Water-Data Report 2013

01616400 MILL CREEK AT BUNKER HILL, WV

Potomac Basin
Conococheague-Opequon Subbasin

LOCATION.--Lat 39°20'04.65", long 78°03'12.37" referenced to North American Datum of 1983, Berkeley County, WV, Hydrologic Unit 02070004, on the right bank on the downstream side of US Rt. 11 bridge, 0.4 miles downstream from LeFevre Spring, 10 miles southwest of Martinsburg, and 4.6 miles upstream from the mouth.

DRAINAGE AREA.--18.4 mi^2.

SURFACE-WATER RECORDS

PERIOD OF RECORD.--October 2011 to current year (daily discharge and annual maxima).

GAGE.--Water-stage recorder with satellite telemeter.

REMARKS.--Records are good.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 800 ft^3/s, Oct. 30, 2012, gage height, 5.36 ft; minimum discharge, 1.6 ft^3/s, Sept. 29, 2013.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 800 ft^3/s, Oct. 30, gage height, 5.36 ft; minimum discharge, 1.6 ft^3/s, Sept. 29, gage height, 1.15 ft.

01616400 MILL CREEK AT BUNKER HILL, WV—Continued

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013
DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	2.8	31	8.4	16	54	29	30	19	14	11	7.6	4.6
2	3.6	24	8.3	18	40	28	27	18	13	11	7.2	4.1
3	5.1	20	8.2	16	36	26	26	17	14	11	7.6	4.0
4	3.6	17	8.0	15	34	25	25	17	13	11	7.1	4.0
5	3.3	15	8.0	15	33	24	25	17	13	10	6.8	4.0
6	3.1	14	7.9	15	32	26	24	16	14	10	7.8	3.9
7	3.1	14	8.0	19	30	33	24	30	16	10	7.6	3.9
8	3.1	13	8.3	19	29	39	23	94	15	11	8.0	3.7
9	3.1	12	9.8	18	28	37	23	46	12	11	7.6	3.4
10	3.0	12	12	19	26	32	23	31	24	11	7.6	3.5
11	2.8	11	12	20	28	30	22	46	39	10	6.8	3.2
12	2.8	11	11	21	27	40	28	33	20	11	6.3	3.4
13	2.7	13	10	19	26	35	25	26	20	11	6.7	3.3
14	2.6	13	9.7	18	26	31	23	23	19	9.7	6.7	3.3
15	2.6	12	9.4	22	26	29	22	22	16	9.2	6.3	3.3
16	2.6	11	9.1	98	25	28	22	20	16	8.8	6.1	3.1
17	2.6	11	8.7	44	24	28	22	19	14	8.1	6.1	4.4
18	2.7	10	8.6	31	23	27	21	18	15	7.9	6.2	3.3
19	9.9	9.9	8.5	27	24	30	23	18	15	7.6	6.0	3.2
20	6.5	10	8.0	24	23	30	37	17	14	7.5	5.8	3.0
21	4.9	9.7	18	22	22	27	25	16	13	7.4	5.6	3.0
22	4.1	9.2	14	20	22	26	23	37	13	8.3	5.1	3.5
23	3.7	8.6	12	18	22	25	22	62	13	14	5.8	3.1
24	3.3	8.9	12	18	22	25	22	33	12	9.5	5.8	2.4
25	3.4	8.9	11	18	21	27	22	24	12	8.6	5.4	2.9
26	3.4	8.8	14	18	22	35	21	19	12	8.3	4.9	3.0
27	3.4	9.3	19	17	51	35	20	18	12	8.1	4.7	2.9
28	4.8	9.5	19	18	32	30	19	18	13	8.5	5.2	4.0
29	51	8.9	20	23	---	29	20	16	12	8.1	5.0	2.3
30	293	8.6	19	45	---	28	19	15	12	7.5	5.0	2.4
31	60	---	17	180	---	28	---	14	---	7.6	4.5	---
Total	506.6	374.3	356.9	891	808	922	708	819	460	293.7	194.9	102.1
Mean	16.3	12.5	11.5	28.7	28.9	29.7	23.6	26.4	15.3	9.47	6.29	3.40
Max	293	31	20	180	54	40	37	94	39	14	8.0	4.6
Min	2.6	8.6	7.9	15	21	24	19	14	12	7.4	4.5	2.3
Cfsm	0.89	0.68	0.63	1.56	1.57	1.62	1.28	1.44	0.83	0.51	0.34	0.18
In.	1.02	0.76	0.72	1.80	1.63	1.86	1.43	1.66	0.93	0.59	0.39	0.21

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2011 - 2013, BY WATER YEAR (WY)

