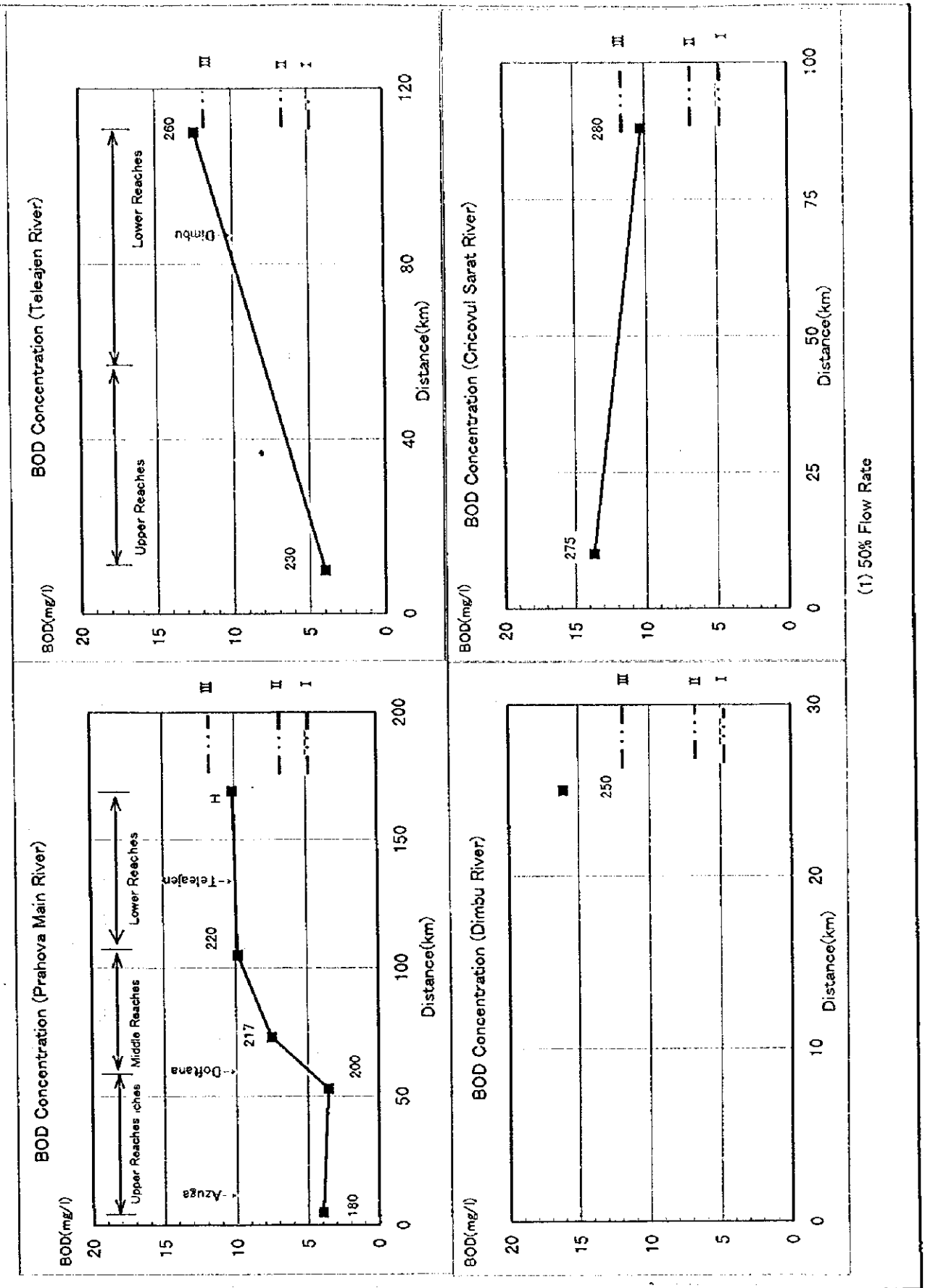
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN	**Fig. C.4.7 Load Generated and Load Runoff in 2015 under Permissible Limit 5 mg/L, 10 mg/L and 20 mg/L (2/3)**
JAPAN INTERNATIONAL COOPERATION AGENCY	



STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN	**Fig. C.4.7** **Load Generated and Load Runoff in 2015 under Permissible Limit 5 mg/L, 10 mg/L and 20 mg/L (3/3)**
JAPAN INTERNATIONAL COOPERATION AGENCY	



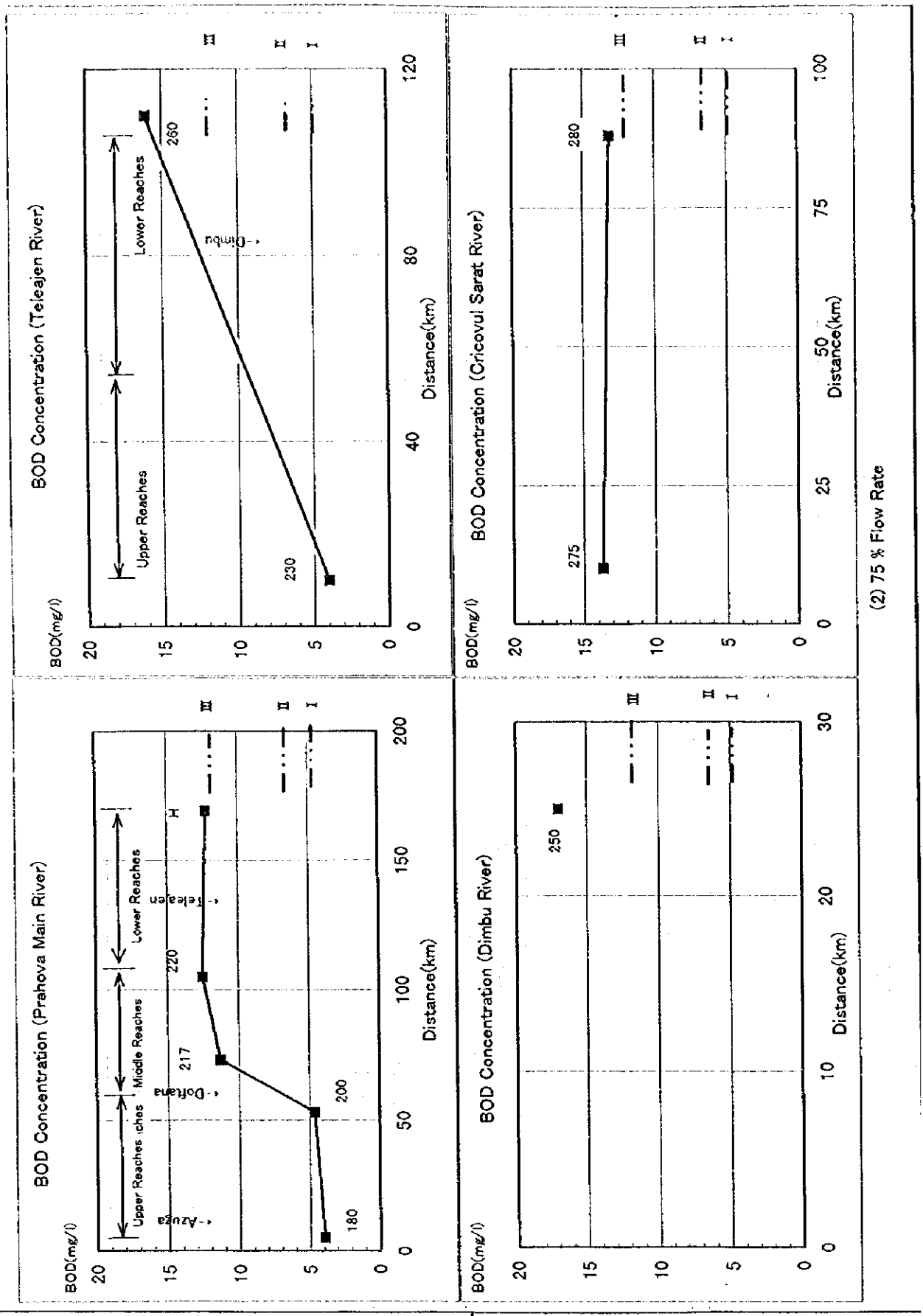
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN	**Fig. C.4.8** **BOD Concentration in 2015 under NTPA 95 % Discharge and Permissible Limit of 5 mg/L, 10 mg/L and 20 mg/L**
JAPAN INTERNATIONAL COOPERATION AGENCY	



STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

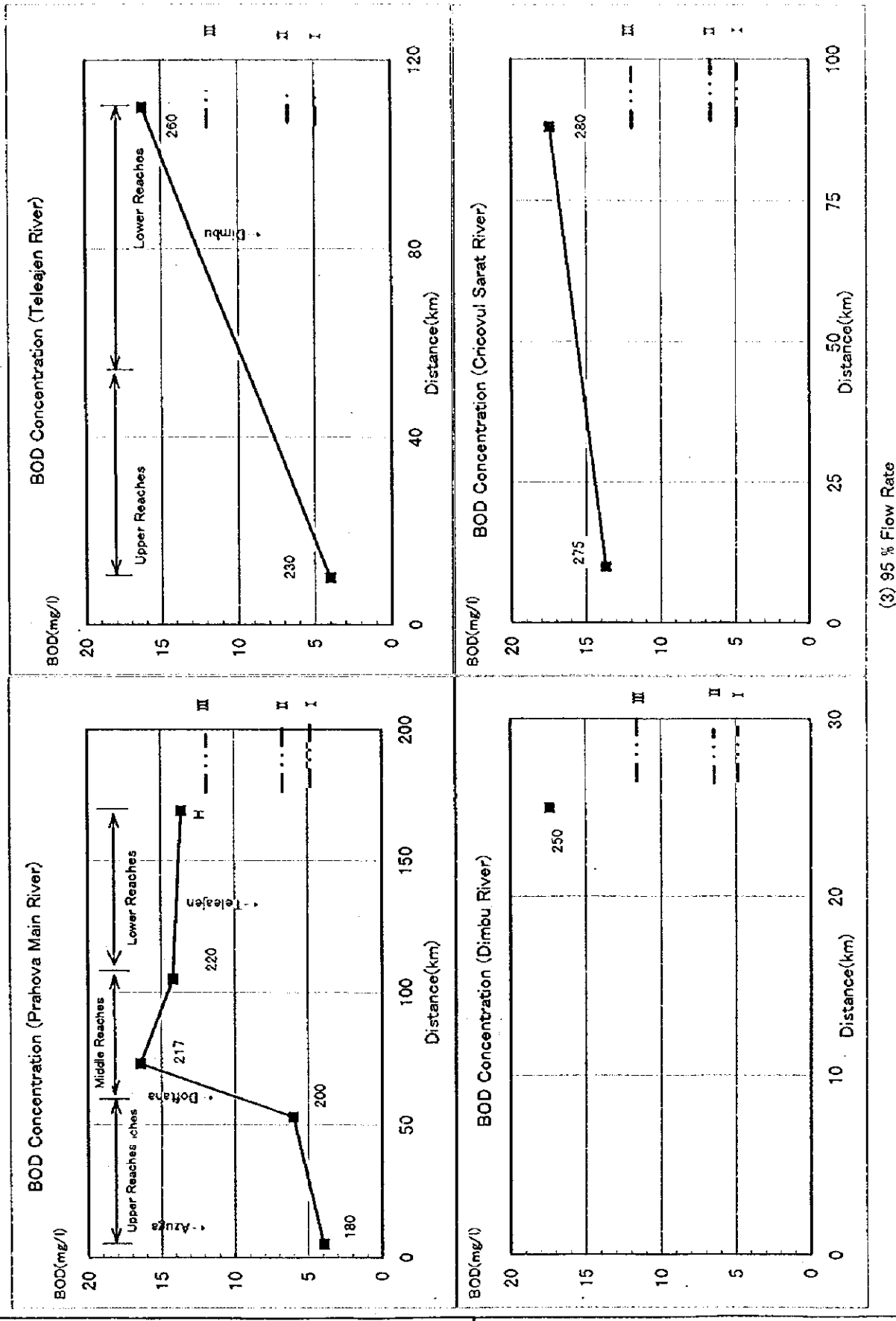
Fig. C.4.9 **BOD Concentration in 2015 under Permissible Limit of 20 mg/L (1/3)**



