Water Resources Data
Missouri
Water Year 1997

by H.S. Hauck, L.G. Huber, and C.D. Nagel

U.S. GEOLOGICAL SURVEY WATER-DATA REPORT MO-97 -1
Prepared in cooperation with the State of Missouri
and other agencies

06902000 GRAND RIVER NEAR SUMNER, MO

LOCATION.--Lat 39°38'25", long 93°16'25", in NE 1/4 sec.29, T.56 N., R.21 W., Livingston County, Hydrologic Unit 10280103, near right bank on downstream side of pier of bridge on State Highway 139, 240 ft downstream from Chicago, Burlington and Quincy Railroad Bridge, 2.0 mi southwest of Sumner, 2.5 mi downstream from Locust Creek, and at mile 41.0.

DRAINAGE AREA.--6,880 mi^2, approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1923 to current year. Prior to April 1924 monthly discharge only, published in WSP 1310.

GAGE.--Water-stage recorder. Datum of gage is 631.18 ft above sea level. Prior to July 11, 1926, nonrecording gage at site 200 ft upstream at same datum; July 11, 1926, to July 9, 1939, nonrecording gage at same site and datum; July 10, 1939, to Aug. 8, 1952, water-stage recorder at site 200 ft upstream at same datum; Aug. 9, 1952, to Nov. 12, 1953, nonrecording gage at site 120 ft upstream and at same datum; Nov. 13, 1953, to July 6, 1964, water-stage recorder and nonrecording gage, for stages below 8.3 ft, at site 120 ft upstream and at same datum; July 7, 1964, to May 26, 1965, nonrecording gage at present site and datum. Auxiliary water-stage recorder at site 3.2 mi downstream from base gage at datum 631.30 ft above sea level; Mar. 15, 1939, to Aug. 4, 1942, auxiliary nonrecording gage at various sites; Aug. 5, 1942, to Dec. 14, 1956, auxiliary nonrecording gage at present site.

REMARKS.--No estimated daily discharges. Water-discharge records fair. National Weather Service gage-height and U.S. Army Corps of Engineers satellite telemeters at station.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 9, 1909, reached a stage of 36.7 ft, from floodmark.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1760	4250	9900	471	530	19300	1630	5430	2480	1900	437	268
2	1340	2590	8110	517	609	20900	1590	18600	2250	1740	360	260
3	1060	2030	4870	607	3690	14500	1540	11800	1920	1350	352	421
4	859	1650	3470	743	5660	8770	1510	14700	1710	1250	326	435
5	725	1540	2800	946	5600	6430	1530	9240	1540	1080	302	608
6	643	5350	2330	1050	5100	4970	3120	7140	2190	904	283	640
7	582	5120	2170	1000	3780	3800	6830	5360	3020	786	269	451
8	539	2880	1970	1000	2740	3280	6470	6900	2340	700	254	345
9	520	2200	1750	920	2290	3130	4030	14000	1860	644	242	284
10	490	2020	1540	820	2050	11400	3000	11300	1570	605	238	243
11	461	1690	1420	750	1820	10600	28500	6780	1390	563	241	215
12	435	1480	1390	733	1610	6590	52200	4720	1290	559	280	201
13	422	1330	1380	656	1510	4800	46800	3810	1200	579	490	215
14	409	1210	1300	519	1450	3770	40000	3330	2140	598	455	284
15	396	1150	1220	439	1430	3180	47100	3030	2230	551	369	350
16	387	1140	1140	367	1510	2790	56100	2640	10000	492	322	352
17	379	1910	1050	333	1770	2540	47500	2470	9660	457	310	530
18	369	10500	741	321	2940	2480	23300	2350	5020	425	330	778
19	409	9000	669	317	9910	2530	8810	4160	2880	402	583	566
20	475	5000	817	313	11400	2510	6970	3670	2230	382	1950	597
21	455	3730	891	331	34000	2400	12000	2420	1730	373	1040	528
22	461	2910	842	463	69200	2280	16300	2140	1710	564	618	386
23	2100	2580	727	689	76400	2140	32400	1840	3230	484	452	351
24	12800	2310	641	1040	46000	2010	38100	1690	2160	457	376	436
25	7750	2020	591	1060	18700	2630	19300	2160	1470	435	320	775
26	4010	1790	544	946	10400	2680	9950	2050	1490	400	273	942
27	2610	1420	505	798	24800	2380	7410	2540	1770	374	278	860
28	2100	1250	463	714	31300	2250	6040	4750	2050	375	429	589
29	1700	1360	435	685	---	2020	5170	6450	1580	423	342	430
30	1500	3290	431	623	---	1870	4480	4500	1590	635	328	362
31	6080	---	439	562	---	1710	---	3250	---	533	311	---
MEAN	1749	2890	1824	669	13510	5246	17990	5652	2590	678	425	457
MAX	12800	10500	9900	1060	76400	20900	56100	18600	10000	1900	1950	942
MIN	369	1140	431	313	530	1710	1510	1690	1200	373	238	201
IN.	.29	.47	.31	.11	2.04	.88	2.92	.95	.42	.11	.07	.07

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1925 - 1997, BY WATER YEAR (WY)

MEAN	2624	2925	2056	1955	3747	5976	6968	6480	7353	4769	1779	3151
MAX	20630	29030	15440	14750	19250	34220	26680	43450	67270	87900	9194	28090
(WY)	1974	1932	1983	1932	1962	1979	1973	1995	1947	1993	1987	1926
MIN	37.1	40.3	53.0	32.1	57.0	79.5	67.3	130	176	52.8	41.0	62.5
(WY)	1957	1957	1956	1940	1939	1957	1956	1956	1988	1934	1936	1955

