Water-Data Report 2010

11276500 Tuolumne River near Hetch Hetchy, CA

San Joaquin River Basin

LOCATION.--Lat 37°56′15″, long 119°47′50″ referenced to North American Datum of 1927, in SW ¼ SE ¼ sec.17, T.1 N., R.20 E., Tuolumne County, CA, Hydrologic Unit 18040009, in Yosemite National Park, on left bank 0.9 mi downstream from O'Shaughnessy Dam at Hetch Hetchy, 2.5 mi downstream from Falls Creek, and 5.0 mi northeast of Mather.

DRAINAGE AREA.--457 mi^2.

SURFACE-WATER RECORDS

PERIOD OF RECORD.--October 1910 to current year. Monthly discharge only for some periods, published in WSP 1315-A. Published as "at Hetch Hetchy damsite, near Sequoia" 1910-14 and as "below Hetch Hetchy damsite, near Sequoia" 1915-18.

REVISED RECORDS.--WSP 1930: Drainage area.

GAGE.--Water-stage recorder, crest-stage gage with concrete control since May 5, 1970. Elevation of gage is 3,480 ft above NGVD of 1929, from topographic map. Prior to Jan. 1, 1915, water-stage recorder at site 1 mi upstream, at damsite, at different datum. Jan. 1, 1915, to Sept. 3, 1968, water-stage recorder, at same site and datum. Oct. 1, 1968, to May 4, 1970, nonrecording gage at site 0.5 mi upstream at different datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Flow regulated by Hetch Hetchy Reservoir (station 11275500) 0.9 mi upstream beginning in April 1923. Flow diverted upstream from station through tunnel to Robert C. Kirkwood Powerplant and Hetch Hetchy Aqueduct beginning Apr. 26, 1967. See schematic diagram of Tuolumne River Basin available from the California Water Science Center.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,400 ft^3/s, Jan. 3, 1997, gage height, 15.08 ft; no flow at times in 1968-70.

11276500 Tuolumne River near Hetch Hetchy, CA—Continued

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010
DAILY MEAN VALUES
[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	90	65	53	55	57	63	72	687	1,570	2,300	134	115
2	60	66	49	55	60	63	75	1,200	572	910	131	103
3	59	67	50	55	59	64	75	2,640	432	404	128	103
4	59	67	50	55	59	65	75	3,470	458	423	127	103
5	58	66	50	55	60	64	78	3,440	490	291	127	103
6	58	66	50	56	61	62	77	1,710	1,070	198	128	104
7	59	66	51	56	61	62	76	246	3,510	395	127	104
8	60	66	51	56	59	62	76	104	5,020	790	131	104
9	60	66	50	56	59	61	155	104	4,320	857	132	104
10	60	66	50	56	59	61	403	198	3,590	783	130	104
11	60	66	51	56	59	60	544	510	2,260	671	129	104
12	60	66	54	56	59	63	547	1,320	1,630	538	128	104
13	62	66	54	57	59	65	865	4,690	1,650	640	129	103
14	44	66	52	56	59	61	1,210	6,760	1,120	665	129	109
15	31	66	52	56	59	60	1,200	6,100	438	389	131	98
16	31	65	53	53	59	60	1,190	5,960	487	234	132	84
17	31	65	52	51	56	59	1,190	5,570	502	257	134	84
18	31	61	52	54	55	59	1,190	5,030	519	267	129	84
19	72	60	52	53	55	59	645	4,610	739	226	129	84
20	e140	62	53	59	55	59	255	4,080	1,530	191	129	84
21	e165	62	53	56	56	58	162	3,540	2,860	165	128	85
22	e105	62	53	55	56	58	150	3,040	3,450	134	128	85
23	e70	62	53	54	60	58	150	2,090	3,580	e140	128	85
24	62	60	54	53	77	58	150	877	3,860	e142	130	84
25	60	58	54	53	65	63	133	355	3,610	e143	131	85
26	59	58	53	53	67	68	95	353	3,650	e144	131	85
27	62	58	54	52	71	68	79	353	4,170	e140	131	85
28	65	57	54	51	65	63	80	354	4,440	138	131	85
29	65	57	55	51	---	71	96	353	4,450	136	131	86
30	65	58	55	51	---	69	229	353	3,340	135	131	86
31	65	---	55	51	---	71	---	1,160	---	134	131	---
Total	2,028	1,896	1,622	1,686	1,686	1,937	11,322	71,257	69,317	12,980	4,025	2,836
Mean	65.4	63.2	52.3	54.4	60.2	62.5	377	2,299	2,311	419	130	94.5
Max	165	67	55	59	77	71	1,210	6,760	5,020	2,300	134	115
Min	31	57	49	51	55	58	72	104	432	134	127	84
Ac-ft	4,020	3,760	3,220	3,340	3,340	3,840	22,460	141,300	137,500	25,750	7,980	5,630

