APPENDIX B

HYDROLOGY AND WATER USE

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CHAPTER 1 CLIMATE, HYDROLOGY AND RIVER SYSTEM

1.1 General Climate

1.1.1 Climate Division

The climate of the Prahova River Basin is divided into 3 types, namely, the mountain, hill and plain.

(1) Mountain Climate

The mountain climate is seen in the northern part of the basin with an elevation of 1000 to 1200 m. The average annual temperature is under 6 °C. The average annual precipitation is between 1000 and 1400 mm with over 180 snowy days per year. The predominant direction of the winds is from North 35.5 %, from south 18.6 % along the Prahova valley. The calm is 20.2 %. The climate condition could be vertically distinguished with a severe climate, not suitable for the vegetation development.

(2) Hill Climate

The annual average temperature is 9 to 10°C and gets lower towards the mountain, reaching 8 °C. The average temperature of January is 2 to 3 °C in the southern slope part, and -4 to -5 °C near the mountain side. The average annual precipitation is between 500-1000 mm. The rainiest month, June has 80 mm on the plain and 140 mm in the high parts of the mountain. The air currents move along the valleys, but the climate in the depression zone is appropriate for human settlements and for vineyards and orchards.

(3) Plain Climate

The characteristic for the southern part of the Basin has typical average annual temperature of over 10 °C and an average of annual precipitation of 550 to 600 mm. The differences in seasons are high, i.e. the climate is continental and the dominant winds are from NE and SW. The climate is suitable for agriculture and the southern slopes are appropriate for vineyards.

1.1.2 Characteristics of Climate

The meteorological data at Sinaia, Cimpina, Cheia and Ploiesti from 1987 to 1996 is listed in Table B.1.1.

The characteristics of climate are mentioned below.

(1) Temperature

Variation of temperature due to altitude is more pronounced than the horizontal variation. The temperature in the lower basin of the Study Area at Ploiesti is approximately 10 °C on an average, while it is 4 to 6 °C in the mountainous area at Sinaia and Cheia in the upper basin. Figs.B.1.1 and B.1.2 show annual mean and monthly mean temperature distribution in the Study area, respectively.

The variation in maximum and minimum temperatures is big at -26 °C to 27 °C from the average temperature in the mountainous and -36 °C to 27 °C in plain areas. At either location, the maximum temperature occurs in July and minimum in January.

(2) Relative Humidity

For Ploiesti at an elevation of 180 m, the relative humidity is slightly higher than those in the mountain area, varying from about 72% to 88%. In the mountain area at Sinaia, these vary in range from 76% to 79%.

The relation between the patterns of relative humidity and temperature is clear at Ploiesti. It rises in July, at the beginning of the summer season, and is highest in January.

(3) Winds

The data of average wind velocity in the study area is available at Sinaia, Cimpina and Ploiesti. The prevailing wind direction in the plain at Ploiesti is NE to SW. For the mountain area, the wind is predominant from N and S along the Prahova valley.

(4) Evaporation

Annual evaporation is small at approximately 500 to 730 mm in the mountain area at Sinaia. The monthly evaporation ranges between 70-110 mm in the summer season and 5-30 mm in the winter season. The monthly variation presents a peak in July, at the beginning of the summer season, with higher values until August. Annual evaporation in the lowland area at Ploiesti (620-800 mm) is slightly higher than the values in the mountain area at Sinaia.

(5) Precipitation

Annual mean precipitation in the study area is illustrated in Fig.B.1.3 and monthly precipitation distribution is shown in Fig. B.1.4. The annual precipitation ranges from 500 to 1,100 mm. In the mountain area of Sinaia to Cheia, it is relatively higher (1,100 mm), but it is less on the north mountain slope. The annual precipitation in the plain at Ploiesti is lower and is about 600 mm.

Effect of the altitude is very clear. Geomorphologic effect or difference by location on the basin is more pronounced to the amount of annual precipitation.

Regarding seasonal precipitation variation, the monthly precipitation increases in May and continues until July at the all stations in the basin. The maximum monthly precipitation is recorded in June and the minimum in September or October.

The meteorological values of the major stations are listed below.

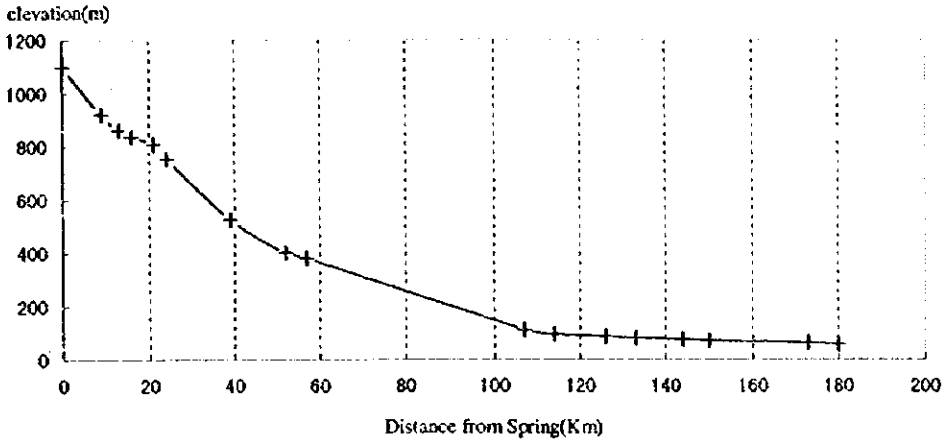
Station Meteorological item	Sinaia	Cimpina	Cheia	Ploiesti	Valenii de Munte	Mizil
Temperature (^{0} C)						
Annual Average	3.7	9.1	5.9	10.2		
Maximum	30	35.8	33.3	37.5		
Minimum	-23	-20.7	-23	-26.2		
Annual Precipitation(mm)	905	682	829	581	636	576
Winter	159	108	132	107	108	80
Spring	240	184	202	147	164	153
Summer	307	252	303	199	224	25
Autumn	199	138	192	127	140	129
Winds (NE)	5.9	4.3	0.3	15.8		
Average Velocity (m/s)	5.5	3.1	2.4	2.7		
Winds (E)	0.3	3.8	0.3	9.9		
Average Velocity (m/s)	2.0	3.0	2.0	3.2		
Average Humidity (%)	78	77	82	80		

Data source: NIMH

1.2 River System

The Prahova River System is presented in Fig.B.1.5. The river features, catchment area and river length by tributaries are summarized in Table B.1.2. The total catchment area of the Prahova River (at the confluence with the Ialomita River) is 3,738 km^2 with the river length of 193 km.

The longitudinal profile of the Prahova main river is shown below:



The Prahova main river, originating on the Carpathian mountain range which has peak elevation of higher than 2,000 m, flows down the Prahova Valley resort area in the upper reaches, the Ploiesti industrial area in the middle reaches, the agricultural area in the lower reaches and finally enters the Ialomita River at the Southern end of the Prahova County.

The Prahova River can be classified into the Prahova Main River and 3 major tributaries, namely, Doftana, Teleajen and Cricovul Sarat. The characteristics of the Main river and 3 major tributaries are explained below.

(1) Prahova Main River

The Prahova Main River originates in the Carpathian mountain range at Predeal. The river generally flows south in the Prahova Valley, joining the tributaries of the Azuga at

9 km (a distance from the spring), Valea Cerbului at 13 km, Izvorul Dorului at 24 km, and Doftana at 57 km, downstream of the Cimpina City, immediately after passing through the Prahova Valley.

Thereafter, it flows down towards south-east through the Prahova flood plain, joining the Purcaru-Lupa, the Viroga, the Penari, Viisoara, and the Teleajen River with a catchment of 1656.0 km^2. Then, the river joins the Cricovul Sarat River with a catchment of 607.2 km^2 at 173 km point and flows into the Ialomita River, the first branch river of the Danube River.

(2) Doftana River

The Doftana is one of the big tributaries of the Prahova River, forming the spring at 1400m near Zanoaga, in Grohotis Mountains. After draining a large mountainous area at the boundary between Garbova and Grohotis Mountains, it flows into the Prahova River near Banesti at an altitude of 361m. The river's length is 51km and a catchment area of 414.3 km^2. In the mountainous area, it has the tributaries such as Musita, Prislop, Florei, Secaria, Valea Neagra, and Paltinu rivers.

(3) Teleajen River

The Teleajen River is the biggest tributary of the Prahova River. It springs from the Southern ridge of Ciucas at altitude of 1,760m. It flows into the Prahova River at Palanca with an altitude of 81 m. It passes through the main relief, on a length of 113 km. The catchment area of the Teleajen River is long, with an average altitude of 493m and an area of 1656.0 km^2, which occupies 44.3% of the total Prahova River Basin. The Teleajen River has 27 tributaries such as Telejenel, Crasna, Drajna, Varbila, Mislea, Cosmina, Dimbu, Leaotul, etc.

(4) Cricovul Sarat River

The Cricovul Sarat River is a tributary of the Prahova and its spring is in Salcia Hill, near the peak Poiana Hotilor at an altitude of 600 m. After it goes through the Singelui depression, it changes direction, flowing from West to South. Its River length is 94km and it flows into the Prahova main river just upstream of Adincata. The catchment area of the Cricovul Sarat River is 607.2 km^2 with an altitude of 287 m. The large tributaries are Matita, Lopatna, Chiojdeanca, Saratel, and Salcia rivers.

The salient features of the Main River and the major tributaries including 3 tributaries mentioned above are summarized below.

River	Drainage Area (km^2)	River Length(km)	Riverhead El. (m)	Lower-end El.(m)
Azuga	89	23	1,600	940
Doftana	414	51	1,400	360
Teleajen	1,656	122	1,760	80
Dimbu	188	39	340	100
Cricovul Sarat	607	94	600	60
Prahova	3,738	193	1,100	60

1.3 Hydrological Basic Data

There are twelve (12) staff gauge water level gauging stations located in the Prahova River Basin and the Romanian Waters, Prahova Office operates these stations. The observation of the water level is made three (3) times a day and converted to the discharge using the rating curves which are developed from the discharge measurement. In addition, the reservoir water level at two (2) reservoirs made in the Prahova River Basin, namely Paltinu and Maneciu dams is available. The location of the stations is indicated in Fig. B.1.6

The period of the observation for each stations is listed below :

Code	Station Name	River Name	Catchment Area (km^2)	Year Started	Remarks
111204	Busteni	Prahova	130	1993	
111210	Cimpina	Prahova	476	1962	
111215	Prahova	Prahova	984	1957	
111220	Adincata	Prahova	3,682	1951	
111405	Azuga	Azuga	83	1953	Not available between 1957 and 1959
111505	Busteni	Valea Cerbului	26	1958	
111605	Tesila	Doftana	288	1959	
111705	Cheia	Teleajen	39	1966	
111710	Gura Vitioarei	Teleajen	491	1959	
111715	Moara	Teleajen	1,434	1955	
111805	Valbilau	Slanic	42	1969	
112105	Ciorani	Cricovul Sarat	596	1966	
111606	A.C Paltinu	Doftana	334	1971	Paltinu Reservoir
111707	A.C. Maneciu	Teleajen	247	1990	Maneciu Reservoir

The National Institute of Meteorology and Hydrology (NIMH) under the Romanian Waters compiles these hydrological data as National Hydrological Database.

1.4 Flow Regime

Based on the daily discharge data available at 12 stations in the Prahova basin, the flow regime at the respective stations are computed and presented in the Table B.1.3. For the record in 1996, the discharge, hydrograghs and duration curves are illustrated in Table B.1.4.

The average flow regime during latest 20 years is summarized below.

Station	C.A (Km^2)	20% 73^{rd}	50% 182^{nd}	70% 255^{th}	75% 274^{th}	80% 292^{nd}	90% 323^{rd}	95% 347^{th}	Min $365/366^{th}$	Average
Busteni,V.C	26	0.675	0.336	0.227	0.195	0.167	0.124	0.102	0.083	0.449
Azuga	83	2.457	1.009	0.571	0.503	0.422	0.298	0.222	0.154	1.591
Busteni, PH	130	4.543	2.087	1.453	1.265	1.053	0.627	0.434	0.286	3.217
Cimpina	476	10.697	5.746	4.238	3.948	3.621	3.077	2.728	2.142	7.565
Prahova	984	14.558	7.282	5.759	5.416	5.193	4.796	4.261	3.634	10.638
Adincata	3682	31.265	18.455	14.814	14.305	13.678	12.700	11.674	10.150	24.234
Tesila	288	5.965	2.902	2.068	1.911	1.739	1.475	1.262	0.801	4.072
Cheia	39	0.997	0.591	0.467	0.440	0.409	0.343	0.315	0.261	0.581
Varbilau	42	0.297	0.130	0.079	0.073	0.066	0.057	0.048	0.034	0.298
G. Vitioarei	491	5.650	2.278	1.400	1.242	1.092	0.857	0.704	0.466	4.019
Moara	1434	11.337	6.934	5.650	5.382	5.172	4.813	4.522	3.972	9.329
Ciorani	596	1.501	0.849	0.615	0.560	0.516	0.432	0.348	0.212	1.354

According to the table in the above, the average discharge during 1978-1997 at Adincata which

is lowest stream flow observation point in the Basin was 24.23 m^3/s. The average discharge values at 11 stations excluding Cheia station are bigger than 50 % discharge's value.

As far as the reservoir water level is concerned, the fluctuation of the water level of the Paltinu Dam (1991-1997) and that of the Maneciu Dam (1989-1997) are shown in Fig. B.1.7.

1.5 NTPA 95% Flow Rate

In NTPA 001, which stipulates effluent limits discharging into rivers, the standard flow rate is defined as a yearly minimum monthly mean discharge with a 95 % probability (hereinafter referred to as NTPA 95 % flow rate).

The following table tabulates the NTPA 95 % flow rate at 11 stations and Table B.1.5 shows monthly mean discharge at 11 stations for 20 years from 1978 to 1997.

(Unit : m^3/s)

Code	Name	Flow Rate	Code	Name	Flow Rate
111210	Cimpina	1.670	111705	Cheia	0.133
111215	Prahova	3.320	111710	G. Vitioarei	0.242
111220	Adincata	7.376	111715	Moara	2.790
111405	Azuga	0.082	111805	Valbilau	0.026
111505	Busteni	0.066	112105	Ciorani	0.108
111605	Tesila	0.532			

CHAPTER II WATER USE AND FLOW RATE

2.1 General

In this chapter, existing water use is first summarized, classifying water use into three (3) sectors, namely domestic use, industrial use and agricultural use. Then, the future water demand in the year of 2015, the target year of the Study, is estimated considering the growth of population, industry and agriculture and the related planning in the Prahova River Basin.

The objective of computation of the existing water use and future water demand is to estimate future probable flow rates at respective model points so as to incorporated into the water pollution simulation model explained in Appendix C. Therefore, existing water use and future water demand is estimated by model blocks shown in Fig. B.2.1 and thereafter, the existing and future probable flow rates are estimated at respective model points in consideration of water intake for water use and return flow from the model blocks.

Out of the water pollution model points, lowest points is Point H (near to Adincata Hydrological Station), which covers area of 3,673.6 km2 or 98.2 % of the total Prahova River Basin. And in this connection, " Prahova River Basin" which is used in this Chapter is actually areas up to Point H.

2.2 Outline of Water Supply System in Prahova River Basin

The characteristics of water supply in the Prahova River Basin is intake of surface water in upper reaches of tributaries of the Prahova River and conveyance of the water to municipalities in which domestic and industrial water is consumed in large quantity through long water pipelines.

Fig.B.2.2 shows water supply system in the Prahova River Basin. The outline of the water supply system is explained hereunder.

(1) Development History of the Water Supply System

The water supply system was established in 1975, constructing the Paltinu Reservoir on the Doftana River in 1971 and water pipeline from the Voila to Ploiesti City in 1975. The increase in the water demand for the agriculture and chemical industry led to construct water pipeline from Valenii de Munte to Ploiesti City in 1985 and the other water resource, namely the Maneciu Reservoir on the Teleajen River in 1994.

(2) Agency Responsible for Water Supply

The Romanian Waters, under the jurisdiction of Ministry of Water, Forest and Environment Protection, is responsible for the construction, operation and maintenance of the water supply system in Romania. The Romanian Waters, Prahova Office supervises the water use of the Prahova County and manages the wide range water supply system.

(3) Characteristics of the System

The characteristics of the water supply system are generally described as follows:

(a) Surface water of the Paltinu and Maneciu reservoirs is transported to the local commune, the consumer of industrial factories etc. and the Ploiesti City in the Prahova County.

(b) Ground water pumped-up in the downstream of the Prahova main river joins to the System.

(c) A portion of the water conveyed through the system is supplied also for the agriculture activity.

(4) Major Water Supply Structure

(a) Dam

Two (2) dams in the Prahova River Basin, namely the Paltinu Dam and the Maneciu Dam have constructed with mufti-purposes of flood control, hydropower, and domestic water supply. One (1) dam construction in the Azuga River is still under the planning. Features of Paltinu and Maneciu dams/reservoirs are listed in Table B.2.1.

(i) Paltinu Dam/Reservoir

The Paltinu Dam was completed in 1971 on the Doftana River at Sotrile with the catchment area of 334 km^2 as an arch type with the height of 108 m. Water collected at the reservoir with the active storage capacity of 53.7 MCM (10^6 m^3) generates the power and the water discharged from the dam is taken at the Voila Weir on the Doftana River and treated at Voila purification plant to be conveyed through the network system to the downstream areas. The volume conveyed in 1997 was 66.2 MCM.

(ii) Maneciu Dam/Reservoir

The Maneciu Dam was completed in 1994 on the Teleajen River at Maneciu with the catchment area of 243 km^2 as a rockfill type with crest length of 750 m and height of 75 m. Water collected at the reservoir with the active capacity of 50.0 MCM generates the power at Valenii de Munte. The water is taken at Valenii de Munte intake and conveyed to the downstream areas after purification through water pipelines. The volume conveyed to the network is 39.0 MCM in 1997.

(b) Intake

To supply water for domestic, industrial and agricultural use in the basin, more than 15 intakes were constructed on the Prahova Main River, Teleajen River and Cricovul Sarat River. Some of them were damaged by flood and artificial disaster, and became too old for use. Major functioning intakes are listed below.

Name of structures		Nedelea	Calinesti	Voila	Valenii de Munte
Location		Aricesti Rahtivani	Floresti	Breba	Valenii de Munte
River		Prahova	Prahova	Doftana	Teleajen
Structure		H=12m		H=14m	H=14m
Dimension		L=110m		L=41m	L=
Discharge Capacity (m^3/s)	Irrigation	5.60	Ave(0.23)		
			Max(2.8)		
	Industry	3.00		1.60	
	Domestic			1.85	1.20
	Total	8.60		3.45	1.20

Recently, the irrigation system supplied water from the Calinesti intake is listed up for the privatization.

The rehabilitation of the some intakes listed in Table B.2.2 will be necessary for irrigation system's reform.

(c) Purification Plant

There are 13 purification plants in the Prahova River Basin. Two (2) purification plants under the Romanian Waters, namely Voila and Valenii de Munte in the water supply system connecting to Ploiesti City serve more than 300,000 persons as tabulated below. Other purification plants including Maneciu purification plant of the Romanian Water serves to the local towns and communes. (refer to Table B.2.3)

Purification Plant	Voila	Valenii de Munte
Location	Voila	Valenii de Munte
Served population	208,000	102,000
Supplied Volume(10^6m^3)	66	39
Delivered Volume(10^6m^3)	61	34
Capacity (l/s)	3,000	1,200
Treatment	Rapid filtration	Rapid filtration

(d) Water Pipeline

There are eight (8) water pipelines located in the Prahova River Basin. Out of them, two (2) pipes convey water from Voila purification plant, which takes water at the Voila intake, to Movila Vulpii chlorination plant near to Ploiesti City and one pipe from Valenii de Munte purification plant to Movila Vulpii.

All water are chlorinated at Movila Vulpii and delivered to Ploiesti, Brazi and Petrotel through five (5) water pipes as listed below.

Seven (7) pipes excluding Movila Vulpii - Ploiesti are maintained by the Romanian Waters, while Movila Vulpii – Ploiesti pipeline is under R.A.G.C. Ploiesti (4162), public service company of the Ploiesti City.

Name	Type	Length (Km)	Size (mm)	Capacity (l/sec)	Year Completed
Voila - Movila Vulpii 1	Drinking	28.5	800	1,400	1975
Voila - Movila Vulpii 2	Industry	28.5	1,000	1,600	1977
Valenii-Movila Vulpii	Drinking	30.0	1,000	1,200	1985
Movila Vulpii – Ploiesti	Drinking	7.0	1,000	900-1,000	1975
Movila Vulpii – Brazi 1	Drinking	29.0	1,000	800-900	1975
Movila Vulpii – Brazi 2	Drinking	29.0	1,000	800-900	1978
Movila Vulpii – Petrotel 1	Drinking	17.0	800	400	1976
Movila Vulpii – Petrotel 2	Drinking	17.0	600	400	1985

At present, new water pipeline of Valenii de Munte - Movila Vulpii is under construction with same length, size and capacity with the existing one. The completion year of the new pipeline is expected to be in the year of 2000.

2.3 Existing Water Use

2.3.1 General

To evaluate the existing water use volume, water user list in King II Database for three (3) years from 1995 to 1997 was applied with the cooperation of the Romanian Waters, Prahova Office.

The water user list contains the water use volume of all the establishments in the Prahova River Basin, including the Romanian Waters itself, which takes water more than 0.2 l/sec in accordance with the Water Law, Chapter II Waters and River Beds Use Regime Article 9.

The main items recorded in the water user list are:

(a) consumer's code

(b) location (city/town/commune)

(c) activity code

(d) actual monthly water use (intake) volume

(e) source of supplied water (drinking water network, industry water network, surface, underground and reuse)

The present water use and intake volume of each establishment in the Prahova River Basin is listed in Table B.2.4. which is obtained as the average of three (3) years from 1995 to 1997. In this table, supplier of network water, which can be identified from another table in King II Database is also tabulated. From this suppler, the volume supplied to others can be computed and thus water use volume is obtained as the residual between the total intake volume and volume supplied to others.

The number of establishments which takes water more than 0.2 l/sec in the Prahova River Basin is 217, which can be classified into (1) Romanian Waters (A.R.R.A.), (2) public service company, and (3) industrial and agricultural establishments.

Out of them, the number of the Romanian Waters is five (5) under the name of so-called hydrotechnical systems, which are stations to supply water. The number of public service company in the Prahova River Basin is 29, while industrial and agricultural establishments is 183.

In addition to the above, the volume of domestic water supply by the municipal halls, which is not included in the King II Database, is separately provided by the Romanian Waters.

2.3.2 Source of Water

The source of water can be classified into (1) surface water, (2) underground, (3) network water (drinking) and (4) network water (non-drinking), as explained below in detail.

(1) Surface Water

Table B.2.5 indicates surface intake volume of each establishment. This volume is average of three (3) years from 1995 to 1997. Also items included in this table are municipality and model block in which the intake is located. 38 establishments takes water and total surface water intake volume in the Prahova River Basin amounts to 159.9 MCM/year.

The Romanian Waters takes surface water at intakes of four (4) hydrotechnical systems, namely, Voila from the Doftana River, Nedelea from the Prahova River, Maneciu and Valenii de Munte, both of which are taking surface water from the Teleajen River. The total annual intake volume by the Romanian Waters amounts to 124.5 MCM.

Record of intake volume shows that intake volume at Voila Intake and Valenii de Munte for three (3) years from 1995 to 1997 is 68.424 MCM and 38,157 MCM, respectively, while the data in water user list is 71.423 MCM and 3.249 MCM.

According to the Romanian Waters, Prahova Office, the water user list in King II Database is allocation of supplied water to water sources and volume between the Voila and the Valenii de Munte has some adjustment, while the intake volume list, Table B.2.5 is actual intake volume.

The difference between total intake of 106.581 MCM and the volume of volume of 74.642 MCM obtained from the King II Database is 31.939 MCM, which may be considered to be the loss during conveyance of water, equivalent to 30.0 %.

The number of public service companies of municipalities, which take surface water, is 9. These are: Predeal, Azuga, Sinaia, Comarnic from the Prahova Main River or tributaries, Valea Doftanei and Cimpina from the Doftana River, Maneciu, Slanic and Valenii de Munte from the Teleajen River and its tributary. Total annual volume taken by these public service companies is 15.7 MCM.