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1925 - 1997	
ANNUAL MEAN	5404		4382		4141	
HIGHEST ANNUAL MEAN					17390	1993
LOWEST ANNUAL MEAN					367	1934
HIGHEST DAILY MEAN	85800	May 29	76400	Feb 23	166000	Jun 8 1947
LOWEST DAILY MEAN	174	Feb 6	201	Sep 12	10	Aug 12 1934
ANNUAL SEVEN-DAY MINIMUM	222	Jan 4	255	Sep 8	12	Aug 7 1934
INSTANTANEOUS PEAK FLOW	---		81500	Feb 23	180000	Jun 8 1947
INSTANTANEOUS PEAK STAGE	---		36.36	Feb 23	42.52	Jul 10 1993
INSTANTANEOUS LOW FLOW	---		201	Sep 12	10	Aug 12 1934
ANNUAL RUNOFF (INCHES)	10.69		8.65		8.18	
10 PERCENT EXCEEDS	9890		9930		10200	
50 PERCENT EXCEEDS	1340		1510		975	
90 PERCENT EXCEEDS	389		357		128	

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(Ambient water-quality monitoring network)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--August 1962 to June 1963, August 1967 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: January 1974 to September 1981.
WATER TEMPERATURE: January 1974 to September 1981.

REMARKS.--National stream-quality accounting network station October 1967 to September 1993. Ambient water-quality monitoring network station since October 1993.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	DIS-CHARGE, INST. (CUBIC FEET PER SECOND) (00061)	SPE-CIFIC CON-DUCT-ANCE (µS/cm) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	TUR-BID-ITY (NTU) (00076)	OXYGEN, DIS-SOLVED (mg/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 µm-MF (COLS./ 100 mL) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 mL) (31673)	HARD-NESS TOTAL (mg/L as $CaCO_3$) (00900)	CALCIUM DIS-SOLVED (mg/L as Ca) (00915)
OCT												
09...	1250	527	425	8.10	16.0	7.9	10.3	107	92	75	190	56
NOV												
20...	1435	4930	260	7.80	5.5	0.4	11.5	94	5200	19000	120	36
DEC												
05...	1000	2860	335	7.70	2.0	97	12.5	94	1900	4500	150	45
JAN												
22...	1315	466	540	7.30	0.5	20	9.1	65	180	980	250	76
FEB												
12...	0945	1620	385	7.70	0.5	20	14.8	103	K32	70	160	48
MAR												
17...	0900	2510	415	8.00	6.0	90	11.7	96	300	260	190	59
APR												
23...	1030	29800	250	7.70	10.0	350	9.3	85	16000	21000	100	32
MAY												
27...	1410	2130	405	8.00	15.5	150	8.6	89	K1400	1800	190	58
JUN												
17...	1015	9790	170	7.50	23.0	430	4.4	53	K3700	K11000	71	22
JUL												
29...	0945	395	453	8.10	26.5	20	7.4	94	50	51	190	57
AUG												
19...	1035	511	390	8.00	23.5	44	7.0	85	400	800	170	51
SEP												
09...	0945	286	364	7.90	24.5	40	6.6	81	62	1200	170	50

DATE	MAGNE-SIUM, DIS-SOLVED (mg/L as Mg) (00925)	SODIUM, DIS-SOLVED (mg/L as Na) (00930)	POTAS-SIUM, DIS-SOLVED (mg/L as K) (00935)	ALKA-LINITY WAT WH TOT FET FIELD (mg/L as $CaCO_3$) (00410)	ALKA-LINITY WAT DIS TOT IT FIELD (mg/L as $CaCO_3$) (39086)	CAR-BONATE WATER WH IT FIELD (mg/L as CO_3) (00447)	BICAR-BONATE WATER WH IT FIELD (mg/L as HCO_3) (00450)	SULFATE DIS-SOLVED (mg/L as SO_4) (00945)	CHLO-RIDE, DIS-SOLVED (mg/L as Cl) (00940)	FLUO-RIDE, DIS-SOLVED (mg/L as F) (00950)	SILICA, DIS-SOLVED (mg/L as SiO_2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (mg/L) (70300)
OCT												
09...	11	11	5.4	177	178	0	217	31	8.8	0.2	9.8	256
NOV												
20...	6.6	6.4	5.7	98	95	0	116	22	8.4	0.2	9.4	172
DEC												
05...	8.3	8.1	5.1	131	132	0	162	30	9.7	0.2	9.3	207
JAN												
22...	15	16	7.0	232	231	0	282	46	13	0.2	14	333
FEB												
12...	9.4	11	6.6	136	136	0	166	36	14	0.2	9.1	233
MAR												
17...	11	11	4.2	161	163	0	199	38	9.3	0.2	10	258
APR												
23...	5.6	6.0	3.3	82	82	0	101	19	5.6	0.2	8.9	156
MAY												
27...	11	10	3.5	170	171	0	208	31	7.3	0.2	8.4	246
JUN												
17...	3.6	3.8	3.9	59	57	0	69	10	3.7	0.2	6.1	118
JUL												
29...	11	13	3.7	200	203	0	247	31	10	0.3	8.6	287
AUG												
19...	10	12	3.3	165	165	0	201	30	9.5	0.2	6.9	239
SEP												
09...	9.9	11	3.7	146	146	0	191	25	8.7	0.3	8.4	222

K--Results based on colony count outside the acceptable range (non-ideal colony count).