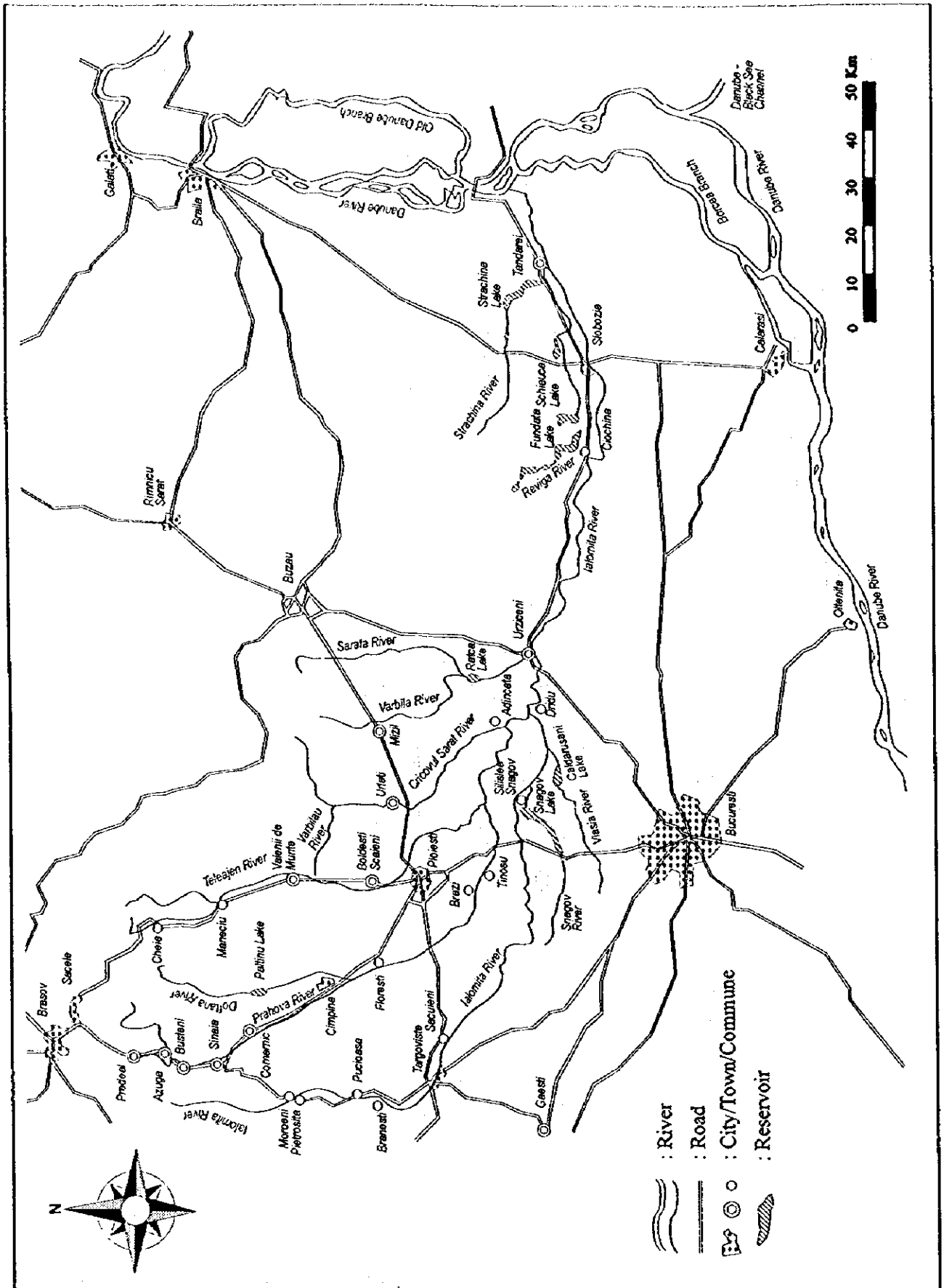
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

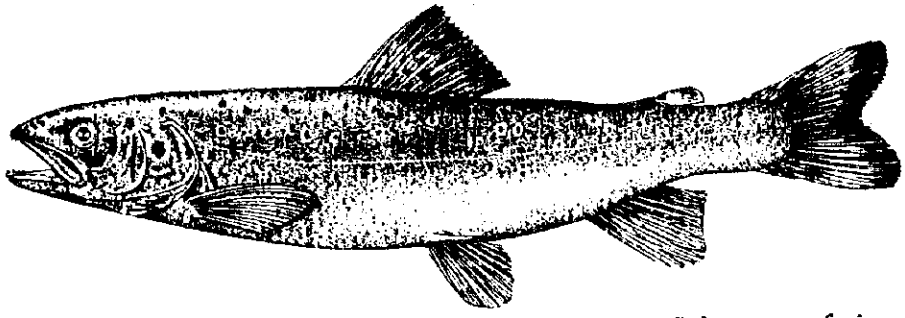
Fig. C.4.9 **BOD Concentration in 2015 under Permissible Limit of 20 mg/L (2/3)**



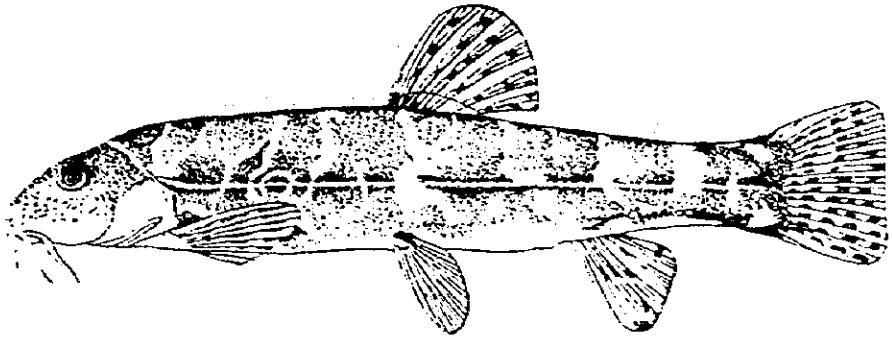
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN	**Fig. C.4.9** **BOD Concentration in 2015 under Permissible Limit of 20 mg/L (3/3)**
JAPAN INTERNATIONAL COOPERATION AGENCY	



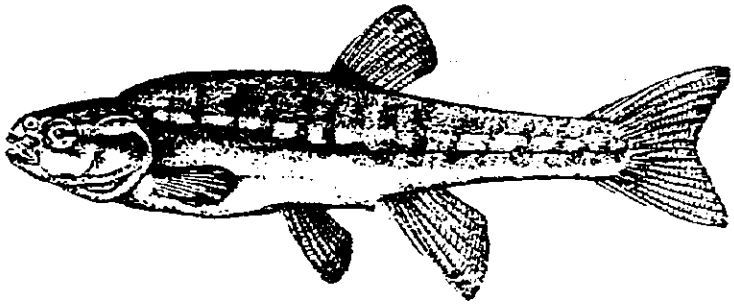
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN	**Fig. C.5.1 Ialomita and Prahova River**
JAPAN INTERNATIONAL COOPERATION AGENCY	



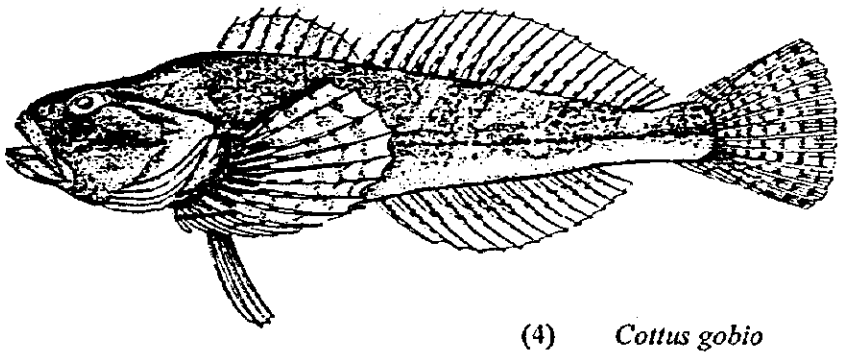
(1) *Salmo trutta fario*



(2) *Noemacheilus barbatulus*

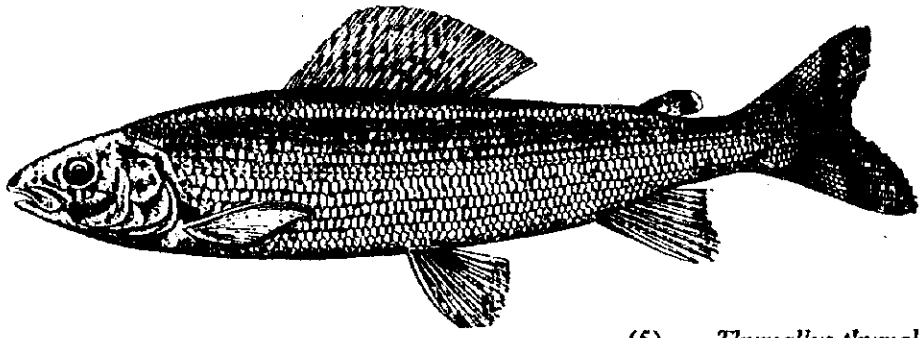


(3) *Phoxinus phoxinus*

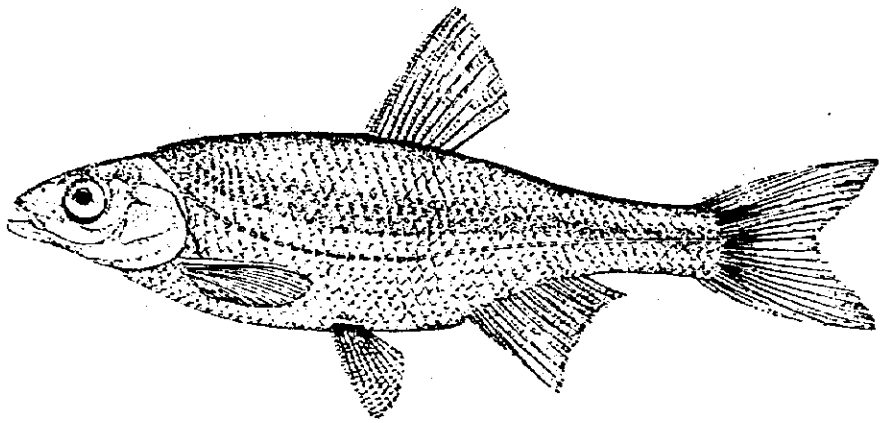


(4) *Cottus gobio*

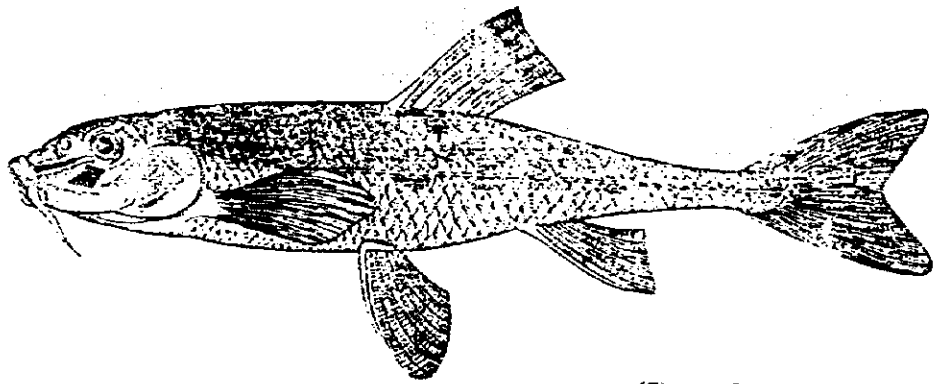
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN JAPAN INTERNATIONAL COOPERATION AGENCY	**Fig. C.5.2** **Fishes in Ialomita and Prahova River (1/8)**



