

LEVEL ONE WATER-QUALITY INVENTORY AND MONITORING

APPOMATTOX COURT HOUSE NATIONAL HISTORICAL PARK (APCO), VIRGINIA



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INTRODUCTION

The U.S. Geological Survey conducted a Level 1 Water-Quality Inventory and Monitoring (WAQIM) data-collection effort for Appomattox Court House National Historical Park (APCO) from March 1999 through December 1999. The primary objective of the WAQIM program was to provide the National Park Service (NPS) and APCO with at least a nominal inventory of its natural resources and to provide those data in a data-management system consistent with park management needs. Water-quality inventory data (physical, chemical, and biological) were collected from “key” water bodies within the boundaries of APCO. The key water bodies are those waters within park boundaries that are essential to the central cultural, historical or natural resources management themes of the parks or provide habitats to threatened or endangered plants and animals. Data were collected during the fall, winter, spring, and summer over a range of hydrologic conditions. Because of the drought conditions that persisted during the study period, variations in flow between seasons were less pronounced than during normal hydrologic conditions.

Appomattox Court House National Historical Park (APCO) encompasses approximately 1,700 acres of rolling hills in rural central Virginia, located 2 miles northeast of Appomattox, Va. Within this park is where Robert E. Lee, commanding general of the Army of Northern Virginia, surrendered his men to Ulysses Grant, general-in-chief of all United States forces, on April 9, 1865. The park contains two perennial streams: Appomattox River and Plain Run Branch. The headwaters for both water bodies are located just outside of the park. The Appomattox River originates west of the park, flows across the park’s west boundary, and flows out of the park at its east boundary. Plain Run Branch originates to the southwest of the park, flows across the park’s southwest boundary, and flows into the Appomattox River within park boundaries.

Land uses adjacent to the park boundary range from forested to urbanized. Various forms of livestock practices are being used around and within the park boundaries. Potential threats to water-quality in the park include: (1) encroaching development and (2) agricultural activities. Parameters most sensitive to these potential water-quality threats include nutrients and bacteria. Data-collection sites and the parameters analyzed were selected based on the spatial distribution of land-use activities inside and immediately outside of the park’s boundaries and the nature of the potential threats to park water-quality.

DESCRIPTION OF INVENTORY PROCESS

Site Descriptions

The water-quality inventory for APCO included the periodic collection of physical, chemical, and microbiological data from two sites on the Appomattox River and two sites on Plain Run Branch (fig. 1). These sites are: (1) Appomattox River at State Route 656 near Appomattox, Va (0203879450), (2) Appomattox River at East Park Boundary near Appomattox, Va (0203880250), (3) Plain Run Branch at Appomattox, Va (0203880090), and (4) Plain Run Branch at Mouth near Appomattox, Va (0203880175). Data-collection activities were conducted in March, June, September, and December 1999. Appomattox River at State Route 656 near Appomattox, Va (0203879450) is located at the northwest boundary of APCO about 20 feet

downstream from SR 656. Surrounding land use includes pasture, agriculture, and light rural development. Access is via SR 656 approximately 0.5 miles north of SR 24. Appomattox River at East Park Boundary near Appomattox, Va (0203880250) is located at the east boundary of APCO. Stream width is typically less than 25 feet. Surroundings include moderately wooded areas and meadows. Access is via park trail on northeast boundary of park. Plain Run Branch at Appomattox, Va (0203880090) is located at southwest boundary of APCO. Stream width is typically less than 8 feet. Surroundings include light industry, recent excavation, and US 460 upstream. Access is via business/trailer park road 0.5 miles south of SR 24. Plain Run Branch at Mouth near Appomattox, Va (0203880175) is located within APCO boundaries approximately 50 feet upstream from the confluence with the Appomattox River. Stream width is typically less than 20 feet. Surroundings are moderately wooded, with SR 24 located immediately to the west of the stream. Access is via SR 24.

Description of Data Collection

Data-collection activities were conducted in March, June, September, and December 1999 (table 1). Data-collection and analysis were conducted according to standard USGS protocols (U.S. Geological Survey, 1997, 1998, 1999; Rantz and others, 1982). Stream water-quality samples were collected as point samples or cross-sectional depth-integrated samples, depending on streamflow conditions. Discharge, water temperature, pH, specific conductivity, dissolved oxygen, and alkalinity were measured at every site on every visit. Water samples were collected and analyzed for nutrients and bacteria at every site on every visit. Samples were collected and analyzed for major ion and trace element analysis on one visit.

