

Water-Data Report 2011

01479820 RED CLAY CREEK NEAR KENNETT SQUARE, PA

Lower Delaware Basin
Brandywine-Christina Subbasin

LOCATION.--Lat 39°49'00", long 75°41'31" referenced to North American Datum of 1927, Chester County, PA, Hydrologic Unit 02040205, on left bank along SR 82 (Creek Road), and 3.0 mi south of the intersection of SR 82 and U.S. Highway 1 at Kennett Square.

DRAINAGE AREA.--28.3 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.--January 1988 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 196.02 ft above National Geodetic Vertical Datum of 1929. Satellite telemetry at station.

COOPERATION.--Station established and maintained by the U.S. Geological Survey in cooperation with the Pennsylvania Department of Environmental Protection and the Delaware Geological Survey.

REMARKS.--Records fair, except those for estimated daily discharges, which are poor. Some regulation upstream of gage. Several measurements of water temperature were made during the year.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft³/s and (or) maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct 1	0415	4,250	8.48
Mar 10	2015	1,750	6.77
Aug 28	0300	*5,470	*9.65
Sep 6	2130	1,320	6.28
Sep 7	0430	1,400	6.38
Sep 23	2315	1,060	5.94

Minimum discharge, 11 ft³/s, July 24, Aug. 2, 3, gage height, 3.14 ft.

01479820 RED CLAY CREEK NEAR KENNETT SQUARE, PA—Continued

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

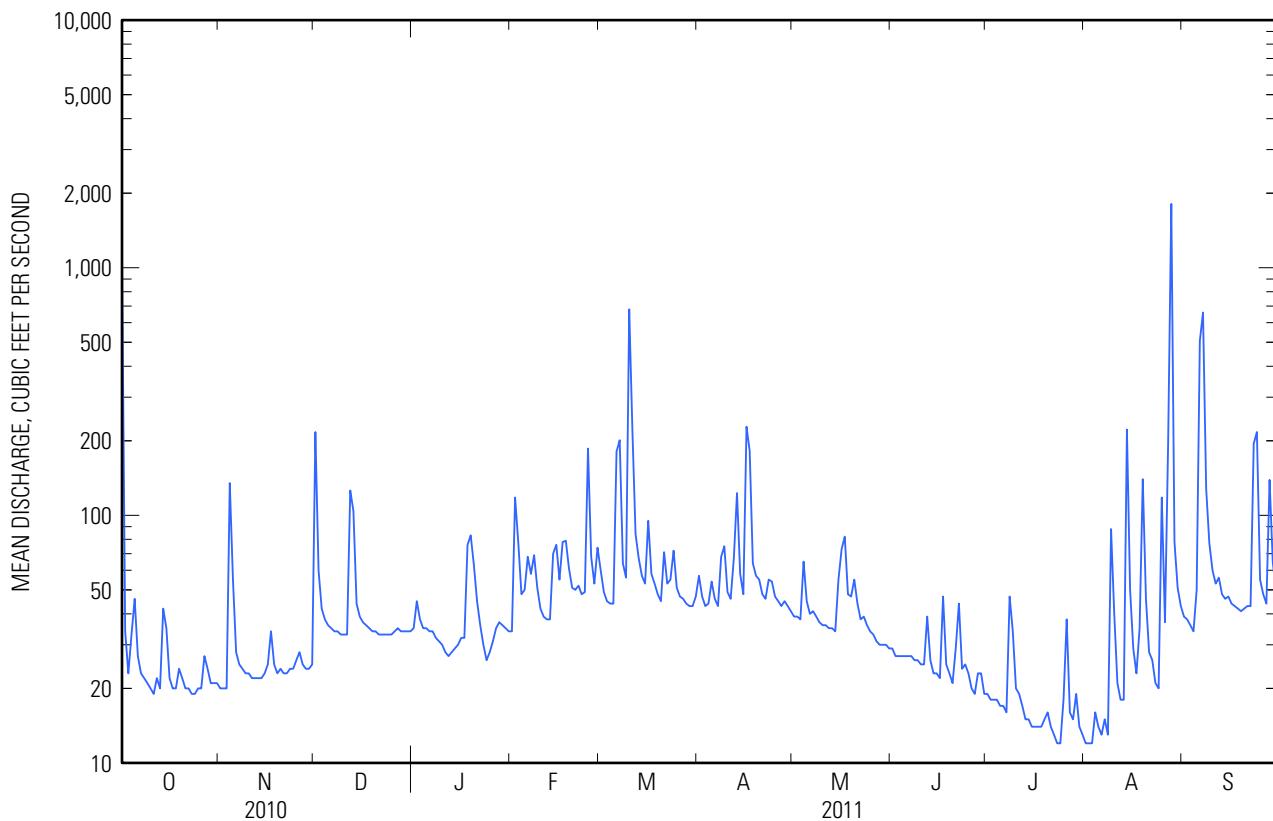
Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	1,150	20	217	35	34	60	57	39	29	19	12	39
2	34	20	60	45	118	49	47	39	27	18	12	38
3	23	20	42	38	78	45	43	38	27	18	12	36
4	33	135	38	35	48	44	44	65	27	18	16	34
5	46	55	36	35	50	44	54	45	27	17	14	50
6	27	28	35	34	68	181	46	40	27	17	13	507
7	23	25	34	34	58	201	43	41	27	16	15	659
8	22	24	34	e32	69	64	68	39	26	47	13	128
9	21	23	33	e31	51	56	75	37	26	34	88	77
10	20	23	33	e30	42	679	49	36	25	20	40	60
11	19	22	33	e28	39	222	46	36	25	19	21	53
12	22	22	126	e27	38	84	67	35	39	17	18	56
13	20	22	104	e28	38	67	123	35	26	15	18	48
14	42	22	44	e29	70	57	58	34	23	15	222	46
15	35	23	39	e30	76	53	48	55	23	14	50	47
16	22	25	37	32	55	95	228	73	22	14	29	44
17	20	34	36	32	78	58	182	82	47	14	23	43
18	20	25	35	76	79	53	64	48	25	14	35	42
19	24	23	34	83	61	48	57	47	23	15	140	41
20	22	24	34	63	51	45	55	55	21	16	46	42
21	20	23	33	45	50	71	48	44	29	14	28	43
22	20	23	33	e36	52	53	46	38	44	13	26	43
23	19	24	33	e30	48	55	55	39	24	12	21	195
24	19	24	33	e26	49	72	54	36	25	12	20	217
25	20	26	33	e28	186	51	47	34	23	18	118	55
26	20	28	34	e31	68	47	45	33	20	38	37	48
27	27	25	35	e35	53	46	43	31	19	16	195	44
28	24	24	34	37	74	44	45	30	23	15	1,810	139
29	21	24	34	36	---	43	43	30	23	19	78	65
30	21	25	34	35	---	43	41	30	19	14	51	49
31	21	---	34	34	---	47	---	29	---	13	43	---
Total	1,877	861	1,454	1,150	1,781	2,777	1,921	1,293	791	561	3,264	2,988
Mean	60.5	28.7	46.9	37.1	63.6	89.6	64.0	41.7	26.4	18.1	105	99.6
Max	1,150	135	217	83	186	679	228	82	47	47	1,810	659
Min	19	20	33	26	34	43	41	29	19	12	12	34