Industrial and/or agricultural establishments which take surface waters amounts to 25 and total volume is 19.8 MCM.

(2) Groundwater

Total intake volume of ground water for the establishments registered in the King II is 78.6 MCM, 2.6 MCM by the Romanian Waters, 25.9 MCM by the public service companies and 50.1 MCM by industrial/agricultural establishments.

In addition to the above, the municipal halls and households take underground as explained in 2.2.2. The volume taken by the municipal halls, which are not included in the King II Database, is estimated to be 2.8 MCM and water volume of shallow well

taken by households is 4.6 MCM.

(3) Network Water

Network water can be classified into (1) drinking water network and (2) industrial water network.

Regarding drinking network water, water use by sector is 39.8 MCM by domestic use, 47.9 MCM by industry and 1.6 MCM by agriculture, while for non-drinking network water, 1.6 MCM by industry and 3.8 MCM by agriculture.

Table B.2.6 tabulates suppliers of network water together with source of water and establishments which develop source of the network water. Drinking network water is supplied by four (4) hydrotechnical systems of the Romanian Waters Authority, 13 public service companies and eight (8) industrial/agricultural establishments, while the industrial network water is provided by one (1) hydrotechnical system of the Romanian Waters Authority and three (3) industrial/agricultural establishments.

2.3.3 Domestic Water

Table B.2.7 and Fig.B.2.3 indicate existing domestic water use of respective municipalities included in the Prahova River Basin. The items included in the tables are total population of municipality, population of the municipality in the Prahova River Basin, water source consisting of surface water, groundwater and network water, served population (with piped water), unserved population, water volume from each source, water volume from shallow well and loss rate.

Out of these items mentioned above, water source, served population, water volume from surface water, groundwater and network water, loss rates data are provided from the Romanian Waters Authority.

Based on the data of served population, total water volume from surface water, groundwater and network water and loss rate, the following per capita gross domestic water is obtained for municipalities with piped water and applied to estimate figures of municipalities without data.

(Unit : l/day/person)

Category	Municipality	Per Capita Gross Domestic Water
1	City	370
2	Town	280
3	Commune	180

For the population without piped water (unserved population) which uses water from shallow well, the per capita gross domestic water of 50/l/day is applied.

(1) Water Source

Water volume supplied for piped domestic water (including loss) is 75.5 MCM and sources of piped water are 7.0 MCM from surface water, 28.7 MCM from groundwater and 39.8 MCM from network water, while it is estimated that 4.6 MCM of water from shallow well is used in the areas where piped water is not supplied.

(2) Water Use by Region

Following table tabulates water use by area. Ploiesti City and surroundings consume

62.6 % of total domestic water use in the Prahova River Basin.

(Water Volume Unit : 1000m³/Year)

Area	Served Population	Unserved Population	Piped Water			Well	Total
			Surface Water	Ground-water	Network Water		
Ploiesti City & Surroundings	272,582	43,186	0	22,768	26,583	788	50,143
Floresti	5343	981	0	0	174	18	191
Cimpina City	36,814	4,090	3,942	0	2,934	75	6,951
Prahova Valley	67,161	18,176	2,807	2.511	3,194	332	8,843
Others	126,684	187,467	215	3,406	6,956	3,421	13,999
Total	508,583	253,901	6,964	28,685	39,840	4,634	80,124

Note : 1) Ploiesti City and Surroundings include Aricesti Rahtivani, Barcanesti, Berceni, Blejoi, Brazi, Bucov, Paulesti, Targusoru Vechi communes besides Ploiesti City.
2) Prahova Valley includes the upstream area of Cimpina City.

2.3.4 Industrial Water

Table B.2.8 tabulates existing industrial water use in the Prahova River Basin. Total industrial water use is 829.4 MCM including 710.6 MCM reuse water.

(1) Water Sources

Out of total water use of 829.4 MCM for industry, 710.6 MCM is water of reuse. Out of remaining water of 122.2 MCM, 47.9 MCM is taken from network drinking water, 48.2 MCM from groundwater, 10.0 MCM from surface water and 16.0 MCM from non-drinking network water.

(2) Water Use by Region

Table B.2.9 shows existing industrial water use by municipality and following table tabulates water use by area. In the Ploiesti City and Surroundings, 88.4 % of industrial water is consumed.

(1000 m³/year)

Area	Intake				Reuse	Supply to Others	Water Use
	Network Water (Drinking)	Ground-water	Surface Water	Network Water (Non-drinking)			
Ploiesti City & Surroundings	33,608	31,585	55	15,145	653,588	364	733,617
Floresti	2,182	3,787	0	0	13,418	0	19,387
Cimpina City	6,634	0	407	18	11,438	0	18,497
Prahova Valley	2,362	1,838	5,920	0	8,559	795	17,884
Others	3,162	11,021	3,602	818	23,604	2,176	40,031
Total	47,948	48,231	9,984	15,981	710,608	3,335	829,417

(3) Water Use by Activity

Table B.2.10 indicates industrial water use by activity. Petroleum refinery uses water volume of 445.0 MCM, 53.7 % of total industrial water and then followed by electricity/gas/water supply of 293.0 MCM (35.3 %). These two activities occupy nearly 90 % of total industrial water use in the Prahova River Basin.

(4) Reuse

Annual reuse volume is 710.6 MCM and this is 85.7 % of total industrial water use as indicated in Table B.2.10 in which reuse ratio by all industrial activities is tabulated. The following table summarizes reuse ratio of main activities in the Prahova River Basin and this ratio is compared with recent ratio of reuse by activity in Japan.

Two (2) activities, namely petroleum refinery and electricity/gas/water supply, which consume nearly 90 % of industrial water, shows extremely high reuse ratio and because of this high ratio, total ratio of the Prahova River Basin has attained high value of 85.7 %.

Activity	Total Water Use ($1000 m^3/Yr$)	Reuse ($1000 m^3/Yr$)	Ratio of Reuse (%)	Ratio of Reuse in Japan (%)
Food/Beverage	3,900.3	340.3	8.7	32
Wood	2,918.7	2,288.7	78.4	14
Paper/Paper Products	10,821.7	5,371.7	49.6	43
Petroleum Refinery	445,031.0	390,007.0	87.6	90
Chemicals/Chemical Products	6,436.0	2,429.0	37.7	82
Rubber/Plastic Products	944.5	219.5	23.2	75
Non-Metallic Mineral Products	711.0	261.0	36.7	73
Basic Metals	1,035.7	190.7	18.4	90
Metal Products Fabricated	8,037.7	5,572.7	69.3	51
Machinery/Equipment	28,012.3	19,950.3	71.2	65
Electrical Machinery/Apparatus	343.0	26.0	7.6	71
Furniture	177.7	32.7	18.4	15
Electricity/Gas Supply	293,040.7	272,000.7	92.8	-

2.3.5 Agricultural Water

Table B.2.11 tabulates existing agricultural water. Total annual agricultural water use is 13.5 MCM in the Prahova River Basin.

(1) Water Source

9.2 MCM, 67.8 % of water use in the agricultural activity, depends on the surface water and the groundwater is amounted to 11.0 % (1.5 MCM). The water supplied from network is 1.6 MCM (11.6 %) from drinking water network and 3.8 MCM (27.9 %) from non-drinking water network.

(2) Water Use by Region

(Unit: 1000m³/year)

Area	Intake				Supply to Others	Water Use
	Network Water (Drinking)	Ground-water	Surface Water	Network Water (Non-drinking)		
Ploiesti City and Surroundings	1,470	467	1,179	1,714	2,48[illegible]	2,341
Prahova Valley	0	0	7,540	0	0	7,540
Others	98	1,026	449	2,063	0	3,636
Total	1,588	1,493	9,168	3,777	2,489	13,517

The water use of Prahova Valley (Azuga Town) amounts to 7.5 MCM for the inland fishery, which occupies 55.8 % of total agricultural water use.

(3) Water Use by Activity

The agriculture activity is composed of inland fishery, livestock farm, irrigation and others. Out of total agricultural water use, 55.8 % of total use is for inland fishery and then followed by irrigation of 23.9 %.

(Unit: 1000 m³/year)

Activity	Intake				Supply to Others	Water Use
	Network Water (Drinking)	Ground-water	Surface Water	Network Water (Non-drinking)		
Livestock farm	161	855	202	1,443	0	2,661
Inland fishery	0	0	7,597	0	0	7,597
Irrigation	1,405	607	1,369	2,334	2,489	3,226
Others	2	31	0	0	0	33
Total	1,568	1,493	9,168	3,777	2,489	13,517

2.3.6 Existing Total Water Use

The total existing water use is estimated to be 923.1 MCM/year as summarized below. The water use in Ploiesti City and surroundings reaches 85.2 % of the total water use in the Prahova River Basin.

(Unit: 1000 m³/year)

Area	Domestic Water	Industrial Water	Agricultural Water	Total Water Use
Ploiesti City & Surroundings	50,143	733,617	2,341	786,101
Floresti	191	19,387	0	19,578
Cimpina City	6,951	18,497	0	25,448
Prahova Valley	8,843	17,884	7,540	34,267
Others	13,999	40,031	3,636	57,666
Total	80,124	829,417	13,517	923,058

2.4 Projected Water Demand

2.4.1 General

Based on the values assumed in the Socio-Economic frame, the water demand for the domestic, industrial and agricultural use in the Target year (Yr.2015) is estimated in each model block to compute the flow rates of the respective model points.

2.4.2 Domestic Water

Table B.2.12 tabulates domestic water demand in the year of 2015. This water demand is estimated in the following procedures.

(1) Estimation Procedures

(a) Served Population

(i) Annual Growth Rate of Population

Based on assumed growth rate of 0.00 % until the year of 2000 and 0.50% from 2001 to 2015 in the Study Area, population of each municipality and its population in the Prahova River Basin are obtained as 1.08 times of existing population of each municipality.

(ii) Increase of Population Supplied with Piped Water

In accordance with recommendation of EPA, it is assumed that piped water will be supplied to all the area of the Prahova County and following increase of served population with piped water in the Prahova River Basin is considered.

In municipalities where network water from the Romanian Waters is planned to be supplied in the future, all the population including those outside of basin is considered as the served population, since source of network water is taken from the Prahova River. These municipalities are indicated as "new" in Table B.2.10.

Existing area supplied with piped water from surface water/groundwater will be extended to unserved built-up areas but only areas within the Prahova Basin, since it is assumed that area of the municipality outside of the Prahova River Basin obtains water in its own area.

The existing areas taking water from shallow well in the Basin are assumed to be served with piped water from the deep well.

(b) Per Capita Gross Domestic Water

The future growth rate of per capita gross domestic water in the Prahova River Basin is estimated to be 1.0 %, considering per capita gross domestic water in Japan during latest 10 years (Water Resources in Japan) and it will be 1.16 times of the existing one.

The following table tabulates existing and future (2015) per capita gross domestic water. For communes where water source is shallow well at present and piped water will be supplied by the year of 2015, 150 l/day/person is applied based on the Romania Standard

(Unit: l/day/person)

Category	Municipality	Existing Facility	Existing	Yr 2015
1	City	Piped Water	370	430
2	Towns	Piped Water	280	320
3	Communes	Piped Water	180	210
4	Communes	Shallow Well	50	150

(c) Loss Rate

Actual loss rate of respective municipalities obtained from the Romanian Waters is used for the water demand. For the municipalites without data, loss rate of 15.0 % is applied.

(d) Water Sources for Domestic Water Demand

From the served population, per capita gross domestic water, and loss rate explained above, total water demand of respective municipalities is calculated. From total water demand, volume of respective water sources, namely, surface water, groundwater and network water is estimated as follows.

(i) Volume of groundwater in the future will be the same in municipalities where the surface water and/or the network water can be developed so as to meet the increased water demand in the future.

(ii) In municipalities where no other source except groundwater can be developed, volume of groundwater will be increased. to meet the future demand.

(2) Water Demand

On the basis of the population and the per capita gross domestic water in the year of 2015, the annual demand is estimated at 126.2 MCM compared with the existing water demand of 80.1 MCM. This demand includes domestic water supply to the municipalites located outside of the Prahova River Basin as explained in (1). When this volume is excluded, total demand will be 121.7 MCM. The total water demand will be allocated 11.3 MCM to surface water, 37.8 MCM to groundwater and 77.0 to network water to supply domestic water of 126.2 MCM.

The following table tabulates domestic water by area. Ploiesti City and surroundings occupy 54.8 % of total water demand.

(Water Volume Unit: 1000 m³/year)

Area	Served Population	Network Water	Ground-water	Surface Water	Total
Ploiesti City & Surroundings	341,029	41,706	24,993	0	66,700
Floresti	8244	718	0	0	718
Cimpina City	44,176	3,944	0	5,300	9245
Prahova Valley	93,309	6,833	2,067	4,373	13,273
Others	338,015	19,334	10,769	1,665	31,768
Outside of Basin	48195	4,458			4,458
Total	872,969	76,994	37,830	11,338	126,162

2.4.3 Industrial Water

(1) Growth Rate of Industry and Tourism

According to prediction made in Appendix A, the average growth rate is assumed to be 0.0% until 2000 and 3.5 % from 2001 to 2015 for industrial production and 0.0 % until 2000 and 5.0 % from 2001 to 2015 for number of tourist.

Based on this prediction, water demand in the year of 2015 is assumed to increase in proportion to the growth rate of the industrial production and number of tourist. Accordingly, the water demand for factories will be 1.68 times of existing water use and that for hotel/restaurant will be 2.08 times in the year of 2015.

(2) Water Sources

Using the King II Database, future total water demand of each industrial establishment was obtained multiplying the growth rates mentioned above. Then total water demand is allocated to drinking network water, groundwater, surface water, non-drinking network water and reuse as mentioned below.

(a) Reuse ratio is assumed to be the same as existing one.

(b) Groundwater is increased to meet the total water demand in the future only for the industrial establishments the water source of which is only groundwater at present and in the future.

(c) For industrial establishments which use water source besides or in addition to groundwater, the volume of groundwater is limited to the present volume. The remaining volume which subtracts groundwater and reuse from the total volume is allocated to network drinking water, surface water and network non-drinking water in proportion to the present ratio of the three (3) sources.

(3) Water Demand

Industrial water demand in the year of 2015 is tabulated in Table B.2.13 together with increased water volume for each water source.

Based on the value of the annual growth rate, the annual demand in the year of 2015 is estimated at 1,388.1 MCM for the Prahova River Basin. The obtained allocation to each water source is 97.1 MCM to network drinking water, 55.3 MCM to groundwater, 14.4 MCM to surface water, 30.9 MCM to network non-drinking water and 1,190.4 MCM to

reuse.

Following table tabulates industrial water demand by area. Water demand in Ploiesti City and surroundings is 88.8 % (1,232.8 MCM) of total demand.

(Unit: 1000 m³/year)

Area	Network Water (Drinking)	Ground-water	Surface Water	Network Water (Non-drinking)	Reuse	Water Use Total
Ploiesti City & Surroundings	67,808	37,369	118	29,518	1,098,028	1,232,841
Floresti	6,241	3,787	0	0	22,543	32,571
Cimpina City	11,176	0	684	30	19,216	31,106
Prahova Valley	4,483	1,952	10,392	0	14,379	31,207
Others	7,362	12,231	3,207	1,394	36,200	60,395
Total	97,070	55,340	14,401	30,942	1,190,366	1,388,119

2.4.4 Agricultural Water

(1) Future Irrigation System Rehabilitation

Rehabilitation of the irrigation channel or the intake structure is important policy of agriculture sector so as to bring back the agriculture at the level before the 1989 revolution. There are five (5) irrigation systems in the Prahova River Basin at present, namely, System Iazul Morilor Prahova, System Canal Leaot, System Buda , System Iazul Morilor Teleajen and System I.C.V.V. Valea Calugareasca, but their irrigation system is not fully used.

(a) System Iazul Morilor Prahova

The zonal water conveyance and the irrigation facilities in the Iazul Morilor are Prahova Channel area. The channel has an intake on the Prahova River at Floresti, downstream Calinesti Bridge. It is located on the right bank side and it's route is almost parallel to the river, crossing the following communes: Calinesti, Filipesti Targ, Bratasanca, Manesti, Cocorasti, Colt. It drains into Cricovul Dulce Brook, and it has a length of about 21 km. The 1,094 ha area may be irrigated from ridges for the private owners.

(b) System Canal Leaot

The Leaot Channel is supplied from Prahova River. It was built in the 1970s and its initial use was changed. It is 80% slabbed and it crosses the lands on the left side of the Prahova River, i.e. the following communes: Aricesti Rahtivani, Targusorul Vechi, Brazi, Puchenii Mari. It discharges into Prahova River. The channel length exceeds 35 km. The system covers the areas belonging to the former Agricultural Cooperative Associations, which are now private owned, and of other areas, belonging to Beizadele Nursery, CERES, Tirgsor Penitentiary, etc. The channel may provide water for irrigating about 3,700 ha.

(c) System Buda

Buda irrigation system was put into service in 1975 using water from Nedelea Intake on the Prahova River. From the intake, the water reaches the station by gravity flow. The system consists of 2 parts. The system irrigates the areas belonging to CERES Ploiesti, SC CONSERVE Valenii de Munte, ASAS Fundulea, etc. The sprinkler irrigation equipment belongs to landowners. The irrigable area may reach about 1,650 ha.

(d) Iazul Morilor Teleajen

The Iazul Morilor Teleajen Channel crosses the following communes: Magurele, Lipanesti, Boldesti-Scaieni, and Bucov. The source is from the Teleajen River, and the system may irrigate an 870 ha area belonging to landowners from SC Magurele, AGROS Scaieni, and also, to supply water to the fish farm belonging to AGROS Scaieni. The sprinkler irrigation uses 2 pumping stations, which pump water by water pressure. They belong to the 2 main users. Total channel length is about 10 km.

(e) System I.C.V.V. Valea Calugareasca

System I.C.V.V. Valea Calugareasca for wine-making has a special surface of 614 ha in Pleasa, Bucov, Chitorani, Valea Calugareasca and Chitorani communes. At present, the sources are the underground water by wells and the surface water from the Bucov River. The Institute of I.C.V.V has an idea to extract the water from Teleajen River. Usually, the irrigation period is between May and September

(2) Water Demand

In the year of 2015, irrigation systems mentioned above is assumed to be rehabilitated and irrigation water will be supplied to these irrigation systems as mentioned below.

Irrigation System	Area	Size (ha)	Water Demand (1000 m^3)	Intake
Iazul Morilor Prahova	Outside of Basin	1,094	437.6	Nedelea, Prahova River
Canal Leaot	Ploiesti & Surroundings	3,700	1,480.0	-ditto-
Buda	-ditto-	1,650	660.0	-ditto-
Iazul Morilor Teleajen	Others	870	348.0	Magurele, Teleajen
I.C.V.V. Valea	-ditto-	614	245.6	-ditto-

Irrigation water for Iazul Morilor Prahova, Canal Leaot, Buda will be taken at the Nedelea of the Prahova River, while water for Iazul Morilor Teleajen and I.C.V.V. Valea will be supplied from at Magurele point of the Teleajen River

As far as the other agricultural establishments included in the King II Database are concerned, it is assumed that the same volume of water is taken in the year of 2015 in consideration of the growth rate of the agricultural sector.

2.4.5 Projected Water Demand

The total water demand in the year of 2015 is estimated at 1,531 MCM/yr. including domestic and irrigation water use outside of the Prahova River Basin versus 923 MCM at present. The water demand in Ploiesti City and surroundings reaches to 85.2 % of total demand. The

industrial water occupies 90.7 % of the demand.

(Unit: 1000 m³/year)

Area	Domestic	Industry	Agriculture	Total
Ploiesti City & surroundings	66,700	1,232,841	4,481	1,304,022
Floresti	718	32,571	0	33,289
Cimpina City	9245	31,106	0	40,351
Prahova Valley	13,273	31,207	7,540	52,020
Others	31,768	60,395	4,230	96,393
Outside of Basin	4,458	-	438	4,896
Total	126,162	1,388,119	16,689	1,530,971

The balance volume (Net water demand) 128.2 MCM/yr. including domestic water supply to outside of the Basin will be required in the year of 2015. Out of the total demand, domestic water demand is 36.0 %, while industrial water demand occupies 61.6 %.

(Unit: 1000 m³/year)

Area	Domestic	Industry	Agriculture	Total
Ploiesti City & surroundings	16,557	54,784	2,140	77,481
Floresti	527	4,059	0	4,586
Cimpina City	2,294	4,831	0	7,125
Prahova Valley	4,430	7,503	0	11,933
Others	17,769	7,768	594	26,131
Outside of Basin	4,458	-	438	4,896
Total	46,035	78,945	3,172	128,152

2.5 Probable Flow Rates

The existing probable flow rates (50 %, 70%, 95 % annual flow rates and 95 % NTPA flow rate) and those in the year of 2015 at respective model points are estimated based on the probable flow rates obtained at 12 hydrological stations, existing and future water use of model blocks estimated in the above.

In addition to the above, flow rate with 50 % annual flow rate in the year of 2005 and 2010 is estimated to be used for the preparation of implementation program. Moreover, the 50 % annual flow rate in the year of 2015, the growth rate of which is different from the case in the above is calculated to grasp the influence of the growth rate.

2.5.1 Existing Flow Rates

Flow rates of model points which are not located at the hydrological stations of the Romanian Waters are necessary to be estimated to be incorporated in the water pollution simulation model.

These flow rates are estimated from the flow rate of neighboring hydrological stations, difference of catchment area and difference of rainfall as wells as existing intake of surface water and return flow from corresponding model blocks, which is tabulated in Table B.2.14.

The return flow rate of following figures, which are obtained in Japan and Asia, is applied to obtain the return flow from the model blocks due to the existing and future water use in the blocks.

- For the domestic water use 80 %
- For the Industrial water use 90 %

Regarding the agricultural water use, which is mainly irrigation water, it is assumed all supplied water is filtrated into the underground and no water returns to the river.

Obtained 50 %, 75 % and 95 % annul flow rate and NTPA-001 95% flow rate are shown in Table B.2.15.

2.5.2 Flow Rates in 2015

(1) Surface Water Volume to Be Newly Developed

Due to the water demand increase in domestic, industrial and agricultural use in the year of 2015, surface water is necessary to be developed in addition to the present volume of intake.

Necessary volume of surface water to be newly developed is sum of increased volume of surface water and network water, source of which is surface water.

Regarding network water for domestic use, the volume of network water of each local public service company is converted to surface water and its supplier, using the ratio of surface water indicated in Table B.2.6. Regarding industrial water, volume of network water to be increased by suppliers, which is tabulated in Table B.2.16, is converted to surface water and its supplier, using the same method for domestic use.

Table B.2.17 summarizes surface water volume to be newly developed. By the year of 2015, the rehabilitation mentioned in 2.2.2 will be completed and the leakage loss from the water pipelines under the Romanian Water is considered to be completely reduced.

(2) Allocation of Surface Water Volume to Be Newly Developed

Following table indicates existing probable flow rates, surface water volume to be newly developed and return flow in the two (2) critical reaches of the Prahova River, namely reaches of Voila Intake in the Doftana River and Valenii de Munte Intake in the Teleajen River.

Without adjustment, necessary water cannot be taken at 50 % annual flow rate in the reaches of Voila Intake, while water can be obtained even at 95 % annual flow rate in the reaches of Valenii de Munte Intake.

However, total necessary volume of two (2) reaches is less than sum of 75 % annual flow rates of these reaches as tabulated in the following table and therefore, adjustment of intake volume of two (2) reaches are planned so as to be able to take necessary water at the 75 % annual flow rate.

Also considered allocation should be within the capacity of water pipelines Voila – Movila Vulpii (3.0 m^3/s) and Valenii de Munte – Movila Vulpii. (2.4 m^3/s) so as not install new additional water pipelines.

This allocation can be attained as tabulated in the following two (2) tables. The Romanian Waters takes additionally 30.81 MCM (0.977 m^3/s) at Voila Intake and 48.13 MCM (1.526 m^3/s) at the Valenii de Munte Intake.