Table 1. Data-collection schedule

Parameter	Data collection period			
	March 1999	June 1999	September 1999	December 1999
Field parameters	X	X	X	X
Fecal bacteria	X	X	X	X
Nutrients	X	X	X	X
Major Ions				X
Trace elements		X		

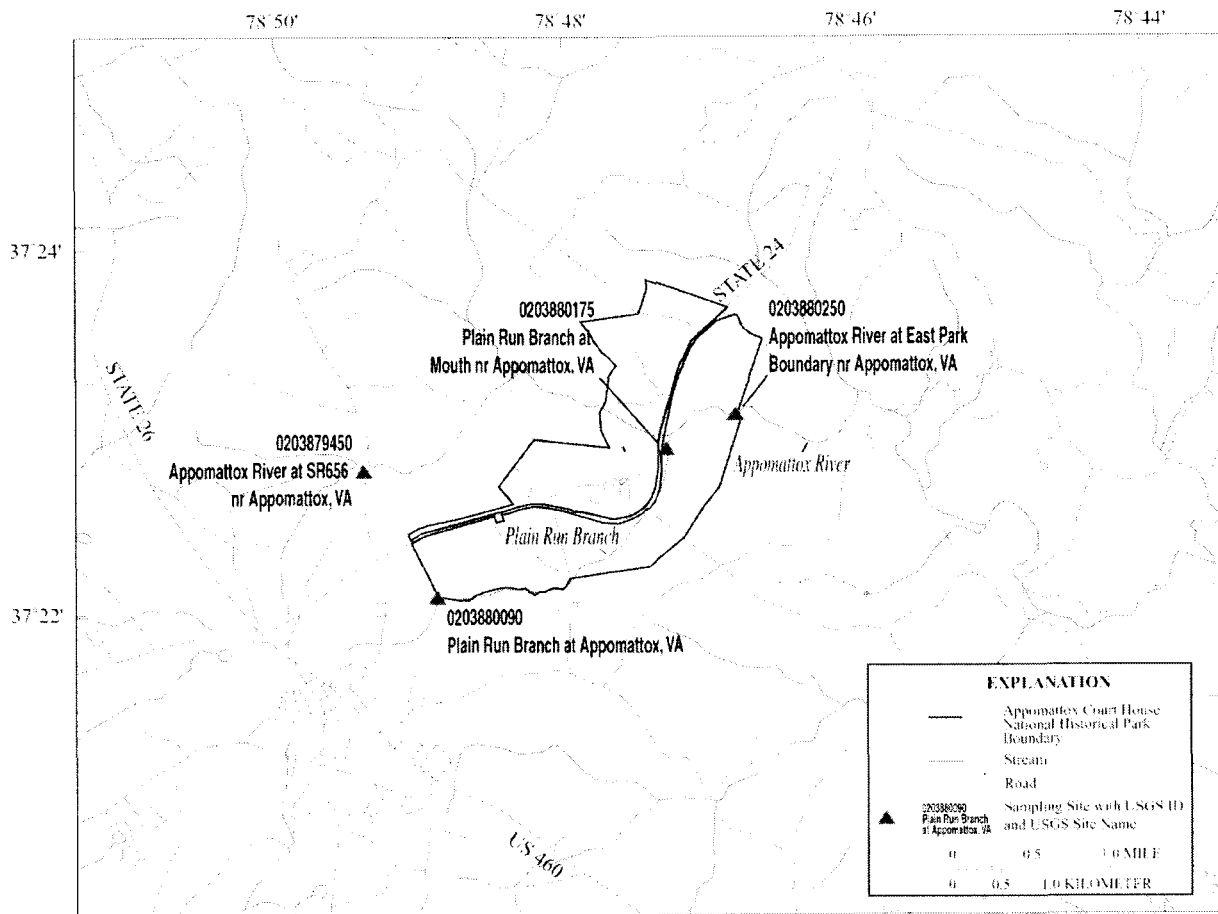


Figure 1. Map of study area and data-collection sites.