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1988 - 2011, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	35.9	37.7	50.7	48.1	49.8	64.8	52.3	41.0	39.5	29.0	28.7	43.2
Max	79.0	93.8	128	96.1	106	119	112	79.2	112	94.5	105	212
(WY)	(2004)	(2005)	(1997)	(1996)	(2004)	(2010)	(2007)	(1989)	(2003)	(1989)	(2011)	(2003)
Min	10.8	10.9	12.9	22.0	16.6	27.0	21.7	20.5	16.0	12.0	5.84	8.83
(WY)	(1995)	(1999)	(1999)	(1992)	(2002)	(2006)	(2002)	(2006)	(1995)	(1995)	(1995)	(1995)

01479820 RED CLAY CREEK NEAR KENNETT SQUARE, PA—Continued**SUMMARY STATISTICS**

	Calendar Year 2010	Water Year 2011		Water Years 1988 - 2011	
Annual total	18,237	20,718			
Annual mean	50.0	56.8		43.6	
Highest annual mean				78.2	2004
Lowest annual mean				18.9	2002
Highest daily mean	1,150	Oct 1	1,810 Aug 28	4,150	Sep 15, 2003
Lowest daily mean	11	Sep 8 ^a	12 Jul 23 ^b	0.86	Sep 3, 1995
Annual seven-day minimum	11	Sep 20	13 Jul 31	1.1	Sep 2, 1995
Maximum peak flow			5,470 Aug 28	^c 19,700	Sep 15, 2003
Maximum peak stage			9.65 Aug 28	^d 15.30	Sep 15, 2003
10 percent exceeds	80	76		66	
50 percent exceeds	34	35		30	
90 percent exceeds	15	19		13	

^a Also Sep 9,10,20-26.^b Also Jul 24, Aug 1-3.^c From rating curve extended above 2,580 ft³/s based on slope-conveyance determination of discharge at gage height 15.30 ft.^d From outside highwater mark.

