Water-Data Report 2011

02034000 RIVANNA RIVER AT PALMYRA, VA

James Basin
Rivanna Subbasin

LOCATION.--Lat 37°51′28″, long 78°15′58″ referenced to North American Datum of 1927, Fluvanna County, VA, Hydrologic Unit 02080204, on left bank 300 ft upstream from bridge on U.S. Highway 15 at Palmyra, 0.5 mi upstream from Cunningham Creek, and 15 mi upstream from mouth.

DRAINAGE AREA.--663 mi^2.

SURFACE-WATER RECORDS

PERIOD OF RECORD.--October 1933 to current year. Monthly discharge only for some periods, published in WSP 1303.

REVISED RECORDS.--WSP 802: 1936(M). WSP 852: 1937. WSP 892: 1934-35. WSP 1303: 1945-46(M). WSP 1503: 1956. WDR VA-72-1: 1969(M). OFR 2006-1308: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 210.39 ft NGVD of 1929. Prior to Oct. 24, 1942, water-stage recorder at site 200 ft downstream at present datum. Oct. 24, 1942, to Dec. 18, 1947, nonrecording gage 10 ft downstream at present datum.

COOPERATION.--Records provided by the Virginia Department of Environmental Quality - Water Division.

REMARKS.--Records good except those for estimated daily discharges, which are fair. Some diurnal fluctuation at times mostly at low and medium flow caused by South Fork Rivanna River Reservoir, diversions and discharge upstream at Charlottesville. National Weather Service gage-height telemeter at station. Maximum discharge, 86,000 ft^3/s, from rating curve extended above 76,000 ft^3/s on basis of contracted-opening measurement of peak flow and velocity-area study. Several measurements of water temperature were made during the year. Water-quality records for some prior periods have been collected at this location.

REVISIONS.--Discharges for Water Years 2008 to 2010 have been revised. Peak discharges greater than base discharge of 6,000 ft^3/s for these years are included in the table below, superseding those published in the 2008 to 2010 Annual Water Data Reports. Maximum for each year indicated by (*).

Date	Time	Discharge (ft^3/s)	Gage height (ft)
May 9, 2008	1930	*8,870	*13.84
Sep 6, 2008	1845	6,080	10.29
May 7, 2009	1000	*7,220	*11.74
Dec 26, 2009	1845	10,700	16.22
Jan 26, 2010	0345	*23,300	*23.52
Mar 13, 2010	2045	10,700	16.16
Mar 29, 2010	1315	6,650	11.01

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 ft^3/s and (or) maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar 7	0845	10,900	16.45
Mar 11	0615	12,000	17.79
Apr 17	1715	*14,600	*19.71
May 18	1215	13,700	19.19
Sep 6	0915	7,370	11.93

Suggested citation: U.S. Geological Survey, 2012, Water-resources data for the United States, Water Year 2011: U.S. Geological Survey Water-Data Report WDR-US-2011, site 02034000, accessed at http://wdr.water.usgs.gov/wy2011/pdfs/02034000.2011.pdf