PRINCIPAL INVESTIGATORS

The principal investigators of the WAQIM program included staff of the U.S. Geological Survey (USGS), Water Resources Division (WRD) district office in Richmond, Virginia. Michael E. Lewis, Supervisory Hydrologist, supervised all work. J. Michael Gearheart, Hydrologic Technician, implemented all fieldwork. All water-quality samples collected as part of the inventory, with the exception of bacteriological samples, were submitted for analysis to the USGS National Water Quality Laboratory (NWQL) in Denver, Colorado. Bacteriological samples were processed by field personnel at each site and analyzed in the Richmond, Virginia office of the USGS.

WATER-QUALITY RESULTS

Tables 2-6 provide all physical, microbiological, and chemical data collected as part of the APCO WAQIM project. Four additional files of supporting documentation are included as attachments to this report:

- (1) "APCO ATTACHMENT 1 SITES.XLS";
- (2) "APCO ATTACHMENT 2 PARMS.DOC";
- (3) "APCO ATTACHMENT 3 DATA.XLS", and
- (4) "README.DOC"

"APCO Attachment 1 sites.xls" is a Microsoft Excel file that contains specific location information for each site where water-quality data were collected. "APCO Attachment 2 parms.doc" is a Microsoft Word file that explicitly defines each water-quality parameter included in the tables of this report and also in the water-quality data spreadsheet. "APCO Attachment 3 data.xls" is a Microsoft Excel spreadsheet that contains all water-quality data collected during this study. "Readme.doc" is a Microsoft Word file that contains basic information related to the project, such as contact information for those who conducted the work and analyzed the samples.

Table 2. Field parameter data

[ft³/s, cubic feet per second; °C, degrees Celsius; uS/cm, microsiemens per centimeter at 25 °C; mg/L, milligrams per liter; mg/L as CaCO₃, milligrams per liter as calcium carbonate; <, less than; --, no data]

Date	Time	Discharge (ft ³ /s)	Water temperature (°C)	pH (units)	Specific conductance (uS/cm)	Dissolved oxygen (mg/L)	Alkalinity (mg/L as CaCO ₃)
Appomattox River at SR656 near Appomattox, VA (0203879450)							
March 1, 1999	12:30	1.4	7.0	7.3	56	11.2	16
June 29, 1999	10:05	0.426	20.8	6.8	68	5.8	21.0
Sept 29, 1999	11:20	2.97	19.2	6.7	70	7.7	20.9
Dec 09, 1999	8:25	0.718	5.9	6.9	58	11.0	--
Appomattox River at East Park Boundary near Appomattox, VA (0203880250)							
March 1, 1999	15:00	6.8	6.9	7.5	76	13.9	21
June 29, 1999	12:55	1.97	24.5	7.4	93	6.5	35.1
Sept 29, 1999	14:30	16.1	19.0	6.9	86	8.2	23.5
Dec 09, 1999	11:10	3.83	4.7	7.5	82	12.1	32
Plain Run Branch at Appomattox, VA (0203880090)							
March 02, 1999	8:50	0.14	5.5	6.9	94	10.6	20
June 29, 1999	15:15	0.081	26.8	6.6	123	7.3	33.5
Sept 30, 1999	8:30	2.72	16.4	7.1	111	8.8	36.9
Dec 08, 1999	13:10	0.108	8.9	6.8	97	12.0	33.2
Plain Run Branch at Mouth near Appomattox, VA (0203880175)							
March 02, 1999	11:45	1.3	5.8	7.5	93	13.1	26
June 29, 1999	17:25	0.357	23.9	7.5	106	5.4	39.6
Sept 30, 1999	11:40	14.8	16.8	7.0	73	9.0	20.0
Dec 08, 1999	15:40	0.862	7.1	7.8	97	11.5	38.5

Table 3. Bacteria data.

[col/100 ml; colonies per 100 milliliters; e, estimated value; >, greater than;
K, non-ideal colony count, *, exceeds State water quality standard]

