

**ANALYSIS OF SAMPLES COLLECTED AT SPECIAL-STUDY SITES  
SOURCE AND EXTENT OF FECAL COLIFORM BACTERIA IN THE BRANDYWINE CREEK AND ITS TRIBUTARIES**

The purpose of the Brandywine bacteria study is to evaluate fecal coliform bacteria concentrations at different flow regimes and identify the hydrologic conditions associated with elevated concentrations. The relationship between land use and fecal coliform bacteria concentrations will be examined. *Escherichia coli* concentrations were measured in the Brandywine Creek and its tributaries to determine the potential presence of intestinal pathogens that cause human diseases. Monthly base-flow samples were collected from March through September 1999. Fecal coliform bacteria were analyzed using a membrane filter technique using a 0.65  $\mu$  filter. *Escherichia coli* bacteria were analyzed using a membrane filter technique using a 0.45  $\mu$  filter. Basic field water-quality measurements were determined for all samples collected. Field water-quality parameters measured included dissolved oxygen, pH, specific conductance, and water temperature. Discharge measurements were made for all base flow samples.

**ANALYSIS OF SAMPLES COLLECTED AT SPECIAL-STUDY SITES**  
**SOURCE AND EXTENT OF FECAL COLIFORM BACTERIA IN THE BRANDYWINE CREEK AND ITS TRIBUTARIES--Continued**

WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
 MISCELLANEOUS STATION ANALYSES

DATE	TIME	AGENCY ANA- LYZING SAMPLE (CODE NUMBER) (00028)	AGENCY COL- LECTING SAMPLE (CODE NUMBER) (00027)	DIS- CHARGE, INST. (CUBIC FEET PER SECOND) (00061)	OXYGEN, DIS- SOLVED (MG/L) (00300)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	SPE- CIFIC CON- DUCT- ANCE (µS/CM) (00095)	TEMPER- ATURE WATER (DEG C) (00010)	COLI- FORM, FECAL, 0.45 µM-MF (COLS./ 100 ML) (31616)	E. COLI WATER WHOLE TOTAL UREASE (COL / 100 ML) (31633)
01480269		WEST BRANCH BRANDYWINE CREEK AT ROCKVILLE, PA (LAT 40 04 50N LONG 075 52 20W)								
APR 1999										
09...	1206	1028	1028	--	12.4	7.3	274	11.5	200	--
MAY										
05...	1010	1028	1028	3.5	10.9	7.0	271	13.5	K1900	--
JUN										
04...	1110	1028	1028	3.1	8.2	7.0	279	20.0	5000	--
JUL										
19...	1220	1028	1028	.60	7.1	7.4	293	24.5	3100	>600
AUG										
16...	1045	1028	1028	.72	6.5	7.1	286	23.5	5100	5900
SEP										
