

## POTOMAC RIVER BASIN

## 01631000 SOUTH FORK SHENANDOAH RIVER AT FRONT ROYAL, VA

LOCATION.--Lat 38°54'50", long 78°12'40", Warren County, Hydrologic Unit 02070005, on left bank 0.7 mi downstream from bridge on State Highway 619, 1.0 mi west of Front Royal, and 3.5 mi upstream from confluence with North Fork.

DRAINAGE AREA.--1,642 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1899 to September 1906, September 1930 to current year. Monthly discharge only for some periods, published in WSP 1302.

REVISED RECORDS.--WSP 951: 1936(M). WSP 1171: 1935(M), 1937(M). WSP 2103: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 469.38 ft above sea level. June 1899 to July 1906, nonrecording gage at site 1.0 mi upstream at different datum.

REMARKS.--No estimated daily discharges. Records good except for period July 28 to Sept. 30, which is fair. Large diurnal fluctuation at low and medium flow caused by powerplants upstream from station prior to 1954; occasional large diurnal fluctuation thereafter. National Weather Service gage-height telemeter at station. Maximum discharge, 130,000 ft<sup>3</sup>/s, from rating curve extended above 92,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow. Minimum gage height, 0.56 ft, Jan. 30, 1934. Water-quality records for some prior periods have been collected at this location.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1870, that of Oct. 16, 1942.

EXTREMES FOR CURRENT YEAR.--Peak discharges equal to or greater than base discharge of 8,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	1100	12,900	8.36	Feb. 18	1945	35,300	15.01
Jan. 9	0930	*36,800	*15.42	Feb. 24	2100	9,620	7.04
Jan. 29	1330	17,400	9.90	Mar. 10	1430	10,600	7.46
Feb. 5	2045	30,800	13.82	Mar. 22	0700	18,300	10.18
Feb. 13	0200	12,600	8.23	Apr. 21	0045	9,600	7.03

Minimum discharge, 403 ft<sup>3</sup>/s, Oct. 12.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1997 TO SEPTEMBER 1998  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	851	649	872	938	6990	5680	2830	1980	1340	1200	594	581
2	642	734	856	905	5640	5860	2660	2100	1260	1060	585	574
3	528	962	842	897	4880	5810	2500	2640	1200	967	576	567
4	487	1170	828	1030	5470	5280	2470	2680	1150	945	572	548
5	445	962	806	1200	21500	4580	2800	4240	1110	1010	567	526
6	447	826	790	1450	21400	4050	3370	4830	1050	940	559	498
7	455	3930	766	1700	12900	3620	3210	4190	1060	918	544	478
8	441	11800	754	7640	9340	3430	2950	4350	1050	912	538	519
9	439	9720	755	32500	8000	5340	2930	6850	1040	898	547	500
10	440	5680	746	15100	6910	9830	3590	7750	1060	895	607	548
11	435	3820	747	8100	6370	8700	4670	5990	1050	868	706	659
12	417	2870	767	5810	8890	6550	4350	4970	1070	851	683	497
13	432	2100	784	4720	11900	5300	3770	4740	1080	825	660	452
14	452	1820	744	3990	9930	4550	3310	4250	1070	810	629	452
15	448	1740	732	3400	7660	3960	2970	3660	1570	794	618	461
16	455	1690	729	3320	6190	3470	2700	3180	1390	792	608	466
17	450	1520	743	4350	9380	3120	2490	2970	1570	779	707	477
18	478	1380	713	4050	31800	3010	2350	3470	1610	803	750	536
19	472	1280	704	3650	23600	4590	2560	3470	1650	919	890	486
20	482	1190	681	3300	13500	8660	5760	2670	1300	800	1040	527
21	491	1140	687	3010	10900	11000	7980	2330	1640	768	777	595
22	479	1140	683	2540	9050	16300	5620	2080	1470	740	687	620
23	461	1110	700	2630	7770	10400	4450	1860	1380	707	665	609
24	444	1110	696	5220	8770	7320	3740	1760	1260	690	651	588
25	462	1040	737	5760	8580	5850	3270	1810	1280	659	636	575
26	474	980	756	5300	7280	4960	2870	1740	1240	652	630	572
27	548	938	869	4430	6350	4400	2610	1630	1070	654	612	523
28	628	906	900	7110	5780	3860	2400	1530	1060	634	601	522
29	639	900	914	15700	---	3480	2260	1580	1050	626	586	521
30	610	869	994	11200	---	3210	2090	1540	1070	620	586	500
31	562	---	967	8860	---	3000	---	1410	---	610	588	---
TOTAL	15494	65976	24262	179810	296730	179170	101530	100250	37200	25346	19999	15977
MEAN	500	2199	783	5800	10600	5780	3384	3234	1240	818	645	533
MAX	851	11800	994	32500	31800	16300	7980	7750	1650	1200	1040	659
MIN	417	649	681	897	4880	3000	2090	1410	1040	610	538	452
CFPSM	.30	1.34	.48	3.53	6.45	3.52	2.06	1.97	.76	.50	.39	.32
IN.	.35	1.49	.55	4.07	6.72	4.06	2.30	2.27	.84	.57	.45	.36