Date	Time	Total coliform (col/100 ml)	Fecal coliform (col/100 ml)	Fecal streptococcus (col/100 ml)
Appomattox River at SR656 near Appomattox, VA (0203879450)				
March 1, 1999	12:30	410	330	340
June 29, 1999	10:05	2,900	1,500 *	2,500
Sept 29, 1999	11:20	3,200	1,900 *	3,200
Dec 09, 1999	8:25	440K	320K	520K
Appomattox River at East Park Boundary near Appomattox, VA (0203880250)				
March 1, 1999	15:00	240	190	100
June 29, 1999	12:55	1,300	190	230
Sept 29, 1999	14:30	5,300	850	2,700
Dec 09, 1999	11:10	112	55	43
Plain Run Branch at Appomattox, VA (0203880090)				
March 02, 1999	8:50	220e	20K	37K
June 29, 1999	15:15	260	67	>100
Sept 30, 1999	8:30	5,800	1,200 *	2,200
Dec 08, 1999	13:10	48	12K	16K
Plain Run Branch at Mouth near Appomattox, VA (0203880175)				
March 02, 1999	11:45	110K	43K	10K
June 29, 1999	17:25	920	170	260
Sept 30, 1999	11:40	6,200	850	2,100
Dec 08, 1999	15:40	62	7K	25K

Table 4. Nutrient data

[mg/L, milligrams per liter; N, nitrogen; P, phosphorous;
 < less than; e, estimated value]

Date	Time	Nitrogen, nitrite, dissolved (mg/L as N)	Nitrogen, nitrate + nitrite, dissolved (mg/L as N)	Nitrogen, ammonia, dissolved (mg/L as N)	Nitrogen, ammonia + organic, total (mg/L as N)	Nitrogen, ammonia + organic, dissolved (mg/L as N)
Appomattox River at SR656 near Appomattox, VA (0203879450)						
March 1, 1999	12:30	0.01	0.35	<0.02	0.3	0.2
June 29, 1999	10:05	<0.01	0.52	0.05	0.3	<0.1
Sept 29, 1999	11:20	<0.01	0.22	0.05	0.7	0.4
Dec 09, 1999	8:25	<0.01	0.39	0.03	0.2	0.2
Appomattox River at East Park Boundary near Appomattox, VA (0203880250)						
March 1, 1999	15:00	0.02	0.28	<0.02	0.2	0.1
June 29, 1999	12:55	<0.01	0.48	0.02	0.2	0.1
Sept 29, 1999	14:30	<0.01	0.26	<0.02	0.4	0.3
Dec 09, 1999	11:10	<0.01	0.39	<0.02	0.2	0.1
Plain Run Branch at Appomattox, VA (0203880090)						
March 02, 1999	8:50	0.01	0.89	<0.02	0.06e	0.06e
June 29, 1999	15:15	<0.01	0.65	0.04	0.2	0.2
Sept 30, 1999	8:30	<0.01	0.49	<0.02	0.5	0.4
Dec 08, 1999	13:10	<0.01	0.90	<0.02	0.2	0.08e
Plain Run Branch at Mouth near Appomattox, VA (0203880175)						
March 02, 1999	11:45	0.01	0.14	<0.02	0.1	0.08e
June 29, 1999	17:25	<0.01	0.38	0.02	0.1	0.07e
Sept 30, 1999	11:40	<0.01	0.14	<0.02	0.4	0.3
Dec 08, 1999	15:40	<0.01	0.19	<0.02	0.1	0.07e

Table 4. Nutrient data--Continued.

[mg/L, milligrams per liter; N, nitrogen; P, phosphorous;
< less than; e, estimated value]

Date	Time	Phosphorus, total (mg/L as P)	Phosphorus, dissolved (mg/L as P)	Orthophosphate, dissolved (mg/L as P)
Appomattox River at SR656 near Appomattox, VA (0203879450)				
March 1, 1999	12:30	0.027	0.009	<0.01
June 29, 1999	10:05	0.028	0.01	0.01
Sept 29, 1999	11:20	0.085	0.029	0.02
Dec 09, 1999	8:25	0.016	0.008	<0.01
Appomattox River at East Park Boundary near Appomattox, VA (0203880250)				
March 1, 1999	15:00	0.018	0.006	<0.01
June 29, 1999	12:55	0.027	0.01	0.01
Sept 29, 1999	14:30	0.053	0.017	0.01
Dec 09, 1999	11:10	0.009	0.006	<0.01
Plain Run Branch at Appomattox, VA (0203880090)				
March 02, 1999	8:50	0.007	<0.004	<0.01
June 29, 1999	15:15	0.017	<0.004	<0.01
Sept 30, 1999	8:30	0.043	0.013	<0.01
Dec 08, 1999	13:10	0.014	<0.006	<0.01
Plain Run Branch at Mouth near Appomattox, VA (0203880175)				
March 02, 1999	11:45	0.01	<0.004	<0.01
June 29, 1999	17:25	0.012	0.008	0.01
Sept 30, 1999	11:40	0.042	0.011	0.02
Dec 08, 1999	15:40	0.006e	0.003e	<0.01

Table 5. Major-element data.