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (mg/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE DIS-SOLVED (mg/L as N) (00613)	NITRO-GEN, NO_2+NO_3 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)	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)	ALUM-INUM, DIS-SOLVED (µg/L as Al) (01106)	BARIUM, DIS-SOLVED (µg/L as Ba) (1105)
OCT 09...	240	0.35	364	<0.010	<0.02	<0.010	0.48	0.10	<0.02	0.02	<5.0	110
NOV 20...	155	0.23	2290	0.012	0.68	<0.010	2.6	0.18	0.07	0.06	<5.0	81
DEC 05...	196	0.28	1600	<0.010	0.68	<0.010	1.5	0.08	<0.02	0.05	<5.0	82
JAN 22...	331	0.45	419	0.020	0.69	0.200	0.68	0.07	<0.02	<0.01	<5.0	150
FEB 12...	222	0.32	1020	0.022	1.20	0.310	1.0	0.16	0.08	0.05	5.9	89
MAR 17...	244	0.35	1750	0.014	0.70	0.040	0.98	0.28	0.02	0.03	<5.0	110
APR 23...	136	0.21	12600	0.024	1.20	0.082	3.4	0.28	0.03	0.05	7.8	74
MAY 27...	234	0.33	1410	0.084	0.45	<0.010	E2.4	0.44	0.05	0.02	<5.0	110
JUN 17...	95	0.16	4810	0.081	1.70	<0.010	3.5	0.25	0.06	<0.01	8.3	67
JUL 29...	256	0.39	306	<0.010	<0.02	0.027	0.78	0.12	0.04	0.04	<5.0	98
AUG 19...	222	0.33	330	<0.010	0.02	0.081	0.96	0.18	0.02	0.05	12.0	82
SEP 09...	212	0.30	171	0.011	0.10	<0.010	1.1	0.15	<0.02	0.04	7.1	88

DATE	COBALT, DIS-SOLVED (µg/L) as Co) (01035)	IRON, DIS-SOLVED (µg/L) as Fe) (01046)	LITHIUM DIS-SOLVED (µg/L) as Li) (01130)	MANGA-NESE, DIS-SOLVED (µg/L) as Mn) (01056)	MOLYB-DENUM, DIS-SOLVED (µg/L) as Mo) (01060)	NICKEL, DIS-SOLVED (µg/L) as Ni) (01065)	SELE-NIUM, DIS-SOLVED (µg/L) as Se) (01145)	SILVER, DIS-SOLVED (µg/L) as Ag) (01075)	STRON-TIUM, DIS-SOLVED (µg/L) as Sr) (01080)	VANA-DIUM, DIS-SOLVED (µg/L) as V) (01085)	SI-MAZINE, WATER, DISS, REC (µg/L) (04035)
OCT 09...	<3.0	<3	<4	140	<10	4	<1	<1	220	<6	--
NOV 20...	<3.0	21	<4	3	<10	4	<1	<1	130	<6	<0.005
DEC 05...	<3.0	14	<4	20	<10	4	<1	<1	160	<6	--
JAN 22...	4.0	27	6	1100	<10	5	<1	<1	300	<6	--
FEB 12..	<3.0	41	<4	83	<10	3	<1	<1	170	<6	--
MAR 17...	<3.0	7	<4	64	<10	3	<1	<1	220	<6	E0.002
APR 23...	<3.0	13	<4	8	<10	3	<1	<1	120	<6	0.015
MAY 27...	3.0	7	5	200	<10	3	<1	<1	220	<6	0.026
JUN 17...	<3.0	14	<4	2	<10	4	<1	<1	91	<6	0.166
JUL 29...	<3.0	3	8	210	<10	2	<1	<1	240	<6	<0.005
AUG 19...	<3.0	<3	6	86	<10	2	<1	<1	220	<6	--
SEP 09...	<3.0	<3	<4	94	<10	2	<1	<1	220	<6	--

DATE	PRO-METON, WATER, DISS, REC (µg/L) (04037)	DEETHYL ATRA-ZINE, WATER, DISS, REC (µg/L) (04040)	CYANA-ZINE, WATER, DISS, REC (µg/L) (04041)	METO-LACHLOR WATER DISSOLV (µg/L) (39415)	ATRA-ZINE, WATER, DISS, REC (µg/L) (39632)	ALA-CHLOR, WATER, DISS, REC, (µg/L) (46342)	METRI-BUZIN SENCOR WATER DISSOLV (µg/L) (82630)	PROP-CHLOR, WATER, DISS, REC (µg/L) (04024)	BUTYL-ATE, WATER, DISS, REC (µg/L) (04028)	FONOFOS WATER DISS REC (µg/L) (04095)	ALPHA BHC DIS-SOLVED (µg/L) (34253)
NOV 20...	<0.018	E0.057	0.040	0.071	0.163	<0.002	<0.004	<0.007	<0.002	<0.003	<0.002
MAR 17...	<0.018	E0.008	0.018	0.038	0.105	E0.004	<0.004	<0.007	<0.002	<0.003	<0.002
APR 23...	E0.003	E0.027	0.268	0.350	1.12	0.013	0.009	<0.007	<0.002	<0.003	<0.002
MAY 27...	<0.018	E0.106	0.903	2.43	7.84	0.088	0.219	<0.007	<0.002	<0.003	<0.002
JUN 17...	E0.010	E0.622	1.24	2.42	9.60	0.356	0.306	E0.011	<0.002	<0.003	<0.002
JUL 29...	<0.018	E0.032	0.046	0.091	0.574	<0.002	<0.004	<0.007	<0.002	<0.003	<0.002

E--Laboratory estimated value.