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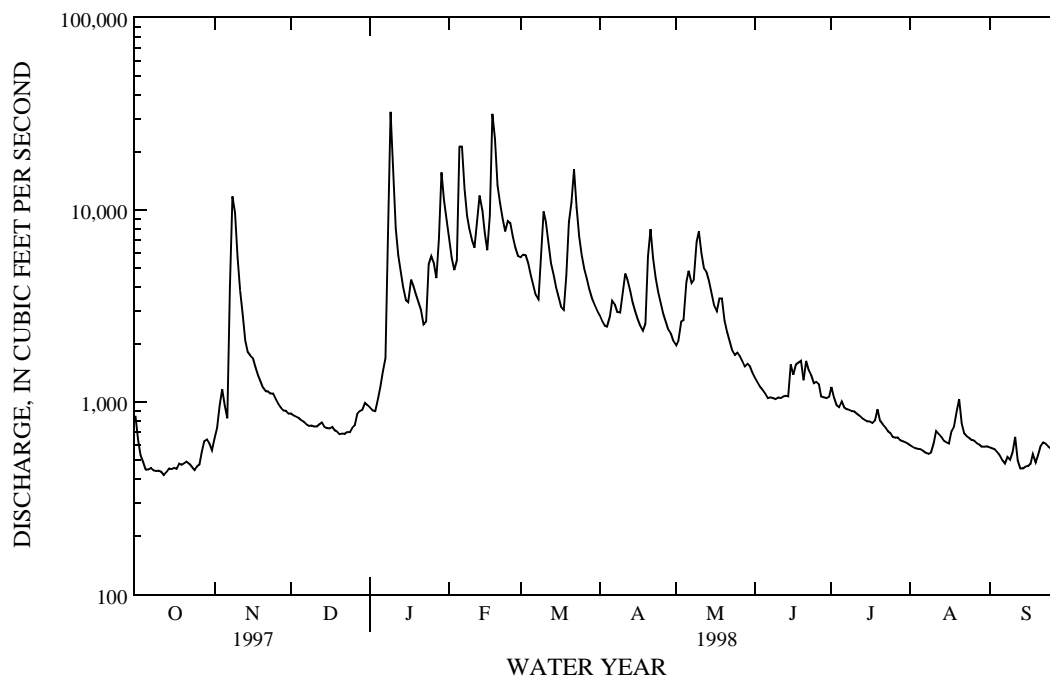
## 01631000 SOUTH FORK SHENANDOAH RIVER AT FRONT ROYAL, VA--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 1998, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	1165	1237	1495	1953	2260	2897	2476	1868	1347	808	949	957
MAX	8678	10130	4795	7876	10600	10300	7963	4807	6586	2876	6807	9631
(WY)	1943	1986	1973	1996	1998	1936	1987	1989	1972	1949	1955	1996
MIN	225	243	268	285	348	632	516	578	393	252	281	314
(WY)	1931	1931	1966	1966	1931	1981	1981	1977	1977	1966	1932	1965