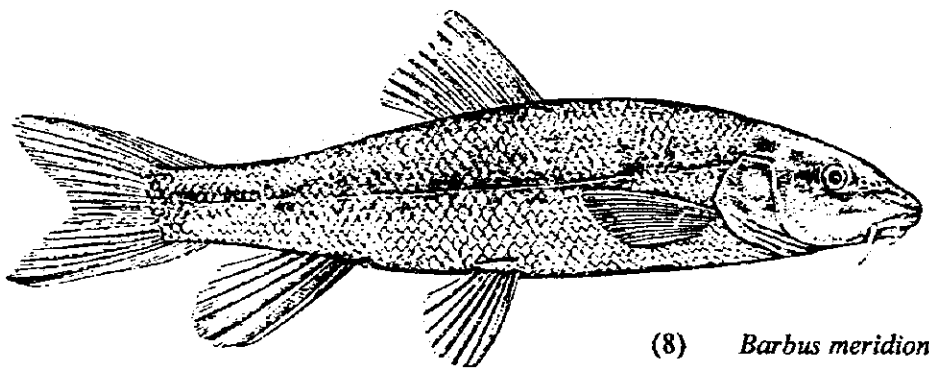
(5) *Thymallus thymallus*



(6) *Alburnoides bipunctatus*

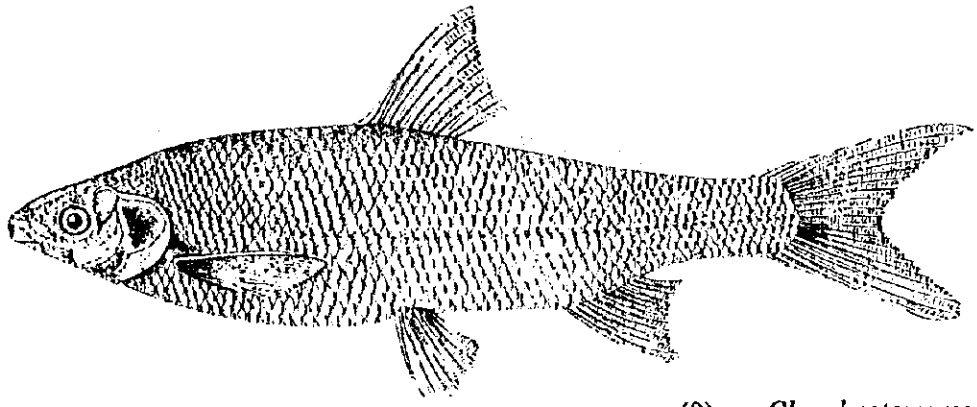


(7) *Gobio uranoscopus*

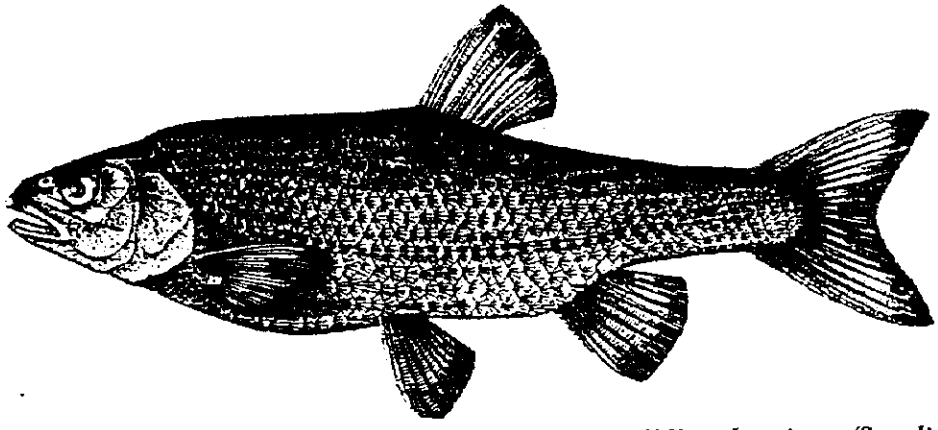


(8) *Barbus meridionalis petenyi*

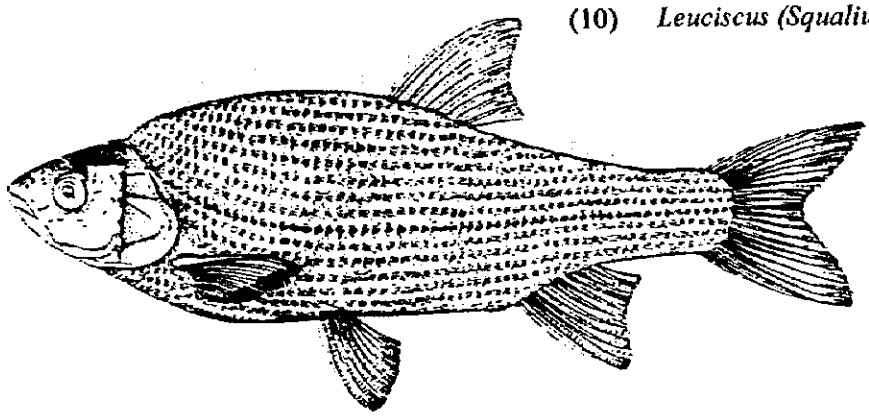
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN JAPAN INTERNATIONAL COOPERATION AGENCY	**Fig. C.5.2** **Fishes in Ialomita and Prahova River (2/8)**



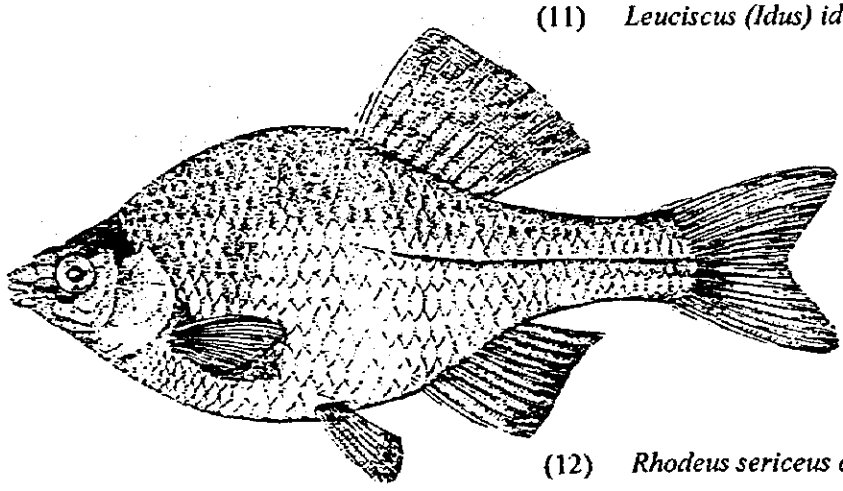
(9) *Chondrostoma nasus*



(10) *Leuciscus (Squalius) cephalus*

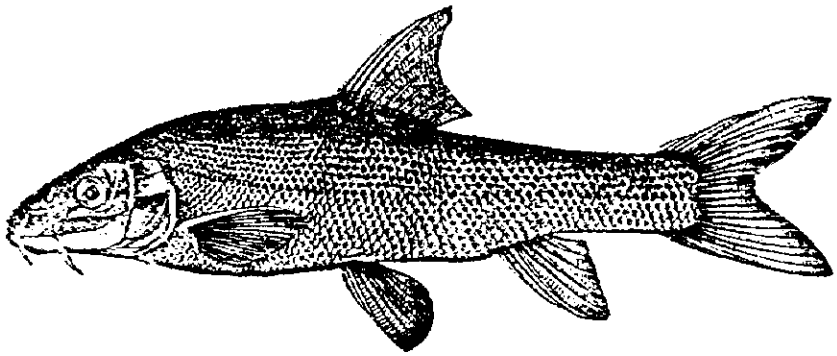


(11) *Leuciscus (Idus) idus*

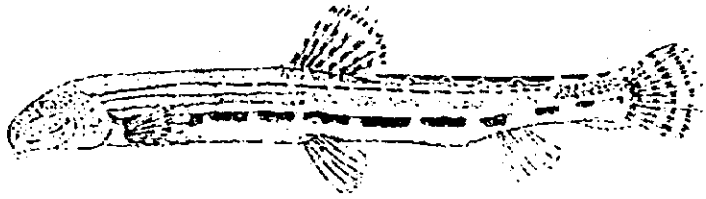


(12) *Rhodeus sericeus amarus*

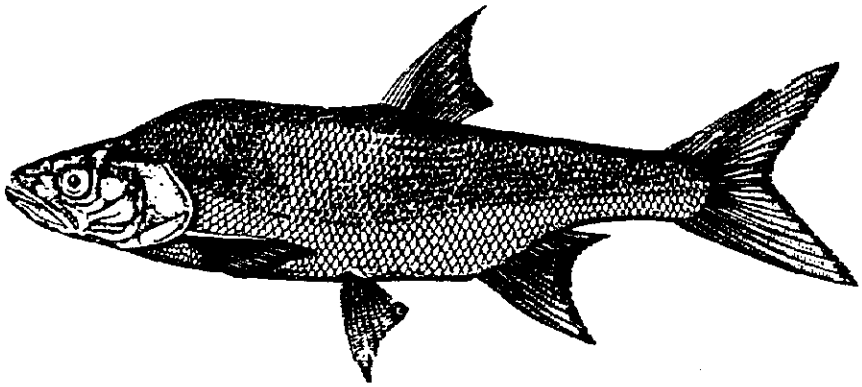
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN	**Fig. C.5.2** **Fishes in Ialomita and Prahova River (3/8)**
JAPAN INTERNATIONAL COOPERATION AGENCY	