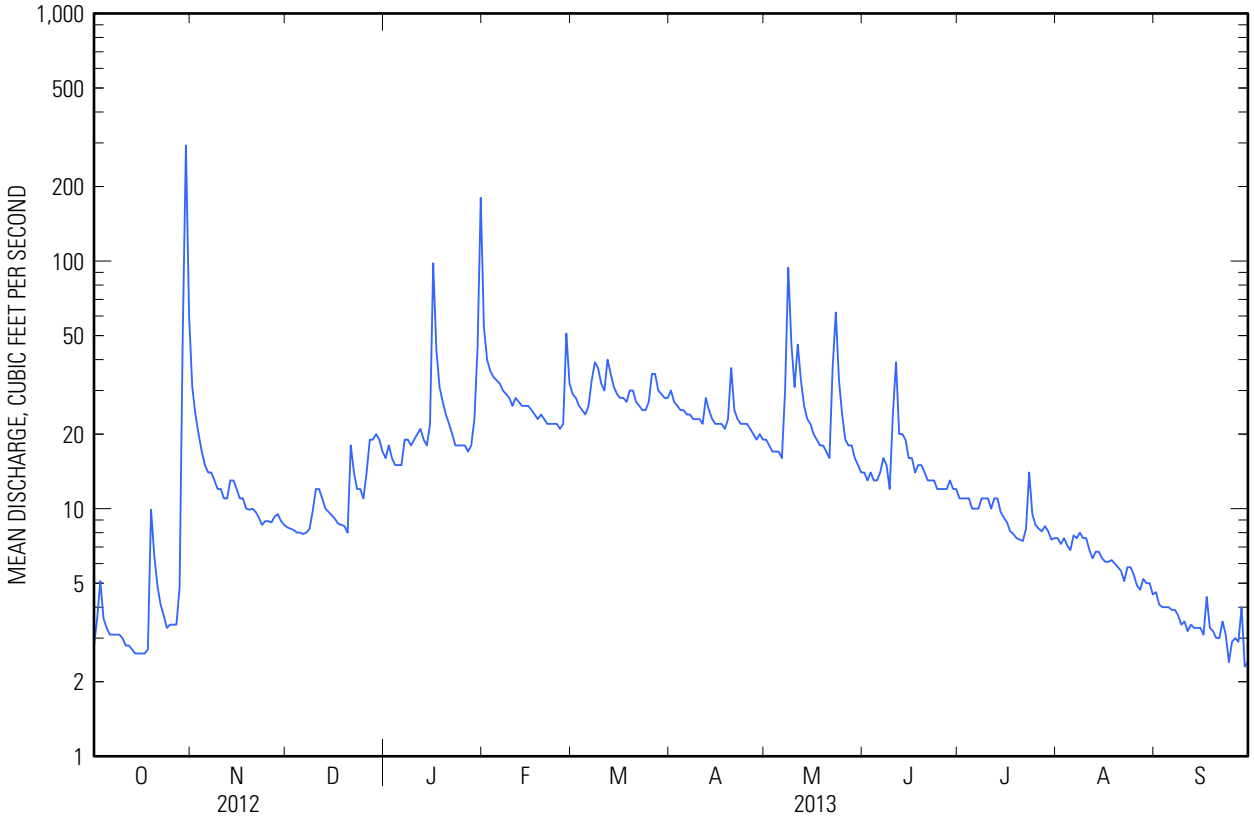
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	16.8	18.8	20.0	24.8	24.4	28.3	18.9	21.2	13.1	7.38	5.03	3.24
Max	17.2	25.2	28.5	28.7	28.9	29.7	23.6	26.4	15.3	9.47	6.29	3.40
(WY)	(2012)	(2012)	(2012)	(2013)	(2013)	(2013)	(2013)	(2013)	(2013)	(2013)	(2013)	(2013)
Min	16.3	12.5	11.5	20.8	20.1	26.9	14.2	16.0	10.9	5.28	3.78	3.08
(WY)	(2013)	(2013)	(2013)	(2012)	(2012)	(2012)	(2012)	(2012)	(2012)	(2012)	(2012)	(2012)

01616400 MILL CREEK AT BUNKER HILL, WV—Continued

SUMMARY STATISTICS

	Calendar Year 2012		Water Year 2013		Water Years 2011 - 2013	
Annual total	4,923.6		6,436.5			
Annual mean	13.5		17.6		16.8	
Highest annual mean					17.6	2013
Lowest annual mean					16.0	2012
Highest daily mean	293	Oct 30	293	Oct 30	293	Oct 30, 2012
Lowest daily mean	2.2	Sep 14[a]	2.3	Sep 29	2.2	Sep 14, 2012[b]
Annual seven-day minimum	2.3	Sep 11	2.7	Oct 12	2.3	Sep 11, 2012
Maximum peak flow			800	Oct 30	800	Oct 30, 2012
Maximum peak stage			5.36	Oct 30	5.36	Oct 30, 2012
Instantaneous low flow			1.6	Sep 29	1.6	Sep 29, 2013
Annual runoff (cfsm)	0.731		0.958		0.914	
Annual runoff (inches)	9.95		13.01		12.42	
10 percent exceeds	21		30		29	
50 percent exceeds	11		14		14	
90 percent exceeds	3.0		3.4		3.4	

[a] Also Sept. 15, 16.
[b] Also Sept. 15, 16, 2012.



