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HYDROLOGICAL REGIME OF THE PRUT RIVER ON THE ROMANIAN TERRITORY

Gheorghe Romanescu[1]

Abstract. The Prut River is the second Danube tributary in terms of length and the second most important river in the region of Moldavia (Romania). It represents the State border between Ukraine, Romania, and the Republic of Moldova. The Stânca-Costești reservoir plays a very important role in the mitigation of downstream discharges. At the Gauging Station of Oroftiana, (at the Prut entry on the Romanian territory) a 70 m^3/s mean multiannual discharge is recorded, while at the Gauging Station of Oancea, (where it discharges into the Danube) the mean multiannual discharge is 95 m^3/s. The ratio of the mean multiannual discharge between the stations of Oroftiana and Oancea is relatively low. Therefore, tributaries on the territory of Romania and the Republic of Moldova hold low discharges (25-30 m^3/s). The maximum mean multiannual discharge was recorded at the Gauging Station of Prisăcani (106 m^3/s). Lower downstream values are due to water losses recorded in the wide Prut floodplain and to the use of a portion of this water for irrigations. The year with the lowest mean multiannual discharges is 1987, while the one with the maximum mean multiannual discharges is 2010. The ratio between minimum and maximum mean annual discharges is relatively low. This study underlines the rapport between minimum and maximum mean annual discharges and the ratio between mean multiannual discharges for each gauging station on the Prut River.

Keywords: gauging stations, mean multiannual discharges, hydrotechnical constructions, reservoir

1. Introduction

Through different actions, (such as hydrotechnical and agro-technical works) the human factor can alter river flow. Through hydrotechnical constructions and installations, man consumes large amounts of river waters, and this consumption has a substantial influence on their regime during droughty periods. The construction of reservoir contributes to the alteration of runoff regime, to flood mitigation, etc. Through evaporation at the level of reservoirs, man-made constructions contribute to the elimination of an important percentage of mean annual runoff. National water management can lead to the preservation of a balance between water demand and the natural hydrological regime. Unfortunately, these measures contribute to a decrease in the surface runoff in the catchment basins in the plain and hill areas. For this reason, underground runoff is intensified, considering that it increases infiltration.

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Mean multiannual discharges of the most important hydrographical arteries have been studied thoroughly in the scientific literature: Čech and Čech, 2013; Corduneanu and Bucur, 2013; Corduneanu et al., 2014; Furtună, 2012; Gavrilovic et al. 2012; Ion and Ion, 2008; Ionuş et al., 2015; Iosub and Lesenciuc, 2012; Iosub et al., 2014; Mierlă et al., 2014; Porcuțan, 2014; Reti et al., 2014; Revuelto et al., 2014; Romanescu and Romanescu, 2011; Romanescu, 2008, 2013; Romanescu et al., 2008, 2010, 2011a,b, 2012a,b,c, 2013a,b, 2014; Romanescu and, Nistor, 2011; Romanescu and Stoleriu, 2013; Salit et al., 2013; Tirnovan et al., 2014; Tutunaru et al., 2013; Yang et al., 2014; Li et al., 2015 etc. Most studies focus on the analysis of water resources within the most populated and most agriculturally used areas populate (agriculture involves the consumption of considerable amounts of water) (Romanescu, 2009; Romanescu et al., 2005). Prut represents the second most important hydrographical artery in Moldavia in terms of hydrology; it is also a border river, equally divided between Romania and the Republic of Moldova. This paper underscores the water resource available for the Romanian side and the temporal fluctuations of annual and multiannual discharges.

2. Study area

The Prut River rises in the north-eastern slope of the Cernahora Mountain (Carpathian Mountains in Ukraine), 1580 m high. It empties into the Danube at an altitude of 2 m, near the locality of Galați. The catchment basin of Prut unfolds throughout three States: Ukraine, Romania and the Republic of Moldova. As far as Oroftiana, on the territory of Ukraine (entry to Romania) it has a length of 211 km, a longitudinal slope of 6.4%, a sinuosity of 1.18 and a catchment basin of 8241 km^2. It measures a total of 952.9 km and it is the second longest tributary of the Danube, in length. It represents the border between Ukraine and Romania for 31 km and between Romania and the Republic of Moldova for 711 km. It is the last important tributary of the Danube before the latter discharges into the Black Sea (Figure 1).

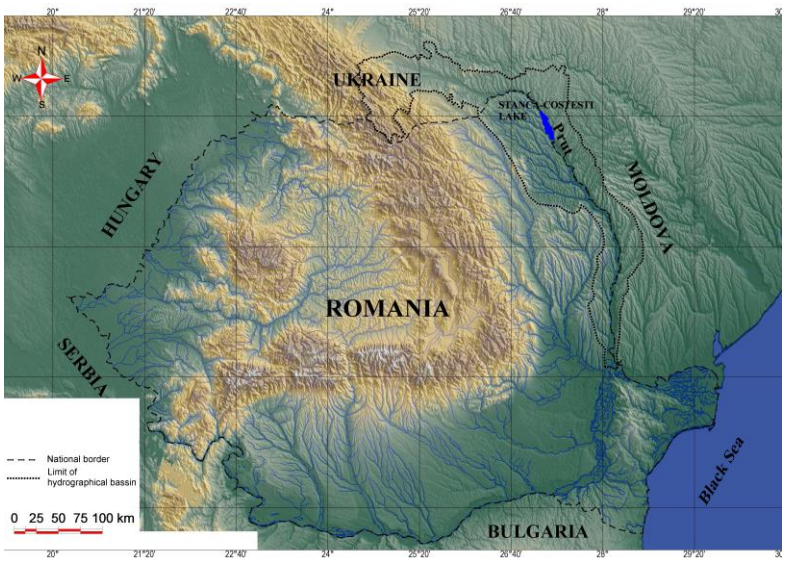

Figure 1: Geographic location of the catchment basin Prut in the countries it crosses and of the Stânca-Costeşti reservoir

The mean altitude of the catchment basin ranges between 130 m in the central area and 2 m at the confluence. Its average slope is around 0.2%. It benefits from 248 tributaries, its

shape is elongated and its average width is 30 km. The hydrographical network measures 11000 km, of which 3000 km are permanent (33%) and 8000 km have intermittent flow (67%). The network has a density of 0.41 km/km^2, higher than the Romanian average (0.33 km/km^2). The main tributaries on the right are as follows (27): Poiana, Cornești, Isnovăț, Rădăuți, Volovăț, Baseu, Jijia (10 m^3/s, the most important one), Moșna, Elan, Oancea, Brăneşti, and Chineja. On the left side, there are 32 tributaries, among which Telenaia, Larga, Vilia, Lopatnic, Racoveţul, Ciugurlui, Kamenka, Gârla Mare, Frasinul, and Mirnova.

Ponds are numerous (225) and they date since the reign of Stephen the Great (15th-16th centuries). There are 26 large reservoirs, among which the most important one is Stânca-Costeşti (maximum volume 1400 million m^3, also the largest reservoir constructed on the Romanian rivers). The landform belongs to the Carpathian unit (the spring area), to the Moldavian Plateau (for the most part), and to the Romanian Plain (at the mouth). The catchment basin of Prut benefits from 54.7% of arable land. Forests occupy around 21.4% of the surface. Perennial cultures take 13.3% of the surface, while the water surface area extends on only 1.19%. Mean multiannual temperature in the catchment basin of Prut is 9^{0}C, while the mean of multiannual precipitations reaches 550 mm. The mean multiannual discharge increases from upstream toward downstream: 82 m^3/s at Rădăuți Prut, 86.7 m^3/s at Ungheni, and 93.8 m^3/s (the period 1950-2008) at the Gauging Station of Oancea (situated at the mouth).

3. Methodology

Hydrological data were provided by the Prut-Bârlad Water Basin Administration, Iași. They include the observations corresponding to the period 1950-2011 (61 years), when the latest data were validated. On the Prut River, (the Romanian territory) there are nine gauging stations (Figure 2): Oroftiana (at the entry point in the country), Rădăuți Prut, Stânca Downstream, Ungheni, Prisăcani, Drănceni, Fălciu, Oancea, etc.