(Unit m^3/sec)

	Voila Intake*	Valenii de Munte Intake
Existing Flow Rate		
(a) 50 % Flow Rate	0.827	2.193
(b) 75 % Flow Rate	0.390	1.186
(c) 95 % Flow Rate	0.007	0.660
Volume to be Developed		
Romanian Waters	2.018	0.486
Others	0.117	0.043
Rehabilitation	-0.651	-0.363
Return Flow	-0.059	-0.083
Necessary Volume	1.425	0.082
Volume to be developed (adjusted)		
Romanian Waters	0.977	1.526
Necessary Volume (Adjusted)	0.384	1.168

Note* Flow rate is that of Model Point "C" located downstream of Voila Intake. Model Point "C" is more critical than Voila Intake due to surface water intake for Cimpina City.

	Voila - Movila Vulpii		Valenii – Movila Vulpii	
	(1000 m^3)	(m^3/sec)	(1000 m^3)	(m^3/sec)
Present Volume	68,424	2.170	38,157	1.210
Rehabilitation	-20,527	-0.651	-11,447	0.363
Additional Volume	29,970	0.950	48,977	1.553
Total	77,867	2.496	75,686	2.373

(3) Flow Rates in 2015

Flow rates in the year of 2015 with 50 %, 75 % and 95 % and also NTPA-001 95 % flow rate are obtained using the results of present probable flow rates, surface water to be newly developed and allocation of water intake.

As mentioned above, surface water cannot be taken for the 95 % annual flow rate and NTPA-001 95 % flow rate at the reaches of the Voila Intake and the Valenii de Munte Intake. To supply domestic, industrial and agricultural water, it is assumed that the two (2) dams, namely Paltinu and Maneciu dams release necessary volume of water.

Table B.2.18 tabulates probable flow rates at respective model points including dam release cases for the 95 % annual flow rate and NTPA-001 95 % flow rate.

2.5.3 Flow Rates in 2005 and 2010

The 50 % annual flow rates in the year of 2005 and 2010 are estimated as the basis to prepare the implementation program.

(1) Calculation Assumption

(a) Domestic Water Use

Population of the Prahova River Basin and also each of municipality is assumed to be 1.025 times in the year of 2005 and 1.051 times in the year of 2010 with growth rate of 0.5 %.

Based on the plan of the Romanian Waters, the planned water pipelines will be completed around the year of 2000 and the per capita water gross domestic water will increase as follows.

(Unit: l/day/person)

Category	Municipality	Yr. 2005	Yr. 2010
1	City	390	410
2	Town	293	307
3	Commune 1	190	200
4	Commune 2	83	117

Note: Commune 1: commune with piped water at present. Commune 2 : commune with shallow well at present.

To compute domestic water demand, the same procedure and assumption used for the year of 2015 are applied except for those mentioned above.

(b) Industrial and Agricultural Water Use

To obtain industrial and agricultural water demand in the year of 2005 and 2010, the same procedure and assumption to obtain that in the year of 2015 are applied. The growth rates of the industrial production, number of tourists and livestock are 3.5 %, 5.0 % and 0.0%, respectively. Because of these growth rates, the industrial water use will be 1.19 and 1.41 times of the existing one in 2005 and 2010, respectively. The water use for truism will be 1.28 and 1.63 times of the existing one in 2005 and 2010, respectively.

(2) Flow Rate

The 50 % annual flow rates of respective model points in the year of 2005 and 2010, which are obtained in the assumption mentioned above are tabulated in Table B.2.19 and B.2.20, respectively.

2.5.4 Flow Rate Change in 2015 Due to Change of Industrial Growth Rates

The cost to attain the BOD standard in the Prahova River is estimated for the cases where the industrial growth rate is higher and lower than 3.5 % and thus flow rates for these cases are computed.

(1) Calculation Assumption

As the higher and lower industrial growth rates, 4.3 % and 2.7 % are used, respectively. In higher case, the industrial water demand will be 1.88 times of the existing one in 2015, while that in lower case will be 1.49 times.

The other growth rates and calculation assumption for the domestic, tourism and agricultural water demand are same as those for the case of 3.5 % which are explained in 2.4, 2.5.1 and 2.5.2.

(2) Flow Rate

The 50 % annual flow rates of respective model points for the industrial growth rates with 4.3 % and 2.7 %, which are obtained in the assumption mentioned above are tabulated in Table B.2.21 and B.2.22, respectively.

CHAPTER III RATIONALIZATION OF WATER USE

3.1 Water Supply Development of Existing Dam Reservoir

3.1.1 General

The existing two (2) reservoirs of the Paltinu and Maneciu dams are used for domestic/industrial water supply to Ploiesti City, Cimpina City and their surrounding areas, hydropower generation and flood control in Prahova and Teleajen rivers. They have a total active storage capacity of 103.7 MCM. However, this storage capacity is not fully used for the water supply at present. It will be necessary to promote effective use of the storage capacity to meet the increasing water demand of the Basin in the future.

In this Section, the potential development capacity of the reservoirs for water supply is studied.

3.1.2 Reservoir Capacity

(1) Paltinu Reservoir

The Paltinu Reservoir is located on the Doftana River, about 17 km upstream from the confluence with the Prahova River. The reservoir supplies domestic and industrial water to Ploiesti City, Cimpina City and their surrounding areas along with supplementary water supply from the Teleajen River at Valenii de Munte intake and from the Prahova River at Nedelea intake.

The reservoir is provided with a total storage capacity of 60.6 MCM with the following breakdown.

(a) Active storage volume: 53.7 MCM for water supply and hydropower use

(b) Surcharge volume : 5.0 MCM for flood control

(c) Dead water volume : 1.9 MCM

The reservoir is provided with a hydropower station of the installed capacity of 10.2 MW.

(2) Maneciu Reservoir

The Maneciu Reservoir is located on the Teleajen River at the Maneciu-Ungureni Commune. The reservoir supplies domestic and industrial water to Ploiesti City and the midway areas to Ploiesti City.

The reservoir is provided with a total storage capacity of 60.0 MCM with the following breakdown.

(d) Active storage volume: 50.0 MCM for water supply and hydropower use

(e) Surcharge volume : 5.0MCM for flood control

(f) Dead water volume : 5.0 MCM

The reservoir is provided with a series of three (3) hydropower stations of the total installed capacity of 36 MW consisting of Maneciu (10 MW), Izvoarele (16 MW) and Valeni (10 MW)..

3.1.3 Hydrological Calculation for Reservoir Use

(1) Duration of the Calculation

According to the standards of the Romanian Waters, domestic and industrial water supply shall be planned to secure a 95 % probability. Hence, the hydrological calculation for the reservoir development potential is done based on daily discharge data during the past 20 years (1977-1996).

(2) River Discharge at the Dam Sites

The river discharge data are available at Tesila Station (C.A=288 km^2) for the upper Doftana River and at Cheia Station (C.A=39 km^2) for the upper Teleajen River.

Hence, the river discharge at the Paltinu dam site (C.A=366 km^2) is estimated based on the data at Tesila Station. The river discharge at the Maneciu Dam site (C.A=247 km^2) is estimated from the data at Tesila Station since Cheia Station covers only 39 km2 or 16 % of the drainage basin at the Maneciu Dam site. In this discharge estimation for the Maneciu Dam site, difference of the rainfall depth between Doftana and Teleajen river basins is duly considered.

(3) Water Supply Development Point and Water User

Five (5) water users draw the river water from the Voila intake (C.A.=366 km^2) and river sections just downstream from the Voila intake at present. Name of the users and the existing annual average water extraction during 1995-1997 are shown below.

(Unit : 1,000 m^3)

Code	Water User Name	Volume
4036	Voila Intake for A R R A FILIALA PLOIESTI S.H. PALTINU	68,424
4034	R A.G.C.L.CIMPINA	8,675
4035	S.C.STEAUA ROMANA SA	218
4341	ASOCIATIA VINATORILOR SI PESCARILOR SPORTIVI CIMPINA	57

Then, the Paltinu Reservoir shall release the stored water to secure the river discharge of 2.454 m^3/s (77,374,000 m^3/year) at the Voila intake under the existing water use condition.

On the other hand, the river water taken from the Voila intake is transmitted to Ploiesti City through two (2) transmission mains for domestic and industrial uses separately. Their capacities are 1.85 m^3/s for domestic use and 1.60 m^3/s for industrial use.

In the Teleajen River, three (3) users (code no.: 4275, 4088, 4089) extract water from the river sections just downstream of the Maneciu Reservoir and three (3) users (code no.: 4212, 4095, 4209) withdraw water from the Valenii de Munte intake (C.A.=470 km^2) at present.

Name of the users and the existing annual average water extraction during 1995-1997 are shown below.

(Unit : 1,000 m^3)

Code	Water User Name	Volume
4275	A.R.R.A. FILIALA PLOIESTI S.H. MANECIU	1,102
4088	NERGA MANECIU SECTOR MANECIU	58
4089	S.E.P.P.L. MANECIU	40
4212	A.R.R.A. FILIALA PLOIESTI S.H. VALENI(1997)	38,157
4095	STICLOVAL VALENI	1,764
4506	R.A.G.C.L. VALENI	417

Hence, the Maneciu Reservoir shall discharge the stored water to maintain the river discharge of 0.038 m^3/s (1,200,000 m^3/year) at the dam site and 1.279 m^3/s (40,338,000 m^3/year) at the Valenii de Munte intake under the existing water use condition.

On the other hand, the river water taken from the Valenii de Munte intake is transmitted to Ploiesti City through one (1) transmission main for domestic use. The capacity is estimated at 1.2 m^3/s.

(4) Impact on Hydropower Generation

Both reservoirs are operated to maximize the water supply development respectively. The existing operation for the hydropower generation shall be changed to completely follow the operation of the water supply, resulting in some impact on the hydropower generation. However, impact on the hydropower generation is not considered in this Study.

3.1.4 Water Supply Development Discharge and Required Storage Capacity

Based on the precondition, the capacity calculation for the reservoir is done, setting the various development of discharge.

Table B.3.1 lists the required maximum capacity and its date for the various discharge rate.

The storage volumes of 20 MCM and 2.0 MCM are required for Paltinu Reservoir and Maneciu Reservoir respectively to meet the existing water supply requirements. The required storage volume of the reservoirs will increase in the future according to the increase of water supply discharge.

The required storage volume of the reservoirs corresponding to the newly developed discharge of water supply is calculated as shown below.

Paltinu Reservoir	New Development Discharge (m^3/s)				
	0.0	0.5	0.7	0.9	1.13
Required Storage Vol. (1000 m^3)	19,508	29,847	34,165	38,485	53,121
Date of Lowest W.L Occurrence	Mar-93	Mar-93	Mar-93	Mar-93	Mar-91

Maneciu Reservoir	New Development Discharge (m^3/s)				
	0.00	2.00	2.75	2.84	3.00
Required Storage Vol. (1000 m^3)	1,650	28,746	44,670	49,987	62,904
Date of Lowest W.L Occurrence	Feb-87	Mar-93	Mar-93	Mar-91	Mar-91

3.1.5 Potential Development Discharge

From the above calculations, the potential development discharge (newly developed discharge) for water supply is estimated at approximately 1.13 m^3/s for Paltinu Reservoir and 2.84 m^3/s for Manecin Reservoir.

Fluctuation of the required storage volume in the case of the above new water supply development is shown in Fig. B.3.1. From the Figure, it is recognized that the duration for the supply from two (2) reservoirs takes about 3 years during the driest period (1989-1991), and it takes four (4) months for the recovery of the reservoir.

It is concluded that the existing reservoir capacity of the two (2) dams is sufficient to meet the future water demand in the year of 2015.

3.2 Leakage from Water Supply Transmission Main

3.2.1 Existing Water Supply System

The river water extracted from Voila intake is conveyed through two (2) transmission mains to Movila Vulpii regulation tank located at Paulesti (northern suburban commune of Ploiesti). The water taken from Valenii de Munte intake is also conveyed by one (1) transmission main to Movila Vulpii regulation tank. Thereafter, the water is distributed to three (3) users of Ploiesti City, S.C. Petrobrazi S.A. and S.C. Petrotel SAPL through six (6) trunk pipelines. Further, Ploiesti City distributes the water to individual consumers through the distribution networks.

Dimension of the above trunk pipelines are shown below.

Name	Length (Km)	Size (mm)	Year Completed
Voila - Movila Vulpii 1	28.5	800	1975
Voila - Movila Vulpii 2	28.5	1,000	1977
Valenii-Movila Vulpii	30.0	1,000	1985
Movila Vulpii - Ploiesti	7.0	1,000	1975
Movila Vulpii – Brazi 1	29.0	1,000	1975
Movila Vulpii – Brazi 2	29.0	1,000	1978
Movila Vulpii – Petrotel 1	17.0	800	1976
Movila Vulpii – Petrotel 2	17.0	600	1985

The above transmission mains are all managed by Romanian Waters except Movila Vulpii – Ploiesti pipeline which is managed by Ploiesti Water Supply and Sewerage Company (R.A.G.C. Ploiesti).

3.2.2 Water Leakage

Among the above eight (8) transmission mains, significant water leakage is identified. According to the King II database, the Romanian Waters extracted an average annual water quantity of 106.581 MCM/year from the Voila and Valenii de Munte intakes during 1995-1997, while they actually sold 74.672 MCM/year to the users. Therefore, the water loss in the transmission mains is estimated at 29.9 %.

The Romanian Waters estimated the water loss in the transmission main of Valenii de Munte – Movila Vulpii. They observed the intake volume from the river, local water use on the mid-way and inflow to Movila Vulpii during 1995-1997 as tabulated below.

Transmission Main	Valenii de Munte – Movila Vulpii		
Length (km)	30.0		
Pipe Size (mm)/Pipe Number	ϕ 1000 x 1		
Pipe Material	Concrete		
Maximum Capacity	1.2 m^3/s		
Year	1997	1996	1995
Intake Volume (1,000 m^3)	37,763	38,068	38,640
Local Use on Midway (1,000 m^3)	3,238	3,445	3,207
Inflow to Movila Vulpii (1,000 m^3)	20,967	23,311	26,060
Water Leakage (1,000 m^3)	13,558	11,312	9,373
Loss (%)	35.9	29.7	24.3

Data Source : Romanian Waters, Ploiesti

From the above data and information, the water loss in the eight (8) transmission mains is estimated at 30 % on average.

TABLES

Table B.1.1 Meteorological Data in Sinaia (1/4)

Average Temperature (°c)

	1	2	3	4	5	6	7	8	9	10	11	12	Ave
1987	-7.2	-3.1	-7.8	1.2	6.1	11.8	15.5	10.7	11.8	2.4	0.6	-3.6	3.2
1988	-2	-3.5	-3.3	1	7.6	10.2	15.2	13.8	8.8	3.5	-5.2	-4.9	3.4
1989	-4.2	-2.7	0.5	6.4	6.5	9	12.4	13.6	8.1	4.6	-1.9	-2.4	4.2
1990	-3.4	-1.2	2.5	2.8	7.6	10.7	12.7	13.3	7.3	5.9	2.5	-3.7	4.8
1991	-4.8	-7.5	-1	1.3	4.1	11.5	13.8	11.4	9.3	4	1.9	-7.3	3.1
1992	-5	-6.8	-2.9	3.2	6.3	10.2	12.5	16.9	7.6	4.7	-0.3	-4.7	3.5
1993	-4.5	-7.6	-3.9	1.3	8.8	10.8	11.9	13.3	8.7	7.7	-3.5	-1.8	3.4
1994	-1.5	-3.9	0.2	4.2	8.2	11.4	13.9	14	13.8	4.8	-0.5	-4.3	5.0
1995	-6.3	-1	-2	1.8	6.5	11.7	14.2	12.2	7.1	5.5	-3	-4.1	3.6
1996	-7.7	-6.1	-7.6	1.4	10.1	12.5	11.8	11.4	4.9	3.4	3.2	-2.9	2.9
Average	-4.7	-4.3	-2.5	2.5	7.2	11.0	13.4	13.1	8.7	4.7	-0.6	-4.0	3.7

Penman Potential Evapotranspiration (mm)

	1	2	3	4	5	6	7	8	9	10	11	12	Total
1987	-	-	-	-	-	-	-	-	-	-	-	-	
1988	14.3	20.3	26.7	47.7	74.2	82.8	120.1	97.7	52.4	38.6	14.1	7.3	596.2
1989	12.1	16.4	45.9	67.4	81.2	71.5	102.6	91.6	46.2	30.4	14.5	26.1	605.9
1990	16.7	30.8	67.2	57.8	99.7	105.8	106.1	115.6	63.9	36.7	20.5	7.7	728.5
1991	11.1	16.6	36.3	40.5	54.6	87.6	94.5	74.1	56.2	39.2	21	8.4	540.1
1992	10.3	16.5	32.2	53.7	81.3	83.4	109.1	112.1	56.3	32.8	16.3	6.7	610.7
1993	21.3	19.8	28.1	47	87.6	92.5	100	85.8	51	35	8.5	8.3	584.9
1994	13.7	14.3	41.2	55.6	80.9	92.3	93.7	91.7	68.8	24.5	12	6.1	594.8
1995	10.7	18.5	31.1	50.6	64	81.3	100.6	74.9	40.7	30.5	6.4	5.6	514.9
1996	7.1	12.2	17.8	53.6	83.1	95	98.4	64.5	23	24.9	15.3	4.4	499.3
Average	13.0	18.4	36.3	52.7	78.5	88.0	102.8	89.8	50.9	32.5	14.3	9.0	586.14

Monthly Precipitation (mm)

	1	2	3	4	5	6	7	8	9	10	11	12	Total
1987	70	55.8	65	88.6	128.7	79.7	60.8	50.1	51.4	48.7	115.1	80.3	894.2
1988	53.4	72.9	85.3	59	101.5	144.6	132.1	38.2	90.3	45.9	77.8	63.4	964.4
1989	10	40.5	56.8	89.5	80.6	149.9	31.7	142.7	60.7	69.4	119	41.4	892.2
1990	15.6	33	13.9	94.5	85.5	56.7	94.1	58.1	14	85.8	17.3	249	817.5
1991	18.3	59.5	25.3	95.4	177.6	305.3	191.8	72.2	12	114.6	81.4	25.1	1178.5
1992	25.5	37.3	23.4	42.2	57.1	147.7	36.1	38.8	32.1	84.1	63	65.2	652.5
1993	10.7	52.7	89.3	64.2	140	42.4	108.4	88.6	68.5	62.9	99.8	48.6	876.1
1994	31.7	9.4	26.7	42.2	127	181.5	181.8	43.5	58.2	81.9	37.8	41.6	863.3
1995	64.8	32.7	97.8	67.2	140.7	130.9	53.8	165.9	135	12.9	104.2	91.5	1097.4
1996	60.1	38.3	67.4	67	99	44.1	133.4	60.6	85.6	12.1	52	87.1	806.7
Average	36.0	43.2	55.1	71.0	113.8	128.3	102.4	75.9	60.8	61.8	76.7	79.3	904.28

Relative Humidity (%)

	1	2	3	4	5	6	7	8	9	10	11	12
1987	82	70	81	75	82	75	74	73	70	82	84	83
1988	78	77	86	81	78	82	75	72	82	69	83	89
1989	73	77	74	73	73	82	72	75	84	78	78	70
1990	68	66	59	76	70	70	70	65	75	72	76	86
1991	78	81	76	81	87	81	81	80	76	75	71	80
1992	76	82	80	73	69	78	72	62	73	78	78	73
1993	64	70	82	78	76	77	77	78	80	81	81	83
1994	79	78	75	77	74	75	76	71	71	84	81	88
1995	83	78	82	78	85	85	81	82	87	80	83	85
1996	91	85	88	77	79	77	76	84	93	85	76	83
Average	77.2	76.4	78.3	76.9	77.3	78.2	75.4	74.2	79.1	78.4	79.1	82.0

Table B.1.1 Meteorological Data in Cimpina (2/4)

Average Temperature (°c)

	1	2	3	4	5	6	7	8	9	10	11	12	Ave.
1987	-1.8	-0.2	-1.9	8.1	13.1	18.8	21.3	17.8	16.5	7.6	5.4	-0.1	8.5
1988	0.4	0.6	3.7	8	14.2	17.5	21.8	19.5	14.9	7.2	-0.4	0.3	9.0
1989	0.7	2.1	6.8	12	13.5	17	19.2	19.6	14.1	9.8	3	0.8	9.9
1990	-1	2.9	7.4	9	13.9	17.8	19.7	18.8	13.5	9.2	6.1	0.6	9.8
1991	-0.3	-3	3.5	8.1	11.8	18.2	19.9	18.1	14.5	9.2	4.1	-2.4	8.5
1992	-1.4	-0.4	4.1	9.5	13	17.7	19.6	21.7	13.7	9.7	4.9	-2	9.2
1993	-0.4	-2.5	2	7.8	15.4	17.8	18.5	18.8	13.4	10.8	-1.1	1.8	8.5
1994	2.1	-0.1	5.8	10.9	15.1	17.9	20.4	20.1	18.5	9.7	3.9	0.7	10.4
1995	-1.9	3.7	4.1	8.9	13.5	19.1	20.8	18.2	13.6	9.5	0.9	-1.8	9.1
1996	-3.4	-3	-1.4	8.3	17.2	19.2	19.3	18.4	11.7	9	6.4	-0.3	8.5
Average	-1.0	0.0	3.4	9.1	14.1	18.1	20.1	19.1	14.4	9.2	3.3	-0.2	9.1

Penman Potential Evapotranspiration (mm)

	1	2	3	4	5	6	7	8	9	10	11	12	Total
1987	5	11.1	26	72.7	84	123	132.9	111.2	76.3	24.3	12.7	9.7	688.9
1988	5.8	14.6	40.8	63.1	92.6	108.7	137.7	107.9	62.8	30.7	10.7	8.9	684.3
1989	15.5	17	47.8	69.1	88.5	101	117.7	104.9	55	42.3	11.9	7	677.7
1990	5.1	23.5	60.1	63.9	100.2	122.1	123.1	113	66.2	29.1	11.9	4.7	722.9
1991	5.5	14.8	30.9	58.3	82.7	110.5	110.1	93	58.9	36.2	7.2	8.2	616.3
1992	15.7	19.8	48.9	63.8	94	99.4	129.8	120.2	61.9	30.6	21.4	1.7	707.2
1993	16.5	19.6	35.3	67	100.8	122.7	128.6	101.9	66	30.8	8.6	4.8	702.6
1994	6.7	15.3	50.9	67.8	105.3	112.9	124.5	117.2	81.1	27.7	15.2	8.3	732.9
1995	13.9	21.7	40	71.3	91.1	130.4	130.1	99.5	59.2	29.1	8.1	7.2	701.6
1996	6.8	12.3	25.2	76.2	124.5	134.5	140.5	92.6	35.8	31.4	10.9	4.5	695.2
Average	9.7	17.0	40.6	67.3	96.4	116.5	127.5	106.1	62.3	31.2	11.9	6.5	692.96

Monthly Precipitation (mm)

	1	2	3	4	5	6	7	8	9	10	11	12	Total
1987	48.7	35	26.3	81.7	92.2	67.7	84.6	35	24.1	50.9	119.8	51.1	717.1
1988	35.6	45.1	77.9	70.2	110.5	174	69	24.9	52.5	39.2	47.6	49.8	796.3
1989	2.8	26.6	20.3	52.2	69.1	65.7	18.5	73	21.5	36.6	67.9	42.8	497
1990	3.3	13.5	0	55.9	88.8	31.7	74.2	56.8	24.9	56.8	2.2	154.5	562.6
1991	11.7	24.7	23.6	72.4	147.6	150.8	271.6	72.6	3.5	51.4	32.8	10.5	873.2
1992	5.1	9.2	22	40.6	81.1	153.3	22.9	62.9	12.4	37.6	12.6	51.3	511
1993	1.6	30.8	73.4	52.8	151.3	72	94.1	57.2	56.2	44.2	64.1	40.8	738.5
1994	22.2	3.8	25.2	19.4	33.6	145.6	122.4	25.2	25.3	89.8	7.1	42.5	562.1
1995	45	18.2	76.4	58.3	81.7	131.9	66.3	91.9	102.4	7.3	107.5	75.8	842.7
1996	75.6	40.3	25.9	53.9	56.5	112.5	43.7	69.2	94.2	12.8	70.6	65.7	720.9
Average	25.2	24.7	37.1	55.7	91.2	108.5	86.7	56.9	41.7	42.7	53.2	58.5	682.14