06902000 GRAND RIVER NEAR SUMNER, MO--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	P,P' DDE DISSOLV (µg/L) (34653)	CHLOR-PYRIFOS DIS-SOLVED (µg/L) (38933)	LINDANE DIS-SOLVED (µg/L) (39341)	DI-ELDRIN DIS-SOLVED (µg/L) (39381)	MALA-THION, DIS-SOLVED (µg/L) (39532)	PARA-THION, DIS-SOLVED (µg/L) (39542)	DI-AZINON, DIS-SOLVED (µg/L) (39572)	2,6-DI-ETHYL ANILINE WAT FLT 0.7 µ GF, REC (µg/L) (82660)	ETHAL-FLUR-ALIN WAT FLT 0.7 µ GF, REC (µg/L) (82663)	PHORATE WATER FLTRD 0.7 µ GF, REC (µg/L) (82664)	TER-BACIL WATER FLTRD 0.7 µ GF, REC (µg/L) (82665)
NOV											
20...	<0.006	<0.004	<0.004	<0.001	<0.005	<0.004	<0.002	<0.003	<0.004	<0.002	<0.007
MAR											
17...	<0.006	<0.004	<0.004	<0.001	<0.005	<0.004	<0.002	<0.003	<0.004	<0.002	<0.007
APR											
23...	<0.006	<0.004	<0.004	<0.001	<0.005	<0.004	<0.002	<0.003	<0.004	<0.002	<0.007
MAY											
27...	<0.006	<0.004	<0.004	<0.001	<0.005	<0.004	<0.002	<0.003	<0.004	<0.002	<0.007
JUN											
17...	<0.006	--	<0.004	0.008	<0.005	<0.004	0.011	<0.003	<0.004	<0.002	<0.007
JUL											
29...	<0.006	<0.004	<0.004	<0.001	<0.005	<0.004	<0.002	<0.003	<0.004	<0.002	<0.007

DATE	LIN-URON WATER FLTRD 0.7 µ GF, REC (µg/L) (82666)	METHYL PARA-THION WAT FLT 0.7 µ GF, REC (µg/L) (82667)	EPTC WATER FLTRD 0.7 µ GF, REC (µg/L) (82668)	PEB-ULATE WATER FILTRD 0.7 µ GF, REC (µg/L) (82669)	TEBU-THIURON WATER FLTRD 0.7 µ GF, REC (µg/L) (82670)	MOL-INATE WATER FLTRD 0.7 µ GF, REC (µg/L) (82671)	ETHO-PROP WATER FLTRD 0.7 µ GF, REC (µg/L) (82672)	BEN-FLUR-ALIN WAT FLD 0.7 µ GF, REC (µg/L) (82673)	CARBO-FURAN WATER FLTRD 0.7 µ GF, REC (µg/L) (82674)	TER-BUFOS WATER FLTRD 0.7 µ GF, REC (µg/L) (82675)	PRON-AMIDE WATER FLTRD 0.7 µ GF, REC (µg/L) (82676)
NOV											
20...	<0.002	<0.006	<0.002	<0.004	<0.010	<0.004	<0.003	<0.002	<0.003	<0.013	<0.003
MAR											
17...	<0.002	<0.006	<0.002	<0.004	<0.010	<0.004	<0.003	<0.002	<0.003	<0.013	<0.003
APR											
23...	0.013	<0.006	<0.002	<0.004	<0.010	<0.004	<0.003	<0.002	<0.003	<0.013	<0.003
MAY											
27...	<0.002	<0.006	<0.002	<0.004	<0.010	<0.004	<0.003	<0.002	<0.003	<0.013	<0.003
JUN											
17...	0.482	<0.006	<0.002	<0.004	E0.014	<0.004	<0.003	<0.002	E0.009	<0.013	<0.003
JUL											
29...	<0.002	<0.006	<0.002	<0.004	<0.010	<0.004	<0.003	<0.002	<0.003	<0.013	<0.003

DATE	DISUL-FOTON WATER FLTRD 0.7 µ GF, REC (µg/L) (82677)	TRIAL-LATE WATER FLTRD 0.7 µ GF, REC (µg/L) (82678)	PRO-PANIL WATER FLTRD 0.7 µ GF, REC (µg/L) (82679)	CAR-BARYL WATER FLTRD 0.7 µ GF, REC (µg/L) (82680)	THIO-BENCARB WATER FLTRD 0.7 µ GF, REC (µg/L) (82681)	DCPA WATER FLTRD 0.7 µ GF, REC (µg/L) (82682)	PENDI-METH-ALIN WAT FLT 0.7 µ GF, REC (µg/L) (82683)	NAPROP-AMIDE WATER FLTRD 0.7 µ GF, REC (µg/L) (82684)	PRO-PARGITE WATER FLTRD 0.7 µ GF, REC (µg/L) (82685)	METHYL AZIN-PHOS WAT FLT 0.7 µ GF, REC (µg/L) (82686)	PER-METHRIN CIS WAT FLT 0.7 µ GF, REC (µg/L) (82687)
NOV											
20...	<0.017	<0.001	<0.004	<0.003	<0.002	<0.002	<0.004	<0.003	<0.013	<0.001	<0.005
MAR											
17...	<0.017	<0.001	<0.004	<0.003	<0.002	<0.002	<0.004	<0.003	<0.013	<0.001	<0.005
APR											
23...	<0.017	<0.001	<0.004	<0.003	<0.002	E0.001	E0.019	<0.003	<0.013	<0.001	<0.005
MAY											
27...	<0.017	<0.001	<0.004	<0.003	<0.002	<0.002	0.044	<0.003	<0.013	<0.001	<0.005
JUN											
17...	<0.017	<0.001	<0.004	<0.003	<0.002	E0.001	0.089	<0.003	<0.013	<0.001	<0.005
JUL											
29...	<0.017	<0.001	<0.004	<0.003	<0.002	<0.002	<0.004	<0.003	<0.013	<0.001	<0.005

E--Laboratory estimated value.

06904050 CHARITON RIVER AT LIVONIA, MO

LOCATION.--Lat 40°29'00", long 92°41'10", in NW 1/4 SE 1/4 NW 1/4 sec.34, T.66 N., R.16 W., Schuyler County, Hydrologic Unit 10280201, on left bank 10 ft downstream from bridge on U.S. Highway 136, 1.0 mi upstream from Shoal Creek, 0.5 mi east of Livonia, and at mile 90.9.