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1911 - 1966, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	534	516	544	528	519	620	971	2,005	3,149	1,396	636	548
Max	813	780	2,281	1,221	1,556	1,078	2,803	5,336	7,859	4,624	1,320	1,143
(WY)	(1949)	(1939)	(1951)	(1965)	(1965)	(1916)	(1952)	(1919)	(1911)	(1911)	(1939)	(1939)
Min	13.8	1.52	1.83	2.51	34.2	11.2	507	493	480	279	27.1	5.83
(WY)	(1925)	(1924)	(1924)	(1924)	(1924)	(1925)	(1937)	(1961)	(1924)	(1919)	(1924)	(1923)

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SUMMARY STATISTICS

	Water Years 1911 - 1966	
Annual mean	997	
Highest annual mean	1,724	1911
Lowest annual mean	516	1924
Highest daily mean	11,400	Jun 18, 1911
Lowest daily mean	1.3	Nov 2, 1923
Annual seven-day minimum	1.4	Nov 1, 1923
Maximum peak flow	12,900	Jun 1, 1943
Maximum peak stage	13.90	Jun 1, 1943
Annual runoff (ac-ft)	722,600	
10 percent exceeds	2,230	
50 percent exceeds	721	
90 percent exceeds	115	

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1968 - 2010, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	52.5	61.4	71.9	108	72.0	81.6	220	1,166	1,735	760	154	79.2
Max	164	561	618	2,105	305	489	1,371	3,327	5,885	5,149	1,263	125
(WY)	(1987)	(1987)	(1997)	(1997)	(1974)	(1983)	(1986)	(1969)	(1983)	(1983)	(1983)	(1989)
Min	31.1	33.6	34.0	33.5	31.7	29.9	33.6	49.0	71.2	68.2	66.7	31.6
(WY)	(1969)	(1991)	(2008)	(1977)	(1971)	(1974)	(1981)	(1990)	(1977)	(1968)	(1974)	(1970)

SUMMARY STATISTICS

	Calendar Year 2009		Water Year 2010		Water Years 1968 - 2010	
Annual total	163,372		182,592			
Annual mean	448		500		381	
Highest annual mean					1,433	1983
Lowest annual mean					49.5	1977
Highest daily mean	6,820	May 19	6,760	May 14	13,800	Jan 3, 1997
Lowest daily mean	31	Oct 15	31	Oct 15	0.00	Oct 3, 1968
Annual seven-day minimum	41	Oct 12	41	Oct 12	0.00	Feb 20, 1970
Maximum peak flow			7,350	May 13	16,400	Jan 3, 1997
Maximum peak stage			12.02	May 13	15.08	Jan 3, 1997
Annual runoff (ac-ft)	324,000		362,200		276,000	
10 percent exceeds	1,240		1,250		892	
50 percent exceeds	90		76		68	
90 percent exceeds	51		53		36	