Relative Humidity (%)

	1	2	3	4	5	6	7	8	9	10	11	12
1987	89	85	82	71	74	71	73	67	73	85	85	84
1988	87	81	75	74	75	76	73	74	78	79	82	81
1989	72	78	74	77	74	75	73	78	83	80	84	78
1990	82	75	64	76	72	71	74	72	74	82	80	87
1991	80	80	83	77	77	80	82	83	83	82	88	79
1992	75	72	72	74	74	80	75	79	79	81	75	84
1993	76	73	80	74	74	74	73	77	77	83	85	82
1994	81	79	72	73	74	74	75	73	77	85	76	82
1995	81	78	76	69	74	72	71	75	79	82	82	89
1996	89	83	80	66	62	63	64	69	78	79	84	91
Average	81.2	78.4	75.8	73.1	73.0	73.6	73.3	74.7	78.1	81.8	82.1	83.7

Table B.1.1 Meteorological Data in Cheia (3/4)

Average Temperature (°c)

	1	2	3	4	5	6	7	8	9	10	11	12	Ave
1987	-5.6	-2.8	-5.1	4.8	9.2	14.5	17	13.5	12.9	4.5	2.3	-2	5.3
1988	-1	-2.3	-0.3	3.7	10.6	13.6	17.7	15.2	11.3	4.2	-2.7	-1.8	5.7
1989	-1.8	-0.6	3.2	8.6	9.3	12.9	15.4	15.6	10.8	7.2	0.7	-1.2	6.7
1990	-2.9	0.7	4.7	5.8	10.4	13.9	15.4	14.4	9.9	6.6	3.6	-2.4	6.7
1991	-2.5	-5	0.6	4.6	8	14.5	16.8	14.6	11.4	6	2	-4.7	5.5
1992	-2.5	-3	0.5	6.1	8.4	13.7	15.3	16.9	9	6.8	1.5	-4.1	5.7
1993	-2	-5.1	-1.1	4	11.6	14.3	14.8	15.3	9.2	8.1	-3.5	0.1	5.5
1994	0.3	-2.7	2.9	7.5	10.9	14.7	17	16.2	14.8	5.9	1.2	-2.1	7.2
1995	-5.1	0.9	1.4	5	9.4	14.3	16.1	14.5	10.2	7.4	-1.5	-4.7	5.7
1996	-5.6	-5.3	-5.2	3	12	14	14.3	13.7	8.5	5.8	3.8	-1.9	4.8
Average	-2.9	-2.5	0.2	5.3	10.0	14.0	16.0	15.0	10.8	6.3	0.7	-2.5	5.9

Penman Potential Evapotranspiration (mm)

	1	2	3	4	5	6	7	8	9	10	11	12	Total
1987	9.5	12.3	24.7	61.7	68.7	99.2	99.1	86.6	57.7	18.3	6.7	7	551.5
1988	5.1	13.1	33.2	45.8	73.5	84	108.7	85.5	44.6	22.7	12.1	12.4	540.7
1989	15.1	12.1	38.7	58.1	71.5	75.4	92.1	73.4	37.2	25.8	14.2	12	525.6
1990	11.4	22.4	49.3	47.8	82.3	93	96.5	83.9	50.4	25.4	8.2	4.8	575.4
1991	8.9	13.5	23	41.9	59	81	89.3	75.3	49.5	25.9	5.3	12.4	485
1992	15	20	33.6	53.6	75.8	79	111.4	96.2	48.4	26.4	15.6	2	577
1993	16.4	18	27.5	44.9	81.3	99.9	109.4	85.8	44.9	22.9	2.5	5.1	558.6
1994	4.7	9.1	34.6	50.9	80	102.8	93.5	87.1	59.2	20.7	10.1	8.4	561.1
1995	5.4	15.2	27.4	49.7	64.8	89.4	102.7	80.1	46	26.7	5.8	0.8	514
1996	6.4	10	19.1	48.4	80.9	96.4	97	63.5	25.2	20.7	5.8	1.9	475.3
Average	9.8	14.6	31.1	50.3	73.8	90.0	100.0	81.7	46.3	23.6	8.6	6.7	536.42

Monthly Precipitation (mm)

	1	2	3	4	5	6	7	8	9	10	11	12	Total
1987	34.4	48.8	35.1	54.6	72.1	74.1	131.8	52.1	29.9	44.4	109.5	74.1	760.9
1988	49.7	66.5	57.7	52.2	92.4	185.3	137.1	38.2	118.6	43.5	44.4	38.3	923.9
1989	7.1	33.8	39	57.7	79.8	81.7	58	70.6	111.9	36.7	92.7	20.4	689.4
1990	16.5	24.4	21.4	79.3	116.1	69	96.6	50.2	15.1	54.6	8	216.3	767.5
1991	14.6	43.7	22.3	51.2	237.9	224.7	234.3	92.2	28.1	85.2	109.9	14.3	1158.4
1992	11.7	28.4	40.7	50	50.2	153.4	53.4	29.4	38	56	46.1	61	618.3
1993	13.8	50.2	85.6	92.7	100.9	89.3	53.2	68.2	61.9	57	103.5	71.9	848.2
1994	26.9	7.1	26.2	33.8	89.9	186.4	122.6	61.1	19.7	99.8	31.3	47.5	752.3
1995	42.6	19.6	47	38.1	143.4	173.2	31.2	125.3	133.4	5.8	73.6	56.5	889.7
1996	56.1	30.2	36	40	73.9	87.4	100.2	97.4	166.8	22.4	73.1	92.9	876.4
Average	27.3	35.3	41.1	55.0	105.7	132.5	101.8	68.5	72.3	50.5	69.2	69.3	828.5

Relative Humidity (%)

	1	2	3	4	5	6	7	8	9	10	11	12
1987	82	81	80	69	79	75	82	78	81	87	92	85
1988	87	81	78	82	79	82	81	82	89	82	83	82
1989	76	84	77	78	79	82	84	89	92	85	80	78
1990	79	73	68	81	78	81	82	83	82	84	85	88
1991	81	84	87	84	85	87	88	86	86	84	87	79
1992	80	74	74	79	75	81	74	76	78	83	80	81
1993	72	71	81	84	78	79	80	82	85	87	90	88
1994	87	87	81	83	80	75	82	82	84	87	83	85
1995	87	81	83	80	87	85	83	81	85	81	83	92
1996	85	83	82	76	79	80	81	85	87	85	86	91
Average	81.6	79.9	79.1	79.6	79.9	80.7	81.7	82.4	84.9	84.5	84.9	84.9

Table B.1.1 Meteorological Data in Ploiesti (4/4)

Average Temperature (°c)

	1	2	3	4	5	6	7	8	9	10	11	12	Ave.
1987	-5.4	-1	-0.6	9.1	14.5	20.4	23.2	19.7	18.5	9.6	6.1	-0.3	9.5
1988	0.8	-0.1	4.7	9	15.6	19.4	23.9	21.9	17.1	8.7	-0.3	-0.6	10.0
1989	-0.1	2.6	7.6	12.6	14.9	18.8	21.6	22.4	16.1	11.2	3.6	0.2	11.0
1990	-2.6	3.4	8.5	10.4	15.6	19.4	21.7	21.2	15.6	10.9	6.5	0.9	11.0
1991	0.2	-3.2	4.6	9.6	13.2	19.5	22	19.9	16	10.5	4.7	-3	9.5
1992	-1.6	0.3	5.5	10.8	14.6	19.3	21.5	24.1	15.7	11	5.7	-1.7	10.4
1993	-1.1	-2.1	2.4	9.5	16.9	19.7	20.6	21.3	15.8	12.5	-0.1	0.8	9.7
1994	2.4	1	7	12.2	17.2	20.2	22.4	22	20.5	10.9	4.3	0.5	11.7
1995	-2.2	4.2	5.3	10.4	15.3	20.8	23.1	21	15.9	10.8	1.2	-1.5	10.4
1996	-2.8	-3.4	-0.5	9.8	19.3	21.9	22	20.9	13.8	10.6	6.9	0.2	9.9
Average	-1.2	0.2	4.5	10.3	15.7	19.9	22.2	21.4	16.5	10.7	3.9	-0.5	10.3

Penman Potential Evapotranspiration (mm)

	1	2	3	4	5	6	7	8	9	10	11	12	Total
1987	4.9	11.2	29.1	68.9	89.8	127.7	150.2	123.9	85.7	30	9.6	2.9	733.9
1988	3.4	9.6	35.3	57.2	113.4	125.7	160.2	130.4	75.6	37.6	10.3	4.2	762.9
1989	3.1	18.6	53.7	83.1	113.1	119.3	141.3	123.9	60.6	39.3	9.7	7.8	773.5
1990	2.8	20.8	61.4	57.8	101.1	125.4	133.2	124.9	65.6	34	14.3	4.8	746.1
1991	2.4	6.5	26.7	53.5	75.9	111.6	125.1	96.6	61.9	37.3	12.3	8.3	618.1
1992	15.6	23.4	50.4	70.2	106.1	111.2	136.1	135	72.5	32.1	18.6	3.2	774.4
1993	12.2	16.6	28.2	63.2	103	126.6	140.1	114.5	71.1	32.9	8.7	1	718.1
1994	2.4	17.9	51	71.6	122.4	135.6	132.2	119	91.8	33	16.2	7.4	800.5
1995	8.4	18.7	39.4	69.8	92.5	128.4	133.8	112	61.7	29.7	6.7	5.8	706.9
1996	5.6	10.2	25.2	72.7	128.2	146.3	147.6	103.1	48.9	27.6	6.7	6.1	728.2
Average	6.1	15.4	40.0	66.8	104.6	125.8	140.0	118.3	69.5	33.4	11.3	5.2	736.26

Monthly Precipitation (mm)

	1	2	3	4	5	6	7	8	9	10	11	12	Total
1987	44	40.4	21.5	45.2	40.8	42.9	92.4	21.1	16.3	38.2	103.7	48	554.5
1988	42	51.9	83.5	66.9	60.9	136.6	60.7	34.9	38.6	28.6	44.5	42.8	691.9
1989	2.2	13.1	17.1	49.2	47.8	35.3	41.6	31.9	26.2	59	57.4	38.4	419.2
1990	7.6	26.2	0.1	61.9	125	54.7	27.7	35.1	25.3	35.8	4.7	109.9	514
1991	11.1	28.5	15	48.4	114.3	95.4	132.8	122.1	20	80	33.4	30.5	731.5
1992	4	15.2	37.4	28.6	59.1	123.8	42.3	38.3	8.5	38.2	9.9	44.9	450.2
1993	8.5	27.3	75.1	26.9	104.7	79.4	68.8	42.7	49.6	33.7	72.7	26.8	616.2
1994	21.4	2.2	21.1	19.1	21.4	66.4	155.4	39.9	20	74.4	7.2	58.5	507
1995	43.5	26.1	62.1	18.1	60.7	103	63.6	43.8	104.3	8	84.7	56.7	674.6
1996	90.9	44.1	24.4	50.5	65.8	69.3	51.6	39	69.4	17.9	61.9	65.8	650.6
Average	27.5	27.5	35.7	41.5	70.1	80.7	73.7	44.9	37.8	41.4	48.0	52.2	580.97

Relative Humidity (%)

	1	2	3	4	5	6	7	8	9	10	11	12
1987	94	90	82	76	79	74	72	67	72	83	91	94
1988	96	93	85	84	66	68	65	65	71	75	86	90
1989	87	81	72	72	67	71	67	73	81	78	89	83
1990	87	83	68	85	79	76	74	69	78	82	82	94
1991	88	96	91	85	86	80	72	80	82	80	85	83
1992	73	72	71	74	72	78	71	71	72	83	81	90
1993	81	77	89	79	78	75	74	75	79	86	89	91
1994	93	83	77	77	68	70	73	77	74	84	79	88
1995	89	86	80	77	82	78	78	80	85	87	90	92
1996	95	90	85	72	69	67	69	79	87	86	92	91
Average	88.3	85.1	80.0	78.1	74.6	73.7	71.5	73.6	78.1	82.4	86.4	89.6

Table B.1.2 The Water Shed in the Prahova River (1/3)

Code	River name	Point of confluence	Length km	Length2 km	Altitude (m) upstream	Altitude (m) downstream	Average Slope slope	Average Slope slope2	Curve coefficient curve1	Curve coefficient curve2	Area (km²)* area	Area (km²)* area2	Average Altitude (m) altitude	Average Altitude (m) altitude2
120	Prahova	L	193		1100	56	5		1.24		3738.0		541	
	am. confl. Azuga			9	1110	920		20		1.27		38		1148
120.1	Azuga	L	23		1600	938	29		1.96		88.9		1360	
	am. confl. Valea Turcului			10	1600	1146		45		1.98		19		
120.1.a	Valea Turcului	L	6		1780	1146	106		1.21		7.2			
	am. confl. Unghia Mare			16	1600	1063		33		1.75		40		1407
120.1.1	Unghia Mare	L	7		1840	1063	111		1.7		10.7		1480	
120.1.2	Limbasel	R	8		1380	992	49		1.35		14.3		1284	
	am. confl. Valea Fetei			11	1100	882		20		1.2		130		
120.1a	Valea Fetei	L	5		1400	882	104		1.12		9.7			
	am. confl. Valea Cerbului			13	1100	861		18		1.38		141		1290
120.2	Valea Cerbului	R	7		1400	861	80		1.14		25.9		1536	
	am. confl. Zamora			16	1100	837		16		1.35		193		1367
120.3	Zamora	L	7		1720	837	126		1.27		9.5		1311	
	am. confl. Valea Rea			21	1100	808		14		1.31		222		1348
120.4	Valea Rea	L	7		1800	808	142		1.22		14.5		1337	
	am. confl. Peles			21	1100	808		14		1.34		236		1347
120.5	Peles	R	6		1980	808	195		1.25		6.5		1415	
	am. confl. Izvorul Dorului			24	1100	753		14		1.32		261		1336
120.6	Izvorul Dorului	R	16		2140	753	87		1.5		32.8		1446	
	am. confl. Valea Beliei			39	1100	524		14		1.28		374		1249
120.7	Valea Beliei	R	11		1220	524	63		1.23		35.4		916	
	am. confl. Talea			8	1220	574		80		1.2		12		970
120.7.1	Talea	R	7		1030	574	65		1.12		20.5		928	
	am. confl. Cimpea			52	1100	400		15		1.21		450		1162
120.8	Cimpea (Campina)	L	14		860	400	33		1.31		30.5		601	
	am. confl. Doftana			57	1100	381		15		1.4		494		1101
120.9	Doftana	L	51		1400	361	20		1.36		414.3		1038	
	am confl. Musita			11	1400	873		48		1.26		33		1222
120.9.1	Musita	R	10		1820	873	95		1.17		31.9		1309	
	am. confl. Manole			7	1820	955		124		1.1		17		
120.9.1.1	Manole	R	5		1720	955	153		1.28		12.3			
	am. confl. Valea Calda			4	1720	980		185		1.29		5		
120.9.1.1.1	Valea Calda	R	4		1760	980	195		1.18		(6)			
	am. confl. Neagra			12	1400	860		45		2.2		67		1263
120.9.2	Neagra	L	16		1600	860	46		2.16		23.5		1287	
	am. confl. Orjogoaia			16	1400	817		36		1.92		100		1238
120.9.3	Orjogoaia	R	8		1560	817	93		1.19		12.9		1203	
	am. confl. Prislop			22	1400	735		30		1.61		129		1197
120.9.4	Prislop	R	15		1700	735	64		1.44		38.3		1234	
	am. confl.Negras			22	1400	733		30		1.6		169		1205
120.9.5	Negras	L	11		1500	733	70		1.1		48.6		1202	
	am. confl. Cucioaia			9	1500	897		67		1.31		22		1266
120.9.5.1	Cucioaia	L	7		1360	897	66		1.4		13.8		1247	
	am. confl. Ermereasca			24	1400	700		29		1.6		222		1196
120.9.6	Ermereasa	L	6		1100	700	67		1.12		13.7		1059	
	am. confl. Florei			26	1400	680		28		1.64		236		1185
120.9.7	Florei	R	15		1800	680	75		1.21		41.5		1150	
120.9.8	Paltinoasa	L	8		1030	612	52		1.38		18.6		938	
120.9.9	Secaria	R	8		950	605	43		1.26		14.7		923	
	am. confl. Purcaru			45	1400	418		22		1.4		368		1085
120.9.10	Purcaru-Lupa	L	10		950	418	53		1.17		29.8		620	
	am. confl. Viroaga			107	1100	110		9		1.28		978		991
120.1	Viroaga	R	15		145	110	2		1.51		35.7		133	
	am. confl. Poenari			114	1100	96		9		1.24		1050		937
120.11	Poenari	R	27		121	96	1		1.92		34.6		118	
	am. confl. Viisoara			126	1100	86		7		1.46		1097		901
120.12	Viisoara	L	26		175	86	3		1.23		30.4		121	
	am. confl. Teleajen			133	1100	81		7		1.48		1135		873
120.13	Teleajen	R	122		1760	81	13		1.54		1656.0		493	
	am. confl. Gropsoarele(Valea Berii)			10	1760	875		90		1.71		23		1303
120.13.1	Gropsoarele	R	7		1646	875	112		1.43		13.7		1194	
	am. confl. Stina			18	1760	753		55		1.47		76		1172
120.13.2	Stina	L	7		1660	753	129		1.1		9.4		1269	
	am. confl. Bobu			19	1760	739		54		1.41		88		1177
120.13.3	Bobu	L	7		1720	739	140		1.21		14.5		1265	
	am. confl. Carpen			20	1760	735		51		1.39		103		1189
120.13.4	Carpen	L	7		1460	735	103		1.22		14.7		1140	
120.13.5	Telejenel	R	22		1760	600	52		1.31		83.7			
	am. confl. Valea Mare			37	1760	430		35		1.56		261		1074
120.13.6	Valea Mare	R	12		1140	430	59		1.21		17.5		789	
	am. confl. Crasna			38	1760	420		35		1.54		280		1055

Table B.1.2 The Water Shed in the Prahova River (2/3)

Code	River name	Point of confluence	Length km	Length2 km	Altitude (m) upstream	Altitude (m) downstream	Average Slope slope	Average Slope slope2	Curve coefficient curve1	Curve coefficient curve2	Area (km^2)* area	Area (km^2)* area2	Average Altitude (m) altitude	Average Altitude (m) altitude2
120.13.7	Crasna	R	22		1460	420	47		1.24		49.9		982	
	am. confl. Drajna			47	1760	352		30		1.48		364		999
120.13.8	Drajna	L	25		1020	352	27		1.12		105.9		647	
	am. confl. Ogretineanca			20	1020	398		31		1.3		66		702
120.13.8.1	Ogretineanca	L	11		760	398	33		1.1		30.3		581	
	am. confl. Stilpul			50	1760	320		29		1.42		476		913
120.13.9	Stilpul	R	12		595	320	23		1.23		11.5		483	
	am. confl. Gura Vitioarei			55	1760	290		27		1.31		493		
120.13.9.a	Gura Vitioarei	L	9		560	290	30		1.22		15.1			
	am. confl. Bughea			58	1760	273		26		1.47		516		878
120.13.10	Bughea	R	18		560	273	16		1.3		28.0		444	
	am. confl. Varbilau			64	1760	238		24		1.43		553		846
120.13.11	Varbilau	R	37		1260	238	28		1.15		213.2		626	
	am. confl. Afunis			19	1260	380		46		1.3		64		870
120.13.11.1	Afunis	R	10		700	378	32		1.1		63.2		632	
	am. confl. Bertea			10	700	380		32		1.21		27		537
120.13.11.1.1	Bertea	L	14		900	380	37		1.23		(36)		707	
	am. confl. Stanic			25	1260	312		38		1.28		140		720
120.13.11.2	Stanic	L	18		860	312	30		1.31		41.8		517	
	am. confl. Tariceanca			5	860	413		89		1.23		8		
120.13.11.2.1	Tariceanca	L	5		695	413	56		1.21		(10)			
	am. confl. Telega			70	1760	206		22		1.4		774		781
120.13.12	Telega	R	30		700	206	16		1.82		188.6		388	
	am. confl. Mislei			12	700	339		30		1.51		20		518
120.13.12.1	Mislei	L	7		700	339	52		1		12.5		501	
	am. confl. Runc			17	700	306		23		1.52		38		495
120.13.12.2	Runc	L	7		550	306	35		1.1		10.5		392	
	am. confl. Doftanet			23	700	263		19		1.87		44		452
120.13.12.3	Doftanet	L	12		700	263	36		1.26		27.1		398	
	am. confl. Cosmina			28	700	221		17		1.82		85		414
120.13.12.4	Cosmina	L	24		610	221	16		1.51		66.1		401	
	am. confl. Luparia			17	610	267		20		1.59		41		
120.13.12.4.1	Luparia	L	6		360	267	15		1.62		(13)			
	am. confl. Iazul Morilor Teleajen			92	1760	131		18		1.43		985		687
120.13.13	Iazul Morilor Teleajen	L	26		300	131	6		1.22		173.9		231	
	am. confl. Lipanesti			10	300	197		10		1.23		12		
120.13.13.a	Lipanesti	L	11		300	197	9		1.21		22.0			
	am. confl. Bucovel			21	300	146		7		1.32		58		223
120.13.13.1	Bucovel	L	25		350	148	8		1.18		101.7		241	
	am. confl. Ciuciuneasca			12	350	179		14		1.3		27		
120.13.13.1.1	Ciuciuneasca	L	9		320	179	16		1.3		(27)			
	am. confl. Dimbul			101	1760	101		16		1.43		1177		611
120.13.14	Dimbul	R	39		340	101	6		1.26		188.1		238	
	am. confl. Valea Larga(Zavoaia)			5	340	270		14		1.4		8		375
120.13.14.1	Valea Larga	R	9		380	270	12		1.21		28.1		341	
	am. Confl.Ghighiu			104	1760	97		16		1.38		1371		559
120.13.15	Ghighiu	R	10		125	97	3		1.32		23.6		120	
	am. confl. Piriul Rece			108	1760	92		15		1.4		1398		552
120.13.16	Piriul Rece	R	13		135	92	3		1.21		45.0		164	
	am. confl. Soava			116	1760	85		14		1.5		1462		
120.13.16.a	Soava	R	10		115	85	3		1.42		13.2			
	am. confl. Leaotul			121	1760	80		14		1.51		1480		532
120.13.17	Leaotul	R	47		260	80	4		1.36		173.3		179	
	am. confl. Vitman			144	1100	74		7		1.53		2814		647
120.14	Vitman	L	22		125	74	2		1.21		80.2		119	
	am. confl. Tuianca			150	1100	71		7		1.5		2922		626
120.15	Tuianca	R	8		80	71	1		1.3		67.7		87	
	am. confl. Cricovul Sarat			173	1100	63		6		1.61		3065		603
120.16	Cricovul Sarat	L	94		600	63	6		1.9		607.2		287	
	am. confl. Lapos			12	600	208		33		1.41		38		370
120.16.1	Lapos	L	10		640	208	40		1.4		18.5		382	
	am. confl. Salcia			15	600	199		27		1.38		70		365
120.16.2	Salcia	R	10		560	199	36		1.3		26.4		416	
	am. confl. Chiojdeanca			24	600	168		18		1.5		125		369
120.16.3	Chiojdeanca	R	12		560	168	32		1.29		33.7		375	
	am. confl. Matita			29	600	149		16		1.48		174		361
120.16.4	Matita	R	24		640	149	20		1.24		234.0		344	
	am. confl. Tulburea			8	640	237		50		1.1		16		
120.16.4.a	Tulburea	L	7		500	237	38		1.21		14.0			
	am. confl. Lopanta			14	640	192		32		1.24		41		421

Table B.1.2 The Water Shed in the Prahova River (3/3)