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DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011
DAILY MEAN VALUES
[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	2,890	203	1,830	196	244	419	503	1,060	441	197	55	93
2	e1,150	184	2,910	202	811	395	496	907	396	161	53	90
3	e428	168	1,350	218	1,070	344	439	779	350	158	55	112
4	e255	295	926	206	740	311	403	1,030	311	347	59	99
5	206	668	724	192	598	301	518	1,060	299	455	64	95
6	165	473	620	187	512	1,720	660	770	281	247	57	4,490
7	149	351	320	192	431	8,250	594	701	273	349	83	4,220
8	137	298	388	194	380	2,600	553	646	253	297	140	1,510
9	125	273	337	179	333	1,610	609	592	242	461	142	545
10	118	253	309	156	301	5,090	575	527	330	324	88	413
11	109	230	304	175	284	9,680	537	473	264	208	72	233
12	106	215	307	182	265	3,390	598	438	314	163	64	229
13	103	199	398	172	257	2,060	2,230	438	542	148	64	267
14	105	194	350	167	252	1,470	1,830	443	335	219	76	199
15	200	189	243	178	241	1,190	1,290	796	236	177	265	175
16	158	338	250	173	213	1,230	1,360	1,380	202	129	249	161
17	128	1,510	273	172	210	1,030	11,200	5,620	187	113	169	154
18	110	979	277	169	218	783	4,080	11,900	216	103	111	148
19	107	615	256	178	216	800	2,160	4,620	266	97	89	146
20	121	469	240	179	199	675	1,580	2,470	918	94	81	159
21	193	399	231	174	183	600	1,240	1,760	708	94	85	176
22	170	352	231	167	203	602	1,020	1,360	468	89	135	186
23	144	320	232	149	225	567	1,090	1,260	329	85	105	262
24	123	297	228	136	210	665	1,000	1,090	272	82	105	340
25	123	270	217	153	245	762	844	895	237	77	100	261
26	123	258	221	189	288	637	744	681	201	75	235	392
27	217	253	224	358	257	591	1,040	653	196	74	116	474
28	775	236	204	410	264	577	1,390	604	190	71	167	504
29	418	219	195	370	---	514	1,920	582	326	67	159	519
30	275	213	207	291	---	469	1,330	556	311	64	110	398
31	225	---	202	251	---	472	---	502	---	60	92	---
Total	9,656	10,921	15,004	6,315	9,650	49,804	43,833	46,593	9,894	5,285	3,445	17,050
Mean	311	364	484	204	345	1,607	1,461	1,503	330	170	111	568
Max	2,890	1,510	2,910	410	1,070	9,680	11,200	11,900	918	461	265	4,490
Min	103	168	195	136	183	301	403	438	187	60	53	90
Cfsm	0.47	0.55	0.73	0.31	0.52	2.42	2.20	2.27	0.50	0.26	0.17	0.86
In.	0.54	0.61	0.84	0.35	0.54	2.79	2.46	2.61	0.56	0.30	0.19	0.96

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1935 - 2011, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	533	596	767	906	997	1,168	1,022	764	578	379	423	477
Max	3,535	3,521	2,667	2,620	3,468	3,415	3,662	2,472	4,473	1,524	3,404	2,915
(WY)	(1943)	(1986)	(1949)	(1936)	(1998)	(1993)	(1937)	(1989)	(1972)	(1975)	(1969)	(1979)
Min	46.4	64.7	88.9	104	103	225	214	204	95.9	39.0	20.2	19.1
(WY)	(1942)	(2002)	(1966)	(1966)	(2002)	(1981)	(1981)	(2002)	(1999)	(1966)	(1966)	(1954)