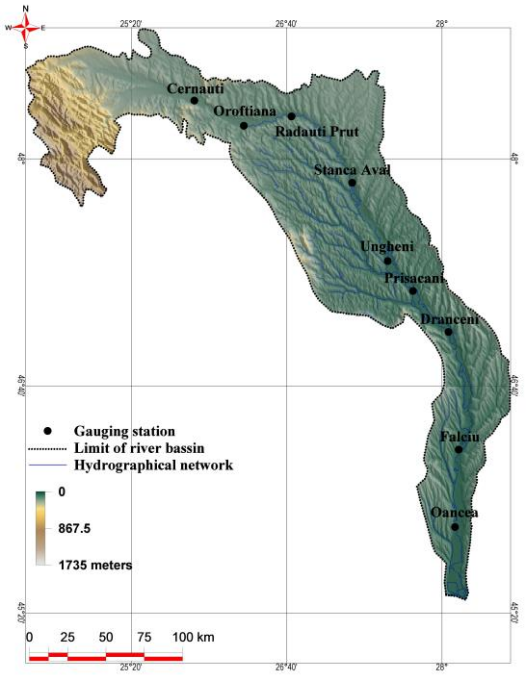

Figure 2: Distribution of gauging stations in the Prut basin

The first gauging station was set at Ungheni, in the year 1915. The latest station is the one of Șivița, inaugurated in 1978 (Table 1). Hydrological data regarding levels and discharges are much older, from stations located in other areas. The Gauging Station of Șivița, situated at the discharge into the Danube, is strongly influenced by the river waters and it cannot be representative.

Table 1: Morphometric data for the gauging stations in the catchment basin of Prut (Romania)

River	Gauging station	Hydrological station	County	Inauguration year	Geographic coordinates		River length from the confluence	Data on the reception basin		"0 mira" level
					Lat.	Long.	km	Surface Km^2	Alt. m	mrMN
Prut	Oroftiana	Botoșani	BT	1976	48 11 12	26 21 04	714	8020	579	123.47
	Radauți Prut			1976	48 14 55	26 48 14	652	9074	529	101.87
	Stanca-aval			1978	47 47 00	27 16 00	554	12000	480	62.00
	Ungheni	Iași	IS	1914	47 11 04	27 48 28	387	15620	361	31.41
	Prisacani			1976	47 05 19	27 53 38	357	21300	374	28.08
	Drănceni	Vaslui	VS	1915	46 48 45	28 08 04	284	22367	310	18.65
	Falciu			1927	46 18 52	28 09 13	212	25095	290	10.04
	Oancea	Galați	GL	1928	45 53 37	28 03 04	88	26874	279	6.30
	Șivița			1978	45 37 10	28 05 23	30	27268	275	1.66

4. Results and Discussions

For a detailed hydrological analysis, it is necessary to study data regarding mean annual and multiannual monthly discharges, annual means, maximum monthly means, minimum monthly means, maximum annual means, minimum annual means, and multiannuals means for all the gauging stations. The multiannual mean of the Prut River at the Gauging Station of Oroftiana is 70 m^3/s (the period 1950-1990). The month with the lowest mean multiannual monthly discharge is January (it coincides with the period of freeze), with the value 28.7 m^3/s, while the highest value is recorded in the month of April (the period of spring rains) – 125.2 m^3/s. The lowest mean annual discharge was 26.2 m^3/s (1990), while the highest – 129 m^3/s (1955) (Table 2).

Table 2: Mean monthly and annual discharges of the Prut River at the Gauging Station of Oroftiana (1950-1990) (m^3/s)

Year/ month	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Annual mean
1950	38.4	114	69.4	86.7	50.1	25.5	29.0	20.4	15.1	22.9	46.5	43.1	46.8
1951	30.3	26.5	68.4	133	118	120	63.7	86.7	45.3	50.8	26.2	21.7	65.8
1952	23.7	33.2	40.2	199	106	62.4	34.5	24.7	19.0	20.2	31.1	45.8	53.3
1953	38.7	37.7	130	135	115	82.1	58.3	28.0	33.0	29.2	18.4	25.9	60.9
1954	12.0	14.4	62.1	65.8	122	70.0	52.6	49.1	26.6	29.9	18.0	23.5	45.5
1955	52.5	60.9	78.8	126	157	130	244	402	127	70.6	55.4	43.4	**129**
1956	39.7	20.8	60.1	164	134	56.3	35.6	27.6	39.3	24.8	23.8	29.9	54.7
1957	21.9	62.1	72.9	72.6	133	107	38.2	26.3	23.9	28.0	25.8	20.8	52.7
1958	23.9	76.8	56.7	120	133	48.7	37.6	25.5	120	34.3	28.5	27.9	61.1

1959	29.1	34.0	50.9	45.8	47.0	164	55.6	113	37.0	27.0	30.4	29.3	55.3
1960	31.8	54.2	62.1	55.5	82.7	89.9	87.7	45.6	25.3	27.2	55.2	57.8	56.3
1961	29.5	39.0	42.6	62.8	100	64.6	22.5	18.7	12.0	11.0	11.2	10.6	35.4
1962	5.60	5.00	30.1	268	92.8	88.0	113	44.8	22.6	17.3	20.2	8.40	59.6
1963	6.20	15.2	44.6	184	61.4	36.1	22.3	21.7	10.9	14.0	17.0	11.4	37.0
1964	11.1	8.40	17.3	150	76.1	29.0	96.1	54.0	72.5	82.4	50.5	50.6	58.2
1965	16.5	18.5	90.8	87.0	250	147	107	56.4	28.3	19.6	22.5	49.5	74.4
1966	32.3	111	96.1	142	64.3	63.2	64.0	60.6	47.5	24.7	36.8	30.4	64.4
1967	10.1	27.3	125	140	110	121	71.6	30.7	16.8	14.3	11.7	8.40	57.2
1968	16.8	27.8	82.6	103	60.2	25.3	30.3	66.5	65.7	69.1	37.0	15.1	50.0
1969	13.0	16.0	67.0	234	74.5	199	281	66.5	37.6	27.0	22.4	33.0	89.3
1970	34.5	39.6	122	164	323	227	97.0	50.9	38.7	36.7	25.7	21.1	98.4
1971	32.8	46.3	67.4	73.2	118	60.9	181	55.2	76.6	50.9	46.3	56.0	72.1
1972	29.5	33.6	86.7	86.7	77.9	40.4	70.8	92.6	89.0	80.8	67.6	44.6	66.7
1973	11.7	38.3	125	142	143	210	130	75.8	44.7	396	36.8	14.2	114
1974	20.2	25.3	16.9	27.1	56.4	104	263	107	52.2	97.0	117	51.8	78.2
1975	59.5	38.4	77.3	134	118	272	164	123	72.9	59.9	43.7	38.5	100
1976	32.8	20.7	64.0	132	89.0	121	51.4	95.2	107	130	65.4	59.4	80.7
1977	44.8	98.9	82.8	194	185	117	128	55.1	62.6	45.3	38.8	29.7	90.2
1978	18.2	27.7	151	124	244	133	254	62.7	184	81.7	38.1	84.6	117
1979	53.4	85.0	167	224	111	71.8	85.0	233	51.8	38.7	37.8	38.8	100
1980	29.5	35.0	39.0	312	195	259	144	151	72.5	63.1	95.5	92.4	124
1981	52.2	85.4	143	98.6	216	91.4	213	79.9	63.6	67.1	108	89.7	109
1982	91.0	28.1	91.5	127	220	72.5	194	75.8	33.1	24.6	18.5	19.0	82.9
1983	18.3	16.2	35.2	88.4	78.1	133	137	226	36.9	26.5	20.8	14.7	69.3
1984	18.2	16.1	56.1	121	182	129	98.0	42.0	30.4	27.5	26.4	21.5	64.0
1985	24.5	18.6	60.7	106	132	217	96.6	37.3	30.3	22.8	26.6	36.1	67.4
1986	34.2	17.6	31.7	77.3	44.6	79.5	55.5	45.1	28.4	20.9	17.9	13.0	38.8
1987	8.37	12.8	21.5	48.9	95.5	48.4	21.1	25.1	18.1	20.2	29.1	35.3	32.0
1988	31.8	26.0	61.7	142	93.7	204	110	60.7	117	33.6	25.2	32.2	78.2
1989	26.5	23.2	43.7	107	194	127	77.7	74.8	94.0	35.7	26.7	59.5	74.2
1990	23.0	19.9	32.2	33.4	44.1	39.5	22.6	16.7	16.2	17.9	29.3	20.0	**26.2**
Media	**28.7**	37.9	71.3	**125.2**	123.1	109.4	100.9	74.5	52.3	49.3	37.3	35.6	**70**

The multiannual mean of the Prut River at the Gauging Station of Rădăuți Prut is 82 m^3/s (the period 1950-2011). The month with the lowest mean multiannual monthly discharge is January (it coincides with the period of freeze), with the value 36.8 m^3/s, while the highest value is recorded in the month of April (the period of spring rains) – 142.9 m^3/s. The lowest mean annual discharge was 34.2 m^3/s (1990), while the highest – 156 m^3/s (2010) (Table 3).