Code	River name	Point of confluence	Length km	Length2 km	Altitude (m) upstream	Altitude (m) downstream	Average Slope slope	Average Slope slope2	Curve coefficient curve1	Curve coefficient curve2	Area (km²)* area	Area (km²)* area2	Average Altitude (m) altitude	Average Altitude (m) altitude2
120.16.4.1	Lopanita	R	23		640	192	19		1.36		85.3		374	
	am. confl. Saratel			18	640	170		26		1.29		132		385
120.16.4.2	Saratel	R	14		350	170	13		1.7		80.3		306	
	am. confl. Tulburea			5	350	208		28		1.22		8		368
120.16.4.2.1	Tulburea	L	10		410	208	20		1.4		(19)		383	
	am. confl. Baltesti			9	350	186		18		1.28		37		
120.16.4.2.2	Baltesti	R	6		240	186	9		1.12		(30)			
	am. confl. Saratica			30	600	149		15		1.65		408		349
120.16.5	Saratica	L	8		460	149	39		1.37		12.7		310	
	am. confl. Varbila			38	600	132		12		1.6		462		338
120.16.6	Varbila	R	10		300	132	17		1.22		17.2		223	
	am. confl. Cring			64	600	91		8		1.41		540		
120.16.7	Cring	L	17		380	91	17		1.22		20.7			
	am. confl. Maia			180	1100	58		6		1.6		3684		548
120.17	Maia	R	14		78	58	1		1.51		45.7		78	
	am. confl. Comana			241	2310	55		9		1.93		6185		493

Data Source : Romanian Waters Authority

Note: * The catchment areas are obtained by the Study Team excluding figures in parenthesis

Table B.1.3 Flow Regime at 12 Stations (1/6)

VARBILAU (111805)

	20%	50%	60%	70%	75%	80%	90%	95%	Min	Average
year/days	73	182	219	255	274	292	323	347	365/366	
1997	0.506	0.23	0.18	0.159	0.145	0.135	0.123	0.111	0.087	0.574
1996	0.396	0.165	0.135	0.135	0.135	0.131	0.120	0.106	0.029	0.408
1995	0.262	0.150	0.130	0.094	0.094	0.094	0.065	0.065	0.061	0.198
1994	0.130	0.094	0.090	0.090	0.090	0.085	0.077	0.049	0.035	0.147
1993	0.263	0.102	0.084	0.074	0.067	0.067	0.051	0.031	0.022	0.227
1992	0.110	0.090	0.070	0.052	0.052	0.052	0.052	0.042	0.024	0.118
1991	0.304	0.160	0.132	0.082	0.072	0.063	0.063	0.054	0.028	0.420
1990	0.076	0.061	0.051	0.045	0.040	0.038	0.035	0.034	0.033	0.097
1989	0.076	0.056	0.051	0.046	0.044	0.042	0.038	0.035	0.031	0.069
1988	0.320	0.091	0.077	0.059	0.057	0.054	0.047	0.042	0.039	0.270
1987	0.144	0.090	0.050	0.044	0.042	0.036	0.034	0.023	0.020	0.123
1986	0.154	0.060	0.050	0.046	0.045	0.045	0.036	0.031	0.025	0.218
1985	0.220	0.086	0.063	0.047	0.041	0.038	0.032	0.025	0.018	0.332
1984	0.420	0.142	0.100	0.090	0.077	0.066	0.051	0.046	0.040	0.441
1983	0.189	0.086	0.075	0.073	0.068	0.061	0.051	0.040	0.036	0.340
1982	0.328	0.149	0.107	0.073	0.065	0.063	0.055	0.050	0.039	0.268
1981	0.460	0.136	0.072	0.051	0.046	0.042	0.038	0.033	0.025	0.322
1980	0.762	0.332	0.255	0.180	0.153	0.100	0.064	0.051	0.030	0.638
1979	0.440	0.169	0.109	0.088	0.081	0.076	0.065	0.054	0.037	0.417
1978	0.378	0.147	0.092	0.059	0.043	0.037	0.034	0.031	0.026	0.335
Average	0.297	0.130	0.099	0.079	0.073	0.066	0.057	0.048	0.034	0.298

TESILA (111605)

	20%	50%	60%	70%	75%	80%	90%	95%	Min	Average
year/days	73	182	219	255	274	292	323	347	365/366	
1997	7.100	3.220	2.830	2.550	2.520	2.300	2.000	1.850	1.010	5.018
1996	5.300	2.600	2.430	2.190	2.080	1.970	1.860	1.640	1.200	4.164
1995	5.530	2.700	2.360	2.100	1.980	1.860	1.430	1.230	0.430	3.819
1994	3.090	2.160	1.910	1.580	1.330	1.230	1.040	0.930	0.370	2.383
1993	4.980	1.900	1.630	1.360	1.230	1.100	0.829	0.693	0.260	3.164
1992	3.130	1.770	1.490	1.290	1.250	1.160	1.050	0.905	0.400	2.359
1991	8.160	3.500	2.800	2.380	2.220	1.880	1.470	1.130	0.540	5.405
1990	3.130	1.990	1.780	1.490	1.380	1.230	1.010	0.839	0.445	2.443
1989	3.520	2.320	1.900	1.670	1.440	1.270	1.060	0.941	0.636	2.666
1988	6.500	2.360	2.010	1.650	1.440	1.340	1.150	0.956	0.522	4.000
1987	4.350	2.190	1.410	1.090	1.000	0.924	0.668	0.481	0.275	2.581
1986	4.190	2.390	2.220	2.090	1.910	1.630	1.050	0.785	0.450	3.068
1985	5.920	2.730	2.070	1.490	1.380	1.270	1.120	0.892	0.704	4.095
1984	9.090	2.650	2.120	1.820	1.680	1.530	1.400	1.300	0.990	5.215
1983	5.870	3.150	2.700	2.480	2.250	1.840	1.660	1.300	0.729	4.503
1982	6.720	3.520	3.150	2.860	2.800	2.560	2.020	1.720	1.460	4.453
1981	8.310	3.720	3.250	2.870	2.710	2.570	2.420	2.230	1.710	5.587
1980	9.700	4.740	3.760	2.820	2.480	2.320	2.200	1.950	1.090	6.182
1979	7.720	4.780	3.520	2.820	2.650	2.480	2.320	2.150	1.940	5.688
1978	6.980	3.640	3.100	2.750	2.480	2.310	1.750	1.310	0.864	4.647
Average	5.965	2.902	2.422	2.068	1.911	1.739	1.475	1.262	0.801	4.072

Table B.1.3 Flow Regime at 12 Stations (2/6)

PRAHOVA (111215)

	20%	50%	60%	70%	75%	80%	90%	95%	Min	Average
year/days	73	182	219	255	274	292	323	347	365/366	
1997	23.200	8.720	7.960	7.180	6.170	5.910	5.650	5.520	4.880	16.512
1996	14.600	6.690	6.200	5.910	5.780	5.650	5.070	4.180	3.400	12.345
1995	13.600	7.970	7.320	6.680	6.260	6.040	5.400	4.820	4.200	10.526
1994	6.500	5.470	4.970	4.970	4.720	4.470	4.470	3.960	2.720	6.420
1993	8.920	4.230	4.000	3.780	3.560	3.540	3.340	3.200	2.900	6.512
1992	7.950	5.600	4.900	4.050	3.880	3.880	3.540	3.370	3.060	6.689
1991	19.700	8.920	7.620	7.040	6.320	5.180	3.780	3.250	2.870	14.377
1990	6.200	4.430	4.000	3.620	3.580	3.580	3.580	3.160	2.950	5.353
1989	6.980	4.950	4.600	4.200	3.870	3.600	3.240	2.810	2.430	5.782
1988	16.400	6.510	5.570	5.570	4.950	4.950	4.950	4.410	4.140	10.868
1987	8.500	4.650	4.280	3.600	3.410	3.410	3.410	3.220	3.020	6.088
1986	9.400	6.220	5.320	5.020	4.840	4.700	4.650	4.300	4.100	7.205
1985	12.600	6.660	5.820	5.000	4.700	4.700	4.300	3.700	3.700	9.435
1984	21.500	8.480	7.250	6.660	6.010	5.820	5.450	5.000	4.600	14.264
1983	13.200	6.640	6.320	5.700	5.700	5.700	5.200	4.700	4.080	11.257
1982	15.500	8.680	7.700	7.300	6.900	6.640	6.100	5.820	4.300	11.726
1981	22.000	9.840	9.260	8.100	7.720	7.340	6.580	5.820	4.300	14.381
1980	26.700	11.700	9.300	8.060	7.800	7.380	6.480	5.100	4.200	17.330
1979	19.900	10.700	8.060	7.200	6.940	6.480	6.480	5.260	3.500	14.480
1978	17.800	8.580	6.190	5.530	5.210	4.890	4.250	3.620	3.330	11.202
Average	14.558	7.282	6.332	5.759	5.416	5.193	4.796	4.261	3.634	10.638

MOARA (111715)

	20%	50%	60%	70%	75%	80%	90%	95%	Min	Average
year/days	73	182	219	255	274	292	323	347	365/366	
1997	16.400	11.100	10.600	8.820	8.530	8.240	7.660	7.080	5.950	14.444
1996	12.900	8.240	7.660	6.500	5.950	5.950	5.400	4.990	4.710	10.629
1995	8.160	6.540	6.140	5.910	5.680	5.440	5.010	4.740	4.160	7.109
1994	6.850	5.440	5.200	4.740	4.500	4.330	4.016	3.820	3.500	5.860
1993	7.560	5.340	4.940	4.700	4.560	4.440	4.320	4.100	3.830	6.881
1992	6.750	5.420	5.040	4.700	4.550	4.400	4.250	4.100	3.830	6.371
1991	16.900	7.600	6.560	5.520	5.400	5.000	4.750	4.500	4.000	12.183
1990	5.200	3.920	3.680	3.550	3.460	3.350	3.110	2.950	2.700	4.966
1989	5.600	4.390	4.230	3.920	3.760	3.760	3.440	3.300	2.920	4.808
1988	13.600	6.240	5.600	5.170	5.020	5.020	4.880	4.780	4.480	10.201
1987	6.930	4.420	4.260	3.860	3.450	3.250	3.090	2.770	2.450	5.468
1986	7.740	4.670	4.420	4.170	4.170	4.170	4.060	3.900	3.700	6.545
1985	11.800	6.500	5.900	5.350	5.200	4.800	4.400	4.200	3.700	9.211
1984	16.100	8.000	6.960	6.200	5.980	5.700	5.700	5.300	4.650	12.808
1983	9.340	5.860	5.300	5.080	4.950	4.850	4.650	4.450	3.300	9.204
1982	12.100	7.700	6.780	6.170	5.560	5.260	4.950	4.950	4.500	9.430
1981	16.100	9.900	8.680	7.080	6.780	6.170	5.560	4.950	4.500	12.629
1980	18.700	11.300	9.900	8.820	8.100	7.740	6.300	5.700	5.450	15.841
1979	13.300	8.400	7.740	7.380	7.020	6.670	6.300	5.680	3.700	11.666
1978	14.700	7.700	6.340	5.350	5.020	4.900	4.420	4.180	3.400	10.329
Average	11.337	6.934	6.297	5.650	5.382	5.172	4.813	4.522	3.972	9.329

Table B.1.3 Flow Regime at 12 Stations (3/6)

GURA VITIOAREI (111710)

	20%	50%	60%	70%	75%	80%	90%	95%	Min	Average
year/days	73	182	219	255	274	292	323	347	365/366	
1997	7.100	3.300	2.700	2.520	2.340	1.980	1.300	0.830	0.580	5.644
1996	6.020	2.580	2.080	1.460	1.180	1.180	0.900	0.700	0.440	4.715
1995	2.420	1.420	1.190	0.970	0.886	0.838	0.710	0.654	0.489	2.288
1994	1.500	0.940	0.664	0.474	0.470	0.375	0.265	0.215	0.185	1.271
1993	3.250	1.000	0.800	0.570	0.560	0.410	0.260	0.210	0.141	2.506
1992	2.700	1.220	0.896	0.570	0.476	0.400	0.314	0.260	0.170	2.272
1991	10.400	3.220	2.600	2.100	1.900	1.660	1.440	1.210	1.000	6.863
1990	1.600	0.690	0.690	0.520	0.424	0.410	0.352	0.233	0.138	1.551
1989	2.050	0.720	0.690	0.520	0.440	0.410	0.410	0.388	0.270	1.468
1988	7.960	2.520	1.520	1.210	0.980	0.806	0.690	0.632	0.562	4.693
1987	2.720	0.500	0.375	0.329	0.312	0.284	0.250	0.245	0.098	1.616
1986	2.700	0.785	0.550	0.400	0.350	0.322	0.268	0.196	0.079	2.117
1985	4.780	1.580	0.966	0.718	0.632	0.550	0.435	0.350	0.250	3.762
1984	8.980	2.990	1.500	0.886	0.802	0.718	0.670	0.634	0.358	5.353
1983	5.510	2.230	1.720	1.480	1.200	1.000	0.808	0.616	0.284	4.356
1982	6.300	3.160	2.600	2.000	1.900	1.600	0.900	0.780	0.710	4.079
1981	9.140	3.560	2.790	2.330	1.920	1.560	1.050	0.850	0.450	6.230
1980	11.300	4.760	3.800	3.020	2.760	2.500	2.060	1.730	1.060	7.896
1979	7.460	3.950	3.200	2.950	2.560	2.240	1.760	1.360	1.150	5.477
1978	9.100	4.440	3.440	2.980	2.750	2.590	2.300	1.990	0.915	6.223
Average	5.650	2.278	1.739	1.400	1.242	1.092	0.857	0.704	0.466	4.019

CIORANI (112105)

	20%	50%	60%	70%	75%	80%	90%	95%	Min	Average
year/days	73	182	219	255	274	292	323	347	365/366	
1997	2.740	1.530	1.350	1.100	0.940	0.880	0.740	0.640	0.473	2.585
1996	1.180	0.680	0.658	0.576	0.540	0.500	0.428	0.320	0.215	1.235
1995	0.888	0.543	0.466	0.360	0.344	0.305	0.250	0.145	0.100	0.703
1994	0.548	0.358	0.292	0.289	0.242	0.227	0.170	0.115	0.075	0.463
1993	1.220	0.679	0.430	0.360	0.304	0.264	0.208	0.190	0.088	0.851
1992	1.260	0.748	0.624	0.380	0.361	0.310	0.270	0.210	0.149	0.942
1991	1.650	0.870	0.790	0.730	0.680	0.640	0.460	0.343	0.122	1.672
1990	0.717	0.434	0.371	0.324	0.313	0.300	0.245	0.200	0.120	0.566
1989	0.616	0.422	0.370	0.340	0.324	0.302	0.270	0.228	0.131	0.480
1988	2.350	0.880	0.690	0.570	0.506	0.470	0.410	0.346	0.230	2.533
1987	0.850	0.522	0.428	0.326	0.280	0.200	0.136	0.100	0.040	0.673
1986	1.350	0.701	0.548	0.440	0.408	0.386	0.292	0.221	0.086	1.019
1985	1.710	0.780	0.660	0.500	0.468	0.436	0.340	0.256	0.125	1.365
1984	1.980	1.300	1.100	0.912	0.826	0.698	0.600	0.526	0.394	2.123
1983	1.170	0.698	0.623	0.587	0.570	0.524	0.450	0.375	0.240	1.169
1982	1.650	1.120	0.916	0.828	0.780	0.735	0.650	0.556	0.320	1.189
1981	2.650	1.750	1.590	1.440	1.320	1.290	1.120	0.915	0.651	2.087
1980	2.480	1.410	1.200	1.060	0.905	0.838	0.676	0.559	0.405	2.922
1979	1.230	0.650	0.575	0.533	0.505	0.489	0.474	0.337	0.097	1.151
1978	1.780	0.898	0.740	0.652	0.575	0.520	0.454	0.378	0.186	1.360
Average	1.501	0.849	0.721	0.615	0.560	0.516	0.432	0.348	0.212	1.354

Table B.1.3 Flow Regime at 12 Stations (4/6)

CHEIA (111705)

	20%	50%	60%	70%	75%	80%	90%	95%	Min	Average
year/days	73	182	219	255	274	292	323	347	365/366	
1997	1.180	0.875	0.779	0.658	0.658	0.508	0.436	0.378	0.302	0.978
1996	0.780	0.450	0.448	0.427	0.417	0.380	0.380	0.380	0.277	0.700
1995	0.988	0.615	0.519	0.485	0.407	0.407	0.337	0.270	0.204	0.713
1994	0.605	0.410	0.355	0.316	0.296	0.292	0.292	0.263	0.216	0.514
1993	0.832	0.325	0.325	0.325	0.325	0.315	0.275	0.234	0.211	0.568
1992	0.942	0.482	0.426	0.370	0.340	0.330	0.270	0.266	0.254	0.723
1991	1.900	1.150	0.990	0.910	0.865	0.685	0.332	0.307	0.237	1.424
1990	0.666	0.379	0.295	0.262	0.234	0.234	0.234	0.234	0.234	0.489
1989	0.560	0.340	0.329	0.272	0.270	0.270	0.266	0.247	0.225	0.468
1988	1.260	0.572	0.523	0.372	0.330	0.310	0.284	0.266	0.208	0.842
1987	0.664	0.225	0.167	0.149	0.145	0.142	0.134	0.120	0.115	0.372
1986	0.518	0.361	0.344	0.325	0.315	0.295	0.295	0.223	0.202	0.231
1985	0.896	0.502	0.435	0.410	0.350	0.350	0.261	0.245	0.227	0.402
1984	1.270	0.500	0.385	0.346	0.330	0.330	0.274	0.234	0.224	0.415
1983	1.030	0.655	0.609	0.550	0.510	0.495	0.413	0.385	0.343	0.436
1982	1.060	0.750	0.708	0.670	0.609	0.609	0.510	0.510	0.412	0.436
1981	1.250	0.840	0.700	0.660	0.580	0.560	0.530	0.520	0.398	0.539
1980	1.500	0.830	0.700	0.580	0.580	0.487	0.414	0.343	0.273	0.512
1979	0.982	0.725	0.663	0.605	0.589	0.575	0.473	0.473	0.336	0.410
1978	1.050	0.826	0.714	0.656	0.656	0.602	0.452	0.394	0.327	0.448
Average	0.997	0.591	0.521	0.467	0.440	0.409	0.343	0.315	0.261	0.581

CIMPINA (111210)

	20%	50%	60%	70%	75%	80%	90%	95%	Min	Average
year/days	73	182	219	255	274	292	323	347	365/366	
1997	18.900	10.600	9.080	7.880	7.360	7.100	6.590	6.340	5.950	10.723
1996	11.300	5.640	5.000	4.840	4.600	4.580	4.200	4.200	3.780	8.230
1995	12.300	6.680	5.950	5.170	4.880	4.370	3.400	2.820	1.420	8.835
1994	6.260	4.430	4.100	3.900	3.660	3.520	3.080	2.820	2.280	5.397
1993	8.900	3.930	3.470	3.070	2.660	2.150	1.760	1.480	1.130	5.847
1992	7.620	3.780	3.610	3.340	3.060	2.780	2.560	2.250	1.270	5.388
1991	15.400	6.100	5.220	4.510	4.140	3.450	2.230	1.850	1.270	9.801
1990	5.190	3.460	3.290	2.700	2.500	2.300	1.900	1.710	1.610	4.202
1989	6.360	4.620	4.180	3.780	3.750	3.490	2.100	2.100	1.900	5.532
1988	12.400	4.840	4.020	3.370	3.370	3.110	2.680	2.200	1.370	8.045
1987	6.800	3.210	2.750	2.380	2.200	2.120	1.830	1.540	0.952	4.809
1986	6.080	3.980	3.500	2.940	2.680	2.600	2.330	1.780	1.460	4.624
1985	10.300	5.180	3.900	3.600	3.520	2.900	2.600	2.340	1.630	7.106
1984	12.600	5.450	4.300	3.700	3.420	3.300	2.700	2.430	2.000	8.377
1983	8.920	4.550	3.870	3.620	3.550	3.140	2.900	2.430	2.150	7.915
1982	11.600	7.340	5.540	4.760	4.300	4.100	3.700	3.420	2.900	8.433
1981	12.900	7.340	6.320	5.800	5.700	5.350	4.650	4.100	3.080	9.770
1980	16.700	9.050	6.850	5.340	4.550	4.200	3.600	3.020	2.310	11.089
1979	12.500	7.790	6.300	4.880	4.360	3.720	3.540	3.360	2.280	9.087
1978	10.900	6.950	5.960	5.170	4.700	4.140	3.180	2.370	2.090	8.088
Average	10.697	5.746	4.861	4.238	3.948	3.621	3.077	2.728	2.142	7.565

Table B.1.3 Flow Regime at 12 Stations (5/6)

BUSTENI (111505)

year/days	20% 73	50% 182	60% 219	70% 255	75% 274	80% 292	90% 323	95% 347	Min 365/366	Average
1997	1.220	0.625	0.450	0.380	0.310	0.250	0.195	0.170	0.160	0.778
1996	0.464	0.375	0.332	0.310	0.281	0.250	0.187	0.133	0.101	0.434
1995	0.635	0.426	0.364	0.275	0.240	0.240	0.094	0.065	0.050	0.459
1994	0.456	0.270	0.192	0.192	0.187	0.170	0.130	0.078	0.062	0.338
1993	0.440	0.235	0.210	0.180	0.160	0.098	0.075	0.066	0.042	0.308
1992	0.320	0.170	0.150	0.150	0.150	0.150	0.130	0.130	0.100	0.275
1991	1.350	0.384	0.344	0.250	0.219	0.133	0.071	0.063	0.042	0.685
1990	0.328	0.205	0.180	0.118	0.118	0.097	0.097	0.076	0.076	0.231
1989	0.399	0.305	0.265	0.262	0.230	0.216	0.124	0.103	0.092	0.344
1988	1.050	0.305	0.230	0.200	0.149	0.140	0.100	0.100	0.077	0.646
1987	0.385	0.170	0.134	0.100	0.077	0.077	0.077	0.064	0.041	0.243
1986	0.342	0.214	0.166	0.147	0.134	0.128	0.095	0.077	0.066	0.242
1985	0.810	0.278	0.182	0.164	0.145	0.145	0.133	0.114	0.105	0.458
1984	0.930	0.293	0.178	0.156	0.118	0.091	0.070	0.060	0.056	0.543
1983	0.604	0.238	0.224	0.173	0.165	0.150	0.112	0.091	0.075	0.372
1982	0.708	0.382	0.321	0.248	0.210	0.197	0.185	0.168	0.137	0.466
1981	0.892	0.520	0.476	0.405	0.344	0.300	0.189	0.148	0.120	0.642
1980	0.701	0.443	0.405	0.290	0.250	0.115	0.095	0.082	0.066	0.476
1979	0.760	0.438	0.290	0.235	0.185	0.161	0.160	0.135	0.095	0.510
1978	0.714	0.438	0.404	0.311	0.235	0.225	0.161	0.111	0.091	0.531
Average	0.675	0.336	0.275	0.227	0.195	0.167	0.124	0.102	0.083	0.449

AZUGA (111405)

year/days	20% 73	50% 182	60% 219	70% 255	75% 274	80% 292	90% 323	95% 347	Min 365/366	Average
1997	2.750	1.190	0.910	0.640	0.550	0.528	0.412	0.301	0.198	1.874
1996	1.400	1.040	0.950	0.752	0.680	0.589	0.372	0.301	0.211	1.205
1995	2.050	0.950	0.747	0.662	0.500	0.369	0.162	0.142	0.116	1.429
1994	0.615	0.319	0.303	0.255	0.245	0.245	0.179	0.150	0.082	0.610
1993	1.350	0.360	0.258	0.258	0.190	0.185	0.180	0.149	0.121	0.758
1992	1.430	0.363	0.301	0.285	0.272	0.260	0.235	0.185	0.185	0.894
1991	2.900	1.140	0.758	0.566	0.438	0.230	0.186	0.150	0.096	1.971
1990	1.210	0.608	0.502	0.406	0.406	0.310	0.270	0.190	0.150	0.828
1989	1.700	1.020	0.813	0.642	0.489	0.336	0.176	0.160	0.150	1.274
1988	3.240	0.543	0.434	0.380	0.368	0.350	0.320	0.300	0.241	1.802
1987	1.840	0.417	0.370	0.365	0.320	0.282	0.282	0.229	0.156	0.998
1986	2.060	0.670	0.462	0.372	0.364	0.340	0.284	0.245	0.166	1.167
1985	2.720	1.070	0.654	0.510	0.450	0.180	0.139	0.081	0.058	1.874
1984	3.180	0.615	0.524	0.145	0.137	0.118	0.098	0.074	0.053	1.923
1983	2.880	0.974	0.670	0.392	0.380	0.333	0.225	0.144	0.060	1.740
1982	3.250	1.520	1.160	0.819	0.730	0.686	0.480	0.385	0.249	2.020
1981	4.040	2.020	1.810	1.530	1.380	1.230	0.651	0.370	0.194	2.783
1980	4.060	1.810	1.270	0.326	0.252	0.219	0.160	0.000	0.000	2.387
1979	3.210	1.670	1.220	0.896	0.895	0.765	0.640	0.467	0.321	2.088
1978	3.260	1.890	1.500	1.220	1.020	0.878	0.501	0.411	0.272	2.196
Average	2.457	1.009	0.781	0.571	0.503	0.422	0.298	0.222	0.154	1.591