01616400 MILL CREEK AT BUNKER HILL, WV—Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--July 2011 to current year.

COOPERATION.--This site is sampled as part of the Chesapeake Bay Program's Non-Tidal Monitoring Network in cooperation with the West Virginia Department of Environmental Protection, Division of Water and Waste Management.

WATER-QUALITY DATA
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013

Part 1 of 4

[%, 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; E, estimated]

Date	Sample start time	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)	pH, water, unfiltered, field, standard units (00400)	Specific conductance, water, unfiltered, µS/cm at 25°C (00095)	Temperature, water, °C (00010)
10-17-2012	**1600**	Regular	745	19.5	2.5	11.3	110	8.2	591	12.8
10-31-2012	**0755**	Regular	735	11.0	68	11.0	97	7.8	256	8.6
11-07-2012	**1555**	Regular	744	6.5	12	11.7	101	8.2	520	7.9
11-07-2012	**1556**	Replicate	--	6.5	--	--	--	--	--	--
12-12-2012	**0845**	Regular	755	4.0	10	12.0	99	7.9	530	7.0
01-17-2013	**0900**	Regular	749	5.0	43	12.0	98	7.7	301	6.0
01-22-2013	**1545**	Regular	76	-6.0	18	14.0	1,140	8.2	491	3.4
02-13-2013	**1425**	Regular	738	6.5	24	12.9	112	8.1	522	7.9
03-14-2013	**1540**	Regular	747	5.0	30	13.5	119	8.1	453	9.1
04-17-2013	**1555**	Regular	752	24.0	20	12.1	130	8.2	544	18.1
05-08-2013	**1440**	Regular	745	23.5	50	9.6	97	7.6	267	15.2
05-09-2013	**1710**	Regular	745	E 17.1	39	9.8	101	7.7	359	15.6
05-09-2013	**1711**	Replicate	745	E 17.1	--	9.8	101	7.7	359	15.6
05-15-2013	**1530**	Regular	741	31.0	21	10.8	112	8.0	506	16.1
06-14-2013	**0910**	Regular	742	19.5	17	9.3	98	7.8	496	16.7
07-17-2013	**1545**	Regular	754	32.0	5.2	9.3	114	8.0	602	24.9
08-15-2013	**0810**	Regular	751	15.0	5.8	8.9	90	7.8	626	15.1
09-09-2013	**1450**	Regular	754	23.0	2.9	10.1	109	8.0	589	19.0

01616400 MILL CREEK AT BUNKER HILL, WV—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013

Part 2 of 4

[%, 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; E, estimated]

Date	Sample start time	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, water, unfiltered, mg/L (00530)	Carbon (inorganic plus organic), suspended sediment, total, mg/L (00694)	Ammonia, water, filtered, mg/L as NH4 (71846)	Ammonia, water, filtered, mg/L as N (00608)	Nitrate plus nitrite, water, filtered, mg/L as N (00631)	Nitrate, water, filtered, mg/L (71851)
10-17-2012	1600	--	1.32	< 15	--	< .013	< .010	1.85	8.17
10-31-2012	0755	--	2.40	21	--	.015	.012	1.27	5.60
11-07-2012	1555	--	1.67	< 15	--	< .013	< .010	2.61	11.6
11-07-2012	1556	--	--	< 15	--	< .013	< .010	2.61	11.5
12-12-2012	0845	.5	1.64	< 15	.35	< .013	< .010	2.13	9.40
01-17-2013	0900	--	2.14	< 15	1.10	< .013	< .010	1.29	5.72
01-22-2013	1545	4.6	1.77	< 15	.36	< .013	< .010	2.29	10.1
02-13-2013	1425	2.2	1.85	< 15	.36	< .013	< .010	2.45	10.8
03-14-2013	1540	4.5	3.73	< 15	.36	< .013	< .010	1.92	8.49
04-17-2013	1555	2.5	1.86	< 15	.53	< .013	< .010	2.14	9.43
05-08-2013	1440	56	2.26	54	3.75	.037	.029	.834	3.67
05-09-2013	1710	21	2.13	17	1.24	.023	.018	1.27	5.59
05-09-2013	1711	21	--	18	1.57	.016	.012	1.28	5.64
05-15-2013	1530	5.2	1.87	< 15	.62	< .013	< .010	2.12	9.36
06-14-2013	0910	13	1.74	< 30	1.16	.020	.015	1.85	8.16
07-17-2013	1545	2.8	1.59	< 15	.55	.019	.015	2.34	10.3
08-15-2013	0810	6.0	1.44	< 15	.64	.014	.011	2.48	11.0
09-09-2013	1450	3.5	1.28	< 15	.49	< .013	< .010	2.38	10.5