13...	1030	1028	1028	.93	7.5	7.0	302	17.0	4100	--
01480349		WEST BRANCH BRANDYWINE CREEK AT BRANDAMORE, PA (LAT 40 02 39N LONG 075 49 51W)								
MAY 1999										
04...	1630	1028	1028	17	10.8	7.6	237	15.0	200	--
JUN										
02...	1040	1028	1028	11	8.1	7.1	210	20.5	200	--
JUL										
19...	1130	1028	1028	--	8.5	7.8	255	24.0	720	470
AUG										
26...	0841	1028	1028	--	--	--	238	20.0	--	1000
16...	0950	1028	1028	3.0	7.0	7.1	272	21.5	590	--
01480390		BIRCH RUN NEAR MARTINS CORNER, PA (LAT 40 01 50N LONG 075 52 20W)								
APR 1999										
08...	1810	1028	1028	2.0	9.1	8.2	104	17.0	33	--
MAY										
04...	1520	1028	1028	1.8	10.9	7.5	100	14.5	K300	--
JUN										
02...	1200	1028	1028	.86	9.1	6.8	89	17.5	130	180
JUL										
19...	1045	1028	1028	--	8.3	7.1	98	22.0	650	--
AUG										
14...	1145	1028	1028	--	--	--	145	22.0	>6000	>8000
16...	0925	1028	1028	.19	8.4	6.8	128	19.5	510	--
SEP										
13...	0947	1028	1028	.23	8.8	6.8	151	16.0	820	K230
16...	0850	1028	1028	--	--	--	119	17.5	>240000	>240000
01480458		ROCK RUN NEAR PHILIPPSVILLE, PA (LAT 40 00 20N LONG 075 52 44W)								
APR 1999										
08...	1710	1028	1028	1.8	9.5	8.9	165	18.5	K20	--
MAY										
04...	1312	1028	1028	1.6	10.8	8.1	164	15.5	K1600	--
JUN										
02...	1340	1028	1028	.98	8.5	7.0	181	20.5	K15000	>1600
JUL										
19...	1015	1028	1028	--	8.0	7.6	191	22.5	K870	K1400
AUG										
14...	1155	1028	1028	--	--	--	218	23.0	>6000	>8000
16...	0845	1028	1028	.39	8.0	7.2	214	21.0	2100	K1500
SEP										
16...	0835	1028	1028	--	--	--	118	18.0	K540000	K16000
01480466		ROCK RUN BL COATESVILLE RESERVOIR NR WAGONTOWN, PA (LAT 40 00 22N LONG 075 51 09W)								
MAY 1999										
05...	0830	1028	1028	1.4	11.4	8.6	192	16.5	<20	--
18...	0906	1028	1028	--	8.6	6.8	193	12.0	100	93
SEP										
13...	0830	1028	1028	1.1	6.8	6.7	215	21.0	K120	97
01480629		BUCK RUN AT DOE RUN, PA (LAT 39 55 46N LONG 075 49 24W)								
APR 1999										
07...	1209	1028	1028	23	11.9	7.8	215	12.0	K7	--
MAY										
04...	1200	1028	1028	21	11.2	7.5	214	14.0	K18	--
JUN										
02...	1705	1028	1028	16	9.1	7.3	217	23.5	170	--
AUG										
14...	1235	1028	1028	--	--	--	220	27.0	>6000	>8000
16...	1255	1028	1028	7.1	9.5	7.7	236	23.5	310	260
SEP										
13...	1130	1028	1028	8.6	9.1	7.1	246	17.0	370	K69

