Water-Data Report 2012

01667500 RAPIDAN RIVER NEAR CULPEPER, VA

Lower Chesapeake Basin
Rapidan-Upper Rappahannock Subbasin

LOCATION.--Lat 38°21′01″, long 77°58′31″ referenced to North American Datum of 1927, Culpeper County, VA, Hydrologic Unit 02080103, on left bank 0.7 mi upstream from Cedar Run and bridge on US Highway 522, 8.5 miles south of Culpeper, Culpeper County, and at mile 29.6.

DRAINAGE AREA.--468 mi^2.

SURFACE-WATER RECORDS

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

REVISED RECORDS.--WSP 741: 1931. WSP 801: 1934(M), 1936(M). WSP 1081: 1943-46. WSP 1171: 1932(M), 1933-35. OFR 2006-1308: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 241.36 ft NGVD of 1929.

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

REMARKS.--Records good. Prior to 1977, diurnal fluctuation at low flow caused by mill at Rapidan, and since July 1986, by powerplant at same site. National Weather Service gage-height telemeter at station. Maximum discharge, 59,300 ft^3/s, from rating curve extended above 43,000 ft^3/s on basis of slope-area measurement at gage height 30.26 ft. Water-quality records for some prior periods have been collected at this location.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,500 ft^3/s and (or) maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)
Oct 13	0530	*12,300	*12.61
Dec 8	0615	9,380	10.83

Suggested citation: U.S. Geological Survey, 2013, Water-resources data for the United States, Water Year 2012: U.S. Geological Survey Water-Data Report WDR-US-2012, site 01667500, accessed at http://wdr.water.usgs.gov/wy2012/pdfs/01667500.2012.pdf

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DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012
DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	333	595	947	706	532	1,930	397	295	373	145	88	74
2	296	550	802	666	721	1,080	388	300	757	132	125	75
3	302	528	714	616	834	1,180	374	318	401	106	82	78
4	303	517	656	568	648	1,000	361	321	321	90	63	118
5	285	488	620	553	618	862	367	373	288	86	53	118
6	261	463	600	544	586	831	353	369	271	80	41	165
7	244	448	2,690	525	556	756	334	364	266	73	47	223
8	234	434	6,120	506	528	711	323	337	253	67	53	135
9	224	419	2,120	484	521	676	316	350	232	61	44	135
10	220	402	1,550	494	497	633	305	375	216	59	42	123
11	214	394	1,240	486	496	611	298	316	202	67	234	90
12	2,440	365	1,070	1,970	493	596	295	281	204	65	132	79
13	8,350	349	957	1,270	455	586	294	264	446	59	68	74
14	3,870	345	867	964	456	565	288	267	358	55	55	71
15	1,780	342	793	836	451	529	286	822	261	119	804	68
16	1,280	358	740	744	439	510	277	1,280	228	105	360	65
17	1,030	586	677	714	489	502	268	633	206	79	171	63
18	843	457	632	689	470	492	264	493	200	49	113	113
19	977	386	592	626	444	476	298	421	298	49	94	428
20	1,070	368	569	597	458	464	292	377	249	46	96	261
21	742	358	546	607	500	457	274	344	203	365	111	157
22	641	385	553	644	475	450	282	361	183	172	103	128
23	579	1,750	1,970	600	461	444	337	531	275	102	86	109
24	540	981	1,240	640	452	434	368	658	276	80	77	98
25	512	683	912	592	478	593	333	504	251	99	73	81
26	481	580	804	559	451	649	312	438	167	88	180	80
27	456	526	948	951	426	494	332	382	139	63	206	78
28	430	497	1,510	911	410	445	298	343	127	53	133	686
29	756	785	932	657	611	445	286	313	119	51	104	559
30	998	1,400	820	590	---	421	306	359	122	45	88	214
31	669	---	762	554	---	406	---	450	---	39	80	---
Total	31,360	16,739	35,953	21,863	14,956	20,228	9,506	13,239	7,892	2,749	4,006	4,746
Mean	1,012	558	1,160	705	516	653	317	427	263	88.7	129	158
Max	8,350	1,750	6,120	1,970	834	1,930	397	1,280	757	365	804	686
Min	214	342	546	484	410	406	264	264	119	39	41	63
Cfsm	2.16	1.19	2.48	1.51	1.10	1.39	0.68	0.91	0.56	0.19	0.28	0.34
In.	2.49	1.33	2.86	1.74	1.19	1.61	0.76	1.05	0.63	0.22	0.32	0.38