Table 3: Monthly and multiannual mean of the Prut River at the Gauging Station of Rădăuți Prut (the period 1950-2011) (m^3/s)

Year/ month	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Annual mean
1950	43.1	127.7	78.0	97.4	56.3	28.7	32.6	22.9	17.0	25.7	52.3	48.4	52.5
1951	34.0	29.8	76.8	149	132	135	71.6	97.4	50.9	57.1	29.4	24.4	74.0

1952	26.6	37.3	45.2	223	119	70.4	38.8	27.8	21.3	22.7	34.9	51.5	59.9
1953	43.5	42.4	146	151	129	92.2	65.5	31.4	37.1	32.8	20.7	29.1	68.4
1954	13.5	16.2	69.7	73.9	137	78.7	59.1	55.2	29.9	33.6	20.2	26.4	51.1
1955	58.9	68.4	88.5	142	176	146	274	452	143	79.3	62.2	48.8	145
1956	44.6	23.4	67.5	184	151	63.3	40.0	31.0	44.7	27.9	26.8	33.6	61.5
1957	24.6	69.8	81.9	81.6	149	120	42.9	29.6	26.9	32.0	29.0	23.4	59.2
1958	26.8	86.3	63.7	135	150	54.7	42.2	28.6	135	38.5	32.1	31.4	68.7
1959	32.7	38.2	57.2	51.4	52.9	184	62.5	127	41.5	30.4	34.2	32.9	62.1
1960	32.7	53.5	64.5	62.3	92.8	101	98.5	51.3	28.4	30.5	62.0	64.9	61.9
1961	33.1	43.8	47.9	70.5	112	72.6	25.3	21.0	13.5	12.3	12.6	11.9	39.7
1962	6.30	5.60	38.8	301	104	98.9	127	50.3	25.4	19.4	22.7	9.50	67.4
1963	6.97	17.1	50.1	206	69.0	40.6	25.0	24.3	12.3	15.7	19.2	12.8	41.6
1964	12.5	9.50	19.4	168	85.5	32.5	108	60.7	81.5	92.6	56.8	56.9	65.3
1965	18.6	20.7	102	97.7	281	165	120	63.3	31.8	22.1	25.2	55.6	83.6
1966	36.3	125	108	159	72.2	71.0	71.9	68.1	53.4	27.8	41.3	34.2	72.4
1967	11.4	30.7	141	158	124	136	80.4	34.5	18.9	16.1	13.1	9.5	64.5
1968	18.9	31.2	92.8	116	67.6	28.4	34.1	74.7	73.8	77.6	41.6	17.0	56.1
1969	14.6	18.0	75.3	263	83.7	224	316	74.7	42.2	30.3	25.2	37.1	100
1970	38.8	44.5	137	184	363	255	109	57.2	43.5	41.2	28.9	23.7	110
1971	36.9	52.0	75.7	82.3	133	68.4	203	62.0	86.1	57.2	52.0	62.9	81.0
1972	33.1	37.8	97.4	97.4	87.5	45.4	79.5	104	100	90.8	76.0	50.1	74.9
1973	13.2	43.0	140	159	161	236	146	85.2	50.2	44.3	41.3	16.0	94.6
1974	22.7	28.4	19.0	30.5	63.4	117	295	120	58.7	109	132	58.2	87.8
1975	66.9	43.1	86.8	150	133	306	184	138	81.9	67.3	49.1	43.3	112
1976	36.9	23.3	71.9	148	100	136	57.7	107	120	146	73.5	66.7	90.6
1977	50.3	111	93.0	218	208	132	144	61.9	70.3	50.9	43.6	33.4	101
1978	21.1	31.1	170	150	274	157	285	70.4	207	91.8	44.6	95.1	133
1979	60.0	95.5	188	252	125	80.7	95.5	262	58.2	43.5	42.5	43.6	112
1980	33.2	39.4	43.8	351	220	292	162	169	81.4	70.9	107	104	139
1981	53.8	108	172	107	237	99.7	211	93.0	69.8	73.5	124	98.1	121
1982	96.0	44.4	110	151	258	84.5	214	92.6	38.5	30.1	22.8	24.3	97.2
1983	24.1	22.6	40.3	92.8	85.6	143	131	223	36.3	25.9	20.8	19.3	72.1
1984	20.9	18.3	56.7	128	182	138	105	50.4	33.4	29.3	26.9	22.9	67.6
1985	20.6	18.2	78.1	108	140	212	106	48.2	39.6	28.9	35.9	46.6	73.5
1986	44.1	23.3	51.4	104	57.9	97.2	73.2	60.2	37.9	25.2	20.7	15.2	50.9
1987	10.2	22.9	42.7	67.3	112	64.5	27.0	32.4	19.0	24.6	35.8	46.4	42.1
1988	45.0	39.9	72.7	155	107	235	127	68.7	128	36.5	25.4	38.5	89.9
1989	27.2	22.8	46.5	114	191	129	88.1	78.5	106	47.7	31.5	59.8	78.5
1990	30.8	25.0	41.6	45.6	56.1	53.0	30.0	20.6	19.4	22.9	38.2	26.6	**34.2**
1991	31.7	17.2	30.3	46.6	226	165	215	181	96.2	81.7	74.4	41.0	101
1992	42.1	38.4	63.8	108	75.3	164	68.7	39.3	35.4	37.2	81.9	36.9	65.9
1993	34.8	23.7	69.5	156	112	59.9	57.6	36.9	96.8	36.6	28.7	48.2	63.4
1994	35.1	28.2	63.8	73.7	75.4	140	43.4	26.6	23.5	25.0	19.3	28.2	48.5
1995	27.4	40.3	81.3	110	127	108	83.1	35.4	51.8	38.8	76.9	55.1	69.6
1996	52.2	31.8	36.6	403	157	51.8	31.8	45.1	172	67.7	67.7	59.9	98.1
1997	39.8	75.3	66.7	108	150	136	72.8	110	134	76.4	46.1	50.2	88.8
1998	56.7	57.1	56.3	177	277	254	208	63.1	54.2	71.4	105	43.3	119
1999	60.3	45.3	204	228	132	119	120	81.6	86.0	53.8	42.1	48.7	102
2000	26.4	71.8	79.9	181	64.3	42.7	96.4	46.0	50.8	31.4	26.5	25.8	61.9
2001	23.7	34.7	103	95.4	69.7	196	146	98.3	146	56.4	68.3	59.0	91.4

2002	84.2	122	143	168	107	110	77.3	188	88.3	95.2	92.7	47.2	110
2003	48.2	38.1	94.8	122	70.4	41.5	119	78.6	27.3	43.3	52.6	29.8	63.7
2004	19.6	66.6	105	80.6	79.2	41.8	60.6	179	59.8	54.0	52.8	60.8	71.7
2005	37.7	40.5	117	137	147	124	63.4	303	84.4	71.6	44.9	45.3	101
2006	46.4	29.6	144	256	148	332	143	109	61.0	36.4	34.9	26.5	114
2007	40.0	49.7	89.3	61.4	117	66.4	57.7	50.0	126	77.4	77.1	50.7	71.9
2008	47.7	60.2	82.7	212	145	78.6	568	118	98.8	134	49.4	47.6	137
2009	63.5	97.0	98.6	154	55.4	87.0	61.6	30.2	19.6	41.3	35.1	27.3	64.2
2010	49.6	37.3	110	93.4	173	446	530	137	96.7	63.4	56.9	80.7	**156**
2011	86.2	45.5	61.4	103	69.4	59.8	97.1	59.8	26.6	25.0	20.1	26.0	56.7
Medie	**36.8**	45.8	84.7	**142.9**	132.5	126.6	121.4	87.9	65.3	50.0	46.6	41.8	**82**

The multiannual mean of the Prut River at the Gauging Station of Stânca Downstream is 84 m^3/s (the period 1950-2011). The month with the lowest mean multiannual monthly discharge is January (it coincides with the period of freeze), with the value 41.4 m^3/s, while the highest value is recorded in the month of May (the period of spring rains) – 127.9 m^3/s. The lowest mean annual discharge was 37.9 m^3/s (1987), while the highest – 150 m^3/s (1955) (Table 4). The low discharge value is due to water retention in the Stânca-Costești reservoir, to its various economic usages, and to higher evaporation recorded at the level of this water body (Romanescu and Romanescu, 2015).