DRAINAGE AREA.--864 mi^2.

PERIOD OF RECORD.--May 1974 to current year. Occasional discharge measurements were made from October 1962 to May 1974.

REVISED RECORDS.--WDR MO-83-1: 1981.

GAGE.--Water-stage recorder. Datum of gage is 770.00 ft above sea level.

REMARKS.--Estimated daily discharges: Dec. 20 to Feb. 3, March 1, 2, 10, May 9, and Sept. 1. Records fair except for discharges above 2,000 ft^3/s and estimated daily discharges, which are poor. Several observations of water temperature were made during the year. Considerable regulation by Rathbun Lake (station 06903880), 51.0 mi upstream. U.S. Army Corps of Engineers satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	59	122	144	75	52	2150	122	2280	980	860	31	32
2	50	92	124	80	150	2240	116	1450	954	853	35	27
3	46	59	115	65	300	1850	111	1880	941	845	35	30
4	43	46	83	55	595	1480	109	1030	935	628	27	31
5	44	48	243	48	434	1380	125	950	920	281	24	32
6	44	55	878	45	309	1410	192	1020	944	261	53	32
7	46	56	885	45	256	1570	238	1030	774	255	29	29
8	46	49	890	45	347	1580	207	1710	564	236	21	26
9	49	48	881	45	539	2090	160	1760	538	110	20	27
10	48	41	885	43	507	2120	141	1000	529	51	24	28
11	67	38	887	43	495	1660	137	925	514	40	29	27
12	48	35	887	40	483	1720	173	969	520	37	34	25
13	43	32	883	40	469	1660	280	1030	574	35	46	34
14	42	31	879	43	458	1590	721	1010	611	35	35	35
15	41	32	877	43	448	1500	2480	989	592	32	28	38
16	41	39	875	45	294	1470	3940	976	701	30	73	33
17	42	226	871	50	254	1470	3870	992	601	28	66	37
18	38	325	864	48	1230	1470	3160	1000	765	26	277	46
19	36	252	789	45	1230	1460	1620	915	899	26	229	50
20	32	172	680	45	707	1460	1050	755	901	32	336	42
21	29	119	500	60	3130	1460	1600	956	903	49	370	34
22	35	97	275	90	3360	1350	1580	952	998	45	359	29
23	61	82	120	85	2720	1230	1630	950	935	51	333	65
24	107	74	90	80	1370	1220	1160	947	902	107	348	63
25	84	67	75	80	1020	1060	1020	959	895	58	348	91
26	53	57	70	70	1230	906	919	961	877	66	348	56
27	43	58	65	60	1940	645	880	903	868	70	335	45
28	38	67	65	55	1680	226	863	1450	868	49	130	39
29	46	56	60	50	---	155	887	930	864	40	50	30
30	77	98	65	48	---	137	1220	762	866	44	47	27
31	172	---	70	48	---	131	---	1000	---	39	33	---
MEAN	53.2	85.8	486	55.3	929	1350	1024	1111	791	172	134	38.0
MAX	172	325	890	90	3360	2240	3940	2280	998	860	370	91
MIN	29	31	60	40	52	131	109	755	514	26	20	25
IN.	.07	.11	.65	.07	1.12	1.80	1.32	1.48	1.02	.23	.18	.05

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1974 - 1997, BY WATER YEAR (WY)

MEAN	445	497	625	336	561	870	847	922	848	1057	656	534
MAX	1764	1714	2005	1797	1956	2046	1898	2239	1839	3923	2045	2029
(WY)	1994	1994	1983	1993	1983	1993	1983	1995	1980	1993	1993	1993
MIN	27.2	26.2	19.9	13.6	23.0	58.6	31.1	52.1	33.6	23.6	32.3	29.6
(WY)	1977	1990	1977	1977	1989	1989	1989	1980	1988	1988	1988	1976

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1974 - 1997	
ANNUAL MEAN	614		516		684	
HIGHEST ANNUAL MEAN					1838	1993
LOWEST ANNUAL MEAN					69.3	1989
HIGHEST DAILY MEAN	5480	May 28	3940	Apr 16	8960	Jul 18 1982
LOWEST DAILY MEAN	26	Feb 2	20	Aug 9	13	Jan 11 1977
ANNUAL SEVEN-DAY MINIMUM	29	Jan 29	28	Sep 6	13	Jan 11 1977
INSTANTANEOUS PEAK FLOW	---		4170	Apr 16	9200	Jul 18 1982
INSTANTANEOUS PEAK STAGE	---		18.29	Apr 16	28.33	Jul 18 1982
INSTANTANEOUS LOW FLOW	---		19	Aug 8,9	13	Jan 11 1977
ANNUAL RUNOFF (INCHES)	9.67		8.11		10.76	
10 PERCENT EXCEEDS	1250		1450		1630	
50 PERCENT EXCEEDS	320		141		385	
90 PERCENT EXCEEDS	42		33		33	

06904500 CHARITON RIVER AT NOVINGER, MO

LOCATION.--Lat 40°14'05", long 92°41'14", on south line of SE 1/4 NE 1/4 sec.28, T.63 N., R.16 W., Adair County, Hydrologic Unit 10280202, on downstream side of center pier of bridge on State Highway 6, 0.6 mi east of Novinger, 1.0 mi downstream from Rye Creek, 2.0 mi upstream from Spring Creek, and at mile 73.1.

DRAINAGE AREA.--1,370 mi^2, approximately.

PERIOD OF RECORD.--October 1930 to September 1952. October 1954 to current year. Prior to February 1931 monthly discharge only, published in WSP 1310.

REVISED RECORDS.--WSP 896: 1939. WSP 1116: 1932(M).