Table B.1.3 Flow Regime at 12 Stations (6/6)

ADINCATA (111220)

	20%	50%	60%	70%	75%	80%	90%	95%	Min	Average
year/days	73	182	219	255	274	292	323	347	365/366	
1997	42.50	28.00	24.00	19.50	19.50	18.20	17.80	17.10	16.00	37.081
1996	33.70	18.80	17.50	16.00	15.30	14.60	13.90	12.60	10.90	27.423
1995	21.40	17.10	16.00	14.50	13.80	13.70	13.10	12.50	10.80	18.966
1994	15.60	12.80	11.80	11.80	11.40	10.90	10.50	9.10	8.00	14.083
1993	22.20	11.80	10.50	10.00	10.00	9.64	9.50	9.10	8.60	16.521
1992	19.90	14.00	13.00	11.00	10.60	10.50	9.81	9.08	8.44	16.384
1991	42.60	20.60	18.10	16.80	16.20	15.40	13.20	12.30	10.80	33.138
1990	14.60	11.00	9.24	8.88	8.80	8.52	8.16	7.44	6.72	12.615
1989	14.60	12.50	12.10	11.80	11.70	10.90	8.90	7.90	7.55	13.259
1988	36.60	17.20	14.10	13.30	13.00	12.90	12.20	11.70	11.20	25.654
1987	18.50	11.00	10.50	9.70	9.30	8.90	7.82	7.46	6.74	13.920
1986	18.8	14.10	12.50	11.50	11.10	11.10	10.80	10.00	9.00	16.188
1985	28.90	16.50	15.00	13.80	12.90	11.50	11.10	10.40	9.50	23.107
1984	46.70	20.80	18.70	15.50	14.70	14.00	12.90	12.90	10.40	31.732
1983	27.30	15.60	15.00	14.20	13.80	13.80	12.70	11.20	6.45	24.030
1982	34.80	21.80	19.20	18.20	17.70	16.70	15.80	14.30	12.60	26.184
1981	50.10	30.80	24.50	21.40	20.30	19.30	18.20	16.30	15.10	35.953
1980	58.10	31.70	27.80	24.00	22.90	21.20	18.30	16.80	13.30	41.218
1979	40.90	23.90	20.30	19.30	18.30	17.80	17.10	14.80	11.60	31.901
1978	37.50	19.10	16.2	15.1	14.80	14	12.2	10.5	9.3	25.315
Average	31.27	18.46	16.30	14.81	14.31	13.68	12.70	11.67	10.15	24.23

BUSTENI PH (111204)

	20%	50%	60%	70%	75%	80%	90%	95%	Min	Average
year/days	73	182	219	255	274	292	323	347	365/366	
1997	6.080	2.510	2.130	1.890	1.770	1.410	1.050	0.807	0.570	4.666
1995	4.500	2.640	2.170	1.790	1.630	1.450	0.610	0.310	0.220	3.194
1993	3.050	1.110	0.950	0.680	0.395	0.300	0.220	0.186	0.068	1.791
Average	4.543	2.087	1.750	1.453	1.265	1.053	0.627	0.434	0.286	3.217

Table B.1.4 Daily Discharge and Hydrograph (1/11)

AZUGA 1996

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1.58	1.16	0.34	0.29	7.55	1.13	0.95	0.59	1.20	1.33	1.09	1.19
2	1.40	0.74	0.40	0.29	7.55	0.95	0.68	0.59	1.20	1.35	1.06	1.56
3	1.22	0.32	0.47	0.29	7.55	1.04	0.68	0.59	1.20	1.38	1.06	1.93
4	1.22	0.33	0.50	0.34	4.57	0.95	0.68	0.59	1.20	1.32	1.06	1.40
5	1.22	0.34	0.53	0.39	2.57	0.95	1.22	0.59	1.20	1.26	1.07	1.50
6	1.22	0.35	0.57	0.43	2.57	0.95	1.22	0.49	1.20	1.19	1.07	1.45
7	1.22	0.35	0.60	0.48	2.57	0.95	1.22	0.49	1.20	1.13	0.99	1.40
8	1.22	0.36	0.63	0.53	2.57	1.04	1.40	0.44	1.20	1.07	0.91	1.34
9	1.31	0.37	0.67	0.58	2.57	0.95	1.40	0.39	1.20	1.04	0.82	1.29
10	1.22	0.37	0.70	0.62	2.57	0.95	6.06	0.39	1.20	1.00	0.74	1.22
11	1.13	0.36	0.62	0.68	2.57	0.95	1.86	0.39	1.20	0.97	0.66	1.16
12	1.04	0.36	0.55	0.68	2.57	0.95	0.98	0.39	1.20	0.94	0.68	1.10
13	0.95	0.36	0.47	0.68	2.57	1.04	0.98	0.39	1.20	0.91	0.70	1.03
14	0.95	0.35	0.39	0.68	2.57	0.95	0.98	0.39	1.20	0.94	0.71	1.06
15	0.95	0.35	0.32	0.68	2.14	0.95	0.98	0.39	1.20	0.97	0.73	1.09
16	0.95	0.36	0.31	1.04	2.14	0.95	0.98	0.49	1.20	1.00	0.74	1.13
17	0.95	0.37	0.30	1.04	2.14	0.95	0.98	1.20	1.20	1.03	0.75	1.16
18	0.95	0.38	0.29	1.04	1.68	1.04	0.98	1.73	1.20	1.06	0.77	1.19
19	1.40	0.39	0.29	1.04	1.58	0.95	0.98	1.73	1.20	1.09	0.88	1.17
20	1.77	0.39	0.28	1.04	1.58	0.95	0.75	2.57	1.20	1.09	0.87	1.15
21	1.77	0.40	0.27	1.04	1.58	0.95	0.75	2.14	1.20	1.09	0.86	1.14
22	1.77	0.38	0.28	1.04	1.40	0.95	0.75	2.57	1.20	1.08	0.86	1.12
23	1.77	0.35	0.30	1.04	1.40	0.95	0.75	2.57	2.31	1.08	0.85	1.10
24	1.77	0.32	0.31	1.04	1.40	1.40	0.75	1.86	3.97	1.08	0.84	1.31
25	1.77	0.29	0.32	1.13	1.40	1.40	0.64	1.46	3.62	1.10	0.84	1.52
26	1.77	0.27	0.31	1.13	1.40	1.22	0.64	1.46	2.42	1.12	0.84	1.72
27	1.77	0.24	0.29	1.22	1.40	1.22	0.64	1.46	1.22	1.15	0.83	1.93
28	1.77	0.21	0.29	6.76	1.49	1.22	0.64	1.20	1.25	1.17	0.83	2.14
29	1.77	0.28	0.29	13.10	1.77	1.22	0.64	1.20	1.27	1.19	0.83	1.93
30	1.58		0.29	8.00	1.86	1.22	0.59	1.20	1.30	1.16	0.82	1.73
31	1.58		0.29		1.86		0.59	1.20		1.12		1.52

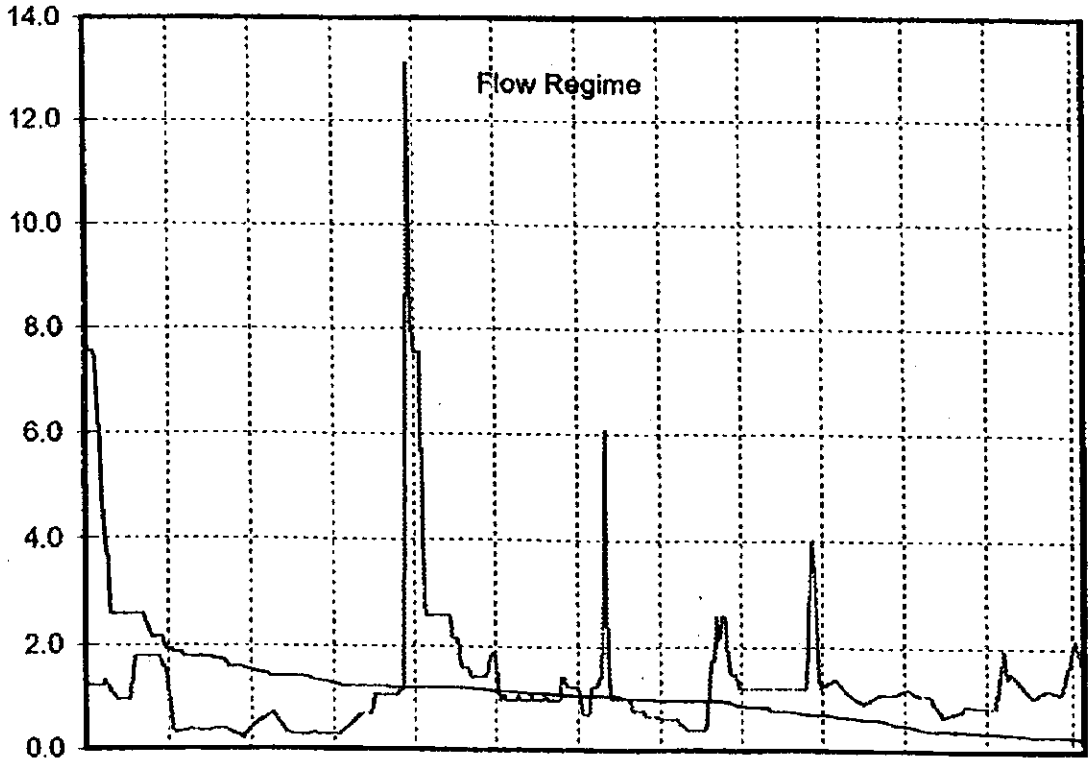


Table B.1.4 Daily Discharge and Hydrograph (2/11)

AIANCATA 1996

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	53.00	20.80	18.80	29.00	69.60	30.80	21.40	11.90	12.60	19.00	15.30	36.10
2	108.00	20.40	18.80	34.90	74.60	28.90	20.20	11.90	12.60	17.50	14.60	87.40
3	235.00	19.60	18.80	31.10	80.10	26.00	19.00	11.90	15.30	16.40	14.60	131.00
4	96.70	18.80	18.80	32.80	71.50	25.10	18.20	11.90	17.50	16.40	14.30	128.00
5	86.90	18.80	18.40	34.90	59.70	23.20	17.80	11.50	17.50	16.80	14.30	58.00
6	75.60	19.20	18.80	45.00	55.10	20.60	17.50	11.90	15.70	16.40	14.30	47.60
7	62.90	18.80	18.00	47.20	51.10	19.00	18.20	11.90	15.30	16.00	17.30	42.40
8	42.20	18.80	18.40	51.80	47.60	18.20	16.80	11.50	14.60	15.70	14.30	38.00
9	38.50	19.60	18.00	42.20	52.20	16.40	16.00	11.90	14.60	15.30	14.60	32.30
10	37.20	19.60	17.30	36.70	46.50	15.70	17.50	11.50	13.90	14.60	16.00	29.40
11	47.80	19.60	16.90	30.60	40.90	15.30	17.50	11.50	14.30	14.30	16.80	28.00
12	47.20	18.80	17.30	28.50	40.40	14.60	19.00	11.50	14.60	13.90	16.40	25.60
13	46.10	18.00	17.30	25.50	41.90	14.60	19.40	11.50	14.60	14.60	16.00	24.10
14	37.60	18.40	17.30	24.60	44.50	14.60	18.20	11.20	14.60	15.70	15.30	23.60
15	34.90	18.80	18.00	31.90	45.50	25.10	17.50	10.90	15.10	13.90	15.30	23.20
16	32.40	18.80	17.70	77.00	41.90	28.90	16.80	10.90	14.30	13.90	15.30	23.20
17	29.40	18.00	16.90	67.10	42.40	20.20	16.40	10.90	14.30	13.90	14.60	24.10
18	26.30	18.00	16.50	99.30	39.00	18.20	22.20	16.00	14.60	14.30	14.60	24.10
19	22.90	17.70	16.90	109.00	35.60	16.80	20.60	15.70	14.60	14.30	15.30	24.10
20	23.80	17.30	17.30	92.30	32.80	14.60	16.80	15.30	13.90	14.60	15.30	23.60
21	23.80	17.70	17.30	84.70	30.80	13.90	15.00	13.90	14.60	15.00	15.30	23.60
22	29.80	18.40	17.30	72.10	29.90	12.90	16.00	13.20	16.00	16.80	15.70	23.20
23	23.30	28.10	18.00	76.40	27.00	13.60	16.00	13.60	15.70	17.10	16.00	23.60
24	22.90	29.40	18.40	74.60	23.20	14.30	14.60	13.90	35.20	16.00	16.00	23.20
25	22.50	24.60	18.40	75.80	21.40	16.00	14.30	13.90	82.70	14.60	16.00	23.20
26	22.50	22.50	18.80	87.40	20.60	15.70	13.90	15.30	38.50	14.60	16.80	23.20
27	22.10	22.10	21.30	102.00	20.60	34.70	13.20	14.60	30.40	14.30	16.80	23.20
28	22.50	22.10	28.10	95.80	19.40	46.50	13.20	14.60	27.50	13.90	28.00	22.70
29	23.80	20.40	36.70	93.00	19.00	30.80	12.60	13.90	26.50	13.90	43.40	23.20
30	22.50		31.50	91.60	37.60	21.80	12.20	13.90	21.40	14.30	33.70	23.20
31	21.30		30.60		32.80		12.20	13.20		15.30		23.20

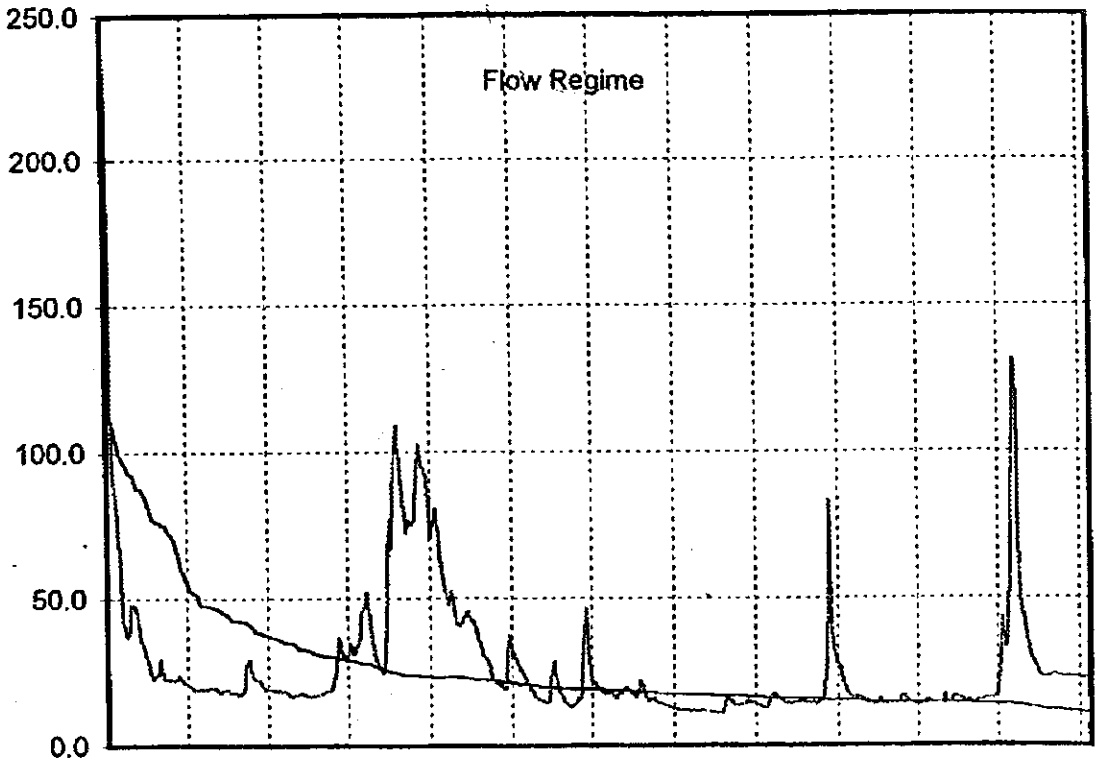


Table B.1.4 Daily Discharge and Hydrograph (3/11)

BUSTENI 1996

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.73	0.38	0.17	0.28	1.36	0.38	0.38	0.55	0.18	0.38	0.38	2.90
2	1.05	0.52	0.17	0.32	1.22	0.35	0.46	0.38	0.18	0.38	0.38	2.10
3	0.89	0.31	0.17	0.36	1.22	0.35	0.46	0.38	0.17	0.38	0.38	2.10
4	0.81	0.28	0.17	0.41	1.22	0.35	0.46	0.38	0.20	0.38	0.38	1.36
5	0.66	0.28	0.17	0.45	1.22	0.38	0.38	0.31	0.22	0.38	0.38	0.94
6	0.66	0.28	0.16	0.52	0.94	0.35	0.38	0.30	0.24	0.31	0.38	0.72
7	0.59	0.27	0.15	0.52	0.80	0.35	0.38	0.28	0.27	0.31	0.38	0.63
8	0.59	0.26	0.14	0.52	0.72	0.31	0.38	0.26	0.29	0.31	0.38	0.55
9	0.59	0.25	0.13	0.45	0.72	0.31	0.38	0.25	0.31	0.31	0.31	0.55
10	0.52	0.23	0.12	0.38	0.72	0.31	0.55	0.23	0.30	0.31	0.31	0.46
11	0.52	0.21	0.12	0.38	0.72	0.31	0.55	0.22	0.29	0.31	0.31	0.46
12	0.48	0.21	0.11	0.38	0.63	0.31	0.46	0.20	0.27	0.31	0.31	0.46
13	0.45	0.20	0.11	0.35	0.63	0.35	0.38	0.25	0.26	0.31	0.31	0.38
14	0.45	0.19	0.11	0.38	0.63	0.38	0.38	0.29	0.25	0.31	0.31	0.38
15	0.38	0.17	0.12	0.38	0.63	0.38	0.38	0.33	0.23	0.31	0.31	0.38
16	0.38	0.18	0.12	0.35	0.72	0.35	0.46	0.38	0.22	0.31	0.25	0.38
17	0.38	0.18	0.12	0.38	0.63	0.35	0.55	0.36	0.25	0.31	0.25	0.38
18	0.35	0.19	0.12	0.35	0.55	0.35	0.31	0.35	0.27	0.31	0.31	0.38
19	0.35	0.19	0.12	0.38	0.46	0.35	0.38	0.34	0.30	0.38	0.25	0.31
20	0.35	0.19	0.12	0.35	0.46	0.38	0.38	0.33	0.33	0.38	0.25	0.31
21	0.35	0.20	0.12	0.55	0.46	0.35	0.38	0.32	0.35	0.38	0.31	0.25
22	0.35	0.20	0.11	0.72	0.46	0.35	0.38	0.45	0.38	0.46	0.25	0.25
23	0.45	0.20	0.11	0.94	0.46	0.38	0.38	0.64	0.38	0.38	0.31	0.25
24	0.35	0.20	0.11	1.50	0.38	0.46	0.31	0.55	4.74	0.55	0.25	0.46
25	0.35	0.19	0.10	1.50	0.38	0.38	0.31	0.46	1.08	0.38	0.46	0.38
26	0.35	0.18	0.10	1.50	0.38	0.72	0.38	0.37	0.63	0.38	0.38	0.36
27	0.35	0.18	0.10	1.50	0.38	0.63	0.38	0.28	0.55	0.38	1.32	0.34
28	0.35	0.17	0.10	1.50	0.38	0.38	0.31	0.19	0.46	0.38	0.80	0.33
29	0.35	0.17	0.15	1.50	0.94	0.38	0.31	0.19	0.46	0.38	0.55	0.31
30	0.31		0.19	1.50	0.55	0.38	0.31	0.18	0.38	0.38	0.63	0.29
31	0.31		0.23		0.38		0.38	0.18		0.38		0.27

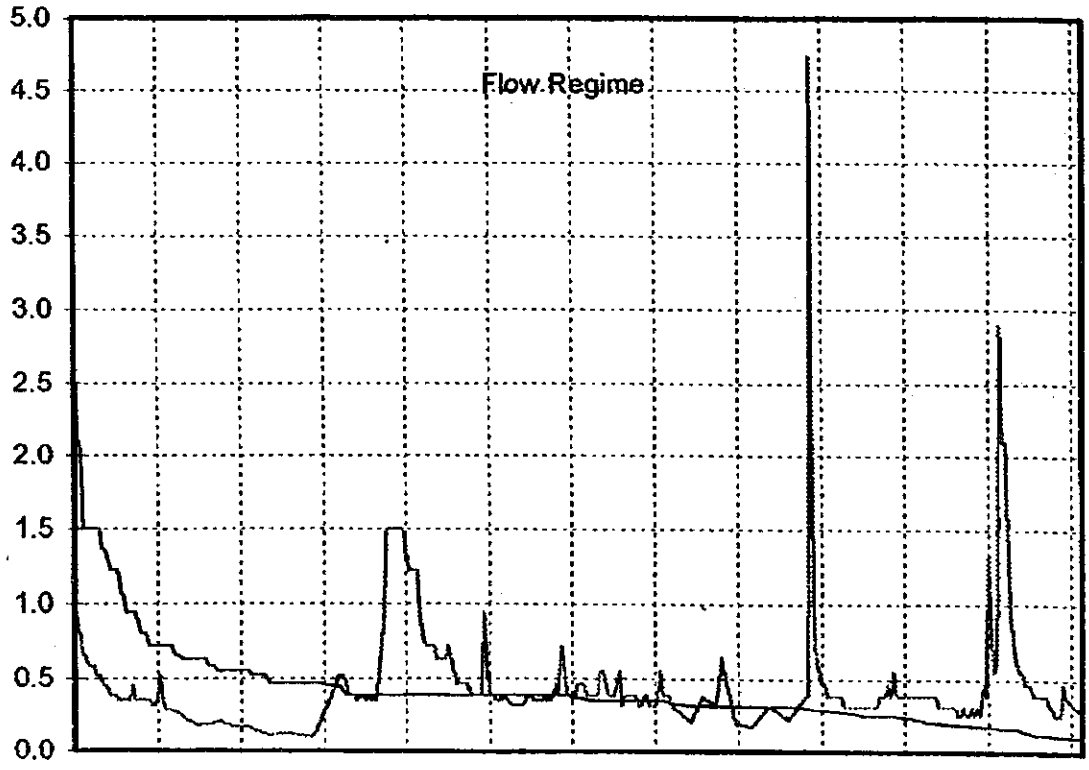


Table B.1.4 Daily Discharge and Hydrograph (4/11)