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
 MISCELLANEOUS STATION ANALYSES

DATE	TIME	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	DIS- CHARGE, INST. (CUBIC FEET PER SECOND)	OXYGEN, DIS- SOLVED (MG/L)	PH WATER WHOLE FIELD (STAND- ARD UNITS)	SPE- CIFIC CON- DUCT- ANCE (µS/CM)	TEMPER- ATURE WATER (DEG C)	COLI- FORM, FECAL, 0.45 µM-MF (COLS./ 100 ML)	E. COLI WATER WHOLE TOTAL UREASE (COL / 100 ML)	
014806318		DOE RUN ABOVE TRIBUTARY AT SPRINGDELL, PA (LAT 39 54 26N LONG 075 50 01W)									
OCT 1998	08...	1245	1028	1028	12	--	--	153	15.5	580	--
APR 1999	07...	1239	1028	1028	12	11.6	7.6	153	12.5	<10	--
MAY	04...	1025	1028	1028	11	11.9	7.1	155	13.0	82	--
JUN	03...	1030	1028	1028	6.9	8.8	7.0	155	18.5	1100	690
JUL	19...	1128	1028	1028	4.2	8.7	7.3	152	23.0	620	--
AUG	16...	1205	1028	1028	2.1	8.9	7.1	148	22.5	360	--
SEP	13...	1045	1028	1028	3.8	10.0	7.0	155	16.5	300	K110
01480634		WEST BRANCH BRANDYWINE CREEK NEAR EMBREEVILLE, PA (LAT 39 56 04N LONG 075 45 00W)									
APR 1999	08...	1024	1028	1028	123	11.3	8.0	240	12.0	K18	--
MAY	03...	1715	1028	1028	112	11.3	8.1	236	13.0	93	--
JUN	01...	1440	1028	1028	84	9.4	7.6	262	22.0	K500	--
JUL	19...	1035	1028	1028	38	9.4	7.5	291	24.5	130	120
AUG	14...	1305	1028	1028	--	--	--	210	26.0	220	190
	16...	1115	1028	1028	39	8.2	7.4	297	23.0	K85	K68
01480637		LITTLE BROAD RUN NEAR MARSHALLTON, PA (LAT 39 57 38N LONG 075 42 44W)									
OCT 1998	08...	1315	1028	1028	2.1	--	--	165	16.5	22000	--
MAR 1999	22...	1300	1028	1028	2.0	11.1	7.7	209	9.0	<24	--
APR	08...	1112	1028	1028	.73	11.6	8.0	235	14.0	K15	--
MAY	03...	1700	1028	1028	.63	10.4	6.9	249	12.5	K27	--
JUN	01...	1305	1028	1028	.42	8.5	7.1	250	19.5	140	--
JUL	19...	0950	1028	1028	.21	8.8	7.0	254	21.0	K2000	--
AUG	14...	1335	1028	1028	--	--	--	249	23.5	720	670
	16...	1015	1028	1028	.35	9.0	7.1	249	20.5	530	330
SEP	13...	0935	1028	1028	.09	--	7.2	243	15.5	380	330
01480638		BROAD RUN AT NORTHBROOK, PA (LAT 39 55 49N LONG 075 41 06W)									
MAY 1999	18...	1222	1028	1028	5.4	9.5	7.3	190	15.0	100	K46
JUL	19...	0855	1028	1028	1.2	9.3	7.1	194	20.5	840	--
AUG	14...	1345	1028	1028	--	--	--	197	23.5	K1400	1300
	16...	0930	1028	1028	.80	8.4	7.0	208	20.5	720	--
SEP	13...	0915	1028	1028	1.6	9.7	7.2	203	15.0	470	320
01480640		WEST BRANCH BRANDYWINE CREEK AT WAWASET, PA (LAT 39 55 34N LONG 075 39 47W)									
APR 1999	08...	1246	1028	1028	134	10.5	8.7	231	14.5	<10	--
MAY	03...	1047	1028	1028	101	8.9	7.0	226	13.0	120	--
JUN	01...	1429	1028	1028	77	9.9	7.1	238	22.5	150	--
JUL	21...	1020	1028	1028	40	8.4	7.7	284	23.5	220	200
AUG	26...	1018	1028	1028	--	--	--	263	21.0	K3600	1300
	18...	0930	1028	1028	28	7.2	7.3	288	24.0	K200	260
SEP	14...	1040	1028	1028	36	8.9	7.6	294	19.0	100	K60

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
 MISCELLANEOUS STATION ANALYSES