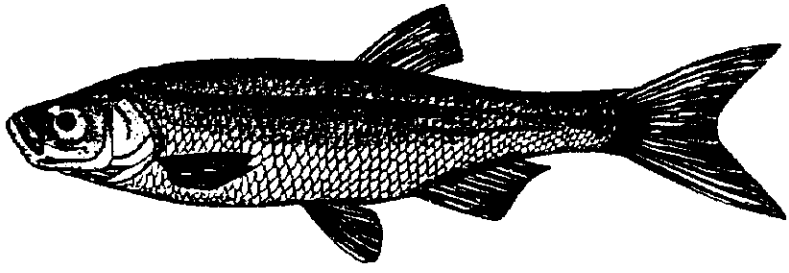
(13) *Barbus barbus*



(14) *Cobitis taenia*

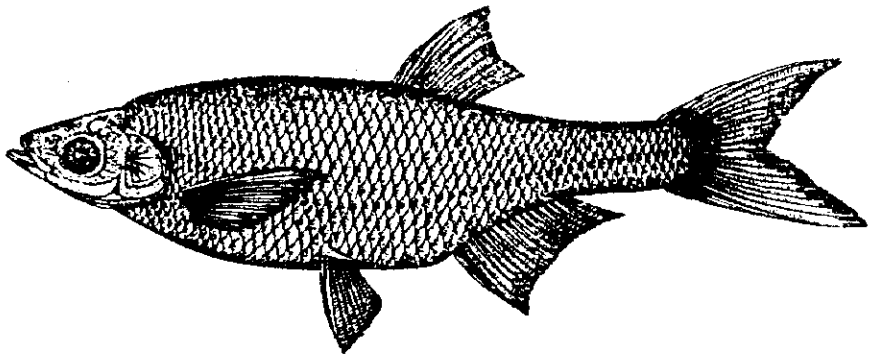


(15) *Aspius aspius*

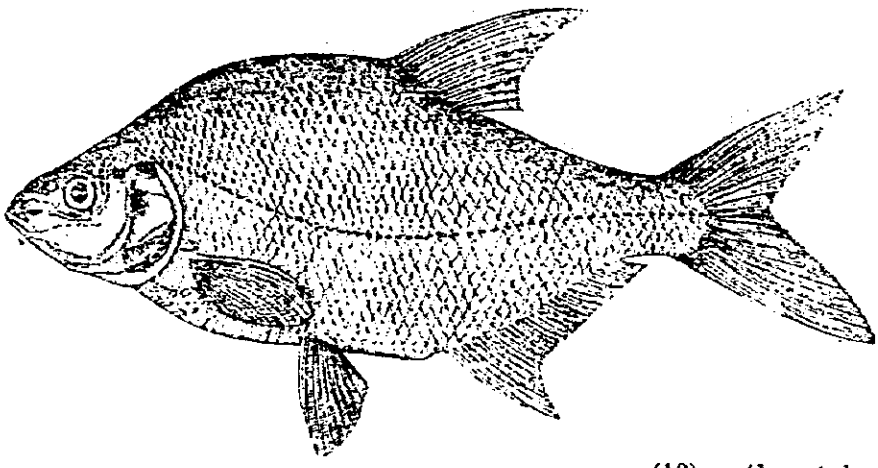


(16) *Leucaspius delineatus*

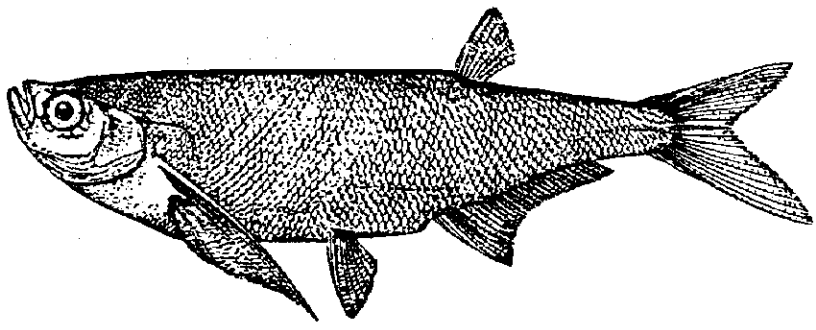
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN JAPAN INTERNATIONAL COOPERATION AGENCY	**Fig. C.5.2** **Fishes in Ialomita and Prahova River (4/8)**



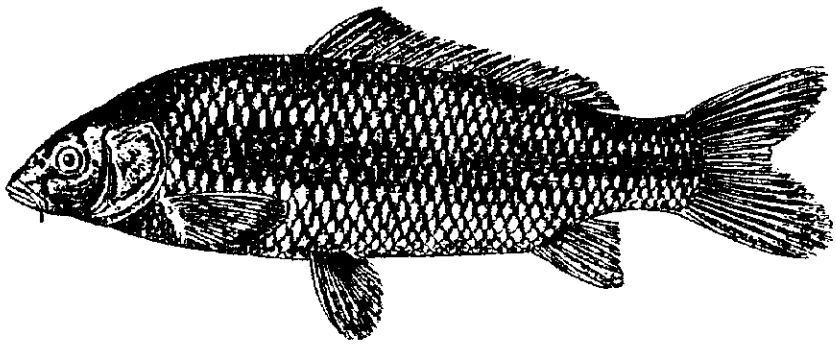
(17) *Alburnus alburnus*



(18) *Abramis brama*

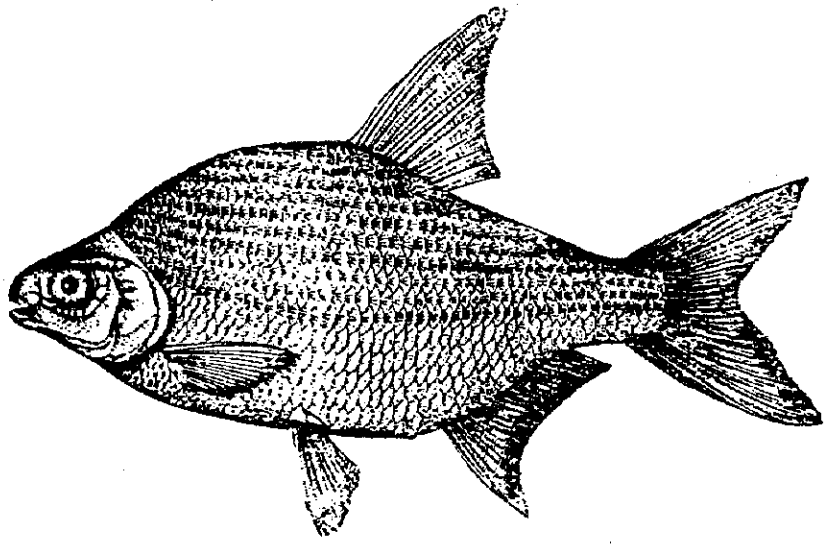


(19) *Pelecus cultratus*

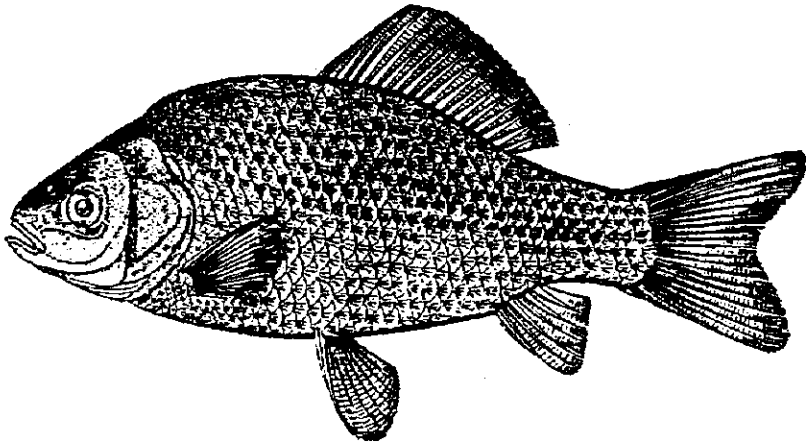


(20) *Cyprinus carpio*

STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN JAPAN INTERNATIONAL COOPERATION AGENCY	**Fig. C.5.2** **Fishes in Ialomita and Prahova River (5/8)**

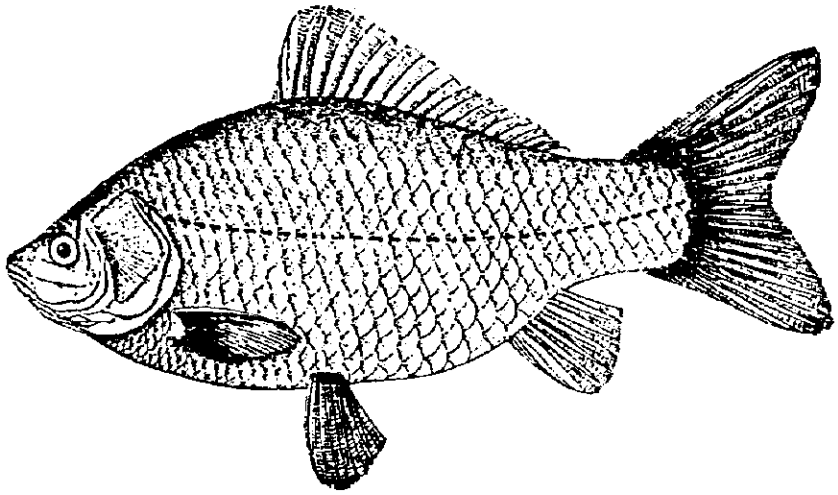


(21) *Blicca bjoerkna*

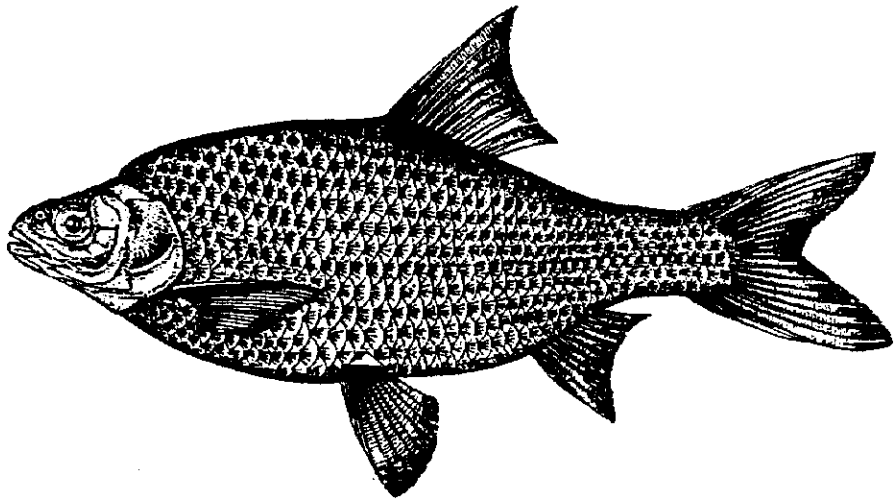


(22) *Carassius carassius*

STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN	**Fig. C.5.2** **Fishes in Ialomita and Prahova River (6/8)**
JAPAN INTERNATIONAL COOPERATION AGENCY	

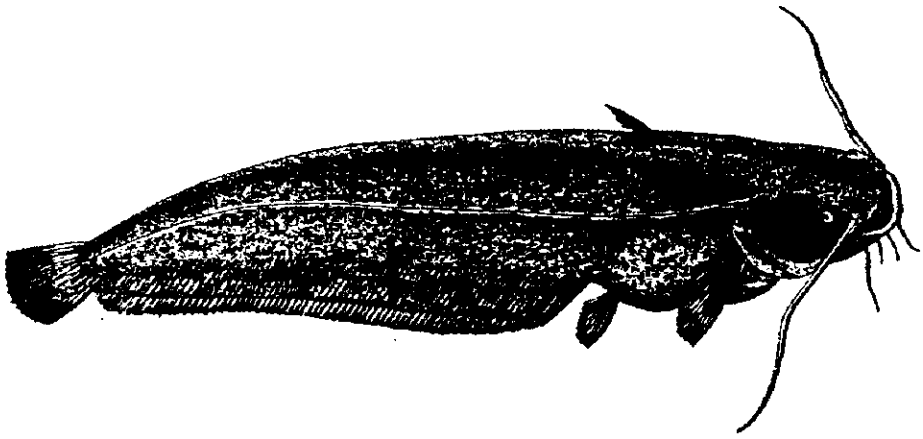


(23) *Carassius auratus gibelio*

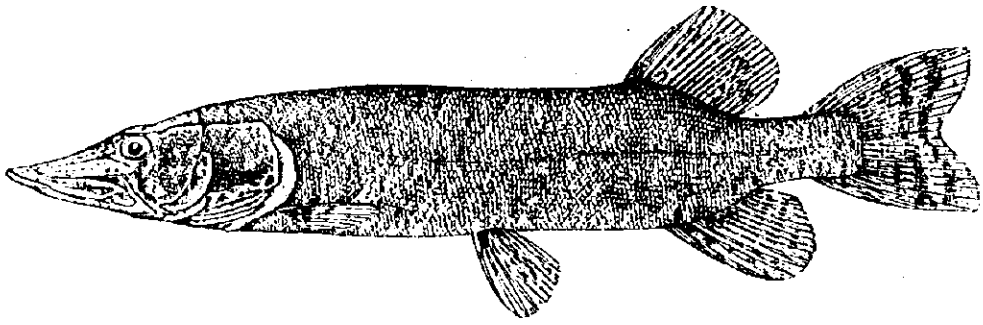


(24) *Rutilus rutilus carpathorossicus*

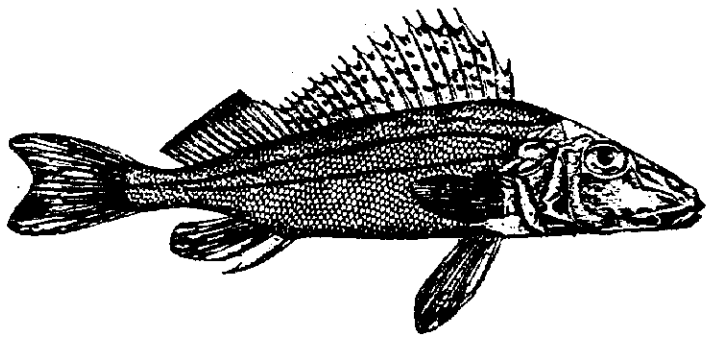
STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN	**Fig. C.5.2 Fishes in Ialomita and Prahova River (7/8)**
JAPAN INTERNATIONAL COOPERATION AGENCY	