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 2012, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	418	479	579	656	712	839	768	578	480	292	305	374
Max	3,163	2,690	1,653	1,924	3,048	2,236	2,615	1,734	2,901	1,206	2,323	2,908
(WY)	(1943)	(1986)	(1949)	(1998)	(1998)	(1993)	(1937)	(1998)	(1995)	(1949)	(1955)	(1996)
Min	8.10	29.4	62.4	93.6	91.5	179	210	166	83.1	45.0	12.6	14.0
(WY)	(1931)	(1931)	(1931)	(1966)	(1931)	(1931)	(1981)	(1956)	(1999)	(1999)	(2002)	(1954)

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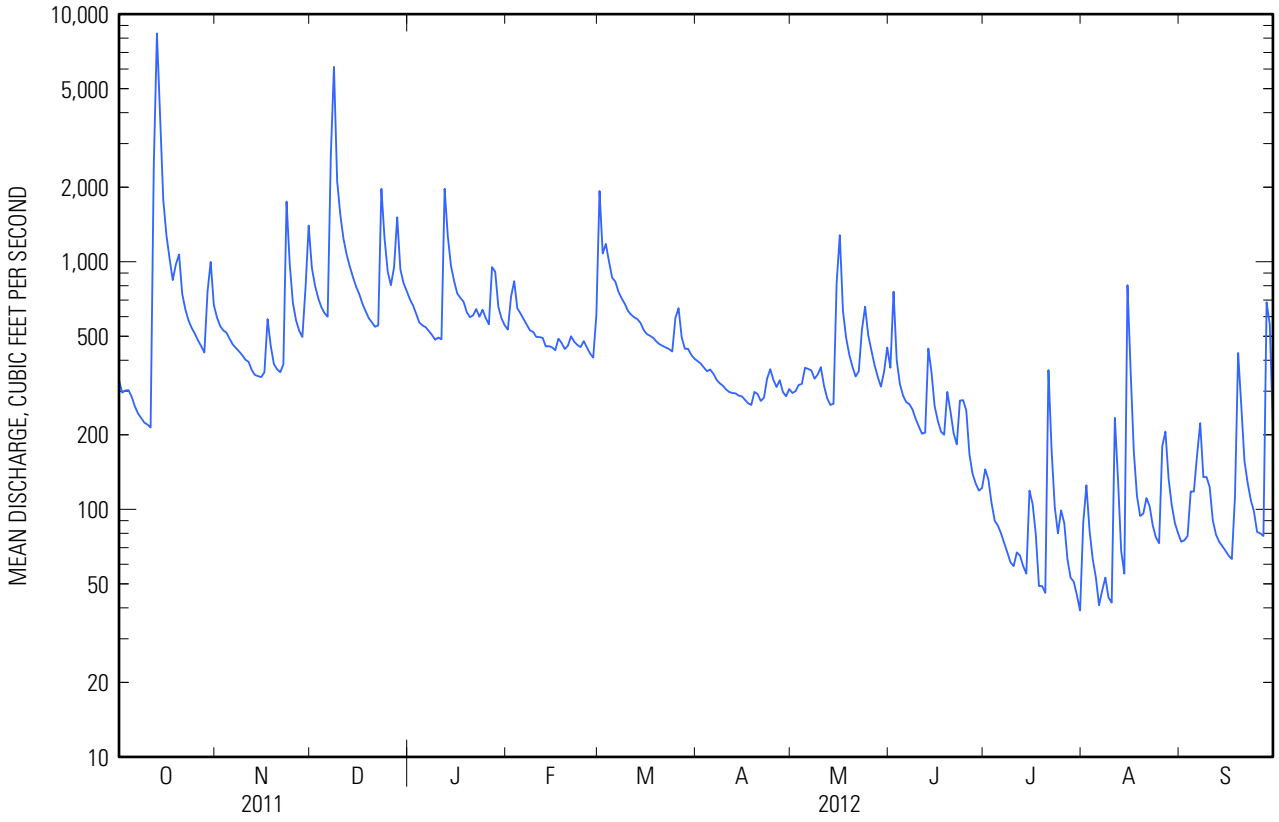
SUMMARY STATISTICS