01479820 RED CLAY CREEK NEAR KENNETT SQUARE, PA—Continued**WATER-QUALITY RECORDS**

PERIOD OF RECORD.--April 2002 to current year.

REMARKS.--Analyses for pH, water temperature, specific conductance, and dissolved oxygen were performed on site. All other sample analyses were performed at the Pennsylvania Department of Environmental Protection laboratory in Harrisburg, Pa.

COOPERATION.--Water-quality samples were collected as part of the Pennsylvania Department of Environmental Protection Water-Quality Network (WQN) with cooperation from the Pennsylvania Department of Environmental Protection.

**WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011**

Part 1 of 6

[ANC, acid neutralizing capacity; CaCO₃, calcium carbonate; MF, membrane filter; N, nitrogen; P, phosphorus; col/100 mL, colonies per 100 milliliters; ft³/s, cubic feet per second; mg/L, milligrams per liter; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; --, no data; <, less than; M, presence verified but not quantified]

Date	Sample start time	Discharge, instantane-		Osmotic pressure, water,		pH, water,		pH, water,		Specific conduc-		Specific conduc-		Biochemi-	
		neous, ft ³ /s	unfiltered, mg/L	dissolved oxygen, unfiltered, millios-	moles per kilogram	unfiltered, field, standard units	unfiltered, standard units	unfiltered, laboratory, standard units	unfiltered, laboratory, standard units	water, 25 °C	µS/cm at 25 °C	water, 25 °C	µS/cm at 25 °C	temperature, water, °C	water, 5 days at 20 °C, mg/L
11-01-2010	1330	21	12.7	8.0	8.2	7.8	452	459	8.9	.2	1.3	510	.2	1.3	
01-25-2011	1330	34	16.6	10	7.8	7.9	500	432	5.0	447	432	422	16.2	1.2	1.2
03-15-2011	1000	52	13.5	9.0	7.8	7.8	422	347	24.2	487	480	480	24.2	1.3	1.3
05-18-2011	1330	47	10.0	6.0	7.7	8.0	450	437	20.1	450	437	437	20.1	.6	.6
07-20-2011	1300	17	10.2	3.0	8.3	7.8									
09-12-2011	1400	55	10.1	4.0	7.9	8.0									

**WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011**

Part 2 of 6

[ANC, acid neutralizing capacity; CaCO₃, calcium carbonate; MF, membrane filter; N, nitrogen; P, phosphorus; col/100 mL, colonies per 100 milliliters; ft³/s, cubic feet per second; mg/L, milligrams per liter; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; --, no data; <, less than; M, presence verified but not quantified]

Date	Sample start time	Dissolved solids dried at 180 °C, water, filtered, mg/L		Suspended Hardness, water, mg/L as CaCO ₃		Calcium, water, unfiltered, mg/L		Magnesium, water, unfiltered, mg/L		Sodium, water, unfiltered, mg/L		ANC, water, unfiltered, fixed endpoint (pH 4.5) titration, laboratory, mg/L as CaCO ₃		Bromide, water, filtered, mg/L	Chloride, water, filtered, mg/L
		(70300)	(00900)	(00530)	(00916)	(00927)	(00929)	(00417)	(71870)	(00940)	(00940)	(00940)	(00940)		
11-01-2010	1330	310	180	6	42.3	16.7	17.7	92	.1	49.9					
01-25-2011	1330	308	160	< 5	38.6	15.4	26.2	79	.1	66.0					
03-15-2011	1000	254	150	< 5	37.6	14.5	20.8	73	< .1	53.8					
05-18-2011	1330	282	140	< 5	34.6	13.3	18.1	78	< .1	46.5					
07-20-2011	1300	300	170	< 5	41.0	15.8	19.6	93	.1	54.2					
09-12-2011	1400	26	160	< 5	38.7	14.7	17.0	83	.1	48.3					

01479820 RED CLAY CREEK NEAR KENNETT SQUARE, PA—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011

Part 3 of 6

[ANC, acid neutralizing capacity; CaCO₃, calcium carbonate; MF, membrane filter; N, nitrogen; P, phosphorus; col/100 mL, colonies per 100 milliliters; ft³/s, cubic feet per second; mg/L, milligrams per liter; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; --, no data; <, less than; M, presence verified but not quantified]