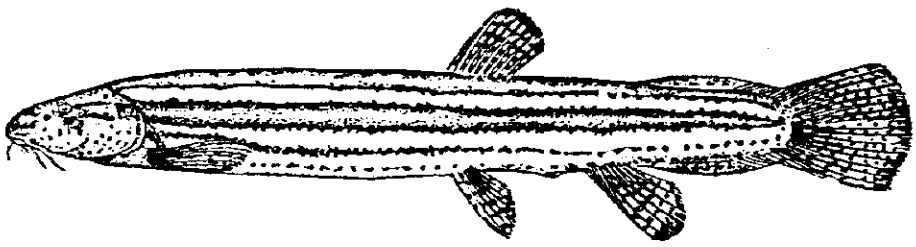
(25) *Silurus glanis*



(26) *Esox lucius*



(27) *Acerina schraetser*



(28) *Misgurnus fossilis*

STUDY ON THE MASTER PLAN FOR WATER ENVIRONMENT MANAGEMENT ON THE PRAHOVA RIVER BASIN JAPAN INTERNATIONAL COOPERATION AGENCY	**Fig. C.5.2** **Fishes in Ialomita and Prahova River (8/8)**

APPENDIX D

DOMESTIC WASTEWATER TREATMENT

APPENDIX D

DOMESTIC WASTEWATER TREATMENT

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Attachment

CHAPTER 1 EXISTING POLLUTION SOURCE INVENTORY

1.1 Existing Sanitary System of the Basin

The Prahova River Basin covers two (2) cities, 12 towns and 73 communes of which two (2) cities, 11 towns and two (2) communes are provided with sewerage system. Sanitary system of the remaining one (1) town and 71 communes is septic tank or latrine.

The municipalities served by sewerage system are listed below.

Municipality	Name of Municipality
City	Cimpina, Ploiesti
Town	Predeal, Azuga, Busteni, Sinaia, Breaza, Baicoi, Plopeni, Slanic, Valenii de Munte, Boldesti Scaieni, Urlati
Commune	Floresti, Maneciu

Barcanesti, Cornu, Valea Doftanei and Valea Calugareasca communes are also provided with sewerage system. However, the served population of the communes is all very small (less than 5 % of commune population each). Their sewerage system is neglected in this Study.

The sewerage systems except Azuga and Busteni are all provided with treatment plant. Azuga and Busteni towns are provided with only sewer networks.

The total population of the Basin is estimated to be 755,000 in 1997. Among them, 322,000 or 43 % is served by sewerage system and the remaining 433,000 or 57 % is treated by septic tank/latrine. The served population by sanitary system and by municipality is shown in Table D.1.1.

1.2 Inventory of the Existing Major Sewerage System

Inventory of the existing sewerage systems of 13 major municipalities (cities/towns) in the Basin was prepared through questionnaire and interviews (conducted in January, 1998) with the sewerage management organization of each municipality and available data in Romanian Waters. The form of questionnaire is shown in Attachment . The results are shown below.

Note: In the following sections, the existing permitted and national new standards of effluent quality are presented together. The Romanian Government published the new national standards, which are constant throughout the country in November 1997. Until then, the effluent quality had been permitted for the wastewater discharge individually. However, the existing permission will be effective for the time-being until the existing license expires. Thereafter, the national new standards will be applied for all the wastewater effluents.

1.2.1 Predeal Town Sewerage System

(1) Served Population

The sewerage system is highly developed and it serves 85 % of the total population of the town. The existing wastewater disposal condition of the town is summarized below.

Treatment System	Population		Household	
	Person	Rate(%)	Number	Rate(%)
Sewerage	5,890	84.9	1,110	80.4
Septic Tank	630	9.1	170	12.3
Latrine	420	6.0	100	7.3
Total	6,940	100.0	1,380	100.0

(2) Sewer Networks

The sewer networks are of separate type. They have been developed since 1923. The total sewer length including tertiary sewers (30-50 mm: 12,900 m) reaches 17.9 km with the following breakdown.

Diameter (mm)	30-50	300	500	Total
Length (m)	12,900	4,000	1,000	17,900

The sewer networks receive the wastewater of 1,110 households and 125 small hotels/shops/others. No factory wastewater is discharged into the sewers.

Rehabilitation of the main sewer has been completed by 75 % and the remaining 25 % will be completed within 1998. The tertiary sewer pipes are under rehabilitation. Location of the existing sewer networks is shown in Fig. D.3.2.

(3) Wastewater Treatment Plant

The original treatment plant was constructed in 1956. It was extended and modernized during 1996 – 1997 to meet the demand in the year of 2015. The new treatment plant was completed in September 1997.

The design population for the treatment plant is assumed as follows.

Item	Number
Existing Residential Population	8,000*
Existing Tourist Population	3,000
Future Population Increase	10,000
Total	21,000

Note: *: including neighboring area of the town.

The treatment plant consists of mechanical and biological processes with a design capacity of 90.0 l/s. Layout of the treatment plant is shown in Fig. D.3.3.

(4) Wastewater Effluent

The wastewater from the treatment plant is discharged into the Prahova River. For location of the discharging site, see Fig. D.3.2. The average effluent quantity and quality during 1995-1997 are shown below, compared with the existing permitted and national new standards. For details, see Table D.1.3.

Parameter		Standards	Permitted	Effluent Quality	
				Average	new treatment
Q	l/s		64.0	49.28	
BOD	mg/l	20	-	19.7	9.7
COD-Mn	mg/l	40	-	32.8	6.1
SS	mg/l	60	-	74.2	66.3
Oil Products	mg/l	5	-	3.12	5.3

(5) Operation and Maintenance

The owner of the sewerage system is Predeal Town. The town implements construction and rehabilitation of the sewerage system with financial assistance of the central government. However, O&M are entrusted to a pure private company "S.C. APEVITA S.A. PREDEAL" which was founded in 1995. The company does communal services including water supply, sewerage and solid wastes.

Number of staff directly engaged in the O&M works and direct O&M expenditure for the sewerage system in 1997 are shown below.

Item	Staff	O&M Cost(million lei/month)			
		Utility	Personnel	Repair	Total
Sewer	10	5.0	7.0	7.0	19.0
Treatment Plant	8	12.0	7.0	8.0	27.0
Total	18	17.0	14.0	15.0	46.0

(6) Sewerage Charge

Sewerage charge is determined so that the company can maintain financial balance between O&M cost and revenue of sewerage charge with permission of the price office of the central government.

The sewerage charge and revenue as of January 1998 are as follows.

User	Number	Unit Charge (lei/m^3)	Charged Volume (10^3 m^3/month)	Revenue (million lei/month)
Household	1,110	120	12.67	1.52
Factory	-	-	-	-
Others	125	270	53.59	14.47
Total	1,235		66.26	15.99

Note : Charged volume was calculated from unit charge and revenue.

1.2.2 Azuga Town Sewerage System

(1) Served Population

The town is provided with the sewerage system with no treatment plant and it serves 85 % of the total population of the town. The existing wastewater disposal condition of the town is summarized below.

Treatment System	Population		Household	
	Person	Rate(%)	Number	Rate(%)
Sewerage	5,320	85.0	1,600	94.1
Septic Tank	630	10.1	50	3.0
Latrine	310	4.9	50	2.9
Total	6,260	100.0	1,700	100.0

(2) Sewer Networks

The sewer networks are of combined type. The total main sewer length reaches 7.6 km with the following breakdown.

Diameter (mm)	300	400	500	Total
Length (m)	2,000	4,000	1,600	7,600

The sewer networks receive the wastewater of 5,320 households, one (1) cement factory and 60 small hotels/shops/others. The average wastewater discharge and quality of the cement factory are shown in Table D.1.2. Location of the existing sewer networks is shown in Fig. D.3.2.

(3) Wastewater Treatment Plant

No treatment plant is provided.

(4) Wastewater Effluent

The wastewater from the sewer networks is discharged into the Prahova River with no treatment. For location of the discharging site, see Fig. D.3.2. The existing effluent quantity and quality (average during 1995-1997) are shown below compared with the existing permitted and national new standards. For details, see Table D.1.3.

Parameter		Standard	Permitted	Average
Q	l/s		50.0	31.42
BOD	mg/l	20	15	-
COD-Mn	mg/l	40	-	-
SS	mg/l	60	25	187
Oil Products	mg/l	5	-	7.93

(5) Operation and Maintenance

The owner of the sewerage system is Azuga Town. The town implements construction and rehabilitation of the sewerage system with financial assistance of the central government. However, O&M is done by a department of the town "SERVICIU DE GOSPODARIRE ORASENEASCA AZUGA". The department does communal services including water supply and sewerage.

Number of staff directly engaged in the O&M works and direct O&M expenditure for the sewerage system in 1997 are shown below.

Item	Staff	O&M Cost(million lei/month)			
		Utility	Personnel	Repair	Total
Sewer Networks	8	-	7.0	4.0	11.0

(6) Sewerage Charge

Sewerage charge is determined so that the town can maintain financial balance between O&M cost and revenue of sewerage charge with permission of the price office of the central government.

The sewerage charge and revenue as of January 1998 are as follows.

User	Number	Unit Charge (lei/m^3)	Charged Volume (10^3 m^3/year)	Revenue (million lei/year)
Household	1,604	125	320.0	40.0
Factory	1	275	36.4	10.0
Others	60	275	36.4	10.0
Total	1,730		392.8	60.0

Note : Charged volume was calculated from unit charge and revenue.

1.2.3 Busteni Town Sewerage System

(1) Served Population

The town is provided with the sewerage system with no treatment plant and it serves 60 % of the total population of the town. The existing wastewater disposal condition of the town is summarized below.

Treatment System	Population		Household	
	Person	Rate(%)	Number	Rate(%)
Sewerage	7,240	60.1	2,200	77.2
Septic Tank	4,070	33.8	540	18.9
Latrine	740	6.1	110	3.9
Total	12,050	100.0	2,850	100.0

(2) Sewer Networks

The sewer networks are of combined type. They were constructed during 1911 to 1956. The sewer networks consisting of diameter of 100-1,000 mm reach 17,000 m in total length.

The sewer networks receive the wastewater of 7,240 households, one (1) large hotel and others. The average wastewater discharge and quality of the large hotel is shown in Table D.1.2. Location of the existing sewer networks is shown in Fig. D.3.2.

(3) Wastewater Treatment Plant

No treatment plant is provided.

(4) Wastewater Effluent

The wastewater from the sewer networks is discharged into the Prahova River with no treatment. For location of the discharging site, see Fig. D.3.2. The existing effluent quantity (average during 1995-1997) is shown below, compared with the existing

permitted one.