SUMMARY STATISTICS	FOR 1997 CALENDAR YEAR		FOR 1998 WATER YEAR		WATER YEARS 1931 - 1998	
ANNUAL TOTAL	524282		1061744		1614	
ANNUAL MEAN	1436		2909		3189	
HIGHEST ANNUAL MEAN					1996	
LOWEST ANNUAL MEAN					1981	
HIGHEST DAILY MEAN	11800	Nov 8	32500	Jan 9	114000	Oct 16 1942
LOWEST DAILY MEAN	328	Aug 7	417	Oct 12	107	Nov 18 1930
ANNUAL SEVEN-DAY MINIMUM	437	Oct 8	437	Oct 8	152	Sep 6 1966
INSTANTANEOUS PEAK FLOW			36800	Jan 9	130000	Oct 16 1942
INSTANTANEOUS PEAK STAGE			15.42	Jan 9	a34.80	Oct 16 1942
INSTANTANEOUS LOW FLOW			403	Oct 12	59	Jan 30 1934
ANNUAL RUNOFF (CFSM)	.87		1.77		.98	
ANNUAL RUNOFF (INCHES)	11.88		24.05		13.36	
10 PERCENT EXCEEDS	2650		7300		3230	
50 PERCENT EXCEEDS	988		1110		960	
90 PERCENT EXCEEDS	472		522		390	

a From floodmarks.



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01631000 SOUTH FORK SHENANDOAH RIVER AT FRONT ROYAL, VA--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--July 1996 to current year.

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1997 TO SEPTEMBER 1998

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (MG/L) (00301)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)
OCT 1997										
30...	1530	623	358	8.9	18.0	12.0	750	13.1	124	40
NOV										
08...	1515	12600	210	7.6	--	9.0	741	10.7	95	--
20...	1010	1150	270	6.6	8.0	9.0	750	11.2	98	--
DEC										
16...	0830	793	315	7.9	3.0	1.0	752	13.2	94	--
JAN 1998										
09...	1300	36100	135	6.0	15.0	13.0	739	11.5	113	--
10...	1015	14600	165	6.2	6.0	10.0	751	10.6	95	--
22...	1200	2500	245	7.7	1.0	5.0	754	12.4	98	30
*22...	1205	2500	245	7.7	1.0	5.0	754	12.4	98	--
24...	1130	5570	238	8.0	4.0	5.5	744	11.9	97	--
29...	1100	17100	184	7.0	6.0	3.0	746	12.8	97	--
30...	1045	10900	182	7.1	6.0	4.0	745	13.0	101	--
FEB										
06...	1045	21100	142	7.4	5.0	3.0	745	12.1	92	--
08...	1100	9240	205	7.0	8.0	4.5	749	12.0	94	--
*12...	1245	8520	212	7.2	12.0	7.0	741	11.2	95	--
12...	1245	8520	212	7.2	12.0	7.0	741	11.2	95	--
18...	1045	33000	126	7.5	13.0	6.5	738	11.1	93	--
20...	1200	13200	136	7.4	12.0	7.0	740	11.7	99	--
MAR										
17...	0945	3140	220	6.9	5.0	6.0	760	12.4	100	--
APR										
16...	0930	2730	194	7.7	20.0	16.5	744	10.4	109	24
21...	1200	7770	200	7.6	19.7	14.0	753	9.3	91	--
MAY										
07...	1135	4170	175	6.6	28.0	21.5	747	8.9	103	--
13...	0900	4760	168	7.1	15.0	15.0	754	10.3	103	--
JUN										
17...	1130	1670	324	7.6	26.0	23.0	755	7.1	84	--
JUL										
22...	1300	741	329	8.6	36.0	29.5	749	6.4	86	37
AUG										
21...	1030	749	332	9.0	27.0	25.0	748	10.0	124	--
SEP										
17...	1245	424	323	9.0	27.6	25.9	746	11.0	139	--

\* Replicate sample.