GAGE.--Water-stage recorder. Datum of gage is 737.65 ft above sea level. Prior to Dec. 20, 1939, nonrecording gage at bridge over old channel, 500 ft east, at the same datum; Dec. 20, 1939, to Sept. 30, 1952, and Oct. 1, 1954, to Aug. 1, 1956, water-stage recorder, supplemented by nonrecording gage, at same site and datum; Aug. 3, 1956, to May 16, 1957, nonrecording gage at present site and datum.

REMARKS.--Estimated daily discharges: Dec. 19 to Feb. 4, Feb. 18, and Apr. 14-23. Records fair except for periods of estimated daily discharges, which are poor. Several observations of water temperature were made during the year. Some regulation by Rathbun Lake (Iowa station 06903880). U.S. Army Corps of Engineers satellite telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,900 ft^3/s, June 13, 1947; gage height, 28.50 ft.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage known, 28.6 ft, June 1917.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	134	188	374	160	150	4500	347	5310	1310	924	39	70
2	105	150	294	210	240	4140	342	3140	1230	902	38	57
3	85	120	253	170	500	3200	328	5590	1170	881	37	54
4	78	96	197	150	1000	2400	318	2630	1150	827	36	52
5	72	107	195	135	1220	2080	350	1730	1090	450	34	50
6	69	143	786	125	752	1950	636	1640	1120	326	32	48
7	67	132	968	120	585	2130	565	1550	1040	302	53	48
8	66	113	962	110	508	2150	462	2770	767	288	35	48
9	66	103	944	110	675	4710	377	3030	687	211	31	48
10	64	92	970	115	724	5180	343	1710	654	101	30	46
11	66	86	957	105	684	2900	2160	1370	634	70	53	44
12	73	76	957	100	672	2650	2250	1280	626	62	85	44
13	64	71	952	100	662	2440	2180	1330	1030	59	51	57
14	104	70	944	95	627	2280	1700	1280	936	55	52	61
15	105	77	938	105	600	2080	1500	1210	743	52	43	52
16	116	82	921	110	518	1990	7600	1160	2180	47	62	52
17	135	619	903	120	399	1990	7000	1140	1040	45	160	60
18	117	752	922	115	1690	1970	5000	1320	877	43	153	72
19	112	436	900	115	2620	1930	3500	1570	991	41	362	62
20	108	303	800	110	1350	1910	2000	912	982	41	255	56
21	101	248	750	130	11300	1890	4000	1060	977	89	371	51
22	118	209	575	160	8730	1800	3600	1070	2440	62	360	49
23	260	190	300	190	4990	1580	3900	1050	1690	50	350	60
24	242	173	220	170	2960	1540	2610	1040	1180	89	348	152
25	219	159	175	160	1720	1510	1990	1750	1100	88	347	115
26	166	115	150	140	2680	1230	1680	1140	1050	60	348	93
27	130	167	130	135	5100	1100	1520	2520	991	66	342	72
28	118	185	120	130	3410	643	1400	4650	962	64	239	63
29	123	180	135	120	---	454	1320	2390	947	53	97	55
30	180	362	150	115	---	403	1650	1380	936	43	72	47
31	282	---	170	120	---	358	---	1330	---	41	84	---
MEAN	121	193	581	131	2038	2164	2088	1969	1084	207	148	61.3
MAX	282	752	970	210	11300	5180	7600	5590	2440	924	371	152
MIN	64	70	120	95	150	358	318	912	626	41	30	44
IN.	.10	.16	.49	.11	1.55	1.82	1.70	1.66	.88	.17	.12	.05

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1970 - 1997[a], BY WATER YEAR (WY)

MEAN	789	762	926	558	981	1561	1553	1809	1281	1578	820	813
MAX	3352	2403	3318	2686	2487	4105	5302	5447	3462	9877	2770	3232
(WY)	1974	1993	1983	1993	1983	1993	1973	1995	1990	1993	1993	1993
MIN	25.6	30.2	20.0	13.6	28.0	87.1	35.8	68.4	46.1	32.2	28.1	39.3
(WY)	1972	1990	1977	1977	1989	1989	1989	1980	1988	1970	1971	1988

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1970 - 1997[a]	
ANNUAL MEAN	1087		890		1120	
HIGHEST ANNUAL MEAN					3299	1993
LOWEST ANNUAL MEAN					114	1989
HIGHEST DAILY MEAN	20800	May 27	11300	Feb 21	20800	May 27 1996
LOWEST DAILY MEAN	53	Sep 22	30	Aug 10	11	Aug 1 1970
ANNUAL SEVEN-DAY MINIMUM	60	Sep 16	36	Aug 4	12	Jul 26 1970
INSTANTANEOUS PEAK FLOW	---		15100	Feb 21	22000	May 27 1996
INSTANTANEOUS PEAK STAGE	---		18.01	Feb 21	25.71	Jul 24 1993
INSTANTANEOUS LOW FLOW	---		28	Aug 10	11	Aug 1 1970,Jan 1 1995
ANNUAL RUNOFF (INCHES)	10.80		8.82		11.11	
10 PERCENT EXCEEDS	1600		2260		2400	
50 PERCENT EXCEEDS	462		326		556	
90 PERCENT EXCEEDS	80		53		41	

[a]Post-regulation period.

06905500 CHARITON RIVER NEAR PRAIRIE HILL, MO

LOCATION.--Lat 39°32'25", long 92°47'23", in NW 1/4 SW 1/4 sec.26, T.55 N., R.17 W., Chariton County, Hydrologic Unit 10280202, on right bank on downstream side of road at bridge on State Highway 129, 3.2 mi northwest of Prairie Hill, 13.5 mi upstream from Puzzle Creek, and at mile 19.6.