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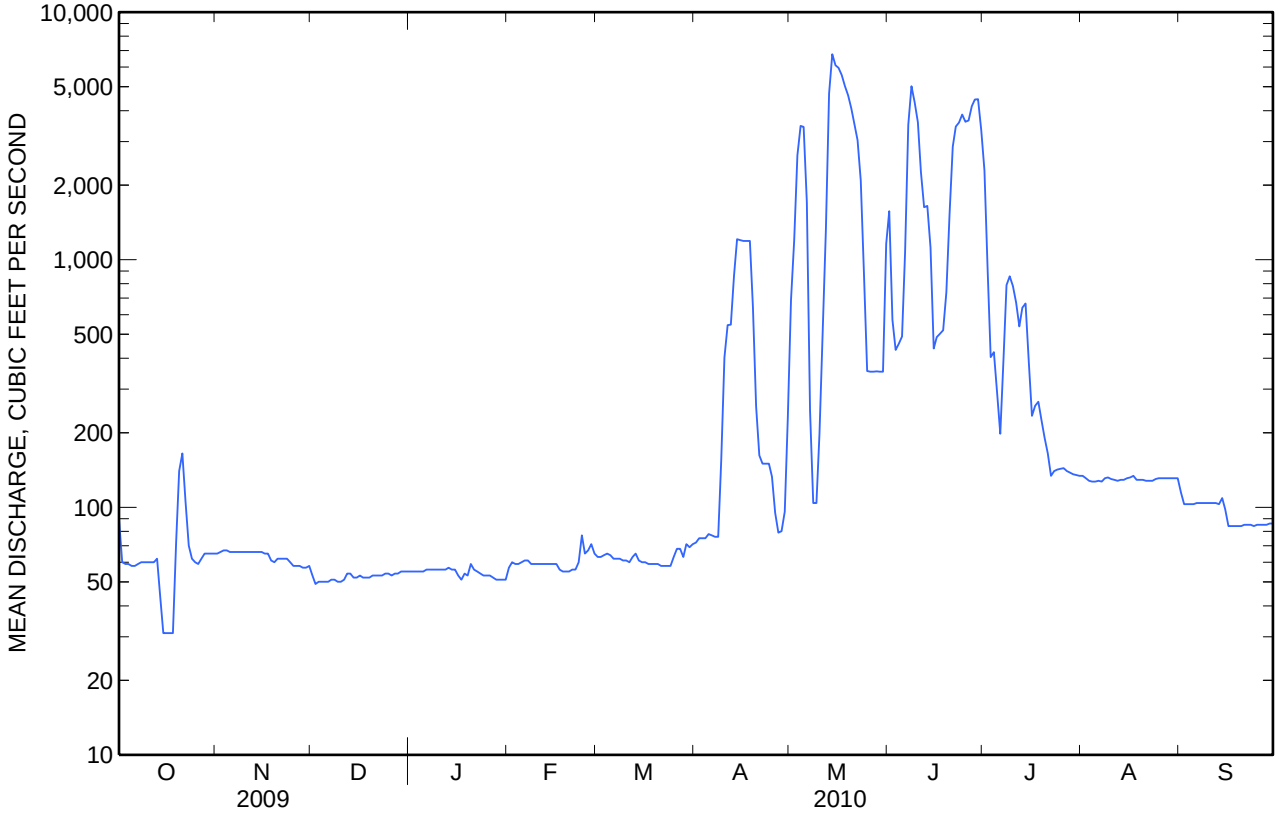

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WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--October 1971 to September 1972, August 1987 to current year.
WATER TEMPERATURE: October 1971 to September 1972, August 1987 to current year.

INSTRUMENTATION.--Water-temperature recorder October 1971 to September 1972, and since August 1987. Aug. 13, 1987, to Feb. 2, 2009, water-temperature recorder located 0.6 mi upstream from gaging station on left bank at road bridge. Since Feb. 3, 2009, at current stream gage location.

REMARKS.--Water-temperature records rated excellent except for Dec. 24 to Jan. 7, May 31 to Aug. 5, Aug. 19 to Sept. 8, and Sept. 15-27, which are rated poor. Water temperature can be affected by releases from O'Shaughnessy Dam. Interruption in record due to malfunction of recording instrument, loss of power, and probe out of water. Data collected during periods of intermittent instrument malfunction did not meet standard reporting accuracy of 0.1°C and were reported to 0.5°C.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: Maximum recorded, 19.5°C, July 12, 1996, June 30, 2000; minimum recorded, 4.0°C, Mar. 25, 1991.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum recorded, 18.0°C, July 14 (rounded to 0.5°C); minimum recorded, 6.0°C, Apr. 5.