	Calendar Year 2011		Water Year 2012		Water Years 1931 - 2012	
Annual total	260,701		183,237			
Annual mean	714		501		539	
Highest annual mean					1,099	1973
Lowest annual mean					132	2002
Highest daily mean	10,500	Apr 17	8,350	Oct 13	43,500	Jun 28, 1995
Lowest daily mean	41	Aug 13	39	Jul 31	1.5	Sep 18, 2002
Annual seven-day minimum	47	Jul 31	49	Aug 4	2.1	Sep 14, 2002
Maximum peak flow			12,300	Oct 13	59,300	Jun 28, 1995
Maximum peak stage			12.61	Oct 13	[a]30.40	Jun 28, 1995
Instantaneous low flow			36	Jul 18	1.2	Sep 17, 2002
Annual runoff (cfsm)	1.53		1.07		1.15	
Annual runoff (inches)	20.72		14.56		15.64	
10 percent exceeds	1,370		880		1,060	
50 percent exceeds	397		386		336	
90 percent exceeds	109		79		81	

[a] From high-water mark in gage house.



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WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1945 to 1946, 1951 to 1956, 1968, 1969, and 2004 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1952 to September 1956, October 2006 to October 2008.
SUSPENDED SEDIMENT DISCHARGE: April 1951 to September 1956.
WATER TEMPERATURE: October 1945 to September 1946, April 1951 to September 1956, October 2006 to October 2008.

COOPERATION.--Daily records for 2006 to 2008 were provided by the Virginia Department of Environmental Quality - Water Division. 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.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum, 361 microseimens/cm, Nov. 16, 2006; minimum, 34 microseimens/cm, Mar. 24 to Apr. 5 and Apr. 11-13, 1953.
SUSPENDED SEDIMENT DISCHARGE: Maximum calculated, 22,600 tons/day, Aug. 18, 1955; minimum 0.0 tons/day, many days.
WATER TEMPERATURE: Maximum, 37.7°C, Aug. 9, 1951; minimum, -0.3°C, Feb. 10, 14, 15, 18, 2007.

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WATER-QUALITY DATA
WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

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)	Tempera-ture, air, °C (00020)	Discharge, instanta-neous, ft³/s (00061)	Dissolved oxygen, water, unfiltered, mg/L (00300)	Dissolved oxygen, water, unfiltered, % saturation (00301)
10-12-2011	**0915**	Surface water	Replicate	754	18.0	211	9.0	94
10-12-2011	***0930***	*QC sample - Surface water*	*Replicate*	--	--	--	--	--
10-13-2011	**1315**	Surface water	Regular	746	22.5	7,190	9.5	100
11-08-2011	**0915**	Surface water	Regular	762	16.0	436	12.3	103
11-30-2011	**1000**	Surface water	Replicate	750	7.5	1,460	10.4	95
11-30-2011	***1005***	*QC sample - Surface water*	*Replicate*	--	--	--	--	--
12-08-2011	**1115**	Surface water	Regular	758	10.0	6,720	10.5	91
12-13-2011	**0945**	Surface water	Regular	762	3.5	973	13.8	104
01-10-2012	**0945**	Surface water	Regular	756	5.0	493	13.2	100
01-12-2012	**1145**	Surface water	Regular	742	16.5	2,550	12.3	99
02-14-2012	**1000**	Surface water	Regular	759	4.3	461	--	--
03-20-2012	**0930**	Surface water	Replicate	761	16.5	467	9.4	96
03-20-2012	***0945***	*QC sample - Surface water*	*Replicate*	--	--	--	--	--
04-10-2012	**0945**	Surface water	Regular	750	19.5	304	10.0	97
05-08-2012	**1115**	Surface water	Regular	753	23.0	340	8.9	97
05-16-2012	**1230**	Surface water	Replicate	757	28.5	1,010	8.2	90
05-16-2012	***1235***	*QC sample - Surface water*	*Replicate*	--	--	--	--	--
06-12-2012	**0930**	Surface water	Regular	754	24.5	200	7.6	90
06-13-2012	**1000**	Surface water	Regular	755	26.0	553	8.2	96
07-17-2012	***1010***	*QC sample - Artificial*	*Blank*	--	--	--	--	--
07-17-2012	**1015**	Surface water	Regular	754	35.5	80	6.4	82
08-02-2012	**1115**	Surface water	Regular	753	33.5	138	7.5	95
08-14-2012	**0930**	Surface water	Regular	754	25.0	52	8.0	100
09-06-2012	**1330**	Surface water	Regular	755	31.5	224	7.5	93
09-11-2012	**0915**	Surface water	Regular	762	17.0	92	8.2	90
09-20-2012	**0845**	Surface water	Replicate	760	20.0	276	8.3	88
09-20-2012	***0900***	*QC sample - Surface water*	*Replicate*	--	--	--	--	--