[mg/l, milligrams per liter, <, less than; --, no data]

Date	Time	Calcium, dissolved (mg/L as Ca)	Magnesium, dissolved (mg/L as Mg)	Sodium, dissolved (mg/L as Na)	Potassium, dissolved (mg/L as K)	Alkalinity (mg/L as CaCO ₃)	Sulfate, dissolved (mg/L as SO ₄)
Appomattox River at SR656 near Appomattox, VA (0203879450)							
March 1, 1999	12:30	--	--	--	--	16	--
June 29, 1999	10:05	--	--	--	--	21.0	--
Sept 29, 1999	11:20	--	--	--	--	20.9	--
Dec 09, 1999	8:25	4.3	2.1	3.4	1.5	23	1.4
Appomattox River at East Park Boundary near Appomattox, VA (0203880250)							
March 1, 1999	15:00	--	--	--	--	21	--
June 29, 1999	12:55	--	--	--	--	35.1	--
Sept 29, 1999	14:30	--	--	--	--	23.5	--
Dec 09, 1999	11:10	7.3	3.4	4.1	1.4	32	2.2
Plain Run Branch at Appomattox, VA (0203880090)							
March 02, 1999	8:50	--	--	--	--	20	--
June 29, 1999	15:15	--	--	--	--	33.5	--
Sept 30, 1999	8:30	--	--	--	--	36.9	--
Dec 08, 1999	13:10	11	2.2	4.8	1.2	33.2	2.1
Plain Run Branch at Mouth near Appomattox, VA (0203880175)							
March 02, 1999	11:45	--	--	--	--	26	--
June 29, 1999	17:25	--	--	--	--	39.6	--
Sept 30, 1999	11:40	--	--	--	--	20.0	--
Dec 08, 1999	15:40	9.9	3.8	4.7	1	38.5	4.0

Table 5. Major-element data—Continued.
 [mg/l, milligrams per liter, <, less than; --no data]

Date	Time	Chloride, dissolved (mg/l as Cl)	Fluoride, dissolved (mg/L as F)	Silica, dissolved (mg/L as SiO ₂)
Appomattox River at SR656 near Appomattox, VA (0203879450)				
March 1, 1999	12:30	--	--	--
June 29, 1999	10:05	--	--	--
Sept 29, 1999	11:20	--	--	--
Dec 09, 1999	8:25	3.1	<0.1	18
Appomattox River at East Park Boundary near Appomattox, VA (0203880250)				
March 1, 1999	15:00	--	--	--
June 29, 1999	12:55	--	--	--
Sept 29, 1999	14:30	--	--	--
Dec 09, 1999	11:10	3.6	<0.1	23
Plain Run Branch at Appomattox, VA (0203880090)				
March 02, 1999	8:50	--	--	--
June 29, 1999	15:15	--	--	--
Sept 30, 1999	8:30	--	--	--
Dec 08, 1999	13:10	7.5	<0.1	9.5
Plain Run Branch at Mouth near Appomattox, VA (0203880175)				
March 02, 1999	11:45	--	--	--
June 29, 1999	17:25	--	--	--
Sept 30, 1999	11:40	--	--	--
Dec 08, 1999	15:40	4	<0.1	21

Table 6.Trace-element data.

[ug/L, micrograms per liter; <, less than; --, no data]