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01631000 SOUTH FORK SHENANDOAH RIVER AT FRONT ROYAL, VA--Continued

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1997 TO SEPTEMBER 1998

DATE	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)
OCT 1997									
30...	18	.14	.23	207	--	<.010	1.09	<.020	.29
NOV									
08...	--	--	--	--	1.04	.024	1.07	.092	.60
20...	--	--	--	--	--	<.010	1.58	<.020	.12
DEC									
16...	--	--	--	--	--	<.010	.219	<.020	.18
JAN 1998									
09...	--	--	--	--	.819	.033	.852	.155	2.2
10...	--	--	--	--	.796	.019	.815	.057	1.2
22...	7.7	<.10	6.8	140	1.70	.013	1.71	<.020	<.10
22...	--	--	--	--	1.66	.013	1.68	<.020	<.10
24...	--	--	--	--	1.70	.019	1.72	<.020	.20
29...	--	--	--	--	1.21	.012	1.22	.096	.47
30...	--	--	--	--	1.05	.016	1.06	.128	.66
FEB									
06...	--	--	--	--	--	<.010	.862	.086	.65
08...	--	--	--	--	--	<.010	1.54	.062	.33
12...	--	--	--	--	--	<.010	1.64	.060	.27
12...	--	--	--	--	--	<.010	1.64	.060	.27
18...	--	--	--	--	--	<.010	.790	.063	.31
20...	--	--	--	--	--	<.010	1.01	.042	.19
MAR									
17...	--	--	--	--	1.55	.041	1.59	<.020	<.10
APR									
16...	5.2	<.10	.48	106	--	<.010	.554	.025	.20
21...	--	--	--	--	--	<.010	.895	.062	.35
MAY									
07...	--	--	--	--	.860	.011	.871	.033	.41
13...	--	--	--	--	.818	.018	.836	.052	.21
JUN									
17...	--	--	--	--	--	<.010	1.48	.066	.63
JUL									
22...	12	.11	5.2	192	.581	.018	.599	.032	.39
AUG									
21...	--	--	--	--	.906	.016	.922	.033	.29
SEP									
17...	--	--	--	--	.490	.010	.500	.020	.34

&lt; Actual value is known to be less than the value shown.

## POTOMAC RIVER BASIN

01631000 SOUTH FORK SHENANDOAH RIVER AT FRONT ROYAL, VA--Continued

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1997 TO SEPTEMBER 1998

DATE	NITRO- GEN, AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN DIS- SOLVED (MG/L AS N) (00602)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	SEDI- MENT, SUS- PENDE (MG/L) (80154)
OCT 1997								
30...	.20	1.3	.174	.169	.174	11	2.2	7
NOV								
08...	.27	1.3	.218	.125	.148	--	--	129
20...	<.10	--	.107	.080	.100	--	--	2
DEC								
16...	.12	.34	.073	.043	.055	--	--	2
JAN 1998								
09...	.52	1.4	.749	.169	.164	--	--	755
10...	.23	1.0	.354	.075	.075	--	--	257
22...	<.10	--	.032	.013	.043	<10	5.4	7
22...	<.10	--	.030	.030	.035	--	--	--
24...	.14	1.9	.051	.048	.057	--	--	26
29...	.21	1.4	.131	.087	.089	--	--	131
30...	.34	1.4	.173	.111	.120	--	--	73
FEB								
06...	.33	1.2	.206	.087	.113	--	--	164
08...	.24	1.8	.117	.091	.084	--	--	37
12...	.13	1.8	.082	.055	.055	--	--	--
12...	.13	1.8	.082	.055	.055	--	--	31
18...	.21	1.0	.105	.065	.072	--	--	325
20...	.11	1.1	.054	.034	.043	--	--	82
MAR								
17...	<.10	--	.026	.021	.031	--	--	7
APR								
16...	.10	.66	.030	.030	.021	28	<4.0	6
21...	.26	1.2	.096	.051	.047	--	--	65
MAY								
07...	.21	1.1	.075	.051	.050	--	--	24
13...	.16	1.0	.094	.050	.062	--	--	27
JUN								
17...	.28	1.8	.141	.113	.108	--	--	22
JUL								
22...	.25	.85	.107	.077	.070	15	7.7	3
AUG								
21...	.22	1.1	.124	.113	.114	--	--	4
SEP								
17...	.30	.80	.065	.062	.057	--	--	2

&lt; Actual value is known to be less than the value shown.