Parameter		Standards	Permitted	Average
Q	l/s		90.0	25.18
BOD	mg/l	20	-	-
COD-Mn	mg/l	40	-	-
SS	mg/l	60	-	-
Oil Products	mg/l	5	-	-

(5) Operation and Maintenance

The owner of the sewerage system is Busteni Town. The town implements construction and rehabilitation of the sewerage system with financial assistance of the central government. However, O&M is done by a department of the town "G.O. BUSTENI". The main jobs of the department are management of the existing water supply and sewerage system.

Number of staff directly engaged in the O&M works and direct O&M expenditure for the sewerage system in 1997 are shown below.

Item	Staff	O&M Cost(million lei/year)			
		Utility	Personnel	Repair	Total
Sewer Networks	4	0.0	26.9	85.6	112.5

(6) Sewerage Charge

Sewerage charge is determined so that the town can maintain financial balance between O&M cost and revenue of sewerage charge with permission of the price office of the central government.

The sewerage charge and revenue as of January 1998 are as follows.

User	Number	Unit Charge (lei/m^3)	Charged Volume (10^3 m^3/year)	Revenue (million lei/year)
Household	2,200	90	410	36.9
Factory/ Hotel	5	160	528	84.5
Total	2,205		938	121.4

Note : Charged volume was calculated from unit charge and revenue.

1.2.4 Sinaia Town Sewerage System

(1) Served Population

The town is provided with the sewerage system with a treatment plant and it serves 80 % of the total population of the town. The existing wastewater disposal condition of the town is summarized below.

Treatment System	Population		Household	
	Person	Rate(%)	Number	Rate(%)
Sewerage	12,000	79.7	3,430	79.7
Septic Tank/Latrine	3,060	20.3	870	20.3
Total	15,060	100.0	4,300	100.0

(2) Sewer Networks

The sewer networks are of combined type. They were constructed during 1917-1956, 1962 and 1996. The total main sewer length is estimated to be 37.2 km with the following break down.

Diameter (mm)	150	250	300	400	Total
Length (m)	5,700	19,500	4,000	8,000	37,200

The sewer networks receive the wastewater of 3,430 households, six (6) major industrial establishments and others. The average wastewater discharge and quality of the six (6) major establishments are shown in Table D.1.2. Location of the existing sewer networks is shown in Fig. D.3.2.

(3) Wastewater Treatment Plant

The treatment plant was constructed in 1980.The treatment plant consists of mechanical and biological processes. Layout of the treatment plant is shown in Fig. D.3.3. The design capacity of the existing plant is 109.0 l/s.

The treatment plant can not always collect the all wastewater in the served area due to frequent pumping troubles in the sewer networks. Some wastewater is directly discharged into the Prahova River at the time of pumping troubles. The treatment efficiency is at a low level due to its old treatment system. Improvement of the treatment plant is necessary.

(4) Wastewater Effluent

The wastewater from the treatment plant is discharged into the Prahova River. For location of the discharging site, see Fig. D.3.2. The existing effluent quantity and quality (average during 1995-1997) are shown below, compared with the existing permitted and national new standards. For details, see Table D 1.3.

Parameter		Standards	Permitted	Average
Q	l/s		103.0	60.57
BOD	mg/l	20	20	39.6
COD-Mn	mg/l	40	-	18.3
SS	mg/l	60	40	118.8
Oil Products	mg/l	5	-	3.05

(5) Operation and Maintenance

The owner of the sewerage system is Sinaia Town. The town implements construction and rehabilitation of the sewerage system with financial assistance of the central government. However, O&M is entrusted to a department of the town "A.D.P.P. SINAIA". The department manages water supply, sewerage and solid waste of the town.

Number of staff directly engaged in the O&M works and direct O&M expenditure for

the sewerage system in 1997 are shown below.

Item	Staff	O&M Cost(million lei/year)			
		Utility	Personnel	Repair	Total
Sewer Networks	33	24.0	198.2	45.0	267.2
Treatment Plant	21	9.7	124.3	25.0	159.0
Total	54	33.7	322.5	70.0	426.2

(6) Sewerage Charge

Sewerage charge is determined so that the town can maintain financial balance between O&M cost and revenue of sewerage charge with permission of the price office of the central government.

The sewerage charge and revenue as of January 1998 are as follows.

User	Number	Unit Charge (lei/m^3)	Charged Volume (10^3 m^3/month)	Revenue (million lei/month)
Household	3,430	140	62.9	8.8
Factory/Hotel	20	405	368.6	149.3
Total	3,450		431.5	158.1

Note : Charged volume was calculated from unit charge and revenue.

1.2.5 Comarnic Town Sewerage System

The town has no sewerage system. The wastewater is discharged into the Prahova River through the ditches, drainage open channel or discharged into underground. The existing wastewater disposal condition is summarized below.

Treatment System	Population		Household	
	Person	Rate(%)	Number	Rate(%)
Sewerage	-	-	-	-
Septic Tank	-	-	1,000	16.7
Latrine	-	-	5,000	83.3
Total	13,580	100.0	6,000	100.0

1.2.6 Breaza Town Sewerage System

(1) Served Population

The town is provided with the sewerage system with a treatment plant and it serves 47 % of the total population of the town. The existing wastewater disposal condition of the town is summarized below.

Treatment System	Population		Household	
	Person	Rate(%)	Number	Rate(%)
Sewerage	9,000	47.3	3,000	47.6
Septic Tank/Latrine	10,040	52.7	3,300	52.4
Total	19,040	100.0	6,300	100.0

(2) Sewer Networks

The sewer networks are of combined type. They have been installed since 1970. The main sewer (diameter: 500 mm) is 4,000 m long in total.

The sewer networks receive the wastewater of 3,000 households, two (2) major factory/ public facilities and others. The average wastewater discharge and quality of the above establishments are shown in Table D.1.2. Location of the existing sewer networks is shown in Fig. D.3.2.

(3) Wastewater Treatment Plant

A new treatment plant consisting of combined basins (combined aeration and secondary sedimentation tanks) was constructed in October in 1997. The old was abandoned except primary sedimentation tank. This new plant was designed to meet the year of 2015.

The treatment plant consists of mechanical and biological processes. Layout of the treatment plant is shown in Fig. D.3.3. The design capacity of the new plant is 76.0 l/s.

According to the water quality data of the company, the treatment efficiency of the new plant is roughly estimated as follows.

Parameter	Inflow (mg/l)	Outflow (mg/l)	Efficiency (%)
BOD	160	40	75
COD	220	60	75
SS	240	60	75

(4) Wastewater Effluent

The wastewater from the treatment plant is discharged into the Prahova River. For location of the discharging site, see Fig. D.3.2. The average effluent quantity and quality during 1995-1997 are shown below, compared with the existing permitted and national new standards. For details, see Table D.1.3.

Parameter		Standards	Permitted	Effluent Quality	
				Average	New Treatment
Q	l/s		48.07	30.16	
BOD	mg/l	20	20	66.5	9.9
COD-Mn	mg/l	40	40	61.2	8.5
SS	mg/l	60	60	80.4	91.5
Oil Products	mg/l	5	1	14.51	2.80

(5) Operation and Maintenance

The owner of the sewerage system is Breaza Town. The town implements construction and rehabilitation of the sewerage system with financial assistance of the central government. However, O&M is entrusted to a state company "S.C. CIVITAS S.A. BREAZA". The company manages water supply, sewerage and solid waste of the town.

Number of staff directly engaged in the O&M works and direct O&M expenditure for the sewerage system in 1997 are shown below.

Item	Staff	O&M Cost(million lei/month)			
		Utility	Personnel	Repair	Total
Sewer Networks	2	1.0	1.0	-	2.0
Treatment Plant	8	3.0	4.0	-	7.0
Total	10	4.0	5.0	-	9.0

(6) Sewerage Charge

Sewerage charge is determined so that the company can maintain financial balance between O&M cost and revenue of sewerage charge with permission of the price office of the central government.

The sewerage charge and revenue as of January 1998 are as follows.

User	Number	Unit Charge (lei/m^3)	Charged Volume (103 m^3/month)	Revenue (million lei/month)
Household	2,560	170	17.0	2.9
Factory/Others	112	270	55.0	14.85
Total	2,672		72.0	17.75

Note : Charged volume was calculated from unit charge and revenue.

1.2.7 Cimpina City Sewerage System

(1) Served Population

The town is provided with the sewerage system with a treatment plant and it serves 64 % of the total population of the town. The existing wastewater disposal condition of the town is summarized below.

Treatment System	Population		Household	
	Person	Rate(%)	Number	Rate(%)
Sewerage	26,250	64.2	10,500	71.5
Septic Tank/Latrine	14,650	35.8	4,190	28.5
Total	40,900	100.0	14,690	100.0

(2) Sewer Networks

The sewer networks are of separate type. They have been installed since 1945. The total sewer length reaches 40 km with the following break down. It covers 400 ha of the urban area of the city.

Diameter (mm)	150	300	400	600	800	Total
Length (m)	11,000	23,000	2,500	3,000	500	40,000

The sewer networks receive the wastewater of 10,500 households, 15 major industrial establishments and others. The average wastewater discharge and quality of the 15 major establishments are shown in Table D.1.2. Location of the existing sewer networks is shown in Fig. D.3.2.

(3) Wastewater Treatment Plant

The treatment plant was constructed in 1975 and it consists of mechanical and biological processes. Layout of the treatment plant is shown in Fig. D.3.3.

The existing treatment plant is old and overloaded. The design capacity of the plant is 150 l/s, while the average existing inflow rate during 1995-1997 is estimated to be 234.7 l/s. Treatment efficiency of the plant is at a low level. According to the water quality data of the company, the treatment efficiency of the plant is roughly estimated as follows. Rehabilitation and extension is necessary.

Parameter	Inflow (mg/l)	Outflow (mg/l)	Efficiency (%)
BOD	90	55	40
COD	140	80	40
SS	110	50	55
Oil Products	20	15	25

(4) Wastewater Effluent

The wastewater from the treatment plant is discharged into the Prahova River. For location of the discharging site, see Fig. D.3.2. The existing effluent quantity and quality (average during 1995-1997) are shown below, compared with the existing permitted and national new standards. For details, see Table D.1.3.

Parameter		Standards	Permitted	Average
Q	l/s		144.0	234.68
BOD	mg/l	20	40	28.2
COD-Mn	mg/l	40	60	19.5
SS	mg/l	60	20	131.8
Oil Products	mg/l	5	5	7.56

(5) Operation and Maintenance

The owner of the sewerage system is Campina City. The city implements construction and rehabilitation of the sewerage system with financial assistance of the central government. However, O&M is entrusted to a self-management company "REGIA AUTONOMA DE GOSPODARIE COMUNALA CAMPINA". The company manages water supply and sewerage of the city.

Number of staff directly engaged in the O&M works and direct O&M expenditure for the sewerage system in 1997 are shown below.

Item	Staff	O&M Cost(million lei/year)			
		Utility	Personnel	Repair	Total
Sewer Networks					
Treatment Plant					
Total	27	59.1	183.9	3.3	246.3

(6) Sewerage Charge

Sewerage charge is determined so that the company can maintain financial balance between O&M cost and revenue of sewerage charge with permission of the price office of the central government.

The sewerage charge and revenue as of March 1998 are as follows.

User	Number	Unit Charge (lei/m^3)	Charged Volume (10^3 m^3/month)	Revenue (million lei/month)
Household	10,500	110	212.0	23.32
Factory/Others	509	125	314.4	39.30
Total	11,009		526.4	62.62

Note : Charged volume was calculated from unit charge and revenue.

1.2.8 Baicoi Town Sewerage System

(1) Served Population

The town is provided with the sewerage system with a treatment plant and it serves 24 % of the total population of the town. The existing wastewater disposal condition of the town is summarized below.