Date	Time	Aluminum, total (ug/L as Al)	Arsenic, total (ug/L as As)	Barium, total (ug/L as Ba)	Beryllium, total (ug/L as Be)	Cadmium, total (ug/L as Cd)	Chromium, total (ug/L as Cr)	Cobalt, total (ug/L as Co)	Copper, total (ug/L as Cu)	Iron, total (ug/L as Fe)
Appomattox River at SR656 near Appomattox, VA (0203879450)										
March 1, 1999	12:30	--	--	--	--	--	--	--	--	--
June 29, 1999	10:05	45.4	<1	20.1	<4	<1	<1.0	<1	2	1,070
Sept 29, 1999	11:20	--	--	--	--	--	--	--	--	--
Dec 09, 1999	8:25	--	--	--	--	--	--	--	--	--
Appomattox River at East Park Boundary near Appomattox, VA (0203880250)										
March 1, 1999	15:00	--	--	--	--	--	--	--	--	--
June 29, 1999	12:55	84.1	<1	21.1	<4	<1	<1.0	<1	2	754
Sept 29, 1999	14:30	--	--	--	--	--	--	--	--	--
Dec 09, 1999	11:10	--	--	--	--	--	--	--	--	--
Plain Run Branch at Appomattox, VA (0203880090)										
March 2, 1999	8:50	--	--	--	--	--	--	--	--	--
June 29, 1999	15:15	217	<1	24.5	<4	<1	<1.0	<1	2	879
Sept 30, 1999	8:30	--	--	--	--	--	--	--	--	--
Dec 08, 1999	13:10	--	--	--	--	--	--	--	--	--
Plain Run Branch at Mouth near Appomattox, VA (0203880175)										
March 2, 1999	11:45	--	--	--	--	--	--	--	--	--
June 29, 1999	17:25	55.6	<1	20.0	<4	<1	<1.0	<1	3	235
Sept 30, 1999	11:40	--	--	--	--	--	--	--	--	--
Dec 08, 1999	15:40	--	--	--	--	--	--	--	--	--

Table 6. Trace-element data—Continued.

[ug/L, micrograms per liter; <, less than; --, no data,

*, minimum reporting limit is above chronic toxicity standard]

Date	Time	Lead, total (ug/L as Pb)	Lithium, total (ug/L as Li)	Manganese total (ug/L as Mn)	Mercury, total (ug/L as Hg)	Molyb- denum, total (ug/L as Mo)	Nickel, total (ug/L as Ni)	Selenium, total (ug/L as Se)	Silver, total (ug/L as Ag)	Zinc, total (ug/L as Zn)
Appomattox River at SR656 near Appomattox, VA (0203879450)										
March 1, 1999	12:30	--	--	--	--	--	--	--	--	--
June 29, 1999	10:05	<1	<12	75.4	<0.1 *	<1.0	<1	<1	<1	<40
Sept 29, 1999	11:20	--	--	--	--	--	--	--	--	--
Dec 09, 1999	8:25	--	--	--	--	--	--	--	--	--
Appomattox River at East Park Boundary near Appomattox, VA (0203880250)										
March 1, 1999	15:00	--	--	--	--	--	--	--	--	--
June 29, 1999	12:55	<1	<12	41.4	<0.1 *	<1.0	<1	<1	<1	<40
Sept 29, 1999	14:30	--	--	--	--	--	--	--	--	--
Dec 09, 1999	11:10	--	--	--	--	--	--	--	--	--
Plain Run Branch at Appomattox, VA (0203880090)										
March 2, 1999	8:50	--	--	--	--	--	--	--	--	--
June 29, 1999	15:15	<1	<12	92.1	<0.1 *	<1.0	<1	<1	<1	<40
Sept 30, 1999	8:30	--	--	--	--	--	--	--	--	--
Dec 08, 1999	13:10	--	--	--	--	--	--	--	--	--
Plain Run Branch at Mouth near Appomattox, VA (0203880175)										
March 2, 1999	11:45	--	--	--	--	--	--	--	--	--
June 29, 1999	17:25	<1	<12	17.7	<0.1 *	<1.0	<1	<1	<1	<40
Sept 30, 1999	11:40	--	--	--	--	--	--	--	--	--
Dec 08, 1999	15:40	--	--	--	--	--	--	--	--	--

GENERAL CLIMATIC AND HYDROLOGIC CONDITIONS

The period of study occurred within calendar year 1999. Published statistics (White and others, 1999, 2000) show that normal precipitation in the winter months of 1999 generally increased streamflows to levels in the normal range, but below median monthly flow. In the spring and summer of 1999, streamflows declined to levels comparable to the four most severe drought periods since the early 1900's: the droughts of 1930-32, 1938-42, 1962-71, and 1980-82. In September 1999, streamflows generally returned to the normal range because of precipitation from Hurricane Dennis (during the first week), Hurricane Floyd (mid-month), and a cold front (September 28-30).