Table 4: Mean monthly and annual discharges of the Prut River at the Gauging Station of Stânca Downstream (1950-2011) (m^3/s)

Year/ month	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Annual mean
1950	44.7	132	80.9	101	58.3	29.7	33.8	23.7	17.6	26.7	54.2	50.2	54.4
1951	35.2	30.9	79.6	154	137	140	74.2	101	52.7	59.2	30.5	24.8	76.6
1952	27.5	38.6	46.8	231	123	72.9	40.2	28.8	22.1	23.5	35.4	52.2	61.8
1953	44.2	43.0	148	154	131	93.6	66.4	31.9	37.6	33.3	21.0	29.6	69.5
1954	14.0	16.8	72.2	76.6	142	81.5	61.3	57.1	31.0	34.8	21.0	27.3	53.0
1955	61.1	70.9	91.7	147	182	151	284	468	148	82.1	64.4	50.6	**150**
1956	45.2	23.7	68.5	186	154	64.2	40.6	31.5	45.3	28.3	27.2	34.1	62.4
1957	25.0	70.8	83.1	82.8	152	122	43.6	30.0	27.3	50.9	25.3	23.7	61.4
1958	27.2	87.5	64.6	137	152	55.5	42.8	29.0	137	39.1	32.5	31.8	69.7
1959	33.2	38.7	58.0	52.2	53.6	187	63.4	129	42.2	30.8	34.7	33.4	63.0
1960	36.3	61.8	70.8	70.5	74.2	117	80.5	61.4	27.8	27.2	56.0	71.9	63.0
1961	47.9	49.3	65.9	76.4	116	86.6	30.7	23.9	16.5	14.0	13.4	13.1	46.1
1962	15.2	16.8	56.2	291	117	86.5	127	52.1	27.4	21.2	24.7	15.2	70.8
1963	10.0	17.9	53.6	220	87.0	41.6	24.2	23.4	14.9	16.1	21.7	16.0	45.5
1964	9.50	5.34	21.2	183	92.5	38.1	118	74.3	88.8	99.7	60.7	70.8	71.8
1965	41.0	41.6	138	126	218	175	117	71.4	47.2	36.2	38.1	78.3	94.0
1966	36.9	127	110	161	73.4	72.1	72.9	70.1	53.9	28.2	42.0	34.7	73.5
1967	11.0	24.0	146	164	128	141.0	83.3	35.8	21.6	19.5	18.5	12.8	67.1
1968	19.2	31.7	94.2	118	68.6	28.8	34.6	75.8	74.9	78.7	42.2	17.3	57.0
1969	14.8	18.2	76.4	267	84.7	227	321	75.8	42.9	30.7	25.6	37.7	102
1970	40.2	46.1	142	191	376	265	113	59.3	45.1	42.6	29.2	24.5	115
1971	38.2	53.9	78.4	85.3	138	70.9	211	64.2	89.2	59.3	53.9	65.2	84.0

1972	34.3	39.2	101	101	90.7	47.0	82.3	108	104	94.1	80.9	51.9	77.9
1973	13.4	43.7	142	161	164	239	147	86.5	51.0	44.9	43.2	18.2	96.2
1974	23.5	29.4	19.7	31.6	65.7	122	306	124	60.8	113	137	60.3	91.1
1975	67.8	43.8	88.2	153	135	310	187	140	83.1	68.3	49.9	44.0	114
1976	37.5	23.6	73.0	150	102	138	58.5	109	122	148	74.6	67.7	92.0
1977	51.1	113	94.4	222	211	133	146	62.8	71.4	51.6	44.2	33.9	103
1978	24.6	35.9	158	128	145	158	207	104	191	135	53.6	57.6	116
1979	40.3	43.0	46.8	305	171	153	101	216	101	95.1	44.7	44.3	113
1980	20.5	36.7	32.9	148	155	263	239	130	157	73.9	150	104	126
1981	55.0	99.1	202	98.5	256	72.9	178	111	58.5	57.1	162	127	123
1982	121	50.1	57.4	64.2	166	120	128	145	91.9	66.3	50.4	48.1	92.4
1983	30.7	27.6	30.5	30.8	44.0	95.0	106	194	88.1	61.9	47.2	32.4	65.7
1984	30.6	35.4	30.9	40.0	163	138	125	132	70.3	69.7	73.3	30.0	78.2
1985	27.0	27.5	51.1	49.6	123	118	184	166	74.8	35.2	35.7	49.0	78.4
1986	47.2	37.1	38.8	86.8	60.8	73.6	66.0	65.0	72.6	37.2	24.2	24.1	52.8
1987	23.5	24.4	23.4	27.3	41.8	70.4	65.5	64.7	33.8	25.7	28.9	25.6	**37.9**
1988	28.8	35.5	34.2	133	106	239	117	131	121	134	50.7	33.6	97.0
1989	32.2	29.9	27.8	42.4	170	114	117	73.7	142	68.6	55.4	58.0	77.6
1990	71.8	56.4	33.1	43.7	43.6	51.3	51.6	52.1	34.1	28.7	30.7	26.8	43.7
1991	27.5	28.2	26.1	29.2	83.9	204	199	268	142	80.0	76.0	60.6	102
1992	38.2	36.1	40.3	101	85.9	136	110	69.1	50.1	54.2	52.0	52.5	68.8
1993	45.7	40.4	55.3	134	134	104	74.3	74.3	56.9	57.8	51.0	38.6	72.2
1994	36.8	39.1	42.6	70.5	70.1	117	66.3	49.0	38.4	44.2	35.6	32.4	53.5
1995	34.9	34.4	36.4	82.1	135	103	124	51.9	50.7	46.6	44.3	52.5	66.3
1996	72.2	114	85.6	232	216	104	64.5	56.4	96.5	96.5	68.8	108	110
1997	72.2	73.0	73.2	76.6	163	151	106	141	133	80.6	71.7	72.1	101
1998	69.4	60.4	61.1	105	272	263	239	115	78.3	35.1	136	90.6	127
1999	64.9	124	175	212	178	108	136	120	73.1	70.0	70.6	64.3	116
2000	58.9	57.4	64.1	120	116	49.7	82.2	59.2	38.1	37.4	35.8	33.4	62.7
2001	31.4	25.6	36.4	91.0	86.1	144	144	105	151	113	62.4	67.8	88.1
2002	68.6	122	128	141	137	139	78.8	156	113	83.6	115	76.2	113
2003	74.9	72.8	62.5	120	97.5	50.8	51.1	101	41.1	30.7	27.9	36.9	63.9
2004	28.4	53.4	83.3	95.6	78.9	55.8	39.8	162	78.8	66.4	48.6	64.8	71.3
2005	44.5	41.8	98.8	111	140	131	144	225	136	65.1	55.4	49.4	104
2006	46.6	30.9	65.3	250	177	329	188	132	109	41.9	42.5	37.7	121
2007	33.2	32.8	36.2	47.8	87.0	122	67.3	39.4	85.3	97.7	72.6	63.2	65.4
2008	58.3	58.1	50.2	180	153	102	212	355	99.1	157	111	57.5	133
2009	50.5	132	103	120	59.2	75.5	75.1	44.3	38.9	33.6	35.8	27.5	66.3
2010	34.3	46.1	95.8	100	117	250	588	180	151	82.3	39.8	65.5	146
2011	116	137	74.4	76.7	69.8	49.6	78.1	48.2	47.8	38.1	31.7	35.8	66.9
Media	**41.4**	52.2	74.6	125.6	**127.9**	125.7	122.0	103.0	75.0	59.7	53.1	47.4	**84**

The multiannual mean of the Prut River at the Gauging Station of Ungheni is 90 m^3/s (the period 1950-2011). The month with the lowest mean multiannual monthly discharge is January (it coincides with the period of freeze), with the value 46.4 m^3/s, while the highest value is recorded in the month of June (the period of late spring rains) – 134.7 m^3/s. The

lowest mean annual discharge was 40.1 m^3/s (1987), while the highest – 157 m^3/s (2010) (Table 5).