DRAINAGE AREA.--1,870 mi^2, approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1928 to current year. Prior to Oct. 1, 1953, published as "near Keytesville". Prior to May 1929, monthly discharge only, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 632.05 ft above sea level (levels by the U.S. Army Corps of Engineers). Prior to Oct. 1, 1953, nonrecording gage at site 8.2 mi downstream at datum 13.68 ft lower; Oct. 1, 1953, to July 2, 1958, nonrecording gage at present site and datum.

REMARKS.--Estimated daily discharges: Dec. 18 to Feb. 5 and May 20. Water-discharge records fair except for Dec. 18 to Feb. 28 and May 20, which are poor. Some regulation by Rathbun Lake (Iowa station 06903880). National Weather Service gage-height and U.S. Army Corps of Engineers satellite telemeters at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	349	281	483	220	150	3840	366	2410	1430	884	82	106
2	267	334	602	230	170	4660	341	5310	1380	876	79	109
3	217	235	507	240	240	3820	327	4950	1260	845	74	98
4	183	197	424	200	500	2960	313	6240	1180	884	71	86
5	162	174	368	170	1800	2290	361	2660	1140	844	67	78
6	148	150	298	150	1310	1980	692	1780	1120	542	66	74
7	140	156	623	145	891	1840	946	1640	1140	357	65	71
8	136	188	1020	145	718	2040	696	1560	1070	328	63	69
9	132	168	1010	140	663	2760	545	3040	776	300	75	66
10	123	139	973	130	648	8120	463	3000	661	280	69	65
11	120	122	978	130	759	4990	9990	1660	629	211	78	62
12	116	112	969	125	750	3030	13100	1300	603	162	86	61
13	117	104	961	125	702	2740	5840	1220	648	137	87	62
14	126	99	952	125	733	2460	6270	1270	1110	123	113	67
15	111	97	951	130	708	2220	9180	1210	1040	114	91	71
16	166	98	945	140	754	1960	14200	1150	3250	110	82	74
17	163	137	937	145	755	1910	11800	1150	3190	106	79	85
18	208	488	940	140	898	1910	9160	1130	1380	101	103	91
19	215	885	930	130	2320	1920	6590	3490	997	96	204	68
20	183	570	920	120	2590	1870	3760	2440	1050	92	297	82
21	164	414	800	130	13900	1850	7150	1160	1030	89	271	70
22	172	346	750	150	12500	1830	6240	1130	1130	105	299	69
23	191	289	600	170	6350	1710	7070	1120	2420	132	339	72
24	312	269	420	210	4360	1520	5260	1080	1670	111	340	73
25	368	257	230	190	2590	2950	2910	1070	1160	97	341	83
26	322	194	210	170	3260	2010	2060	1770	1050	115	340	136
27	271	168	200	155	7250	1360	1660	1380	994	125	337	117
28	221	204	190	150	5400	1150	1450	8140	934	114	341	103
29	192	244	185	150	---	736	1320	5250	910	122	323	84
30	182	314	200	145	---	496	1230	2770	897	111	213	73
31	183	---	210	145	---	410	---	1600	---	93	137	---
MEAN	192	248	638	156	2631	2430	4376	2422	1242	278	168	80.8
MAX	368	885	1020	240	13900	8120	14200	8140	3250	884	341	136
MIN	111	97	185	120	150	410	313	1070	603	89	63	61
IN.	.12	.15	.39	.10	1.47	1.50	2.61	1.49	.74	.17	.10	.05

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1997, BY WATER YEAR (WY)

MEAN	728	826	754	710	1127	1907	2049	2059	2006	1444	726	744
MAX	5695	6574	5449	4516	4102	5724	8981	9560	14830	15980	4856	5203
(WY)	1974	1962	1983	1946	1937	1973	1973	1995	1947	1993	1932	1993
MIN	9.59	9.77	13.0	12.9	18.1	37.3	45.9	84.1	25.8	13.4	7.97	13.6
(WY)	1957	1957	1957	1957	1957	1957	1956	1956	1934	1934	1936	1953

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1929 - 1997	
ANNUAL MEAN	1468		1224		1254	
HIGHEST ANNUAL MEAN					4320	1993
LOWEST ANNUAL MEAN					166	1989
HIGHEST DAILY MEAN	31800	May 28	14200	Apr 16	31800	May 28 1996
LOWEST DAILY MEAN	76	Apr 26	61	Sep 12	4.6	Aug 7 1934
ANNUAL SEVEN-DAY MINIMUM	91	Apr 22	65	Sep 8	4.8	Aug 4 1934
INSTANTANEOUS PEAK FLOW	---		21800	Apr 11	33600	May 27 1996
INSTANTANEOUS PEAK STAGE	---		18.35	Apr 11	22.33	May 27 1996
INSTANTANEOUS LOW FLOW	---		61	Aug 8,Sep 11-13	4.6	Aug 7 1934
ANNUAL RUNOFF (INCHES)	10.69		8.89		9.11	
10 PERCENT EXCEEDS	2200		3010		3180	
50 PERCENT EXCEEDS	618		341		358	
90 PERCENT EXCEEDS	127		86		38	

06905500 CHARITON RIVER NEAR PRAIRIE HILL, MO--Continued
(Ambient water-quality monitoring network)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--August 1962 to June 1963, August 1967 to July 1975, January 1978 to September 1986, November 1992 to current year.