Date	Sample start time	Sulfate, water, filtered, mg/L	Ammonia, water, unfiltered, mg/L as N	Nitrate, water, unfiltered, mg/L as N	Nitrite, water, unfiltered, mg/L as N	Orthophosphate, water, unfiltered, mg/L as P	Phosphorus, water, unfiltered, mg/L as P	Total nitrogen, water, unfiltered, mg/L	Fecal coliform, M-FC MF (0.45 micron) method, col/100 mL	Aluminum, water, filtered, µg/L
		(00945)	(00610)	(00620)	(00615)	(70507)	(00665)	(00600)	(31616)	(01106)
11-01-2010	1330	38.0	.020	5.03	<.040	.12	.153	5.6	30	<10
01-25-2011	1330	39.7	<.020	5.58	<.040	.07	.091	6.3	<10	<10
03-15-2011	1000	37.6	<.020	4.89	<.040	.04	.058	5.0	60	<10
05-18-2011	1330	31.2	.080	3.48	<.040	.08	.112	4.0	570	12
07-20-2011	1300	34.6	.030	5.30	<.040	.31	.339	5.5	400	12
09-12-2011	1400	36.6	.040	4.34	<.040	.10	.110	4.8	800	<10

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011

Part 4 of 6

[ANC, acid neutralizing capacity; CaCO₃, calcium carbonate; MF, membrane filter; N, nitrogen; P, phosphorus; col/100 mL, colonies per 100 milliliters; ft³/s, cubic feet per second; mg/L, milligrams per liter; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; --, no data; <, less than; M, presence verified but not quantified]

Date	Sample start time	Aluminum, water, unfiltered, recoverable, µg/L	Barium, water, unfiltered, recoverable, µg/L	Cadmium, water, filtered, µg/L	Copper, water, filtered, µg/L	Copper, water, unfiltered, recoverable, µg/L	Iron, water, filtered, µg/L	Iron, water, unfiltered, recoverable, µg/L	Lead, water, filtered, µg/L	Lead, water, unfiltered, recoverable, µg/L
		(01105)	(01007)	(01025)	(01040)	(01042)	(01046)	(01045)	(01049)	(01051)
11-01-2010	1330	M	M	<0.20	<4	<4	<20	40	<1.0	<1.0
01-25-2011	1330	M	M	<0.20	<4	<4	40	100	<1.0	<1.0
03-15-2011	1000	M	M	<0.20	<4	<4	50	150	<1.0	<1.0
05-18-2011	1330	100	M	<0.20	<4	<4	60	280	<1.0	<1.0
07-20-2011	1300	M	M	<0.20	<4	M	<20	90	<1.0	<1.0
09-12-2011	1400	M	M	<0.20	<4	<4	20	140	<1.0	<1.0

01479820 RED CLAY CREEK NEAR KENNETT SQUARE, PA—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011

Part 5 of 6

[ANC, acid neutralizing capacity; CaCO₃, calcium carbonate; MF, membrane filter; N, nitrogen; P, phosphorus; col/100 mL, colonies per 100 milliliters; ft³/s, cubic feet per second; mg/L, milligrams per liter; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; --, no data; <, less than; M, presence verified but not quantified]

Date	Sample start time	Manga-nese, water, unfiltered, recoverable, µg/L (01056)	Manga-nese, water, filtered, recoverable, µg/L (01055)	Nickel, water, unfiltered, recoverable, µg/L (01065)	Nickel, water, filtered, recoverable, µg/L (01067)	Strontium, water, unfiltered, recoverable, micrograms per liter (01082)	Zinc, water, unfiltered, recoverable, µg/L (01090)	Zinc, water, unfiltered, recoverable, µg/L (01092)	Arsenic, water, unfiltered, recoverable, µg/L (01000)	Boron, water, unfiltered, recoverable, micrograms per liter (01022)
11-01-2010	1330	M	M	< 4.0	< 4.0	160	M	M	< 3.0	< 200
01-25-2011	1330	40	40	< 4.0	< 4.0	180	--	--	< 3.0	< 200
03-15-2011	1000	30	40	< 4.0	< 4.0	150	M	M	< 3.0	< 200
05-18-2011	1330	30	40	M	M	140	M	10	< 3.0	< 200
07-20-2011	1300	20	30	< 4.0	< 4.0	180	M	M	< 3.0	< 200
09-12-2011	1400	20	20	< 4.0	< 4.0	160	--	--	< 3.0	< 200

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO
SEPTEMBER 2011

Part 6 of 6

[ANC, acid neutralizing capacity; CaCO₃, calcium carbonate; MF, membrane filter; N, nitrogen; P, phosphorus; col/100 mL, colonies per 100 milliliters; ft³/s, cubic feet per second; mg/L, milligrams per liter; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; --, no data; <, less than; M, presence verified but not quantified]

Date	Sample start time	Selenium, water, unfiltered, µg/L (01147)
11-01-2010	1330	< 7
01-25-2011	1330	< 7
03-15-2011	1000	< 7
05-18-2011	1330	< 7
07-20-2011	1300	< 7
09-12-2011	1400	< 7