Table 5: Mean monthly and annual discharges of the Prut River at the Gauging Station of Ungheni (1950-2011) (m^3/s)

Year/ month	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Annual mean
1950	45.6	135	82.5	103	59.5	30.3	34.5	24.2	18.0	27.2	55.3	51.2	55.5
1951	35.9	31.5	81.2	157	140	143	75.7	103	53.8	60.4	31.1	25.8	78.2
1952	28.1	39.4	47.8	236	126	74.4	41.0	29.4	22.5	24.0	36.9	54.4	63.3
1953	46.0	44.8	154	160	136	97.5	69.2	33.2	39.2	34.7	21.9	30.8	72.3
1954	14.3	17.1	73.7	78.1	145	83.2	62.5	58.3	31.6	35.5	21.4	27.9	54.1
1955	62.3	72.3	93.6	150	186	154	290	478	151	83.8	65.8	51.6	153
1956	47.1	24.7	71.4	194	160	66.9	42.3	32.8	47.2	29.5	28.3	35.5	65.0
1957	26.0	73.8	86.6	86.3	158	127	45.4	31.3	28.4	53.0	26.4	24.7	63.9
1958	28.4	91.2	67.3	143	158	57.8	44.6	30.3	143	40.7	33.9	33.2	72.6
1959	34.6	40.3	60.5	54.4	55.9	195	66.1	135	43.9	32.1	36.1	34.8	65.7
1960	37.8	64.4	73.7	73.4	77.3	122	83.9	63.9	28.9	28.4	58.3	74.9	65.6
1961	49.9	51.3	68.6	79.6	121	90.2	32.0	24.9	17.2	14.5	14.0	13.7	48.1
1962	15.8	17.5	58.5	303	121	90.2	132	54.2	28.5	22.1	25.8	15.8	73.7
1963	10.4	18.6	55.8	229	90.6	43.3	25.2	24.4	15.5	16.8	22.6	16.6	47.4
1964	9.89	5.56	22.1	191	96.3	39.7	123	77.4	92.5	104	63.2	73.8	74.9
1965	42.7	43.3	144	132	227	182	122	74.4	49.1	37.7	39.7	81.5	98.0
1966	38.4	132	114	167	76.5	75.1	76.0	73.0	56.2	29.4	43.7	36.2	76.5
1967	12.0	32.5	149	167	151	144	85.0	38.5	20.0	17.0	13.8	10.0	70.0
1968	20.0	33.0	98.1	123	71.5	300	36.0	79.0	780	82.0	44.0	18.0	140
1969	15.4	19.0	79.6	278	88.5	237	334	79.0	44.6	32.0	26.6	39.3	106
1970	41.0	47.0	145	195	384	270	115	60.5	46.0	43.5	30.5	25.0	117
1971	39.0	55.0	80.0	87.0	141	72.3	215	65.5	91.0	80.5	55.0	66.5	87.3
1972	35.0	40.0	103	103	92.5	48.0	84.0	110	108	96.0	82.5	53.0	79.6
1973	14.0	45.5	148	168	170	249	154	90.1	58.1	46.8	43.7	19.0	101
1974	24.0	30.0	20.1	32.2	67.0	124	312	127	62.0	115	140	61.5	92.9
1975	70.7	45.6	91.9	159	141	323	195	146	86.6	71.1	52.0	45.8	119
1976	39.0	24.6	76.1	157	106	144	61.0	113	127	154	77.7	70.5	95.8
1977	53.2	117	98.3	231	220	139	152	65.4	74.4	53.8	46.1	35.3	107
1978	25.7	37.1	165	133	151	149	222	109	195	141	55.8	60.0	120
1979	39.4	41.4	48.5	324	190	163	107	211	118	104	55.3	54.7	121
1980	28.3	50.2	49.8	169	166	260	280	139	169	95.2	159	126	141
1981	92.6	116	200	131	279	92.0	182	129	76.9	73.8	158	160	141
1982	142	56.2	83.4	72.1	171	128	128	154	96.1	70.8	55.2	50.7	101
1983	36.9	31.6	35.2	34.6	43.1	91.1	109	197	98.3	65.7	49.8	32.9	68.8
1984	35.4	37.4	44.4	42.7	167	171	133	138	73.2	71.0	84.0	36.1	86.1
1985	28.1	29.6	54.6	66.5	118	173	193	166	86.6	38.5	39.8	53.8	87.3
1986	52.1	43.1	62.4	96.3	67.5	75.8	70.2	69.0	68.2	41.0	29.1	24.4	58.3
1987	26.0	29.6	28.7	33.4	40.3	69.2	61.8	63.3	38.5	28.5	32.3	29.4	**40.1**
1988	28.9	39.0	42.4	129	108	276	123	130	119	130	59.0	34.5	102

1989	34.9	34.2	30.1	38.9	160	112	123	70.2	150	81.3	56.7	58.0	79.1
1990	71.1	56.4	35.4	39.8	39.1	50.1	47.8	46.4	33.8	29.6	31.9	29.1	42.5
1991	26.5	30.0	27.5	27.9	72.1	206	223	294	162	96.0	84.5	67.0	110
1992	39.4	39.5	41.1	102	95.8	126	117	64.7	49.3	51.3	49.1	48.6	68.7
1993	44.2	42.2	47.6	144	139	116	75.8	72.7	62.8	56.7	51.1	38.7	74.2
1994	38.0	38.5	42.0	72.7	70.2	113	67.9	50.0	37.7	41.5	34.5	29.6	53.0
1995	26.3	31.1	36.4	75.3	132	103	121	52.0	55.3	50.9	43.1	49.2	64.6
1996	73.6	112	99.4	229	247	116	71.2	57.0	110	125	79.2	131	121
1997	111	90.9	83.4	84.7	164	151	107	142	141	90.6	79.4	90.9	111
1998	77.8	68.3	67.1	102	255	270	248	120	90.7	57.2	136	109	133
1999	81.2	142	242	234	193	110	131	119	74.7	71.8	74.1	74.0	129
2000	76.9	84.1	77.0	127	124	55.1	84.5	65.7	48.5	48.6	41.8	32.9	72.2
2001	34.3	32.3	37.8	99.1	96.8	141	150	110	135	121	66.5	85.2	92.4
2002	107	144	144	149	138	135	84.4	146	114	85.2	124	101	123
2003	109	86.5	91.7	145	118	47.7	52.3	101	39.1	34.7	38.6	40.1	75.3
2004	33.2	52.8	92.7	105	78.5	58.5	39.1	144	82.6	67.9	53.7	64.5	72.7
2005	49.6	57.1	103	119	147	134	112	221	151	69.3	56.9	50.8	106
2006	54.3	36.2	73.0	292	188	349	205	144	115	52.3	46.3	42.8	133
2007	38.4	38.1	43.0	55.1	90.3	135	68.8	41.1	88.8	98.5	74.4	70.8	70.2
2008	62.5	61.7	54.6	176	174	110	131	381	104	163	114	59.8	133
2009	58.6	137	123	133	60.4	69.2	73.1	44.6	41.3	34.4	39.1	34.5	70.7
2010	32.2	50.6	99.1	98.4	111	224	657	237	165	95.8	49.1	67.7	**157**
2011	125	134	81.5	82.7	72.3	50.5	77.2	47.4	47.0	41.2	35.2	35.3	69.1
Media	**46.4**	56.5	81.1	132.3	132.8	**134.7**	125.6	106.4	90.3	64.3	56.0	51.6	**90**

The multiannual mean of the Prut River at the Gauging Station of Prisăcani is 106 m^3/s (the period 1981-2011). The month with the lowest mean multiannual monthly discharge is January (it coincides with the period of freeze), with the value 71.8 m^3/s, while the highest value is recorded in the month of June (the period of late spring rains) – 145 m^3/s. The lowest mean annual discharge was 44.3 m^3/s (1987), while the highest – 166 m^3/s (2010) (Table 6). The data of the Gauging Station of Prisăcani have been analyzed for a period of 31 years. They are different from the data of other stations because the period analyzed is significantly shorter (Romanescu and Romanescu, 2015).