DATE	TIME	AGENCY ANA- LYZING SAMPLE (CODE NUMBER) (00028)	AGENCY COL- LECTING SAMPLE (CODE NUMBER) (00027)	DIS- CHARGE, INST. (CUBIC FEET PER SECOND) (00061)	OXYGEN, DIS- SOLVED (MG/L) (00300)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	SPE- CIFIC CON- DUCT- ANCE (µS/CM) (00095)	TEMPER- ATURE WATER (DEG C) (00010)	COLI- FORM, FECAL, 0.45 µM-MF (COLS./ 100 ML) (31616)	E. COLI WATER WHOLE TOTAL UREASE (COL / 100 ML) (31633)
01480648		EAST BRANCH BRANDYWINE CREEK NEAR CUPOLA, PA (LAT 40 05 41N LONG 075 51 14W)								
MAR 1999										
31...	1415	1028	1028	4.4	10.6	8.3	203	13.5	K31	--
MAY										
04...	1309	1028	1028	3.7	13.3	8.5	220	15.5	140	--
JUN										
02...	1015	1028	1028	2.2	8.2	6.5	217	18.5	>1200	--
JUL										
20...	1015	1028	1028	.67	7.6	7.5	227	21.5	>1200	--
AUG										
03...	0836	1028	1028	.44	8.6	7.3	219	19.0	260	240
17...	0830	1028	1028	.57	7.6	7.3	228	20.0	260	K86
01480653		EAST BRANCH BRANDYWINE CREEK AT GLENMOORE, PA (LAT 40 05 48N LONG 075 46 44W)								
MAR 1999										
31...	1040	1028	1028	14	12.2	7.6	191	8.0	K63	--
MAY										
04...	1033	1028	1028	14	11.5	7.4	201	12.5	200	--
JUN										
02...	1400	1028	1028	8.0	8.9	6.7	200	21.5	160	170
JUL										
20...	1100	1028	1028	5.4	6.8	7.1	204	22.0	>1200	--
AUG										
26...	1236	1028	1028	--	--	--	173	19.5	>12000	>16000
03...	0755	1028	1028	--	6.9	7.0	200	20.0	330	--
17...	0930	1028	1028	2.6	7.7	7.2	209	21.0	270	--
SEP										
15...	0759	1028	1028	1.7	7.9	7.0	228	18.0	K220	K110
01480658		INDIAN RUN AT GLENMOORE, PA (LAT 40 04 32N LONG 075 46 55W)								
MAR 1999										
31...	1309	1028	1028	5.8	12.3	8.5	158	12.5	K11	--
MAY										
04...	1506	1028	1028	4.2	11.0	8.5	177	14.5	65	--
JUN										
02...	1205	1028	1028	3.2	8.9	6.8	183	18.5	K71	90
01480660		EAST BRANCH BRANDYWINE CREEK AT LYNDELL, PA (LAT 40 03 34N LONG 075 44 39W)								
MAR 1999										
31...	1355	1028	1028	29	12.2	8.5	187	13.5	K9	--
MAY										
05...	1249	1028	1028	23	11.2	7.6	223	17.5	67	--
JUN										
02...	1630	1028	1028	12	8.6	6.6	197	23.0	K970	120
JUL										
20...	1130	1028	1028	10	7.6	7.7	185	22.5	3200	--
AUG										
26...	1208	1028	1028	--	--	--	158	19.0	9200	2200
03...	0932	1028	1028	3.6	9.4	7.4	201	20.5	440	--
SEP										
14...	0900	1028	1028	5.7	9.4	7.2	217	17.0	K140	K100
01480662		CULBERTSON RUN AT LYNDELL, PA (LAT 40 03 29N LONG 075 45 07W)								
MAR 1999										
31...	1338	1028	1028	5.0	11.9	8.1	228	12.5	K9	--
MAY										
05...	1001	1028	1028	4.9	10.7	7.3	254	13.5	K120	--
AUG										
26...	1203	1028	1028	--	--	--	240	19.5	K19000	K960
17...	1045	1028	1028	.34	8.1	7.2	237	21.5	300	340
SEP										
14...	0835	1028	1028	.72	8.8	7.2	257	17.0	430	200