Treatment System	Population		Household	
	Person	Rate(%)	Number	Rate(%)
Sewerage	4,830	23.8	1,210	19.0
Septic Tank	9,670	47.7	3,220	50.6
Latrine	5,790	28.5	1,930	30.4
Total	20,290	100.0	6,360	100.0

(2) Sewer Networks

The sewer networks are of separate type. They were installed during 1961 to1966. The total sewer length reaches 10 km with the following break down.

Diameter (mm)	250	300	400	Total
Length (m)	1,550	3,450	5,000	10,000

The sewer networks receive the wastewater of 1,280 households, six (6) major industrial establishments and others. The average wastewater discharge and quality of the six (6) major establishments are shown in Table D.1.2. Location of the existing sewer networks is shown in Fig. D.3.2.

(3) Wastewater Treatment Plant

The treatment plant was constructed in 1967 and it consists of mechanical and biological processes. The design capacity of the existing plant is 26.0 l/s.

The existing treatment plant is old and overloaded. Its operation is often suspended due to technical troubles. Rehabilitation is necessary. The layout of the treatment plant is shown in Fig. D.3.3.

Treatment efficiency of the plant is at a very low level. According to the water quality data of the company, treatment efficiency of the plant is roughly estimated as follows.

Parameter	Inflow (mg/l)	Outflow (mg/l)	Efficiency (%)
BOD	80	50	40
COD	120	80	35
SS	130	90	30
Oil Products	20	15	25

(4) Wastewater Effluent

The wastewater from the treatment plant is discharged into the Dimbu River. For location of the discharging site, see Fig. D.3.2. The existing average effluent quantity and quality (average during 1995-1997) are shown below, compared with the existing permitted and national new standards. For details, see Table D.1.3.

Parameter		Standards	Permitted	Average
Q	l/s		25.0	50.48
BOD	mg/l	20	20	63.0
COD-Mn	mg/l	40	-	25.8
SS	mg/l	60	50	97.3
Oil Products	mg/l	5	2	1.90

(5) Operation and Maintenance

The owner of the sewerage system is Baicoi Town. The town implements construction and rehabilitation of the sewerage system with financial assistance of the central government. However, O&M is entrusted to a state company "S.C.G.L. BAICOI". The company manages water supply, sewerage, solid waste and heating of the town.

Number of staff directly engaged in the O&M works and direct O&M expenditure for the sewerage system in 1997 are shown below.

Item	Staff	O&M Cost(million lei/year)			
		Utility	Personnel	Repair	Total
Sewer Networks	2	0.6	0.7	1.8	3.1
Treatment Plant	6	24.1	20.3	2.6	47.0
Total	8	24.7	21.0	4.4	50.1

(6) Sewerage Charge

Sewerage charge is determined so that the company can maintain financial balance between O&M cost and revenue of sewerage charge with permission of the price office of the central government.

The sewerage charge and revenue as of January 1998 are as follows.

User	Number	Unit Charge (lei/m³)	Charged Volume (10^3 m³/year)	Revenue (million lei/year)
Household	1,210	70	192.9	13.5
Factory	2	70	145.7	10.2
Others	38	70	142.9	10.0
Total	1,250		481.5	33.7

Note : Charged volume was calculated from unit charge and revenue.

1.2.9 Plopeni Town Sewerage System

(1) Served Population

The town is provided with the sewerage system with a treatment plant and it serves 79 % of the total population of the town. The existing wastewater disposal condition of the town is summarized below.

Treatment System	Population		Household	
	Person	Rate(%)	Number	Rate(%)
Sewerage	8,100	78.5	4,750	89.6
Septic Tank/Latrine	2,220	21.5	550	10.4
Total	10,320	100.0	5,300	100.0

(2) Sewer Networks

The sewer networks are of separate type. They were installed during 1960 to1980. The sewer with a diameter of 300 - 500 mm extends 13,900 m. The networks cover a small area of the town. However, they are overloaded in some places due to some mistakes in the construction stages.

The sewer networks receive the wastewater of 4,750 households, one (1) major factory and others. The average wastewater discharge and quality of the factory are shown in Table D.1.2. Location of the existing sewer networks is shown in Fig. D.3.2.

(3) Wastewater Treatment Plant

The treatment plant consisting of mechanical and biological processes was constructed in 1964 and 1976. The layout of the treatment plant is shown in Fig. D.3.3.

The design capacity of the existing plant is 190.0 l/s. The treatment plant does not function well and rehabilitation is necessary.

(4) Wastewater Effluent

The wastewater from the treatment plant is discharged into the Teiului River (a tributary of Teleajen River) at 2 km upstream of the confluence with Teleajen River. For location of the discharging site, see Fig. D.3.2. The existing effluent quantity and quality (average during 1995-1997) are shown below, compared with the existing permitted and national new standards. For details, see Table D.1.3.

Parameter		Standards	Permitted	Average
Q	l/s		175.0	77.44
BOD	mg/l	20	20	36.6
COD-Mn	mg/l	40	-	20.1
SS	mg/l	60	60	208.0
Oil Products	mg/l	5	0.0	2.93

(5) Operation and Maintenance

The owner of the sewerage system is Plopeni Town. The town implements construction and rehabilitation of the sewerage system with financial assistance of the central government. However, O&M is entrusted to a state company "S.C.GOPODARIE COMUNALA SI LOCATIVA PLOPENI". The company manages water supply, sewerage and heating of the town.

Number of staff directly engaged in the O&M works and direct O&M expenditure for the sewerage system in 1997 are shown below.

Item	Staff	O&M Cost(million lei/year)			
		Utility	Personnel	Repair	Total
Sewer Networks	5	2.8	44.6	-	47.4
Treatment Plant	5	38.0	44.6	-	82.6
Total	10	40.8	89.2	-	130.0

(6) Sewerage Charge

Sewerage charge is determined so that the company can maintain financial balance between O&M cost and revenue of sewerage charge with permission of the price office of the central government.

The sewerage charge and revenue as of January 1998 are as follows.

User	Number	Unit Charge (lei/m^3)	Charged Volume (10^3 m^3/year)	Revenue (million lei/year)
Household	4,750	95	494.7	47.0
Factory	1	165	1,783.0	294.2
Others	137	165	357.6	59.0
Total	4,888		2,635.3	400.2

Note : Charged volume was calculated from unit charge and revenue.

1.2.10 Slanic Town Sewerage System

(1) Served Population

The town is provided with the sewerage system with a treatment plant and it serves 33 % of the total population of the town. The existing wastewater disposal condition of the town is summarized below.

Treatment System	Population		Household	
	Person	Rate(%)	Number	Rate(%)
Sewerage	2,400	32.5	800	32.0
Septic Tank	1,500	20.3	500	20.0
Latrine	3,480	47.2	1,200	48.0
Total	7,380	100.0	2,500	100.0

(2) Sewer Networks

The sewer networks are of separate type. The main sewer with a diameter of 300 mm extends 4,000 m. The sewer networks receive the wastewater of 800 households and others. No wastewater of major industrial establishments is discharged into the sewers. Location of the existing sewer networks is shown in Fig. D.3.2.

(3) Wastewater Treatment Plant

The treatment plant was constructed during 1981-1982. It consists of mechanical and biological processes. The design capacity of the existing plant is 27.0 l/s. Layout of the treatment plant is shown in Fig. D.3.3.

(4) Wastewater Effluent

The wastewater from the treatment plant is discharged into the Slanic River (a tributary of Teleajen River). For location of the discharging site, see Fig. D.3.2. The existing effluent quantity and quality (average during 1995-1997) are shown below, compared with the existing permitted and national new standards. For details, see Table D.1.3.

Parameter		Standards	Permitted	Average
Q	l/s		11.91	6.60
BOD	mg/l	20	20	16.4
COD-Mn	mg/l	40		8.9
SS	mg/l	60	33	84.4
Oil Products	mg/l	5	0.1	1.93

(5) Operation and Maintenance

The owner of the sewerage system is Slanic town. The town implements construction and rehabilitation of the sewerage system with financial assistance of the central government. However, O&M is entrusted to a state company "S.C.GOSCOM S.A. SLANIC". The company manages water supply, sewerage, solid waste and heating of the town.

Number of staff directly engaged in the O&M of the sewerage system and its direct O&M expenditure in 1997 are shown below.

Item	Staff	O&M Cost(million lei/month)			
		Utility	Personnel	Repair	Total
Sewer Networks	1	0.2	0.6	-	0.8
Treatment Plant	5	1.5	3.0	-	4.5
Total	6	1.7	3.6	-	5.3

(6) Sewerage Charge

Sewerage charge is determined so that the company can maintain financial balance between O&M cost and revenue of sewerage charge with permission of the price office of the central government.

The sewerage charge and revenue as of January 1998 are as follows.

User	Number	Unit Charge (lei/m^3)	Charged Volume (10^3 m^3/year)	Revenue (million lei/year)
Household	800	290	39.3	11.4
Factory/Others	15	490	37.1	18.2
Total	815		76.4	29.6

Note : Charged volume was calculated from unit charge and revenue.

1.2.11 Valenii de Munte Town Sewerage System

(1) Served Population

The town is provided with the sewerage system with treatment plant and it serves 23 % of the total population of the town. The existing wastewater disposal condition of the town is summarized below.

Treatment System	Population		Household	
	Person	Rate(%)	Number	Rate(%)
Sewerage	3,190	22.8	1,100	29.4
Septic Tank	2,800	20.0	640	17.1
Latrine	8,020	57.2	2,000	53.5
Total	14,010	100.0	3,740	100.0

(2) Sewer Networks

The sewer networks are of separate type. They were installed during 1963-1980. The main sewer with a diameter of 500 mm extends 8,300 m. The sewer networks receive the wastewater of 1,100 households, two (2) major industrial establishments and others. The average wastewater discharge and quality of the above two (2) major establishments are shown in Table D.1.2. Location of the existing sewer networks is shown in Fig. D.3.2.

(3) Wastewater Treatment Plant

The treatment plant consisting of mechanical and biological processes was constructed during 1978 and 1987. Layout of the plant is shown also in Fig. D.3.3.

The designed capacity of the existing plant is 106 l/s. This nominal capacity is large enough compared to the actual average inflow (30.3 l/s) during 1995-1997. However, rehabilitation of the plant is urgently necessary because of frequent pump and engine troubles. Further, the laboratory should be immediately strengthened since the plant is now operated with poor information of the treatment efficiency.

(4) Wastewater Effluent

The wastewater from the treatment plant is discharged into the Teleajen River. For location of the discharging site, see Fig. D.3.2. The existing effluent quantity and quality (average during 1995-1997) are shown below, compared with the existing permitted and national new standards. For details, see Table D.1.3.

Parameter		Standards	Permitted	Average
Q	l/s		85.0	30.25
BOD	mg/l	20	30	21.8
COD-Mn	mg/l	40		13.4
SS	mg/l	60	60	149.2
Oil Products	mg/l	5		3.47

(5) Operation and Maintenance

The owner of the sewerage system is Valenii de Munte Town. The town implements construction and rehabilitation of the sewerage system with financial assistance of the central government. However, O&M is done by a department of the town "SERVICIUL PUBLIC DE SPECIALITATE VLENII DE MUNTE". The department manages water supply, sewerage, solid waste and heating of the town.

Number of staff directly engaged in the O&M works and direct O&M expenditure for the sewerage system in 1997 are shown below.

Item	Staff	O&M Cost(million lei/year)			
		Utility	Personnel	Repair	Total
Sewer Networks	2	2.0	12.0	-	14.0
Treatment Plant	5	10.0	32.0	-	42.0
Total	7	12.0	44.0	-	56.0

(6) Sewerage Charge

Sewerage charge is determined so that the town can maintain financial balance between O&M cost and revenue of sewerage charge with permission of the price office of the central government.

The sewerage charge and revenue as of January 1998 are as follows.