Table 6: Mean monthly and annual discharges of the Prut River at the Gauging Station of Prisăcani (1981-2011) (m^3/s)

Year/ month	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Annual mean
1981	102	128	203	142	329	111	203	143	95.0	91.3	184	209	162
1982	205	82.6	155	110	204	148	151	172	116	89.0	68.2	63.1	130
1983	49.3	40.6	42.9	38.0	46.4	95.9	112	212	113	78.3	58.1	45.8	77.7
1984	42.4	53.1	85.0	75.0	207	217	156	158	89.6	87.5	96.4	43.3	109
1985	36.1	39.3	89.2	86.6	130	232	259	192	108	49.0	45.7	60.3	111
1986	59.2	55.0	92.6	107	66.0	74.1	69.8	67.3	69.6	43.7	28.6	25.3	63.2
1987	30.1	36.8	36.4	40.3	44.7	68.7	62.5	65.9	43.1	32.3	35.4	35.4	**44.3**
1988	35.9	49.1	59.8	161	120	339	143	139	132	140	67.7	43.7	119

1989	46.6	40.2	35.7	39.6	167	120	138	76.6	176	97.8	66.2	70.3	89.5
1990	85.1	66.1	42.5	43.1	44.3	55.8	50.5	46.3	39.7	35.2	34.4	31.6	47.9
1991	32.1	35.0	35.5	32.6	82.3	234	268	348	178	110	91.9	78.4	127
1992	52.5	56.6	54.5	112	99.9	142	122	67.9	56.3	60.2	55.3	57.4	78.1
1993	52.7	47.0	66.7	167	147	126	88.0	82.2	78.4	70.0	61.7	48.8	86.3
1994	47.0	52.4	48.7	78.1	74.6	114	71.2	51.1	42.0	46.7	39.4	34.6	58.3
1995	36.1	38.9	44.0	77.1	139	109	122	56.9	65.4	59.4	48.6	55.3	71.0
1996	83.1	127	119	316	295	127	79.5	65.1	163	164	99.3	169	151
1997	113	128	105	111	184	160	145	153	159	109	90.4	101	130
1998	102	95.9	92.1	111	278	291	273	135	111	104	166	129	157
1999	117	191	321	276	219	122	137	127	88.1	86.7	82.7	84.9	154
2000	101	101	89.6	146	134	57.2	101	69.4	57.8	52.4	45.7	39.2	82.9
2001	40.3	39.4	43.2	110	109	145	162	116	151	138	77.6	96.2	102
2002	115	174	174	175	149	144	95.2	170	132	99.8	149	109	141
2003	121	102	150	175	132	53.6	60.6	112	47.0	43.5	44.8	47.3	90.7
2004	53.4	86.5	103	111	79.2	58.9	40.6	148	90.1	73.5	55.8	67.0	80.6
2005	52.3	62.3	124	134	202	148	124	249	170	83.6	66.6	60.7	123
2006	51.9	45.1	106	353	191	395	219	147	125	62.6	53.6	48.3	150
2007	44.1	41.9	48.9	57.0	87.7	133	68.3	49.2	91.6	101	81.7	74.3	73.2
2008	69.4	68.5	61.9	197	196	116	137	436	114	176	124	68.8	147
2009	61.6	169	143	140	68.1	71.1	76.1	47.1	45.2	42.3	41.4	36.7	78.4
2010	39.1	58.3	105	101	115	229	674	243	172	113	60.3	77.8	**166**
2011	149	160	99.7	109	80.2	58.5	80.8	49.6	47.5	48.4	40.8	37.8	80.1
Media	**71.8**	79.7	96.0	126.8	142.6	**145.0**	144.8	135.3	102.1	83.5	72.9	69.3	**106**

The multiannual mean of the Prut River at the Gauging Station of Drănceni is 103 m^3/s (the period 1950-2011). The month with the lowest mean multiannual monthly discharge is January (it coincides with the period of freeze), with the value 61.4 m^3/s, while the highest value is recorded in the month of April (the period of spring rains) – 154.7 m^3/s. The lowest mean annual discharge was 43.0 m^3/s (1987), while the highest – 186 m^3/s (1981) (Table 7).

Table 7: Mean monthly and annual discharges of the Prut River at the Gauging Station of Drănceni (1950-2011) (m^3/s)

Year/ month	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Annual mean
1950	53.0	153	94.4	117	68.6	35.9	40.6	29.1	22.1	32.4	63.9	59.3	64.1
1951	42.2	37.2	92.9	177	158	162	86.7	117	62.2	69.6	36.8	30.8	89.4
1952	33.4	46.1	55.5	266	143	85.3	47.9	34.9	27.2	26.9	43.3	62.9	72.7
1953	53.5	52.2	174	181	154	111	79.5	39.1	45.9	40.8	26.5	36.4	82.8
1954	18.0	21.1	84.5	87.4	164	95.1	72.0	67.2	37.3	41.7	25.9	33.2	62.3
1955	71.7	82.9	106	170	210	174	326	537	171	95.8	73.6	64.8	174
1956	54.7	29.1	81.9	219	170	76.9	49.3	38.5	54.8	35.0	34.2	41.7	73.8
1957	31.1	84.4	98.9	98.6	178	144	52.8	37.0	33.8	39.8	31.5	29.6	71.6
1958	33.3	104	77.3	162	178	66.7	51.9	35.9	162	47.6	39.9	39.1	83.1
1959	63.1	47.1	69.7	61.6	64.4	219	76.1	153	51.1	37.9	42.5	40.9	77.2
1960	44.3	74.1	84.5	84.2	88.5	134	93.9	73.6	34.3	33.8	67.2	85.2	74.8

1961	57.7	59.6	78.8	91.2	136	103	37.8	29.7	19.2	16.2	17.6	17.2	55.3
1962	19.6	21.6	66.7	341	138	103	149	62.7	33.9	26.7	30.8	19.6	84.4
1963	15.4	23.5	83.4	280	97.6	52.4	31.8	28.8	18.1	18.6	23.9	19.0	57.7
1964	16.5	13.3	29.6	198	97.6	44.9	113	79.4	75.3	113	64.1	77.1	76.8
1965	57.3	88.2	170	129	224	237	128	70.5	42.8	24.9	25.1	70.9	106
1966	41.6	108	180	192	82.3	74.2	71.0	69.6	58.5	32.7	43.8	37.5	82.6
1967	16.0	27.4	167	187	147	161	95.2	40.9	24.6	22.4	21.2	14.6	77.0
1968	24.4	38.9	111	133	81.9	37.6	40.7	83.2	87.1	100	53.4	18.4	67.5
1969	-	-	-	442	144	29.7	55.8	136	67.2	43.6	29.4	45.9	110
1970	47.9	54.6	164	220	432	304	130	69.7	53.5	50.7	36.1	30.0	133
1971	45.6	63.6	91.6	110	162	87.1	298	79.8	112	76.6	69.8	114	109
1972	41.2	46.8	117	117	105	55.7	96.0	125	120	109	94.4	61.3	90.7
1973	54.0	87.5	161	244	158	259	163	90.6	57.2	51.9	50.7	43.6	118
1974	29.0	47.3	42.8	42.1	67.2	129	289	215	72.6	143	189	96.1	114
1975	82.4	60.2	110	169	178	377	230	160	97.9	80.4	62.8	51.2	138
1976	56.0	45.4	138	186	126	147	65.5	116	136	183	95.0	86.9	115
1977	79.3	161	121	222	253	156	161	77.8	89.3	67.7	55.2	52.9	125
1978	46.9	57.1	216	173	193	200	242	136	217	168	73.6	74.5	150
1979	82.9	82.5	88.2	363	234	195	140	221	171	129	79.7	71.2	155
1980	54.3	76.8	84.7	286	207	291	352	175	200	119	185	183	184
1981	145	204	251	189	337	120	209	152	99.6	96.8	186	244	**186**
1982	206	97.8	170	112	205	148	149	174	116	87.5	66.8	59.3	133
1983	49.0	43.4	41.4	36.0	41.8	87.6	106	206	116	78.2	57.9	51.6	76.2
1984	43.0	43.1	75.0	68.2	193	226	152	157	91.2	89.2	95.4	44.6	106
1985	43.2	40.0	75.2	94.4	124	219	273	184	111	54.5	52.5	63.2	111
1986	68.6	74.0	91.6	105	68.1	72.3	65.5	64.0	66.3	46.0	29.4	27.4	64.9
1987	27.5	35.6	34.5	37.1	40.7	66.0	59.6	62.4	44.4	32.5	35.0	40.4	**43.0**
1988	40.5	58.2	59.2	158	122	349	134	136	128	138	70.4	48.2	120
1989	51.4	42.2	36.4	37.5	150	110	141	77.2	166	104	68.7	71.7	88.0
1990	96.0	65.5	42.0	41.6	42.3	55.7	47.4	42.1	35.9	31.2	32.0	27.9	46.6
1991	27.7	33.0	32.9	28.8	67.3	218	246	324	170	120	97.7	88.5	121
1992	57.1	65.8	53.2	105	102	130	126	71.0	59.7	60.8	57.3	60.3	79.0
1993	71.2	54.5	63.3	157	144	123	82.2	75.8	73.9	67.6	64.0	52.3	85.7
1994	53.8	57.3	51.0	72.7	70.8	112	71.1	52.6	45.6	46.1	40.3	35.3	59.1
1995	46.9	41.2	45.5	71.6	134	108	123	59.5	67.0	54.4	42.2	61.1	71.2
1996	81.6	123	130	271	300	132	81.3	66.1	124	170	101	173	146
1997	119	132	115	115	180	162	126	155	161	114	93.2	115	132
1998	112	112	95.1	125	244	285	284	140	118	110	160	143	161
1999	140	183	308	265	220	132	145	137	93.8	87.9	87.6	90.8	158
2000	94.8	129	99.8	138	133	62.6	96.6	72.8	61.1	57.1	49.3	42.1	86.4
2001	41.0	39.1	39.9	98.9	103	123	162	116	144	135	80.4	91.5	97.8
2002	113	170	163	169	145	138	96.3	160	131	99.1	141	108	136
2003	119	102	143	169	133	59.8	61.7	110	50.1	44.9	44.5	46.9	90.3
2004	54.2	87.0	102	113	81.6	63.1	42.6	137	92.7	74.8	59.9	67.9	81.3
2005	54.6	63.1	115	129	199	146	122	204	206	96.3	75.3	66.1	123
2006	50.9	45.1	102	351	188	393	220	148	132	71.5	62.1	55.9	152