01667500 RAPIDAN RIVER NEAR CULPEPER, VA—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

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)
10-12-2011	**0915**	6.6	90	16.7	2.3	1.05	1	2	< .008
10-12-2011	***0930***	--	--	--	--	--	*1*	*1*	*< .008*
10-13-2011	**1315**	6.4	64	17.1	160	8.82	238	269	.020
11-08-2011	**0915**	6.8	74	7.9	2.8	1.47	1	2	< .008
11-30-2011	**1000**	7.0	74	10.8	70	2.76	64	78	.010
11-30-2011	***1005***	--	--	--	--	--	--	--	--
12-08-2011	**1115**	6.8	56	9.1	220	8.37	275	317	.050
12-13-2011	**0945**	6.2	68	3.8	10	2.20	8	10	.010
01-10-2012	**0945**	6.9	72	3.8	4.3	1.56	3	3	.010
01-12-2012	**1145**	7.0	68	5.4	240	3.96	237	276	.090
02-14-2012	**1000**	6.0	70	3.1	5.6	1.51	2	3	< .008
03-20-2012	**0930**	7.3	69	16.5	2.1	1.52	3	3	.010
03-20-2012	***0945***	--	--	--	--	--	*2*	*2*	*< .008*
04-10-2012	**0945**	6.0	72	13.7	1.9	1.27	1	2	< .008
05-08-2012	**1115**	7.4	63	19.5	4.6	1.40	4	4	.070
05-16-2012	**1230**	6.9	65	19.6	160	2.38	125	142	.100
05-16-2012	***1235***	--	--	--	--	--	--	--	--
06-12-2012	**0930**	7.1	71	23.3	2.1	1.09	1	2	.010
06-13-2012	**1000**	7.3	71	22.8	10	1.77	10	13	.020
07-17-2012	***1010***	--	--	--	--	--	*< 1*	*< 1*	*< .008*
07-17-2012	**1015**	6.7	86	27.9	1.3	.69	2	3	.050
08-02-2012	**1115**	6.9	89	26.8	2.7	.91	1	1	.010
08-14-2012	**0930**	7.1	76	26.2	4.9	.55	1	2	.030
09-06-2012	**1330**	7.3	91	25.6	17	1.07	6	9	.030
09-11-2012	**0915**	7.3	92	19.6	4.0	.64	1	2	.010
09-20-2012	**0845**	7.1	75	17.9	8.5	1.19	4	5	.060
09-20-2012	***0900***	--	--	--	--	--	*4*	*5*	*.060*

01667500 RAPIDAN RIVER NEAR CULPEPER, VA—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012

Part 3 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	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)
10-12-2011	0915	0.560	0.006	0.020	0.73	100	0.8
10-12-2011	*0930*	*.570*	*.005*	*.020*	*.80*	*100*	*.8*
10-13-2011	1315	.740	.080	.490	1.9	57	308
11-08-2011	0915	.700	.006	.010	.83	100	1
11-30-2011	1000	.640	.025	.240	1.3	32	182
11-30-2011	*1005*	--	--	--	--	*35*	*220*
12-08-2011	1115	.590	.052	.630	1.8	44	540
12-13-2011	0945	.900	.007	.040	1.1	44	16
01-10-2012	0945	.970	.008	.020	1.1	53	4
01-12-2012	1145	.770	.051	.550	2.0	70	349
02-14-2012	1000	.880	.006	.020	1.0	33	7
03-20-2012	0930	.490	.003	.020	.64	50	2
03-20-2012	*0945*	*.490*	*.003*	*.020*	*.64*	*40*	*2*
04-10-2012	0945	.510	.006	.020	.66	62	3
05-08-2012	1115	.560	.016	.040	.90	90	4
05-16-2012	1230	.830	.041	.380	1.9	90	155
05-16-2012	*1235*	--	--	--	--	*95*	*186*
06-12-2012	0930	.460	.009	.030	.65	100	.6
06-13-2012	1000	.540	.012	.050	.81	82	11
07-17-2012	*1010*	*.010*	*.002*	*< .002*	*< .02*	*.0*	*.2*
07-17-2012	1015	.430	.029	.060	.84	100	.9
08-02-2012	1115	.320	.019	.040	.63	100	1
08-14-2012	0930	.460	.023	.050	.80	89	2
09-06-2012	1330	.610	.056	.110	1.0	79	12
09-11-2012	0915	.500	.019	.050	.79	78	2
09-20-2012	0845	.450	.027	.070	.82	80	5
09-20-2012	*0900*	*.450*	*.025*	*.050*	*.80*	*71*	*7*