User	Number	Unit Charge (lei/m^3)	Charged Volume (10^3 m^3/month)	Revenue (million lei/month)
Household	1,100	130	26.2	3.4
Factory/Others	75	245	74.3	18.2
Total	1,175		100.5	21.6

Note : Charged volume was calculated from unit charge and revenue.

1.2.12 Boldesti Scaieni Town Sewerage System

(1) Served Population

The town is provided with the sewerage system with a treatment plant and it serves 32 % of the total population of the town. The existing wastewater disposal condition of the town is summarized below.

Treatment System	Population		Household	
	Person	Rate(%)	Number	Rate(%)
Sewerage	3,660	31.6	1,070	38.9
Septic Tank	4,000	34.5	900	32.7
Latrine	3,920	33.9	780	28.4
Total	11,580	100.0	2,750	100.0

(2) Sewer Networks

The sewer networks are of combined type. They were installed during 1973 to 1993. The total sewer length reaches 10.5 km with the following break down.

Diameter (mm)	200	300	500	Total
Length (m)	2,000	4,000	4,500	10,500

The sewer networks receive the wastewater of 1,070 households, four (4) major factory and others. The average wastewater discharge and quality of the above major factories are shown in Table D.1.2. Location of the existing sewer networks is shown in Fig. D.3.2.

(3) Wastewater Treatment Plant

The treatment plant consisting of mechanical and biological processes was constructed during 1990 to 1993. Layout of the treatment plant is shown in Fig. D.3.3.

The designed capacity of the existing plant is 40 l/s. It was originally designed to meet domestic wastewater of 93 % and factory wastewater of 7 %. However, the existing inflow rate is 70-80 % from the factories and 20-30 % from the households. Hence, the plant is overloaded due to the unexpected increase of factory wastewater. Extension of the plant is considered necessary to increase the coverage of households.

The wastewater inflow rate to the plant varies much, resulting in difficulty of proper plant operation. The treatment efficiency of the plant is at a low level. According to the water quality data of the company, treatment efficiency of the plant is roughly estimated as follows.

Parameter	Inflow (mg/l)	Outflow (mg/l)	Efficiency (%)
COD	25	20	20
SS	100	50	50
Oil Products	3	2	30

(4) Wastewater Effluent

The wastewater from the treatment plant is discharged into the Teleajen River. For location of the discharging site, see Fig. D.3.2 The existing effluent quantity and quality (average during 1995-1997) are shown below, compared with the existing permitted and national new standards. For details, see Table D.1.3.

Parameter		Standards	Permitted	Average
Q	l/s		34.15	21.88
BOD	mg/l	20	33	33.6
COD-Mn	mg/l	40		20.3
SS	mg/l	60	55	101.5
Oil Products	mg/l	5	1	3.19

(5) Operation and Maintenance

The owner of the sewerage system is Boldesti Scaeni Town. The town implements construction and rehabilitation of the sewerage system with financial assistance of the central government. However, O&M is entrusted to a state company "S.C. GOSPODARIE COMUNALA SI LOCATIVA BOLDESTI SCAENI". The company

manages water supply and sewerage of the town.

Number of staff directly engaged in the O&M works and direct O&M expenditure for the sewerage system in 1997 are shown below.

Item	Staff	O&M Cost(million lei/year)			
		Utility	Personnel	Repair	Total
Sewer Networks	4				
Treatment Plant	7				
Total	11	24.0	200.0	1.0	225.0

(6) Sewerage Charge

Sewerage charge is determined so that the company can maintain financial balance between O&M cost and revenue of sewerage charge with permission of the price office of the central government.

The sewerage charge and revenue as of January 1998 are as follows.

User	Number	Unit Charge (lei/m^3)	Charged Volume (10^3 m^3/month)	Revenue (million lei/month)
Household	1,074	155	23.9	3.7
Factory	14	245	63.7	15.6
Others		245	2.9	0.7
Total			90.5	20.0

Note : Charged volume was calculated from unit charge and revenue.

1.2.13 Urlati Town Sewerage System

(1) Served Population

The town is provided with the sewerage system with a treatment plant and it serves 42 % of the total population of the town. The existing wastewater disposal condition of the town is summarized below.

Treatment System	Population		Household	
	Person	Rate(%)	Number	Rate(%)
Sewerage	5,000	42.1	1,700	48.6
Septic Tank	4,000	33.6	1,000	28.6
Latrine	2,890	24.3	800	22.8
Total	11,890	100.0	3,500	100.0

(2) Sewer Networks

The sewer networks are of combined type. They were installed during 1950 to 1960 and in 1980. The total sewer length reaches 7.0 km with the following break down.

Diameter (mm)	250	300	600	Total
Length (m)	4,000	1,500	1,500	7,000

The sewer networks receive the wastewater of 1,700 households, two (2) major factories and others. The average wastewater discharge and quality of the above major factories are shown in Table D.1.2. Location of the existing sewer networks is shown in Fig. D.3.2.

(3) Wastewater Treatment Plant

The treatment plant consisting of mechanical and biological processes was constructed during 1990 to 1992. Layout of the treatment plant is shown in Fig. D.3.3.

The designed capacity of the existing plant is 32.0 l/s. The treatment efficiency is not good. The aerator has often troubles. Rehabilitation and improvement of the plant is considered necessary to treat the existing wastewater up to the required level.

(4) Wastewater Effluent

The wastewater from the treatment plant is discharged into the Teleajen River. For location of the discharging site, see Fig. D.3.2. The existing effluent quantity and quality (average during 1995-1997) are shown below, compared with the existing permitted and national new standards. For details, see Table D.1.3.

Parameter		Standards	Permitted	Average
Q	l/s		32.0	21.82
BOD	mg/l	20	12	23.4
COD-Mn	mg/l	40	25	14.3
SS	mg/l	60	60	52.0
Oil Products	mg/l	5	1	5.23

(5) Operation and Maintenance

The owner of the sewerage system is Urlati Town. The town implements construction and rehabilitation of the sewerage system with financial assistance of the central government. However, O&M is done by a department of the town "ADMINISTRATIA DOMENIULUI PUBLIC URLATI". The department manages water supply, sewerage, solid waste and heating of the town.

Number of staff directly engaged in the O&M works and direct O&M expenditure of the sewerage system in 1997 are shown below.

Item	Staff	O&M Cost(million lei/year)			
		Utility	Personnel	Repair	Total
Sewer Networks	2	14.0	7.5	2.0	23.5
Treatment Plant	11	60.0	38.0	-	98.0
Total	13	74.0	45.5	2.0	121.5

(6) Sewerage Charge

Sewerage charge is determined so that the town can maintain financial balance between O&M cost and revenue of sewerage charge with permission of the price office of the central government.

The sewerage charge and revenue as of 1998 are as follows.

User	Number	Unit Charge (lei/m³)	Charged Volume (10^3 m³/month)	Revenue (million lei/month)
Household	1,700	195	22.1	4.3
Factory	6	270	31.5	8.5
Total	1,706		53.6	12.8

Note : Charged volume was calculated from unit charge and revenue.

1.2.14 Ploiesti City Sewerage System

(1) Served Population

The town is provided with the sewerage system with a treatment plant and it serves 87 % of the total population of the town. The existing wastewater disposal condition of the town is summarized below.

Treatment System	Population		Household	
	Person	Rate(%)	Number	Rate(%)
Sewerage	220,000	86.8	88,000	87.1
Septic Tank	33,410	13.2	13,000	12.9
Latrine	-	-	-	-
Total	253,410	100.0	101,000	100.0

(2) Sewer Networks

The sewer networks are of combined type. They have been installed since 1906. The sewer pipe diameter ranges from 200 mm to 3,000 mm and total length is 276 km. The sewer length by diameter is shown below.

Diameter (mm)	200-400	900-1,200	3,000	Total
Length (m)	172,560	81,600	22,100	276,260

The sewer networks receive domestic wastewater of 88,000 households, 42 major industrial establishments and others. The average wastewater discharge and quality of the above 42 establishments are shown in Table D.1.2. Location of the existing sewer networks is shown in Fig. D.3.2.

(3) Wastewater Treatment Plant

The treatment plant of only mechanical process was constructed during 1969 to 1971. Layout of the treatment plant is shown in Fig. D.3.3.

The designed capacity of the existing plant is 1,200 l/s. On the other hand, the existing average inflow rate during 1995-1997 is estimated to be 1,522 l/s. The treatment plant is overloaded and its treatment efficiency is at a low level. According to the water quality data of the company, treatment efficiency of the plant is roughly estimated as follows.

Parameter	Inflow (mg/l)	Outflow (mg/l)	Efficiency (%)
BOD	120	80	30
COD	50	25	50
SS	200	120	40
Oil Products	8	8	0

Rehabilitation and improvement of the plant is considered necessary to treat the existing wastewater up to the required level.

(4) Wastewater Effluent

The wastewater from the treatment plant is discharged into the Dimbu River. For location of the discharging site, see Fig. D.3.2. The existing effluent quantity and quality (average during 1995-1997) are shown below, compared with the existing permitted and national new standards. For details, see Table D.1.3.

Parameter		Standards	Permitted	Average
Q	l/s		1,641.0	1,522.4
BOD	mg/l	20	100	49.3
COD-Mn	mg/l	40	25	31.6
SS	mg/l	60	150	125.7
Oil Products	mg/l	5	8	12.07

(5) Operation and Maintenance

The owner of the sewerage system is Ploiesti City. The city implements construction and rehabilitation of the sewerage system with financial assistance of the central government. However, O&M is entrusted to a self-management company "REGIA AUTONOMA DE APA, CANAL SI FOND LOCATIV PLOIESTI". The company manages water supply and sewerage of the city.

Number of staff directly engaged in the O&M of the sewerage system and its direct O&M expenditure in 1997 are shown below.

Item	Staff	O&M Cost(million lei/month)			
		Utility	Personnel	Repair	Total
Sewer Networks	147	6.7	49.0	-	55.7
Treatment Plant	28	37.0	8.4	0.5	45.9
Total	175	43.7	57.4	0.5	101.6

(6) Sewerage Charge

Sewerage charge is determined so that the company can maintain financial balance between O&M cost and revenue of sewerage charge with permission of the price office of the central government.

The sewerage charge and revenue as of January 1998 are as follows.

User	Number	Unit Charge (lei/m^3)	Charged Volume (10^3 m^3/month)	Revenue (million lei/month)
Household	88,000	120	1,450	174.0
Factory/Commerce	1,900	120	350	42.0
Others	123*	120	900	108.0
Total	90,023		2,700	324.0

Note : Charged volume was calculated from unit charge and revenue.
*: School/hospital/others: 123

1.3 Average Pollution Load Effluent from Sewerage System during 1995-1997

The average pollution load effluent from the sewerage system of two (2) cities, 11 towns and two (2) communes during 1995-1997 are estimated based on King II data. The total pollution load effluent from the sewerage system in the Prahova River Basin is roughly estimated to be 9.0 ton/day in BOD, 24.1 ton/day in SS and 1.9 ton/day in Oil Products.

The Ploiesti sewerage is the largest domestic wastewater pollution source in the Basin. It discharges 70-80 % of the total pollution load of the sewerage system in the Basin. The sewerage pollution load effluent by area is summarized below.

Municipality	BOD		SS		Oil Product	
	(kg/day)	(%)	(kg/day)	(%)	(kg/day)	(%)
Ploiesti	6,485	72.1	16,534	68.7	1,588	83.1
Campina	572	6.4	2,672	11.1	153	8.0
Prahova Valley	1,166	12.9	2,062	8.6	106	5.5
Others	776	8.6	2,787	11.6	65	3.4
Total	8,999	100.0	24,055	100.0	1,912	100.0

Note: Prahova Valley includes Predeal, Azuga, Busteni, Sinaia and Breaza

The pollution load effluent of each sewerage system is shown in Table D.1.4.