REMARKS.--National stream-quality accounting network station from January 1978 to September 1986 and an ambient water-quality monitoring network station from November 1992 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	DIS-CHARGE, INST. (CUBIC FEET PER SECOND) (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SPE-CIFIC CON-DUCT-ANCE (µS/cm) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	OXYGEN, DIS-SOLVED (mg/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	OXYGEN DEMAND, CHEM-ICAL (HIGH LEVEL) (mg/L) (00340)	COLI-FORM, FECAL, 0.7 µm-MF (COLS./ 100 mL) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 mL) (31673)	ALKA-LINITY WAT WH TOT FET FIELD (mg/L as $CaCO_3$) (00410)
OCT											
09...	0930	126	13.5	434	8.2	9.7	96	--	K53	190	152
NOV											
20...	1030	559	5.0	370	8.2	11.8	95	28	2800	15000	118
DEC											
05...	1400	352	4.0	450	8.3	12.9	102	--	160	460	147
JAN											
22...	0930	150	0.5	460	7.6	8.9	63	18	K580	K3100	157
FEB											
12...	1400	702	1.5	450	8.1	13.4	97	--	K6	K43	136
MAR											
17...	1355	1920	6.5	290	8.0	12.4	103	--	K20	120	106
APR											
23...	1525	8530	11.0	265	7.8	10.6	99	--	K6600	5300	77
MAY											
27...	1030	1350	15.0	255	8.0	9.0	92	--	3100	4900	95
JUN											
17...	1515	2780	23.5	205	7.7	5.9	72	28	K9000	23000	74
JUL											
29...	1500	122	30.0	357	8.6	8.8	119	--	K10	50	143
AUG											
19...	1445	217	23.0	328	8.2	8.2	98	16	K6000	K10000	125
SEP											
09...	1410	66	27.5	422	8.5	8.7	113	--	K35	100	184

DATE	BICAR-BONATE WATER WH IT FIELD (mg/L as HCO_3) (00450)	CAR-BONATE WATER WH IT FIELD (mg/L as CO_3) (00447)	NITRO-GEN, NO_2+NO_3 TOTAL (mg/L as N) (00630)	NITRO-GEN, NITRITE TOTAL (mg/L as N) (00615)	NITRO-GEN, AMMONIA TOTAL (mg/L as N) (00610)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (mg/L as N) (00625)	PHOS-PHORUS TOTAL (mg/L as P) (00665)	PHOS-PHORUS ORTHO TOTAL (mg/L as P) (70507)	HARD-NESS TOTAL (mg/L as $CaCO_3$) (00900)	CALCIUM DIS-SOLVED (mg/L as Ca) (00915)
OCT										
09...	186	0	<0.02	<0.010	<0.01	0.38	0.06	0.02	--	--
NOV										
20...	146	0	0.39	0.010	0.07	1.3	0.23	0.07	170	50
DEC										
05...	178	0	0.42	<0.010	0.07	0.59	0.09	0.03	--	--
JAN										
22...	191	0	0.52	<0.010	0.39	0.79	0.08	0.04	200	60
FEB										
12...	166	0	0.75	0.030	0.32	1.1	0.14	0.11	--	--
MAR										
17...	130	0	0.45	0.020	0.02	0.91	0.34	0.04	--	--
APR										
23...	94	0	0.66	0.040	0.05	2.5	0.98	0.11	--	--
MAY										
27...	116	0	0.92	0.040	0.03	E1.7	0.45	0.08	--	--
JUN										
17...	90	0	1.30	0.027	0.04	7.5	0.52	0.08	99	30
JUL										
29...	165	10	<0.02	<0.010	0.03	0.67	0.07	0.04	--	--
AUG										
19...	153	0	<0.02	<0.010	0.06	1.5	0.27	0.05	140	40
SEP										
09...	216	4	<0.02	<0.010	0.02	0.60	0.06	0.04	--	--

K--Results based on colony count outside the acceptable range (non-ideal colony count).
E--Laboratory estimated value.

06905500 CHARITON RIVER NEAR PRAIRIE HILL, MO--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	MAGNESIUM, DISSOLVED (mg/L as Mg) (00925)	SODIUM, DISSOLVED (mg/L as Na) (00930)	POTASSIUM, DISSOLVED (mg/L as K) (00935)	SULFATE DISSOLVED (mg/L as SO_4) (00945)	CHLORIDE, DISSOLVED (mg/L as Cl) (00940)	FLUORIDE, DISSOLVED (mg/L as F) (00950)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (mg/L) (70300)	RESIDUE TOTAL AT 105 DEG. C, SUSPENDED (mg/L) (00530)	ALUMINUM, TOTAL RECOVERABLE (µg/L as Al) (01105)	ALUMINUM, DISSOLVED (µg/L as Al) (01106)
NOV 20...	11	9.3	4.7	66	8.2	0.2	256	240	3200	5.3
JAN 22...	13	15	3.5	71	10	0.2	288	24	380	<3.0
JUN 17...	5.8	4.1	2.8	19	3.8	0.2	136	3300	36000	<3.0
AUG 19...	9.0	10	3.7	38	7.0	0.2	200	140	2500	3.5

DATE	CADMIUM TOTAL RECOVERABLE (µg/L as Cd) (01027)	CADMIUM DISSOLVED (µg/L as Cd) (01025)	COPPER, DISSOLVED (µg/L as Cu) (01040)	IRON, DISSOLVED (µg/L as Fe) (01046)	LEAD, TOTAL RECOVERABLE (µg/L as Pb) (01051)	LEAD, DISSOLVED (µg/L as Pb) (01049)	MANGANESE, DISSOLVED (µg/L as Mn) (01056)	MERCURY TOTAL RECOVERABLE (µg/L as Hg) (71900)	ZINC, TOTAL RECOVERABLE (µg/L as Zn) (01092)	ZINC, DISSOLVED (µg/L as Zn) (01090)
NOV 20...	<1	<1	1.5	40	6	<1	5.6	<0.1	30	1.6
JAN 22...	<1	<1	<1.0	20	<1	<1	890	<0.1	7	1.2
JUN 17...	5	<1	1.4	7.0	42	<1	0.30	0.1	210	<1.0
AUG 19...	<1	<1	1.0	6.0	4	<1	13	<0.1	20	<1.0