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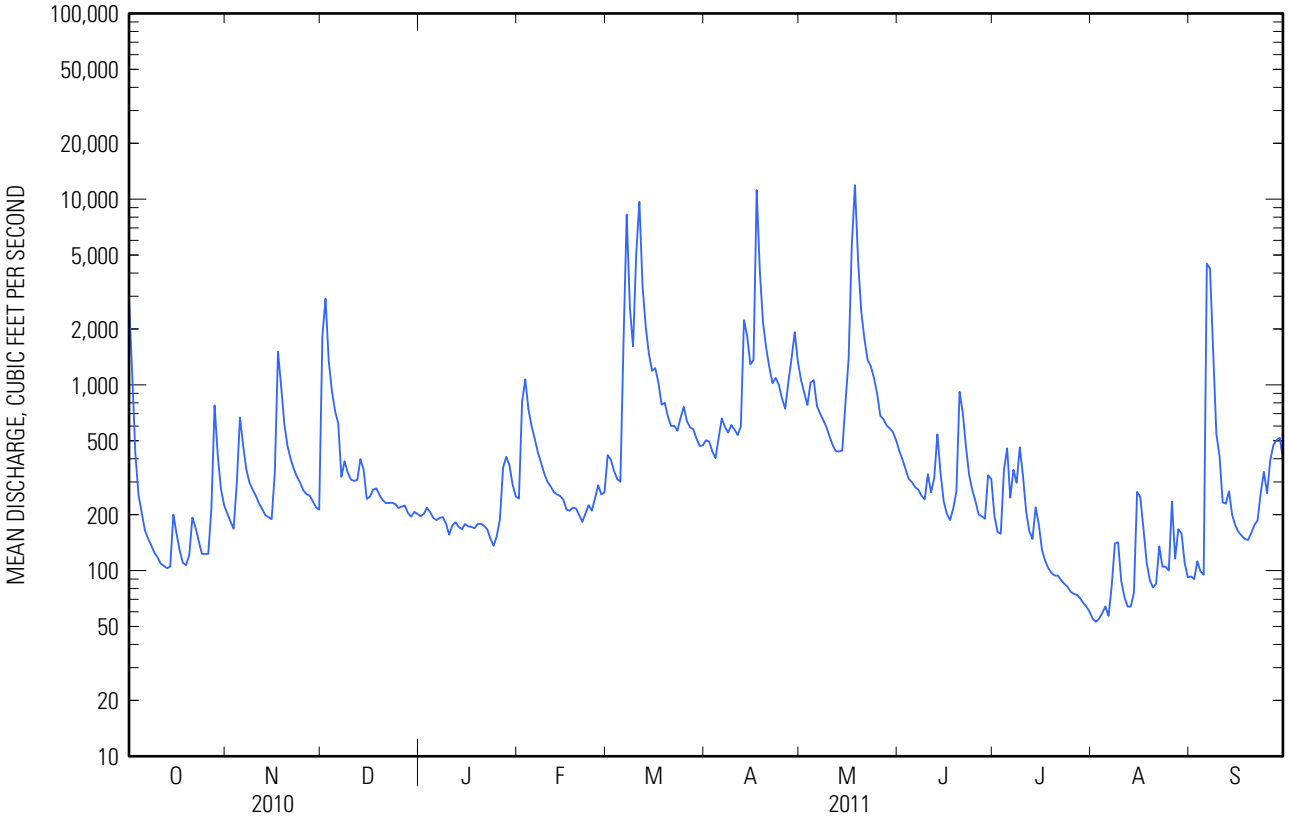
SUMMARY STATISTICS

	Calendar Year 2010		Water Year 2011		Water Years 1935 - 2011	
Annual total	244,800		227,450			
Annual mean	671		623		716	
Highest annual mean					1,401	1973
Lowest annual mean					129	2002
Highest daily mean	15,200	Jan 26	11,900	May 18	68,000	Jun 22, 1972
Lowest daily mean	24	Sep 26[a]	53	Aug 2	5.2	Sep 9, 1966[b]
Annual seven-day minimum	28	Sep 20	58	Jul 31	5.6	Sep 7, 1966
Maximum peak flow			14,600	Apr 17	86,000	Aug 20, 1969
Maximum peak stage			19.71	Apr 17	39.85	Aug 20, 1969
Instantaneous low flow			47	Jul 31	5.2	Sep 9, 1966
Annual runoff (cfsm)	1.01		0.940		1.08	
Annual runoff (inches)	13.74		12.76		14.67	
10 percent exceeds	1,360		1,250		1,400	
50 percent exceeds	308		265		411	
90 percent exceeds	55		104		100	

[a] Estimated.
[b] Also Sept. 10, 11, 1966.



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WATER-QUALITY RECORDS

PERIOD OF RECORD.--January to September 2011.

COOPERATION.--Water samples were collected by the U.S. Geological Survey and analyzed by either the U.S. Geological Survey (Agency code 1028) or by the Virginia Division of Consolidated Laboratory Services (VDCLS, Agency code 85116), using analytical methods approved by the U.S. Geological Survey. Analyses performed by the VDCLS are reported to U.S. Geological Survey rounding specifications. Results of chemical analyses provided by VDCLS were quality-assured and approved by the U.S. Geological Survey.