01616400 MILL CREEK AT BUNKER HILL, WV—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013

Part 3 of 4

[%, 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; E, estimated]

Date	Sample start time	Nitrate, water, filtered, mg/L as N (00618)	Nitrite, water, filtered, mg/L (71856)	Nitrite, water, filtered, mg/L as N (00613)	Organic nitrogen, water, filtered, mg/L (00607)	Organic nitrogen, water, unfiltered, mg/L (00605)	Orthophosphate, water, filtered, mg/L (00660)	Orthophosphate, water, filtered, mg/L as P (00671)	Particulate nitrogen, suspended in water, mg/L (49570)	Phosphorus, water, filtered, mg/L as P (00666)
10-17-2012	**1600**	1.85	0.013	0.004	--	< .25	0.022	0.007	--	--
10-31-2012	**0755**	1.26	.012	.004	--	.64	.071	.023	--	--
11-07-2012	**1555**	2.61	.009	.003	--	< .17	.031	.010	--	--
11-07-2012	**1556**	2.61	.008	.002	--	< .18	.030	.010	--	--
12-12-2012	**0845**	2.12	.014	.004	< .12	< .29	.014	.005	.043	.005
01-17-2013	**0900**	1.29	.009	.003	< .34	< .28	.025	.008	.120	.015
01-22-2013	**1545**	2.29	.009	.003	< .11	< .07	< .012	< .004	.034	.004
02-13-2013	**1425**	2.45	.008	.002	< .08	< .10	< .012	< .004	.034	< .003
03-14-2013	**1540**	1.92	.008	.002	< .16	< .13	< .012	< .004	.041	.005
04-17-2013	**1555**	2.13	.023	.007	< .18	< .15	< .012	< .004	.072	< .003
05-08-2013	**1440**	.828	.019	.006	.56	1.1	.025	.008	.478	.025
05-09-2013	**1710**	1.26	.014	.004	.41	.67	.022	.007	.125	.017
05-09-2013	**1711**	1.27	.022	.007	.32	.62	.021	.007	.154	.017
05-15-2013	**1530**	2.11	.013	.004	< .11	< .05	.019	.006	.051	.008
06-14-2013	**0910**	1.84	.014	.004	.07	.22	.034	.011	.124	.015
07-17-2013	**1545**	2.33	.026	.008	.08	.15	.014	.005	.055	.006
08-15-2013	**0810**	2.47	.013	.004	.12	.07	.030	.010	.056	.008
09-09-2013	**1450**	2.38	.015	.005	< .13	--	.035	.011	.054	.005

01616400 MILL CREEK AT BUNKER HILL, WV—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013

Part 4 of 4

[%, 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; E, estimated]

Date	Sample start time	Phosphorus, water, unfiltered, mg/L as P (00665)	Total nitrogen, water, filtered, analytically determined, mg/L (62854)	Total nitrogen, water, unfiltered, analytically determined, mg/L (62855)	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)
10-17-2012	**1600**	0.018	--	2.10	--	--	10
10-31-2012	**0755**	.080	--	1.92	--	72	32
11-07-2012	**1555**	.013	--	2.78	--	--	8
11-07-2012	**1556**	.014	--	2.79	--	--	9
12-12-2012	**0845**	< .01	2.25	2.42	2.3	--	8
01-17-2013	**0900**	.02	1.64	1.58	1.8	97	14
01-22-2013	**1545**	.02	2.41	2.36	2.4	--	--
02-13-2013	**1425**	< .01	2.53	2.55	2.6	--	7
03-14-2013	**1540**	.01	2.08	2.05	2.1	--	8
04-17-2013	**1555**	< .01	2.32	2.29	2.4	--	8
05-08-2013	**1440**	.09	1.43	1.96	1.9	96	61
05-09-2013	**1710**	.04	1.69	1.95	1.8	100	19
05-09-2013	**1711**	.04	1.61	1.92	1.8	99	18
05-15-2013	**1530**	< .01	2.23	2.17	2.3	--	10
06-14-2013	**0910**	.03	1.94	2.08	2.1	--	25
07-17-2013	**1545**	.02	2.43	2.50	2.5	--	12
08-15-2013	**0810**	< .01	2.60	2.56	2.7	--	9
09-09-2013	**1450**	.02	2.51	2.32	2.6	--	5