TEMPERATURE, WATER, DEGREES CELSIUS
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010

Day	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
	October		November		December		January		February		March	
1	---	---	11.6	10.3	---	---	9.5	8.5	8.0	6.9	8.5	7.1
2	---	---	11.7	10.4	---	---	9.5	8.0	8.2	7.4	7.8	7.4
3	---	---	11.6	10.4	---	---	9.0	8.0	8.2	7.2	7.6	6.6
4	---	---	11.8	10.6	---	---	9.0	8.0	8.1	7.4	8.2	6.5
5	---	---	11.7	10.6	---	---	9.5	8.0	8.2	7.5	8.0	6.6
6	---	---	---	10.3	---	---	9.5	8.0	7.9	7.2	8.4	7.0
7	---	---	---	---	---	---	9.0	8.5	7.9	7.1	8.4	6.8
8	---	---	---	---	---	---	9.3	8.6	7.8	6.9	7.7	6.6
9	---	---	---	---	---	---	9.4	8.5	8.0	7.2	7.7	6.3
10	---	---	---	---	---	---	9.4	8.8	8.0	6.8	8.1	6.4
11	---	---	---	---	---	---	9.3	8.5	8.2	7.3	8.2	6.4
12	---	---	---	---	---	---	9.0	8.4	8.5	7.3	7.6	6.7
13	---	---	---	---	---	---	9.0	8.3	8.5	7.0	8.3	6.6
14	---	---	---	---	---	---	8.5	7.5	8.6	7.1	8.4	6.4
15	---	---	---	---	---	---	8.8	7.9	8.7	7.1	8.8	6.8
16	12.6	11.1	---	---	---	---	8.7	8.0	8.8	7.4	8.9	7.0
17	12.6	11.2	---	---	---	---	8.4	7.9	8.8	7.3	9.0	7.2
18	12.5	11.3	---	---	---	---	8.1	7.3	8.7	7.4	9.0	7.1
19	12.1	10.4	---	---	---	---	8.0	7.4	8.3	7.3	9.2	6.9
20	---	10.1	---	---	---	---	7.6	6.9	8.3	7.4	8.9	7.2
21	---	---	---	---	---	---	7.5	6.9	7.5	7.0	8.5	6.9
22	---	---	---	---	---	---	7.8	6.8	8.1	6.6	9.0	6.8
23	11.8	---	---	---	---	---	7.8	7.0	7.7	6.9	8.9	6.9
24	12.0	10.7	---	---	9.5	8.5	7.7	6.7	7.9	7.0	9.0	7.2
25	11.8	10.5	---	---	9.5	8.5	8.1	7.5	8.4	6.9	8.6	7.2
26	11.8	10.6	---	---	9.5	8.5	8.5	7.6	7.9	7.3	8.8	6.7
27	11.3	9.5	---	---	9.5	8.5	8.3	7.3	7.8	7.2	9.0	6.8
28	10.1	8.9	---	---	9.5	8.0	8.0	7.0	8.6	6.8	9.1	7.0
29	10.5	9.2	---	---	9.5	8.5	8.3	7.3	---	---	8.9	7.0
30	11.4	9.8	---	---	9.5	8.5	8.5	7.5	---	---	7.7	6.9
31	11.4	10.1	---	---	9.5	8.5	7.7	6.6	---	---	8.6	6.5
Month	---	---	---	---	---	---	9.5	6.6	8.8	6.6	9.2	6.3

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TEMPERATURE, WATER, DEGREES CELSIUS
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010