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DATE	TIME	AGENCY ANA- LYZING SAMPLE (CODE NUMBER) (00028)	AGENCY COL- LECTING SAMPLE (CODE NUMBER) (00027)	DIS- CHARGE, INST. (CUBIC FEET PER SECOND) (00061)	OXYGEN, DIS- SOLVED (MG/L) (00300)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	SPE- CIFIC CON- DUCT- ANCE (µS/CM) (00095)	TEMPER- ATURE WATER (DEG C) (00010)	COLI- FORM, FECAL, 0.45 µM-MF (COLS./ 100 ML) (31616)	E. COLI WATER WHOLE TOTAL UREASE (COL / 100 ML) (31633)
01480775 BEAVER CREEK NEAR DOWNINGTOWN, PA (LAT 40 00 12N LONG 075 43 28W)										
MAR 1999										
31...	0945	1028	1028	18	12.5	7.2	315	8.0	140	--
MAY										
03...	1430	1028	1028	15	10.2	7.9	312	12.5	740	--
JUN										
02...	1331	1028	1028	9.0	8.8	7.6	324	21.0	K1700	K1000
JUL										
20...	1325	1028	1028	4.0	8.8	7.2	356	21.5	K6800	--
AUG										
26...	1136	1028	1028	--	--	--	248	19.5	K1700	--
03...	1115	1028	1028	2.2	9.2	7.7	405	20.5	K1200	--
17...	1035	1028	1028	2.3	8.3	7.6	403	20.5	700	--
SEP										
14...	0959	1028	1028	4.0	9.0	7.6	383	17.5	K140	210
01480878 UNN TRIB TO VALLEY CR AT HWY 30 AT EXTON, PA (LAT 40 01 35N LONG 075 38 11W)										
OCT 1998										
08...	1340	1028	1028	--	--	--	106	18.0	K20000	--
MAR 1999										
31...	1032	1028	1028	1.2	13.5	8.6	415	10.0	K6	--
MAY										
04...	1006	1028	1028	.65	11.8	7.8	407	13.5	200	140
JUN										
04...	0936	1028	1028	.30	8.2	7.2	406	18.5	2000	--
JUL										
20...	1000	1028	1028	.34	8.9	7.3	285	23.5	>6000	--
SEP										
14...	0915	1028	1028	--	8.1	7.8	417	17.5	390	220
01480905 VALLEY CREEK AT ALTOR, PA (LAT 39 58 12N LONG 075 39 59W)										
MAR 1999										
31...	0736	1028	1028	24	10.6	7.5	398	6.5	K40	--
MAY										
03...	1220	1028	1028	18	11.2	8.0	375	12.0	77	--
JUN										
04...	1216	1028	1028	11	11.0	8.0	334	22.0	220	290
JUL										
20...	1150	1028	1028	8.1	9.5	7.0	240	23.5	>1200	--
AUG										
26...	1111	1028	1028	--	--	--	148	21.0	K600	1600
03...	0920	1028	1028	2.5	8.0	7.5	332	21.0	K88	--
17...	1005	1028	1028	4.7	9.1	7.6	444	22.0	200	--
01480930 TAYLOR RUN AT COPEVILLE, PA (LAT 39 57 19N LONG 075 38 55W)										
MAR 1999										
31...	1310	1028	1028	7.0	13.0	7.7	500	14.5	<20	--
MAY										
03...	1100	1028	1028	6.8	10.9	7.4	426	12.5	200	--
JUN										
02...	1115	1028	1028	4.9	--	7.8	489	22.0	390	--
JUL										
20...	1100	1028	1028	3.3	8.2	7.1	516	23.5	4700	--
AUG										
03...	0905	1028	1028	2.1	7.4	7.1	706	20.5	920	--
17...	0910	1028	1028	2.3	7.3	7.0	591	22.5	800	390
SEP										
14...	0955	1028	1028	3.0	10.7	7.7	530	19.0	250	K130
01480950 EAST BRANCH BRANDYWINE CREEK AT WAWASET, PA (LAT 39 55 35N LONG 075 38 54W)										
MAR 1999										
31...	1515	1028	1028	265	--	8.6	304	13.0	K11	--
MAY										
03...	1319	1028	1028	--	10.8	7.2	330	13.0	120	--
JUN										
02...	0900	1028	1028	59	--	7.4	335	22.0	220	--
JUL										
21...	1025	1028	1028	31	7.6	7.2	392	23.0	230	360
AUG										
26...	1009	1028	1028	--	--	--	167	21.0	K280	--
18...	1000	1028	1028	24	6.9	7.4	408	24.0	330	410
SEP										
14...	1140	1028	1028	28	9.0	7.4	415	21.5	K120	K81

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01480970		BRANDYWINE CREEK AT POCOPSON, PA (LAT 39 54 04N LONG 075 37 26W)								
OCT 1998										
09...	0900	1028	1028	--	--	--	200	16.5	4400	--
APR 1999										
08...	1422	1028	1028	--	13.0	7.6	265	15.0	K2	--
JUN										
01...	1025	1028	1028	146	9.2	6.8	283	22.5	K63	--
AUG										
18...	1140	1028	1028	53	8.0	7.4	319	26.0	83	93
SEP										
15...	0950	1028	1028	43	7.3	7.2	347	20.5	K85	70
16...	0950	1028	1028	--	--	--	347	20.5	5500	K180
01480975		POCOPSON CREEK AT POCOPSON, PA (LAT 39 54 03N LONG 075 38 16W)								
OCT 1998										
09...	0910	1028	1028	--	--	--	186	16.0	15000	--
APR 1999										
08...	1345	1028	1028	--	11.5	8.0	215	15.0	K2	--
MAY										
03...	1410	1028	1028	7.9	10.6	6.9	220	11.0	1100	--
JUN										
01...	1315	1028	1028	4.6	9.1	6.8	--	19.5	1100	--
JUL										
21...	1128	1028	1028	2.1	8.8	7.5	234	22.0	420	390
AUG										
18...	1050	1028	1028	.39	8.1	7.3	244	22.5	K130	K80
SEP										
15...	0915	1028	1028	1.7	8.5	7.1	248	19.0	240	<20
16...	0915	1028	1028	--	--	--	108	20.0	K20000	--