CHEIA 1996

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.79	0.44	0.49	0.31	2.38	0.66	0.38	0.38	0.38	0.67	0.45	4.06
2	0.62	0.44	0.49	0.38	2.21	0.66	0.38	0.38	0.38	0.67	0.45	4.11
3	0.70	0.44	0.49	0.41	1.89	0.66	0.38	0.38	0.45	0.60	0.45	3.28
4	0.79	0.44	0.49	0.56	1.58	0.60	0.87	0.38	0.38	0.60	0.50	2.07
5	0.70	0.44	0.49	1.42	1.42	0.69	0.66	0.38	0.38	0.60	0.45	1.37
6	0.70	0.44	0.49	1.73	1.27	0.55	0.60	0.38	0.38	0.60	0.45	1.37
7	0.62	0.44	0.49	1.73	1.27	0.55	0.45	0.38	0.38	0.52	0.45	1.24
8	0.62	0.43	0.42	1.42	1.13	0.55	0.38	0.38	0.45	0.52	0.45	1.11
9	0.62	0.43	0.42	1.13	1.13	0.55	0.38	0.38	0.45	0.52	0.45	1.11
10	0.62	0.43	0.42	0.89	1.00	0.55	0.73	0.38	0.38	0.52	0.45	1.11
11	0.62	0.42	0.42	0.79	1.00	0.45	0.55	0.33	0.38	0.52	0.45	1.11
12	0.62	0.42	0.42	0.70	0.89	0.45	0.45	0.33	0.38	0.52	0.45	0.86
13	0.62	0.42	0.42	0.70	0.79	0.45	0.45	0.33	0.38	0.52	0.45	0.75
14	0.55	0.42	0.42	0.79	0.89	0.45	0.38	0.33	0.38	0.52	0.45	0.75
15	0.52	0.41	0.42	0.79	0.89	0.45	0.38	0.33	0.38	0.52	0.45	0.75
16	0.44	0.41	0.42	0.79	0.79	0.45	0.38	0.38	0.38	0.52	0.45	0.75
17	0.43	0.42	0.42	0.79	0.78	0.45	0.45	0.45	0.38	0.45	0.45	0.75
18	0.42	0.43	0.49	0.79	0.79	0.45	0.38	0.38	0.38	0.45	0.45	0.66
19	0.42	0.44	0.49	0.89	0.79	0.38	0.38	0.38	0.38	0.45	0.45	0.66
20	0.42	0.45	0.33	1.42	0.70	0.38	0.38	0.55	0.45	0.45	0.45	0.65
21	0.43	0.46	0.31	1.89	0.62	0.38	0.38	0.45	0.55	0.45	0.45	0.66
22	0.43	0.42	0.31	2.04	0.62	0.38	0.38	0.45	0.76	0.45	0.45	0.66
23	0.43	0.38	0.29	2.89	0.62	0.38	0.38	0.59	5.49	0.45	0.45	0.66
24	0.43	0.38	0.28	3.10	0.62	0.38	0.38	0.45	5.82	0.45	0.45	0.66
25	0.43	0.40	0.31	3.53	0.62	0.38	0.38	0.45	1.55	0.52	0.82	0.58
26	0.44	0.42	0.91	3.74	0.62	0.66	0.38	0.38	1.11	0.52	0.54	0.52
27	0.44	0.44	0.31	3.53	0.62	0.86	0.38	0.98	0.92	0.45	1.42	0.49
28	0.44	0.46	0.31	2.89	0.69	0.55	0.38	0.38	0.82	0.45	1.67	0.49
29	0.44	0.48	0.31	2.55	1.25	0.38	0.38	0.38	0.67	0.45	1.11	0.48
30	0.44		0.29	2.55	0.78	0.38	0.38	0.38	0.67	0.45	1.02	0.48
31	0.44		0.30		0.66		0.38	0.38		0.45		0.47

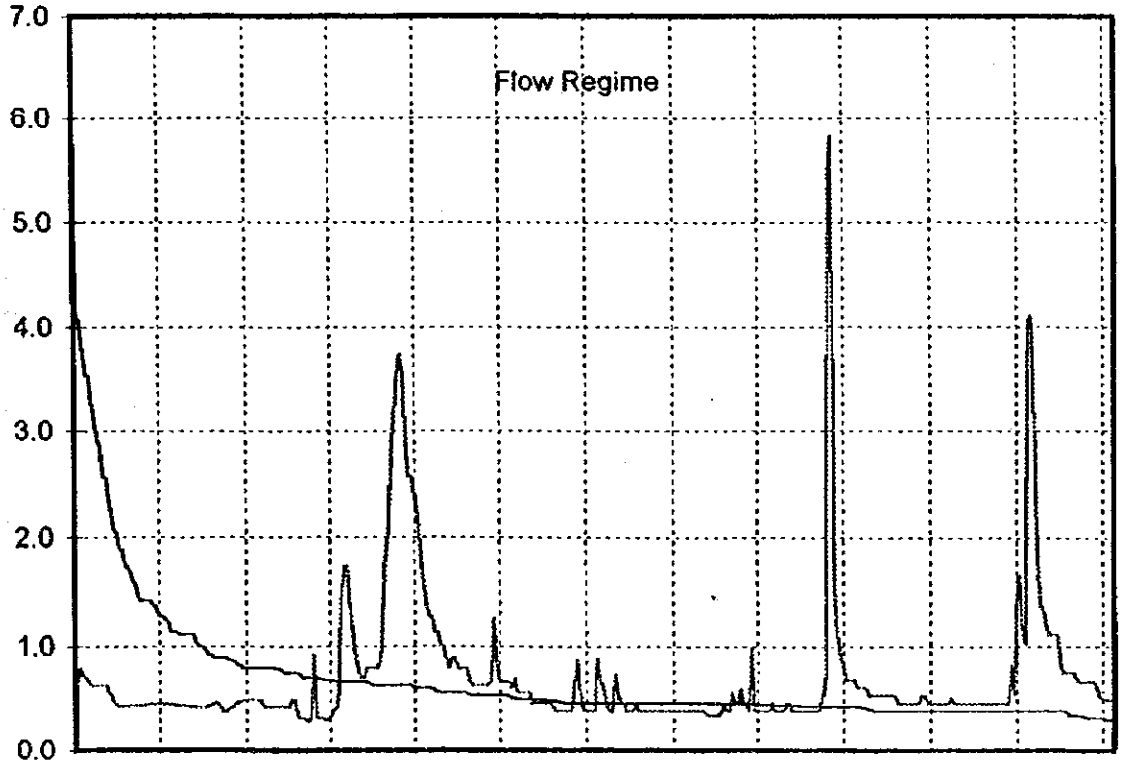


Table B.1.4 Daily Discharge and Hydrograph (5/11)

CIMPINA 1996

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	11.20	5.80	4.88	6.84	22.70	8.65	5.80	4.20	4.20	7.58	4.58	31.00
2	62.50	5.80	4.88	8.06	21.60	7.90	5.32	4.20	4.20	7.20	4.58	30.20
3	35.10	5.80	4.60	10.00	20.70	7.65	4.84	4.20	4.68	6.45	4.58	27.20
4	20.60	5.80	4.60	10.70	20.20	7.40	4.84	4.20	4.84	6.08	4.20	22.10
5	14.10	5.80	4.45	19.50	21.10	7.15	4.84	4.36	4.84	5.70	4.58	17.20
6	14.10	5.64	4.45	23.20	21.60	6.90	4.68	4.20	4.52	5.70	4.58	16.50
7	13.60	5.64	4.30	24.60	20.70	6.90	4.52	4.20	4.52	5.32	4.58	15.30
8	13.20	5.48	4.45	20.00	16.10	6.90	4.36	4.36	4.52	5.32	4.58	14.00
9	12.80	5.48	4.88	14.10	14.90	6.42	4.20	4.84	4.52	5.32	4.58	14.00
10	12.40	5.64	5.16	14.10	15.70	5.70	5.16	5.00	5.16	4.95	4.95	13.40
11	11.50	5.48	5.16	12.40	15.30	5.70	4.84	4.52	5.00	4.95	4.95	10.90
12	11.50	5.48	5.16	10.40	13.30	5.46	4.20	4.36	4.84	4.58	4.95	10.30
13	10.70	5.48	4.88	9.38	12.90	7.40	4.20	4.10	4.84	4.20	4.58	9.26
14	10.10	5.48	5.16	10.70	12.90	6.18	4.20	4.00	5.48	4.20	4.58	9.26
15	7.80	5.64	5.16	11.50	12.90	6.42	4.52	3.80	4.84	4.20	4.20	9.26
16	6.40	5.64	4.60	11.50	13.70	6.42	5.00	3.80	4.84	4.20	4.20	8.22
17	6.20	5.32	4.60	11.50	13.30	5.94	5.80	4.00	4.84	4.20	4.20	7.70
18	6.20	5.16	4.60	14.90	12.90	6.18	5.32	4.84	5.00	4.20	4.20	6.92
19	6.20	5.16	4.60	19.50	12.60	6.42	5.00	4.84	4.84	4.20	4.20	5.75
20	6.20	5.16	4.60	21.90	11.50	6.66	5.00	5.48	5.16	4.20	4.20	5.75
21	6.00	5.64	4.45	21.30	9.75	6.90	4.84	4.84	5.64	4.80	4.20	5.09
22	6.00	6.20	4.60	23.20	8.90	6.42	5.16	4.84	5.48	4.58	4.20	4.43
23	5.80	6.20	4.60	25.20	8.15	6.42	5.16	4.84	13.20	4.58	3.78	4.10
24	5.80	6.20	4.30	26.50	7.65	6.90	5.16	5.80	37.80	4.58	3.78	4.43
25	5.80	6.80	4.60	27.20	7.15	7.15	4.84	5.64	14.30	4.58	4.20	4.43
26	5.80	5.44	5.72	28.80	7.15	10.80	4.84	5.00	13.70	4.58	4.20	4.43
27	5.80	5.16	7.12	28.80	7.15	10.70	4.52	5.16	12.70	4.20	4.95	4.12
28	5.80	5.16	6.28	27.20	7.65	7.80	4.52	5.00	11.30	4.58	17.40	3.94
29	6.00	4.60	6.56	37.60	16.10	5.80	4.36	4.84	9.38	4.58	12.20	3.99
30	5.80		6.28	3.80	9.40	5.80	4.20	4.52	7.95	4.95	13.70	4.12
31	5.80		6.84		8.90		4.20	4.20		4.95		4.52

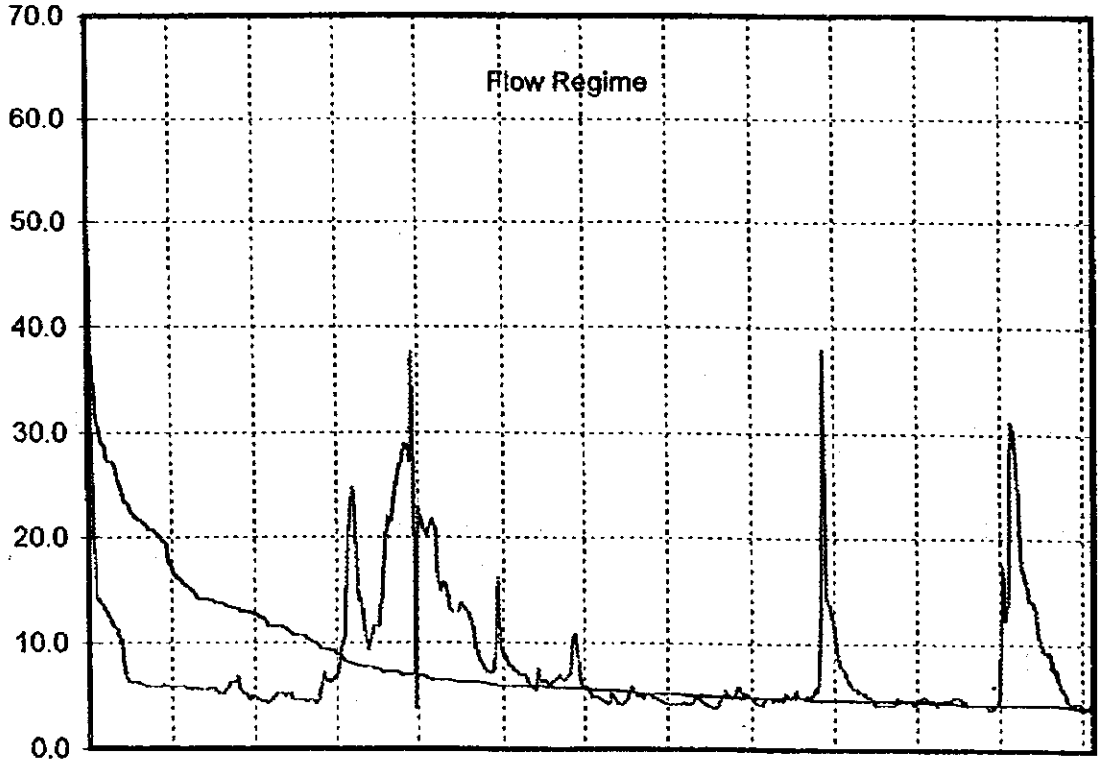


Table B.1.4 Daily Discharge and Hydrograph (6/11)

VARBILAU 1996

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.46	0.24	0.29	1.20	0.29	0.14	0.14	0.08	0.12	0.14	0.14	0.51
2	17.40	0.24	0.24	1.13	0.29	0.14	0.14	0.08	0.14	0.14	0.14	1.06
3	3.57	0.24	0.29	1.06	0.29	0.14	0.14	0.09	0.14	0.14	0.14	1.13
4	1.13	0.23	0.24	1.20	0.29	0.14	0.14	0.09	0.14	0.14	0.14	0.51
5	0.78	0.23	0.20	0.99	0.29	0.14	0.14	0.12	0.14	0.14	0.12	0.51
6	0.78	0.23	0.34	0.51	0.20	0.14	0.14	0.11	0.14	0.14	0.12	0.51
7	0.57	0.24	0.29	0.51	0.20	0.12	0.20	0.11	0.14	0.14	0.12	0.51
8	0.35	0.24	0.34	0.45	0.20	0.12	0.12	0.11	0.14	0.14	0.12	0.34
9	0.40	0.26	0.34	0.40	0.20	0.11	0.62	0.11	0.12	0.14	0.14	0.34
10	0.57	0.24	0.29	0.51	0.17	0.11	0.24	0.11	0.40	0.14	0.14	0.29
11	0.71	0.24	0.29	0.45	0.17	0.11	0.14	0.11	0.14	0.12	0.14	0.29
12	0.44	0.26	0.20	0.40	0.14	0.24	0.14	0.11	0.12	0.12	0.14	0.24
13	0.57	0.27	0.29	0.40	0.17	0.17	0.20	0.12	0.14	0.12	0.14	0.23
14	0.51	0.27	0.29	0.51	0.24	0.14	0.12	0.12	0.14	0.12	0.14	0.24
15	0.51	0.30	0.29	1.06	0.24	0.14	0.11	0.12	0.14	0.12	0.14	0.24
16	0.36	0.29	0.24	1.20	0.29	0.14	0.12	0.14	0.14	0.08	0.04	0.24
17	0.30	0.29	0.29	3.84	0.24	0.14	0.14	0.24	0.14	0.07	0.14	0.20
18	0.30	0.03	20.29	2.97	0.20	0.12	0.12	0.14	0.12	0.08	0.14	0.20
19	0.24	0.29	0.29	2.15	0.20	0.12	0.12	0.12	0.11	0.04	0.14	0.17
20	0.24	0.38	0.29	1.20	0.20	0.14	0.12	0.14	0.17	0.11	0.14	0.17
21	0.24	0.40	0.29	0.40	0.17	0.14	0.12	0.14	0.14	0.11	0.17	0.17
22	0.24	0.51	0.29	0.40	0.17	0.14	0.14	0.14	0.14	0.11	0.17	0.17
23	0.24	0.51	0.44	0.40	0.20	0.14	0.14	0.12	2.58	0.12	0.17	0.17
24	0.24	0.40	0.92	0.40	0.20	0.14	0.12	0.14	0.45	0.12	0.17	0.17
25	0.24	0.40	1.06	0.40	0.20	0.11	0.12	0.14	0.17	0.12	0.17	0.16
26	0.25	0.34	0.99	0.40	0.20	0.51	0.12	0.12	0.14	0.14	0.14	0.17
27	0.25	0.34	0.92	0.40	0.20	0.78	0.12	0.09	0.14	0.14	1.05	0.15
28	0.26	0.29	1.39	0.40	0.24	0.14	0.12	0.12	0.14	0.14	0.40	0.14
29	0.26	0.29	0.92	0.40	0.29	0.14	0.12	0.12	0.14	0.14	0.29	0.13
30	0.26		1.06	0.34	0.20	0.14	0.08	0.12	0.14	0.14	0.40	0.12
31	0.25		1.79		0.14		0.08	0.14		0.14		0.11

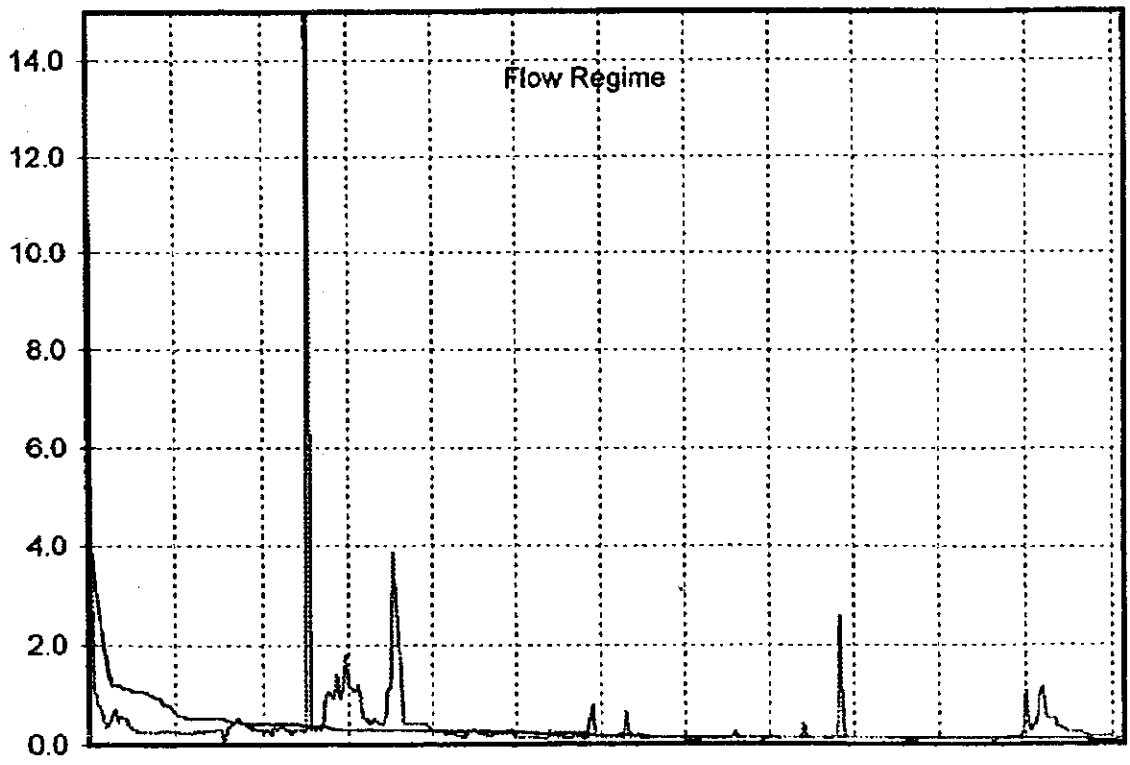


Table B.1.4 Daily Discharge and Hydrograph (7/11)

CIORANI 1996

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	5.70	0.96	1.34	6.02	0.88	0.88	0.46	0.22	0.27	0.60	0.66	1.88
2	46.40	0.70	1.34	3.75	0.88	0.73	0.39	0.22	0.27	0.54	0.66	6.98
3	19.60	0.72	1.10	1.98	0.80	0.58	0.46	0.27	0.72	0.60	0.66	5.98
4	2.95	0.71	0.86	2.61	0.80	0.46	0.36	0.22	0.78	0.54	0.66	2.27
5	3.75	0.70	1.04	2.10	0.73	0.39	0.46	0.22	0.89	0.66	0.66	1.63
6	2.44	0.73	0.80	1.34	0.73	0.50	0.46	0.89	0.66	0.60	0.66	1.50
7	1.18	0.61	0.75	2.27	0.65	0.58	0.43	0.43	0.54	0.54	0.66	1.38
8	0.86	0.54	0.75	2.27	0.65	0.50	0.46	0.32	0.54	0.54	0.66	1.25
9	0.80	0.59	0.70	2.27	0.65	0.39	0.39	0.32	0.54	0.54	0.66	1.13
10	0.80	0.48	0.70	1.62	0.58	0.32	0.43	0.32	0.54	0.60	0.66	1.13
11	1.74	0.43	0.60	1.34	0.73	0.32	0.73	0.22	0.54	0.66	0.66	1.01
12	1.74	0.44	0.65	1.04	0.58	0.39	0.58	0.22	0.54	0.60	0.66	0.96
13	1.50	0.48	0.70	0.98	0.50	0.58	0.58	0.22	0.54	0.54	0.66	0.89
14	1.34	0.60	0.70	1.34	0.65	0.48	0.43	0.22	0.66	0.54	0.66	0.89
15	1.18	0.68	0.80	1.98	1.15	0.73	0.50	0.22	0.66	0.54	0.66	0.89
16	0.92	0.80	0.75	6.70	1.00	0.73	0.58	0.22	0.49	0.54	0.66	0.89
17	0.60	0.97	0.92	5.45	1.51	0.46	0.58	0.27	0.38	0.54	0.66	0.84
18	0.50	1.09	0.75	9.55	1.33	0.39	0.58	2.34	0.43	0.54	0.66	0.78
19	0.48	1.26	0.80	7.20	0.88	0.67	0.50	1.01	0.54	0.66	0.66	0.78
20	0.52	1.93	0.92	1.91	0.58	0.46	0.43	0.78	0.49	0.66	0.72	0.78
21	0.67	2.33	1.04	1.91	0.58	0.46	0.46	0.78	0.60	0.66	0.78	0.78
22	0.60	2.22	1.04	1.69	0.58	0.43	0.46	0.66	0.72	0.78	0.84	0.78
23	0.65	6.19	1.04	1.69	0.58	0.43	0.58	0.66	0.78	0.89	0.78	0.89
24	0.62	4.20	1.04	1.51	0.58	0.32	0.46	0.54	0.89	0.72	0.78	0.83
25	0.84	3.35	1.18	1.51	0.46	0.24	0.39	0.66	1.13	0.66	0.89	0.76
26	0.67	1.98	1.92	1.33	0.39	0.32	0.39	0.78	0.78	0.66	1.07	0.77
27	0.84	2.27	3.17	1.15	0.39	4.74	0.39	0.60	0.84	0.66	1.01	0.64
28	1.10	2.10	4.82	1.15	0.58	0.88	0.32	0.54	0.89	0.66	2.74	0.54
29	1.10	1.18	6.28	1.15	0.88	2.13	0.39	0.54	0.72	0.66	1.88	0.44
30	1.10		6.45	1.00	2.65	0.43	0.32	0.43	0.66	0.66	1.63	0.36
31	0.93		3.95		0.73		0.32	0.32		0.66		0.41

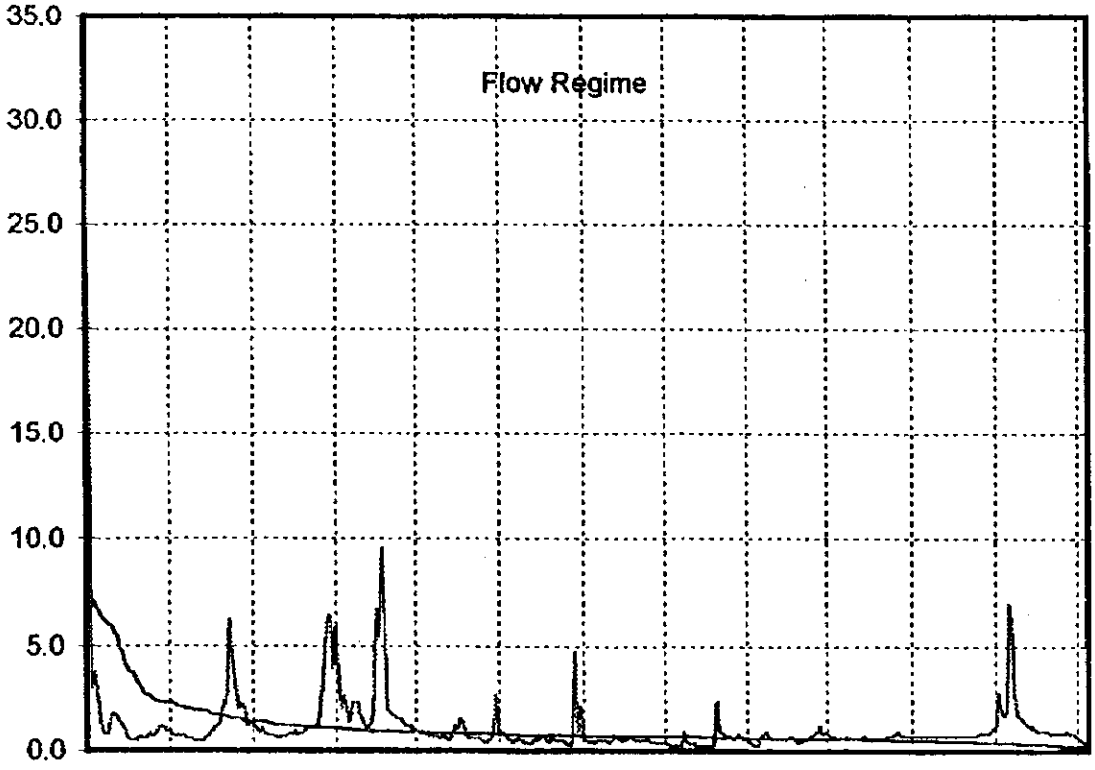


Table B.1.4 Daily Discharge and Hydrograph (8/11)