Day	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
	April		May		June		July		August		September	
1	7.9	6.3	8.0	7.2	9.0	8.5	13.5	9.0	13.0	10.5	12.0	9.0
2	7.5	6.7	8.0	7.3	9.5	8.5	11.0	9.0	13.5	10.0	12.0	9.5
3	7.8	7.0	7.9	7.4	10.0	8.5	11.0	9.5	13.0	10.5	12.0	9.5
4	7.4	6.6	8.0	7.5	9.5	8.5	11.0	9.5	13.0	10.5	12.0	9.5
5	7.9	6.0	7.9	7.5	10.0	8.5	13.0	9.5	13.0	10.0	12.0	9.0
6	8.8	6.2	8.1	7.4	9.5	8.5	13.0	10.0	12.7	10.5	12.0	9.0
7	9.2	6.9	9.0	7.3	9.0	8.5	15.5	10.5	12.5	10.5	11.5	9.0
8	9.4	7.1	9.4	7.3	9.0	8.5	17.0	15.0	12.4	10.5	10.5	9.5
9	8.6	7.1	7.8	7.3	9.0	8.5	17.5	15.0	12.5	10.2	11.1	9.1
10	7.8	7.3	7.6	7.0	9.0	8.5	17.5	15.5	12.0	10.1	11.4	9.2
11	7.4	6.8	7.9	6.9	9.0	8.5	17.5	15.5	12.0	10.2	11.4	9.5
12	7.5	7.1	8.0	7.3	9.0	8.5	17.0	15.0	11.8	10.0	11.4	9.5
13	7.7	7.0	8.0	7.5	9.0	8.5	17.5	15.0	12.0	10.1	11.1	9.3
14	7.7	7.2	8.0	7.7	10.0	8.5	18.0	16.0	12.0	10.1	11.3	9.4
15	7.8	7.2	8.1	7.6	10.0	8.5	17.5	14.5	11.8	10.0	12.0	9.0
16	7.8	7.3	8.2	7.9	9.5	8.5	16.5	13.5	12.0	9.9	12.0	9.0
17	7.8	7.3	8.1	7.9	9.5	8.5	17.0	13.0	11.7	9.9	12.0	9.0
18	7.9	7.3	8.3	8.0	9.5	8.5	17.0	13.5	11.5	9.4	12.0	9.5
19	8.3	7.4	8.5	7.9	11.0	9.0	16.0	12.5	11.5	9.0	12.0	9.0
20	7.8	6.9	8.5	8.0	11.5	9.5	13.0	10.0	11.5	9.0	11.5	9.0
21	7.8	7.1	8.7	8.0	12.0	11.0	12.5	10.0	11.0	9.0	12.0	9.0
22	8.1	7.0	8.5	8.0	12.5	11.5	13.5	10.5	11.5	9.0	11.5	9.0
23	9.0	7.2	8.6	8.0	12.5	11.5	13.5	10.5	11.5	9.0	12.0	9.0
24	9.1	7.3	8.5	7.9	13.0	12.0	13.5	10.5	12.0	9.0	11.5	9.0
25	9.1	7.3	8.8	7.7	13.0	11.5	13.5	10.5	12.0	9.5	12.0	9.0
26	9.6	7.3	8.8	8.0	13.0	11.5	13.0	11.0	12.0	10.0	12.0	9.5
27	8.0	7.6	8.7	8.0	14.0	12.0	13.5	10.5	11.5	9.5	12.0	9.5
28	7.7	6.8	9.1	7.9	14.0	10.5	13.0	10.5	10.5	9.0	11.9	10.1
29	8.0	6.7	9.4	8.1	12.0	10.5	13.0	10.5	11.0	9.0	11.9	10.0
30	8.3	6.8	9.6	8.2	13.0	11.0	13.5	10.5	11.5	8.5	11.8	10.1
31	---	---	9.0	8.5	---	---	13.5	10.5	11.0	9.0	---	---
Month	9.6	6.0	9.6	6.9	14.0	8.5	18.0	9.0	13.5	8.5	12.0	9.0