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011
Part 1 of 3

[%, percent; FNU, Formazin nephelometric units; LED, light-emitting diode; N, nitrogen; P, phosphorus; ft, feet; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; --, no data; <, less than]

Date	Sample start time	Medium name	Sample type	Barometric pressure, mm Hg (00025)	Temperature, air, °C (00020)	Discharge, instantaneous, ft³/s (00061)	Dissolved oxygen, water, unfiltered, mg/L (00300)	Dissolved oxygen, water, unfiltered, % saturation (00301)
01-28-2011	**0900**	Surface water	Regular	753	2.5	434	14.1	101
02-04-2011	**0930**	Surface water	Replicate	762	3.5	762	12.8	96
02-04-2011	***0935***	*QC sample - Surface water*	*Replicate*	--	--	--	--	--
03-07-2011	**1345**	Surface water	Replicate	759	21.0	8,670	12.3	104
03-07-2011	***1350***	*QC sample - Surface water*	*Replicate*	--	--	--	--	--
03-11-2011	**0745**	Surface water	Regular	750	2.0	12,000	11.6	100
09-06-2011	***1040***	*QC sample - Artificial*	*Blank*	--	--	--	--	--
09-06-2011	**1045**	Surface water	Blank	753	17.0	7,060	8.3	95
09-07-2011	**1500**	Surface water	Regular	755	25.0	3,640	8.7	98

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011
Part 2 of 3

[%, percent; FNU, Formazin nephelometric units; LED, light-emitting diode; N, nitrogen; P, phosphorus; ft, feet; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; --, no data; <, less than]

Date	Sample start time	pH, water, unfiltered, field, standard units (00400)	Specific conductance, water, unfiltered, µS/cm at 25 °C (00095)	Temperature, water, °C (00010)	Turbidity, water, unfiltered, monochrome near infrared LED light, 780-900 nm, detection angle 90 +/- 2.5 degrees, FNU (63680)	Gage height, ft (00065)	Suspended solids remaining after ignition, water, unfiltered, mg/L (00540)	Suspended solids, water, unfiltered, mg/L (00530)	Ammonia, water, filtered, mg/L as N (00608)
01-28-2011	**0900**	7.4	323	1.5	17	3.28	10	12	0.040
02-04-2011	**0930**	6.9	100	3.5	20	3.69	13	15	.030
02-04-2011	***0935***	--	--	--	--	--	--	--	--
03-07-2011	**1345**	7.1	62	7.9	180	13.58	200	228	.060
03-07-2011	***1350***	--	--	--	--	--	--	--	--
03-11-2011	**0745**	6.9	56	8.1	250	17.77	296	332	--
09-06-2011	***1040***	--	--	--	--	--	*< 1*	*< 1*	*< .008*
09-06-2011	**1045**	6.8	52	21.1	160	11.53	129	151	.030
09-07-2011	**1500**	7.0	45	20.8	110	7.23	59	69	.060

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WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011

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[%, percent; FNU, Formazin nephelometric units; LED, light-emitting diode; N, nitrogen; P, phosphorus; ft, feet; ft^3/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; --, no data; <, less than]

Date	Sample start time	Nitrate plus nitrite, water, filtered, mg/L as N (00631)	Orthophos-phate, water, filtered, mg/L as P (00671)	Phosphorus, water, unfiltered, mg/L as P (00665)	Total nitrogen, water, unfiltered, mg/L (00600)	Suspended sediment, sieve diameter, percent smaller than 0.0625 mm (70331)	Suspended sediment concen-tration, mg/L (80154)
01-28-2011	**0900**	0.900	0.106	0.170	1.3	81	12
02-04-2011	**0930**	.690	.048	.120	1.1	93	13
02-04-2011	***0935***	--	--	--	--	--	*17*
03-07-2011	**1345**	.450	.013	.390	1.4	66	271
03-07-2011	***1350***	--	--	--	--	*77*	*288*
03-11-2011	**0745**	--	.018	.540	1.5	68	412
09-06-2011	***1040***	*< .008*	*.002*	*< .002*	*.02*	*.0*	*2*
09-06-2011	**1045**	.270	.022	.250	1.2	87	157
09-07-2011	**1500**	.300	.010	.150	.92	86	66