GURA VITIOAREI 1996

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	5.70	2.80	2.46	2.95	13.50	6.40	1.32	1.32	1.18	1.11	0.83	33.60
2	37.00	4.74	2.38	2.46	13.50	5.26	1.18	1.32	1.32	1.11	0.83	52.80
3	26.30	4.06	2.38	2.80	13.50	3.12	1.18	1.46	1.46	1.44	0.70	44.10
4	16.60	3.62	2.38	2.80	11.00	2.24	1.04	1.76	1.60	4.04	0.70	21.60
5	14.80	3.25	2.65	3.62	12.20	2.08	1.04	1.46	1.04	1.11	0.70	14.70
6	13.50	2.95	2.95	6.40	14.20	2.08	0.90	1.18	1.04	1.11	0.70	11.80
7	8.80	3.10	2.55	24.60	13.50	1.92	1.04	1.04	1.32	0.96	0.70	10.20
8	8.32	3.25	2.55	13.50	12.90	1.76	2.08	1.04	1.32	2.16	1.11	5.82
9	7.84	3.10	2.80	6.02	10.50	1.18	1.18	0.90	1.18	1.44	1.80	5.54
10	8.80	2.65	2.95	3.62	11.00	1.18	2.08	0.90	1.46	1.11	0.58	4.70
11	12.20	2.95	2.65	3.25	8.80	1.04	5.26	1.04	1.60	1.81	0.44	4.48
12	9.36	3.10	2.80	2.65	8.80	1.04	4.50	0.90	1.76	4.70	0.44	4.04
13	8.80	3.25	2.95	3.10	6.88	1.18	1.46	0.90	1.76	2.52	0.50	3.60
14	7.84	3.62	2.95	3.25	5.64	4.50	1.18	1.04	1.60	0.96	0.58	3.60
15	3.62	3.25	2.95	3.84	5.26	7.84	0.90	0.90	1.60	0.83	0.58	3.60
16	3.25	3.25	2.95	3.62	9.27	2.58	1.04	0.90	1.46	0.83	0.58	4.04
17	3.25	2.95	2.80	4.06	7.84	1.92	1.18	1.60	1.32	0.83	0.58	4.04
18	2.80	2.65	3.25	4.88	8.80	1.60	1.04	1.46	1.46	0.70	0.58	3.60
19	2.65	2.95	2.65	6.88	8.32	1.46	0.90	1.18	1.60	0.83	0.58	3.24
20	2.65	2.46	2.55	9.92	6.02	1.46	0.90	1.18	1.76	2.16	0.58	2.88
21	2.95	2.30	2.46	9.92	4.50	1.32	2.93	1.18	2.08	0.83	0.70	2.88
22	3.10	2.46	2.46	27.10	4.06	1.32	1.60	1.18	2.08	0.96	0.70	2.88
23	3.25	2.38	2.46	22.20	3.84	1.46	1.76	0.90	5.64	0.83	0.58	2.52
24	3.25	2.46	2.46	25.20	3.25	1.46	1.46	1.76	42.60	0.83	0.58	2.70
25	3.10	2.46	2.55	23.10	3.25	1.18	1.32	1.46	11.80	0.83	0.83	4.48
26	2.95	2.46	2.46	29.80	2.95	4.88	1.18	1.32	11.80	0.83	0.83	3.42
27	2.95	2.46	2.46	27.50	2.30	19.40	1.18	2.08	23.30	0.70	2.88	3.24
28	3.40	2.46	3.25	22.20	2.46	6.72	1.32	1.76	10.60	0.70	13.20	3.06
29	3.25	2.46	3.10	20.30	13.30	5.26	1.60	1.46	10.20	0.70	11.80	4.98
30	3.25		2.95	13.50	7.36	2.24	1.32	1.18	5.82	0.83	10.60	8.35
31	3.10		2.95		6.88		1.32	1.18		0.83		8.35

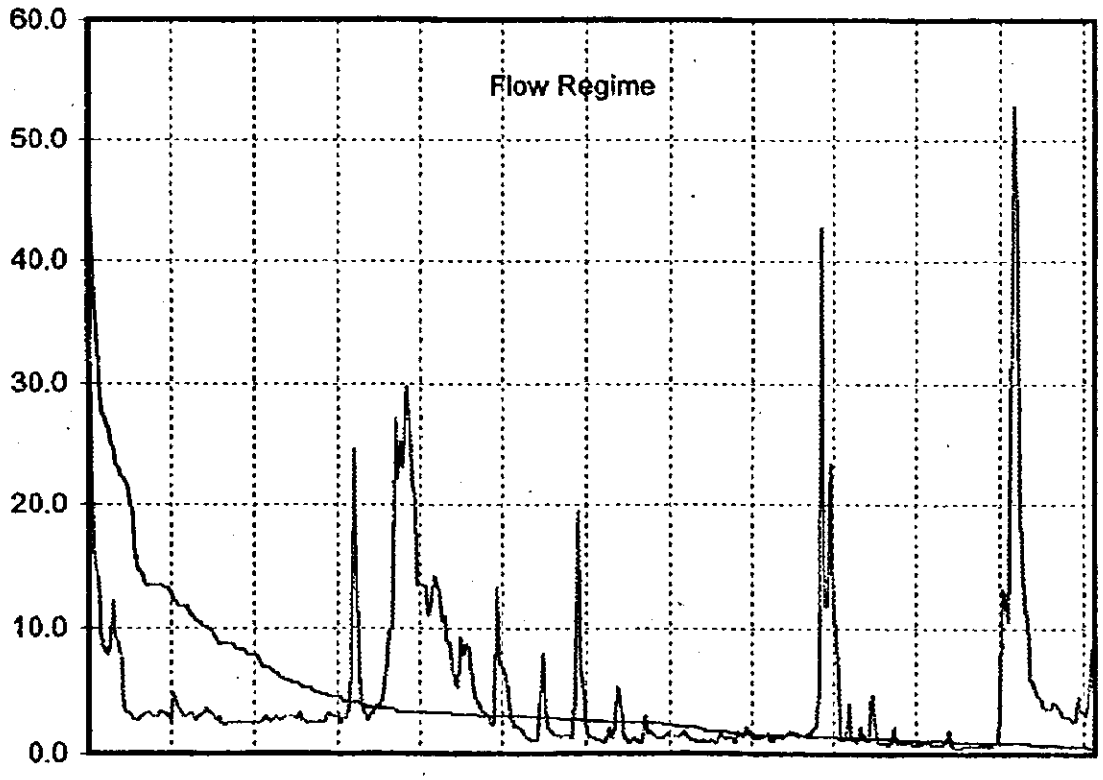


Table B.1.4 Daily Discharge and Hydrograph (9/11)

MOARA DOMNEASCA1996

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	14.90	7.66	8.24	15.20	19.00	12.00	7.66	5.12	5.40	5.95	5.40	10.30
2	111.00	7.66	8.24	14.00	19.60	10.60	7.08	5.40	5.95	5.95	5.40	55.20
3	84.30	8.24	8.53	14.30	19.80	10.60	6.50	4.91	6.50	5.40	5.40	80.60
4	36.80	8.24	7.66	14.00	19.30	9.98	6.50	4.91	6.50	5.40	5.12	42.00
5	23.70	8.82	7.66	13.50	17.80	7.95	5.95	5.40	6.50	5.40	4.91	22.80
6	20.10	8.82	8.24	16.60	16.60	7.37	6.22	5.40	5.68	5.40	5.12	18.70
7	16.40	8.24	8.24	18.70	14.60	6.79	6.50	4.91	5.68	5.40	5.68	17.50
8	12.30	7.66	7.95	21.60	12.60	7.08	7.66	5.40	5.12	5.12	5.95	15.80
9	12.60	7.66	7.66	14.30	12.90	6.50	6.79	5.95	4.91	4.91	6.50	14.30
10	12.90	6.79	8.53	13.20	13.20	6.50	8.82	5.40	5.12	5.12	8.82	10.60
11	15.80	6.50	8.53	12.90	12.90	5.95	8.53	4.91	5.68	5.12	5.95	9.40
12	15.50	7.08	8.24	12.30	12.00	6.22	7.66	5.12	4.91	4.91	5.95	9.40
13	16.10	7.66	7.95	11.70	11.10	6.50	7.66	4.94	5.12	5.40	5.95	9.69
14	13.50	7.95	8.24	12.30	11.70	10.60	7.08	4.94	4.91	5.12	5.95	9.98
15	12.60	7.95	8.24	15.20	12.00	14.30	5.95	4.94	4.91	5.12	5.95	11.40
16	11.40	8.24	8.24	22.20	12.90	14.00	5.68	4.94	4.71	5.12	5.95	10.80
17	9.40	8.24	7.66	21.60	12.90	10.60	9.40	5.95	4.91	5.12	5.95	10.60
18	8.53	8.53	8.24	24.90	12.30	6.79	7.95	7.08	5.12	4.91	5.95	10.60
19	9.11	8.24	7.66	34.50	12.00	5.40	7.66	6.50	4.91	5.95	5.95	10.60
20	9.40	7.95	8.53	26.40	11.10	5.40	8.53	6.79	5.40	5.40	7.08	9.98
21	9.11	8.53	8.82	23.40	10.30	4.91	7.08	6.22	6.50	5.40	7.08	7.37
22	9.40	9.40	8.82	22.50	9.69	6.22	6.79	5.95	7.95	7.66	6.50	8.82
23	8.82	9.40	8.24	22.50	8.82	7.66	6.22	5.12	7.08	6.50	7.66	8.82
24	7.95	9.40	9.98	20.40	7.95	8.24	5.95	5.68	33.20	5.95	8.24	8.82
25	7.66	9.69	10.60	31.20	7.37	8.24	5.95	5.95	23.40	5.68	8.24	8.82
26	7.66	9.69	14.00	29.10	7.08	10.80	5.95	5.68	9.40	5.95	7.66	8.82
27	7.95	8.82	13.80	29.40	7.66	20.90	5.95	6.79	10.80	5.95	9.98	9.11
28	7.66	8.24	15.20	29.40	8.24	14.60	5.40	5.95	12.60	5.95	25.10	8.82
29	7.37	8.24	15.20	28.20	26.10	9.98	5.40	5.95	8.24	5.68	17.80	8.82
30	8.24		15.80	24.30	15.80	8.53	5.40	5.95	5.95	5.95	13.80	8.24
31	7.95		15.80		11.70		4.91	5.68		5.40		7.66

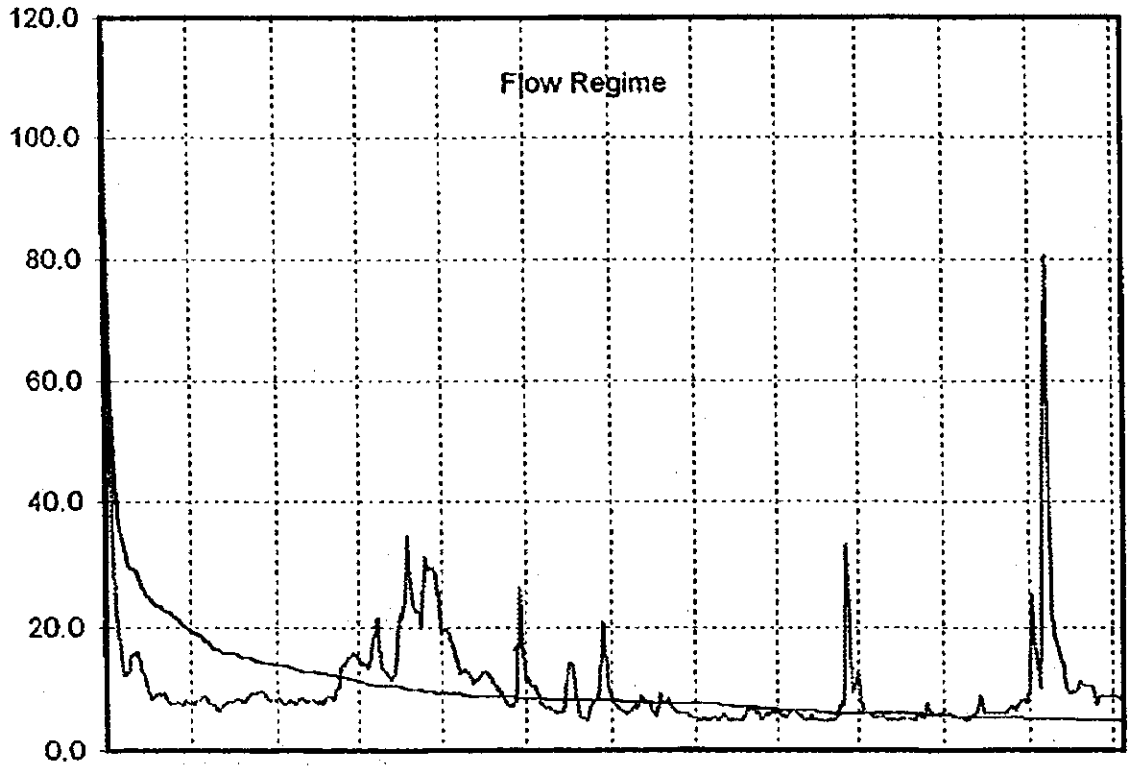


Table B.1.4 Daily Discharge and Hydrograph (10/11)

PRAHOVA 1996

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	28.80	5.88	6.96	12.10	45.50	12.00	4.80	3.92	5.26	8.16	6.17	25.00
2	104.00	6.42	6.69	15.80	75.80	12.00	4.64	3.84	5.52	7.89	6.17	43.60
3	79.70	6.42	6.42	14.60	66.20	10.90	4.48	3.52	5.65	6.56	5.91	82.60
4	51.10	6.96	6.42	19.80	28.30	7.85	4.16	3.40	6.30	6.30	6.04	49.20
5	37.20	7.50	6.42	25.70	21.30	6.75	6.69	7.02	6.04	5.91	5.78	25.70
6	34.50	7.23	6.42	31.00	24.20	8.12	8.42	5.16	5.52	5.78	5.65	18.30
7	25.70	6.96	6.42	22.70	31.00	6.20	5.88	4.72	5.26	6.30	5.78	20.50
8	21.30	6.96	6.42	18.30	31.00	6.75	6.69	5.16	5.65	6.04	5.65	11.60
9	18.30	6.69	6.42	17.10	30.10	6.20	5.88	4.36	5.78	5.91	5.78	12.80
10	29.20	6.42	6.42	14.60	27.50	6.20	5.88	4.54	6.04	5.78	6.04	13.40
11	25.70	6.42	6.15	13.30	27.50	5.94	8.42	4.72	6.17	5.78	5.91	11.30
12	17.10	5.88	6.42	13.30	24.20	5.68	6.96	4.18	5.91	5.91	5.65	9.34
13	17.10	6.42	6.69	11.60	22.00	5.94	6.15	4.00	5.52	5.65	5.78	8.42
14	15.80	6.69	6.96	12.10	21.30	16.10	5.34	3.76	5.78	5.52	5.65	8.42
15	14.60	7.23	6.69	22.70	28.30	14.60	4.80	3.44	6.04	5.52	5.52	7.89
16	13.30	7.23	7.23	33.60	25.00	7.96	4.32	3.64	6.04	5.52	5.78	6.83
17	12.10	6.96	6.96	25.70	19.00	5.07	10.70	4.00	5.91	5.52	5.78	6.04
18	10.70	6.96	6.96	27.50	15.00	5.07	6.42	4.72	5.78	5.78	5.52	6.17
19	12.10	7.23	7.50	31.00	11.30	4.48	4.80	4.72	5.78	5.52	5.52	6.30
20	13.30	6.69	7.50	36.30	10.50	4.64	4.48	4.00	5.52	5.78	5.65	6.30
21	12.70	6.96	7.50	43.60	8.95	6.42	4.32	4.36	6.04	5.78	5.65	6.30
22	12.10	9.34	7.50	44.50	8.12	5.34	4.48	5.16	6.04	6.17	5.65	6.30
23	11.20	9.80	7.50	43.60	7.85	4.48	4.32	5.68	14.90	5.78	5.91	5.91
24	10.30	12.10	8.42	49.20	7.85	5.07	4.00	7.30	54.90	5.78	5.65	6.04
25	11.60	9.34	8.42	50.20	6.20	4.80	3.76	5.68	21.30	6.04	6.30	5.78
26	11.20	7.50	9.34	76.80	7.58	11.20	3.76	7.30	11.60	6.17	8.68	6.04
27	13.30	6.96	8.88	79.70	7.02	21.30	4.16	6.04	9.72	5.91	7.36	5.65
28	10.70	6.96	10.30	77.80	6.75	12.10	3.76	6.17	8.68	6.30	26.60	5.65
29	8.42	7.50	11.20	80.60	18.30	8.42	3.76	5.65	8.42	5.91	10.90	6.83
30	6.96		11.20	51.10	13.40	5.88	3.84	5.00	7.89	6.17	8.95	7.36
31	6.42		10.30		12.00		3.92	5.78		6.30		5.78

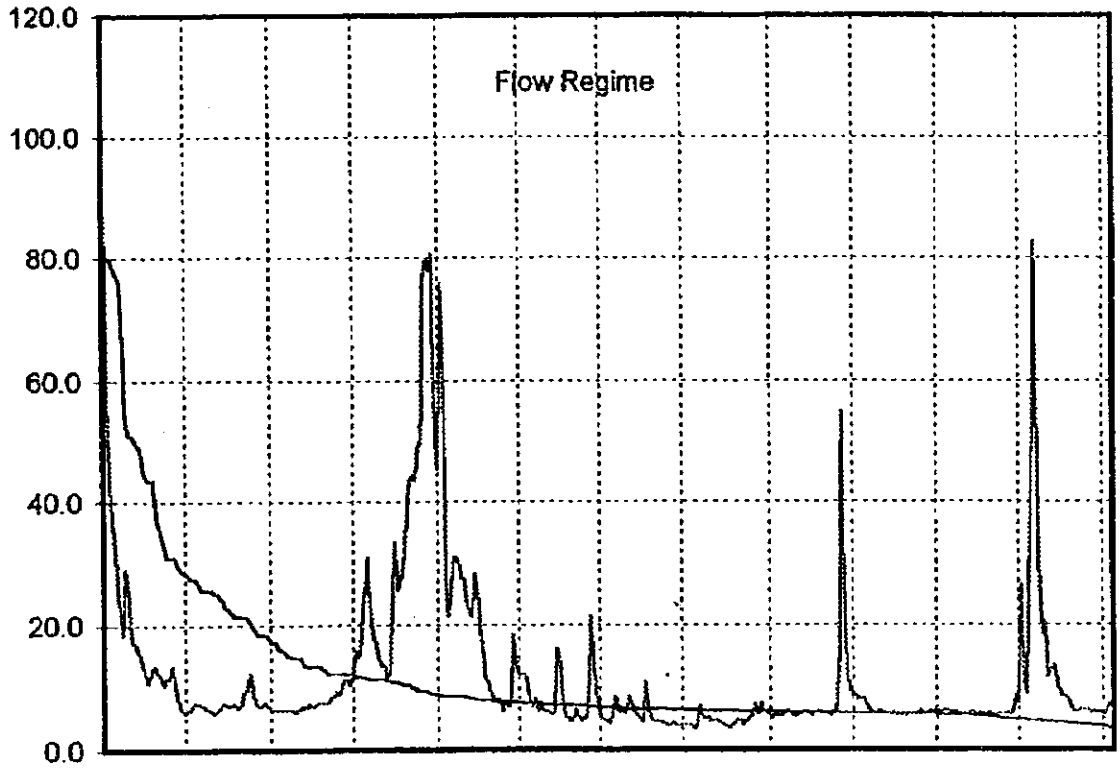


Table B.1.4 Daily Discharge and Hydrograph (11/11)

TESILA 1996

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	6.39	2.88	2.60	3.44	15.00	4.88	2.48	2.08	1.53	3.20	1.86	21.10
2	15.60	2.88	2.60	4.56	12.70	4.46	2.48	2.08	1.97	3.02	1.86	17.50
3	10.40	2.26	2.60	4.56	10.90	3.62	2.84	1.86	1.97	2.66	1.64	21.80
4	7.38	2.60	2.88	8.37	8.04	3.62	6.59	1.86	1.64	2.48	1.64	12.70
5	6.06	2.60	2.60	14.50	10.90	2.66	4.04	2.08	1.75	2.30	1.53	9.60
6	5.40	2.26	2.26	14.00	11.50	2.30	3.02	1.97	1.86	2.30	1.42	8.31
7	5.73	2.60	2.60	12.50	10.90	2.19	2.84	2.08	1.86	2.30	1.42	7.02
8	5.73	2.60	2.60	10.80	9.20	2.08	2.66	1.97	2.08	2.08	1.20	5.30
9	4.84	2.43	2.43	8.61	8.62	2.08	2.30	2.08	2.19	1.97	1.42	4.04
10	4.28	2.60	2.26	7.78	8.62	2.48	3.02	2.08	2.48	1.75	1.53	3.62
11	4.28	2.60	3.16	7.00	8.04	3.02	3.02	1.86	1.97	1.64	1.86	3.20
12	3.72	2.60	2.60	6.74	7.46	3.02	2.19	2.08	1.64	1.97	1.86	3.02
13	3.44	2.88	2.60	7.26	6.88	7.45	1.97	1.86	1.75	1.86	1.86	3.02
14	3.16	2.88	2.60	8.61	8.04	7.02	1.97	1.53	1.75	1.86	1.86	2.84
15	3.16	2.60	2.60	7.52	6.30	3.02	2.30	1.31	1.97	1.75	1.75	3.02
16	2.88	2.43	2.60	7.78	3.51	3.20	2.66	1.64	2.84	1.86	1.97	2.66
17	2.60	2.43	2.26	8.61	3.78	3.02	2.30	2.19	2.30	1.75	1.86	3.02
18	2.43	2.43	1.58	8.92	4.95	3.02	2.08	2.48	2.08	1.86	1.75	4.88
19	2.60	2.60	1.58	10.20	7.46	2.84	2.66	1.97	1.86	1.97	1.75	4.46
20	2.60	1.92	1.58	13.60	6.30	3.02	2.19	2.19	1.75	2.08	1.75	4.46
21	2.60	1.92	2.71	14.70	5.85	2.84	2.30	1.97	1.86	1.97	1.75	4.04
22	2.60	1.75	2.09	15.10	4.50	2.66	2.30	2.19	1.97	1.97	1.64	3.62
23	2.09	2.60	2.26	16.80	4.50	2.48	2.19	2.19	12.40	1.86	1.86	3.20
24	2.60	2.60	2.26	17.60	4.95	2.66	2.30	2.66	15.40	1.86	1.64	2.84
25	2.60	2.60	2.26	17.60	4.50	2.66	2.08	2.19	3.20	1.86	2.48	2.66
26	2.88	2.88	2.26	22.60	3.78	4.88	2.30	2.08	3.20	1.86	2.19	2.30
27	2.60	3.44	1.92	22.70	3.78	7.02	2.48	2.48	4.04	1.86	6.93	1.85
28	2.88	2.26	2.43	22.10	6.91	3.62	2.19	1.86	3.20	1.86	8.31	1.55
29	2.60	2.26	2.60	18.60	19.20	2.66	2.19	1.97	3.02	1.86	4.04	2.00
30	2.60		2.26	16.20	7.02	2.48	2.48	1.64	3.02	1.86	5.30	2.48
31	2.60		2.88		5.73		1.97	1.64		1.97		2.48