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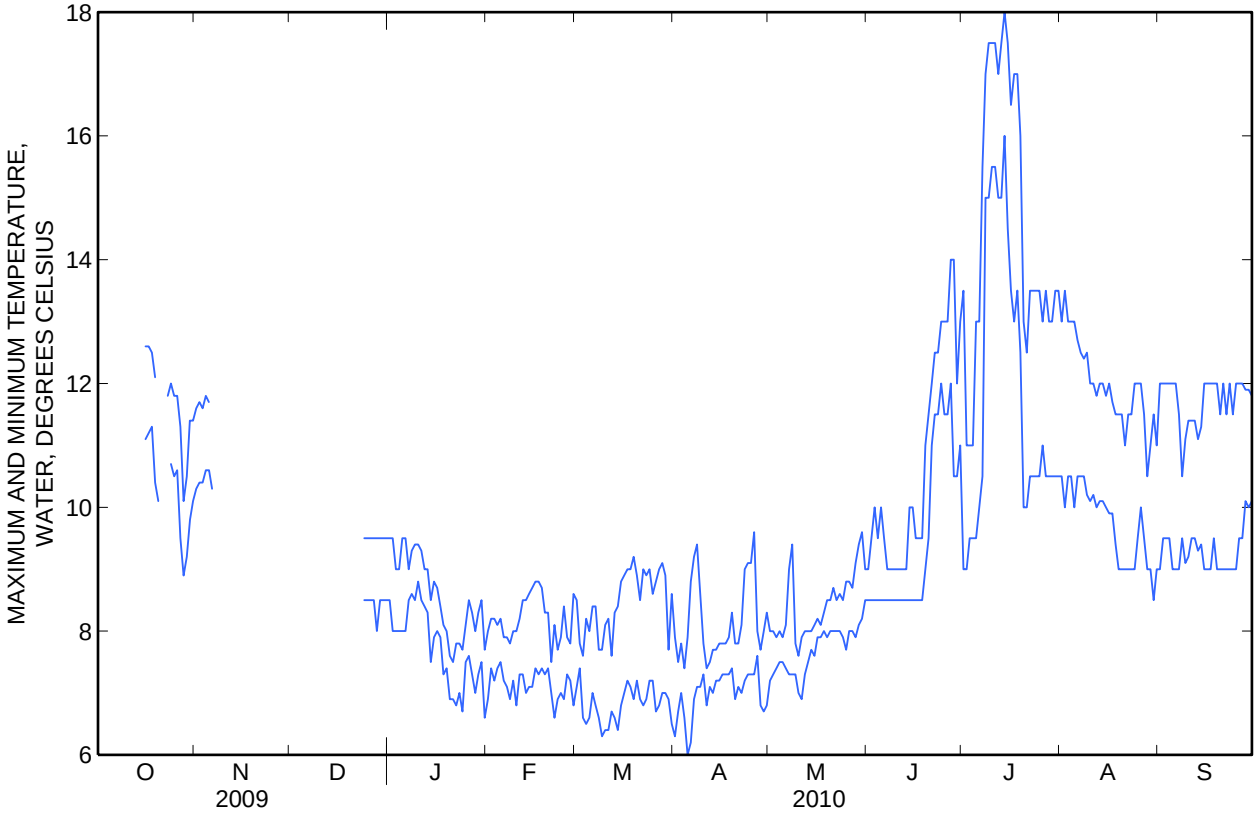

11276500 Tuolumne River near Hetch Hetchy, CA—Continued

CROSS SECTION ANALYSES
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010
[ft, feet; °C, degrees Celsius]

Sample date-time	Temperature, water, °C (00010)	Depth to bottom at sample location, ft (81903)	Sampling depth, ft (00003)	Stream width, ft (00004)	Location in cross section, distance from left bank looking downstream, ft (00009)
08-05-2010 1050	11.2	1.35	.81	70.0	3.50
08-05-2010 1051	11.2	1.71	1.03	70.0	10.5
08-05-2010 1052	11.2	1.91	1.15	70.0	17.5
08-05-2010 1053	11.2	1.91	1.15	70.0	24.5
08-05-2010 1054	11.3	.93	.56	70.0	31.5
08-05-2010 1055	11.2	2.21	1.33	70.0	38.5
08-05-2010 1056	11.2	2.00	1.20	70.0	45.5
08-05-2010 1057	11.3	1.76	1.06	70.0	52.5
08-05-2010 1058	11.3	1.01	.61	70.0	59.5
08-05-2010 1059	11.3	.92	.55	70.0	66.5
09-22-2010 1140	10.3	.72	.43	72.0	3.60
09-22-2010 1141	10.3	1.22	.73	72.0	10.8
09-22-2010 1142	10.3	1.70	1.02	72.0	18.0
09-22-2010 1143	10.3	.92	.55	72.0	25.2
09-22-2010 1144	10.3	1.91	1.15	72.0	32.4
09-22-2010 1145	10.3	.92	.55	72.0	39.6
09-22-2010 1146	10.4	.73	.44	72.0	46.8
09-22-2010 1147	10.3	1.77	1.06	72.0	54.0
09-22-2010 1148	10.3	1.70	1.02	72.0	61.2
09-22-2010 1149	10.4	.40	.24	72.0	68.4

Note: Instantaneous discharge at the mean time of cross-sectional measurements: Aug. 5, 126 ft^3/s; Sept. 22, 85 ft^3/s.