2007	49.9	47.4	52.8	65.0	84.4	127	73.0	47.9	87.8	102	85.8	78.3	75.1
2008	69.4	69.0	63.5	167	199	120	114	437	118	175	132	80.8	145
2009	60.0	166	142	138	74.5	73.7	80.6	50.0	47.2	43.1	44.6	37.4	79.8
2010	40.3	59.5	107	103	115	184	612	260	172	114	60.8	74.2	158
2011	151	160	101	109	81.8	59.1	81.0	51.6	49.0	49.1	41.0	38.7	81.0
Media	**61.4**	74.4	102.3	**154.7**	147.8	141.2	133.0	118.7	90.9	76.3	66.1	64.4	**103**

The multiannual mean of the Prut River at the Gauging Station of Fălciu is 104 m^3/s (the period 1950-2011). The month with the lowest mean multiannual monthly discharge is January (it coincides with the period of freeze), with the value 60.6 m^3/s, while the highest value is recorded in the month of April (the period of spring rains) – 154.9 m^3/s. The lowest mean annual discharge was 41.9 m^3/s (1987), while the highest – 184 m^3/s (1980) (Table 8).

Table 8: Mean monthly and annual discharges of the Prut River at the Gauging Station of Fălciu (1950-2011) (m^3/s)

Year/ month	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Annual mean
1950	54.7	162	99.0	124	71.4	36.4	41.4	29.0	21.6	32.6	66.4	61.4	66.6
1951	43.1	37.8	97.4	188	168	172	90.8	124	64.6	72.5	37.3	93.7	99.1
1952	33.7	47.3	57.4	283	151	89.3	49.2	35.3	27.0	28.8	65.3	76.1	78.6
1953	55.2	53.8	185	192	163	117	83.0	39.8	47.0	41.6	26.3	37.0	86.7
1954	17.2	20.5	88.4	93.7	174	99.8	75.0	70.0	37.9	42.6	25.7	33.5	64.9
1955	74.8	86.8	112	180	223	185	348	574	181	101	79.0	61.9	184
1956	56.5	29.6	85.7	247	194	83.4	52.6	39.4	56.0	33.5	34.0	45.6	79.8
1957	31.0	89.3	105	107	208	155	56.5	36.7	32.4	40.1	28.1	41.6	77.5
1958	34.1	109	80.7	163	190	69.3	53.5	36.3	169	48.9	40.7	39.8	86.2
1959	41.5	48.4	72.5	65.2	67.0	234	79.3	162	52.7	38.6	43.4	41.8	78.8
1960	45.4	77.3	88.5	88.1	92.8	146	101	76.7	34.7	34.0	70.0	89.9	78.7
1961	59.9	61.6	82.3	95.5	145	108	38.4	29.9	20.6	17.4	16.8	16.4	57.6
1962	19.0	21.0	70.2	363	146	108	158	65.1	34.2	26.5	30.9	19.0	88.4
1963	12.5	22.4	67.0	274	109	52.0	30.2	29.3	18.6	20.1	27.1	20.0	56.8
1964	19.3	16.9	27.6	202	105	50.1	108	83.4	64.6	128	67.3	81.5	79.5
1965	51.3	52.0	173	158	273	219	147	89.3	59.0	45.3	47.6	97.9	118
1966	46.1	141	137	201	91.8	89.7	91.2	87.6	67.4	35.2	52.5	43.4	90.3
1967	14.4	39.0	179	200	181	173	102	46.2	24.0	20.4	16.6	12.0	84.0
1968	19.8	34.5	126	159	89.0	41.0	49.0	107	99.6	103	56.5	31.2	76.3
1969	18.4	31.4	95.5	334	105	284	401	146	53.6	38.4	31.9	47.1	132
1970	49.2	56.4	174	234	461	324	138	72.6	55.2	52.2	36.6	30.0	140
1971	46.8	66.0	96.0	104	169	86.8	258	78.6	109	96.6	66.0	79.8	105
1972	42.0	48.0	124	124	111	57.6	101	132	130	115	99.0	63.6	95.5
1973	60.4	88.8	147	269	158	246	168	95.1	60.7	52.4	52.5	46.3	120
1974	48.6	59.3	44.7	43.0	65.7	131	252	261	78.9	146	191	104	119
1975	84.8	54.8	110	139	169	361	208	139	95.9	73.7	62.4	55.0	129
1976	46.9	29.6	91.3	170	123	142	63.8	108	125	197	95.4	88.4	107
1977	76.1	156	129	187	282	141	148	71.1	79.6	66.3	53.4	50.5	120
1978	43.9	55.4	208	148	190	203	218	140	201	175	66.6	68.2	143

1979	72.0	92.4	85.1	355	257	183	137	186	192	120	80.3	73.0	153
1980	67.4	85.5	89.4	286	196	273	389	167	191	121	172	175	**184**
1981	142	210	233	210	330	139	187	138	98.0	97.0	157	242	182
1982	189	93.5	159	109	188	142	139	162	117	87.3	70.2	64.0	127
1983	53.1	43.3	43.8	36.0	38.1	86.0	110	203	127	80.6	62.4	54.8	78.2
1984	43.7	44.8	84.6	77.1	169	259	149	159	92.4	91.3	104	50.9	110
1985	49.5	31.5	89.6	100	111	183	306	192	114	47.5	42.9	55.4	110
1986	70.1	68.8	92.0	103	67.9	65.6	63.6	62.5	65.6	46.8	34.9	32.3	64.4
1987	28.9	35.0	41.1	40.2	35.5	62.4	55.7	55.0	45.1	32.1	35.1	36.9	**41.9**
1988	40.4	56.1	63.5	157.0	132	360	126	140	125	139	79.2	53.0	123
1989	53.6	42.4	37.5	31.6	142	97.4	152	67.1	173	104	63.3	70.6	86.2
1990	91.5	60.3	46.7	38.2	38.7	50.6	43.2	38.5	36.2	33.0	35.1	31.1	45.3
1991	31.5	33.6	39.3	31.6	61.6	258	267	344	177	114	87.9	93.5	128
1992	56.4	64.5	51.4	104	103	124	131	63.2	58.1	59.8	57.7	58.4	77.6
1993	68.6	54.0	68.6	162	146	128	77.0	70.8	70.1	65.2	65.4	55.0	85.9
1994	55.2	58.1	54.6	68.3	66.2	102	69.4	57.4	54.3	47.0	42.2	39.3	59.5
1995	45.8	46.4	45.9	64.6	129	104	114	55.4	61.7	56.4	47.7	60.5	69.3
1996	85.5	117	148	273	331	122	73.0	60.4	102	191	90.2	182	148
1997	120	134	110	104	191	167	121	154	163	114	84.7	115	131
1998	111	102	88.2	113	200	310	348	136	115	102	159	174	163
1999	145	200	334	287	262	135	145	143	94.7	88.2	86.5	89.5	167
2000	90.5	131	100	137	139	59.6	92.4	70.3	56.8	52.8	49.7	40.0	84.9
2001	41.5	40.8	39.9	93.3	105	101	183	121	144	134	76.8	85.7	97.2
2002	113	169	166	184	156	140	95.0	158	140	95.1	142	112	139
2003	117	102	147	167	128	58.4	58.7	102	51.4	46.6	46.9	48.9	89.5
2004	51.5	83.1	97.5	112	76.5	63.0	44.9	125	95.3	72.8	60.8	67.0	79.1
2005	57.7	63.1	114	120	207	134	112	151	255	91.7	72.0	66.0	120
2006	49.8	42.9	99.3	349	186	388	218	146	135	70.0	62.0	54.2	150
2007	49.0	45.7	50.3	65.0	77.4	128	74.9	47.2	81.4	101	87.4	77.6	73.7
2008	69.0	65.8	63.5	138	235	129	96.1	436	116	174	133	80.6	145
2009	60.0	164	147	138	72.1	66.5	76.9	48.9	46.7	43.8	44.8	36.9	78.8
2010	40.6	59.8	107	103	102	181	559	303	172	114	61.2	74.3	156
2011	152	161	102	110	82.9	59.9	81.3	53.1	51.0	50.8	43.2	39.5	82.2
Media	**60.6**	74.1	103.1	**154.9**	152.2	146.2	138.8	119.7	92.2	77.5	66.5	67.2	**104**

The multiannual mean of the Prut River at the Gauging Station of Oancea is 95 m^3/s (the period 1959-2011, with interruptions). The month with the lowest mean multiannual monthly discharge is January (it coincides with the period of freeze), with the value 64.4 m^3/s, while the highest value is recorded in the month of July (late spring rains or shorter recording period) – 130.3 m^3/s. The lowest mean annual discharge was 41.5 m^3/s (1987), while the highest – 149.0 m^3/s (2010) (Table 9). The Gauging Station of Oancea has functioned with several interruptions (1963-1970 and 1972-1978). The analysis concerned a period of 38 years (Romanescu and Romanescu, 2015).

Table 9: Mean monthly and annual discharges of the Prut River at the Gauging Station of Oancea (1959-2011) (m^3/s)

Year/ month	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Annual mean
1959	34.0	30.1	58.9	47.8	48.9	94.0	62.6	83.2	47.6	36.7	38.9	35.4	51.5
1960	45.5	49.0	72.0	56.0	57.8	83.6	61.6	58.4	34.7	33.3	58.5	84.9	57.9
1961	74.4	52.4	92.5	74.3	101	105	44.2	33.3	23.3	17.0	16.6	17.7	54.3
1962	20.5	30.8	63.0	114	107	85.6	97.6	61.4	34.4	29.8	28.6	33.7	58.9
1963	-	-	-	-	-	-	-	-	-	-	-	-	-
1964	-	-	-	-	-	-	-	-	-	-	-	-	-
1965	-	-	-	-	-	-	-	-	-	-	-	-	-
1966	-	-	-	-	-	-	-	-	-	-	-	-	-
1967	-	-	-	-	-	-	-	-	-	-	-	-	-
1968	-	-	-	-	-	-	-	-	-	-	-	-	-
1969	-	-	-	-	-	-	-	-	-	-	-	-	-
1970	-	-	-	-	-	-	-	-	-	-	-	-	-
1971	33.1	60.7	74.8	135	148	63.1	279.0	73.0	83.6	48.3	41.3	78.5	93.2
1972	-	-	-	-	-	-	-	-	-	-	-	-	-
1973	-	-	-	-	-	-	-	-	-	-	-	-	-
1974	-	-	-	-	-	-	-	-	-	-	-	-	-
1975	-	-	-	-	-	-	-	-	-	-	-	-	-
1976	-	-	-	-	-	-	-	-	-	-	-	-	-
1977	-	-	-	-	-	-	-	-	-	-	-	-	-
1978	-	-	-	-		-	-	-	-	-	-	-	-
1979	-	-	74.6	381	260	145	112	125	173	87.7	61.1	54.8	147
1980	61.8	81.1	93.8	221	147	185	318	133	140	98.7	126	131	145
1981	112	157	163	178	234	127	139	109	71.0	70.2	113	206	140
1982	147	71.0	123	83.4	133	107	110	135	92.6	67.1	54.7	51.4	97.9
1983	44.2	34.6	37.7	32.1	33.0	65.7	81.9	145	98.3	57.7	45.9	33.7	59.2
1984	35.6	39.1	74.1	66.7	120	215	125	134	76.0	72.7	83.6	37.3	89.9
1985	28.1	28.7	67.6	96.7	95.0	144	292	160	102	40.7	36.1	47.2	94.8
1986	47.0	46.6	74.7	87.7	58.3	55.4	55.4	54.5	58.4	44.1	31.1	26.1	53.3
1987	31.6	34.5	37.0	36.9	30.0	51.9	65.7	53.8	46.0	36.0	38.3	36.7	**41.5**
1988	40.4	48.7	62.9	128	119	322	114	126	111	123	75.4	47.1	110
1989	53.7	45.4	39.2	31.0	117	88.9	137	60.0	142	99.0	57.4	61.1	77.6
1990	73.5	54.1	42.1	33.0	32.4	41.6	35.2	32.0	30.7	28.4	29.7	27.8	38.4
1991	27.7	30.5	33.6	27.6	52.1	222	233	314	153	99.9	74.1	75.2	112
1992	43.3	47.2	46.3	85.9	90.6	100	112	54.7	53.7	55.3	53.7	50.7	66.1
1993	44.7	42.1	63.5	136	128	119	79.8	73.3	73.7	68.8	68.9	66.3	80.3
1994	58.3	60.4	57.8	72.4	70.3	98.6	73.6	59.2	59.0	53.5	49.7	45.2	63.2
1995	50.5	51.1	51.4	67.6	122	104	109	58.0	66.1	61.7	53.1	64.1	71.6
1996	79.2	111	130	235	318	121	83.1	70.9	97.3	171	96.0	153	139
1997	136	142	109	102	158	143	116	138	146	114	93.9	102	125
1998	108	98.4	96.2	108	159	268	314	133	111	102	136	148	148
1999	114	155	276	235	226	124	124	123	91.7	91.5	93.0	94.6	146
2000	86.6	100	102	129	133	64.6	85.4	74.1	62.1	58.6	54.6	47.2	83.1
2001	47.1	47.1	46.2	91.6	103	91.3	160	114	127	131	81.1	68.0	92.3
2002	84.1	152	142	158	138	126	94.5	139	130	92.3	129	96.9	123
2003	87.7	99.6	132	158	128	56.4	55.1	99.6	49.5	43.3	44.6	47.7	83.5
2004	49.3	77.1	97.0	115	77.5	63.8	43.3	119	99.2	73.5	62.6	67.9	78.8

2005	59.6	58.2	107	120	179	139	112	123	245	93.7	72.2	67.6	115
2006	66.1	55.3	107	326	200	375	231	140	131	66.2	58.1	48.9	150
2007	47.6	45.3	50.6	65.5	74.4	123	73.1	46.8	76.9	99.2	86.1	77.1	72.1
2008	73.5	65.2	64.8	122	218	128	87.8	395	115	161	132	78.1	137
2009	66.8	142	146	136	77.9	66.9	82.7	46.8	42.5	40.9	43.7	37.2	77.5
2010	43.4	64.0	107	103	94.2	162	474	312	165	123	64.6	79.5	**149**
2011	126	163	119	109	88.9	58.8	77.6	49.2	49.7	47.3	38.4	33.4	80.0
Media	**64.4**	72.2	87.8	118.6	123.1	124.6	**130.3**	112.1	92.3	74.7	66.4	67.3	**95**

For all the gauging stations situated on the course of the Prut River, the year 1987 was the droughtiest one by far, with extremely low discharges, compared to multiannual monthly maxims. As far as maximums are concerned, it is worth noting the year 2010, followed by 1955, and by the period 1980-1981. The lowest mean multiannual monthly discharges have been recorded in the month of January, in all the gauging stations. The maximum multiannual monthly discharge is specific to the period March-July. In this sense, we underline the higher discharges recorded in March-May at the northern (upstream) stations and in June-July for the southern (downstream) sector, where there is heavier runoff (Romanescu and Romanescu, 2015).

Conclusions

The mean multiannual discharge of the Prut River depends on the amount of water fallen in the upper basin (Ukrainian Carpathians). The ratio between the mean multiannual discharge at the Gauging Station of Oroftiana (river entry on the Romanian territory) and the one at the Gauging Station of Oancea (upstream from the discharge mouth into the Danube) is relatively low: 25 m^3/s. Compared to the maximum value of the mean multiannual discharge (106 m^3/s la Prisăcani), the ratio is 36 m^3/s. Therefore, tributaries on the Romanian territory and in the Republic of Moldova hold low discharges and their water contribution is insignificant.

Higher discharges are recorded in the middle sector and lower discharges in the lower sector. The wide Prut floodplain within the lower sector takes over a part of river water, while agriculture uses another part. It is worth underscoring the year 1987, which recorded a minimum mean annual discharge, as well as the year 2010, which recorded a maximum mean annual discharge. During the winter, the lowest annual monthly means are recorded (January) while spring brings along the highest mean annual discharges (April-June). The Stânca-Costești reservoir has the role of mitigating floods and controlling discharges downstream.

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