Analysis of streamflow records for two indicator gages located near the APCO study area shows that for Holiday Creek near Andersonville, Va. (USGS data), the annual mean streamflow for water year 1999 is 56 percent of the 35-year annual mean; and for Buffalo Creek near Hampden Sydney, Va. (data from Virginia Department of Environmental Quality), the annual mean streamflow for water year 1999 is 58 percent of the 54-year annual mean. At both gages, streamflow was only minimally affected by either of the September storms. Streamflow records for Holiday Creek (02038850) begin in 1966 and show that the drought of water year 1999 was comparable to the drought of 1962-71, but was not as severe as the drought of 1980-82. For Buffalo Creek (02039000), records begin in 1947 and show that the drought of water year 1999 was comparable to both the drought of 1962-71 and that of 1980-82.

EXCEEDENCES OF STATE WATER-QUALITY STANDARDS

In the APCO study area, all water-quality measurements are within the surface water standards established by the Virginia State Water Control Board (1997), except as noted below.

Fecal coliform: Of 16 measurements of fecal coliform bacteria made in the study area, 3 measurements exceeded the standard of 1,000 bacteria per 100 milliliters (ml.). Bacteria counts of 1,505 per 100 ml. and 1,933 per 100 ml. were measured at station 0203879450 (Appomattox River) on June 29, 1999, and September 29, 1999, respectively. One count of 1,175 bacteria per 100 ml. was measured at station 0203880090 (Plain Run Branch) on September 30, 1999.

Mercury: Of 4 measurements of total mercury concentration made in the study area, 4 are reported as less than 0.1 micrograms per liter (ug/L), the minimum reporting level. The most restrictive standard limiting mercury concentration is the chronic toxicity limit for freshwater aquatic life, 0.012 ug/L. No inferences can be made about exceedence of this standard because the analytical determination is not meaningful in this concentration range. None of the samples, however, exceeded the acute toxicity limit for freshwater aquatic life, 2.4 ug/L.

SELECTED REFERENCES

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- Virginia State Water Control Board, 1997, Surface water standards with general, statewide application: Code of Virginia, 9 VAC 25-260-5 et seq. Water Quality Standards.
- White, R.K., Hayes, D.C., Eckenwiler, M.R., and Herman, P.E., 1999, Water resources data, Virginia, water year 1999: U.S. Geological Survey Water-Data Report VA-99-1, 546 p.
- White, R.K., Hayes, D.C., Eckenwiler, M.R., and Herman, P.E., 2000, Water resources data, Virginia, water year 2000: U.S. Geological Survey Water-Data Report VA-00-1, 547 p.

TABLE 1. SITES AT APCO

Station Name	Station ID	Station Type	Description	Purpose	Latitude	Longitude
Appomattox River at SR656 nr Appomattox, VA	0203879450	River	Station is at northwest boundary to APCO. Stream width is typically less than 8 feet. Surrounding area includes SR 656 upstream by 20 feet, pastures, agriculture, and light rural development. Access is via SR 656 approximately 0.5 miles north of SR 24.	Station is monitored as it is one of the park's key water bodies.	37o22'45"	78o49'27"
Appomattox River at East Park Boundary nr Appomattox, VA	0203880250	River	Station is at east boundary to APCO. Stream width is typically less than 25 feet. Surroundings include moderately wooded areas and meadows. Access is via park trail on northeast boundary of park.	Station is monitored as it is one of the park's key water bodies.	37o23'01"	78o46'52"
Plain Run Branch at Appomattox, VA	0203880090	Stream	Station is at southwest boundary to APCO. Stream width is typically less than 8 feet. Surroundings include light industry, recent excavation, and US 460 upstream. Access is via business/trailer park road 0.5 miles south of SR 24.	Station is monitored as it is one of the park's key water bodies.	37o22'03"	78o48'58"
Plain Run Branch at Mouth nr Appomattox, VA	0203880175	Stream	Station is in APCO. Stream width is typically less than 20 feet. Surroundings are moderately wooded, with SR 24 adjacent to stream by approximately 200 yards. Station is approximately 50 feet above Appomattox River. Access is via Appomattox Wayside on SR 24 and streamward by approximately 200 yards.	Station is monitored as it is one of the park's key water bodies.	37o22'50"	78o47'21"

TABLE 1. SITES AT APCO

Method of Determining Lat/Long	Map Scale	Referenced Datum	State	County	HUC	Elevation ft	Elevation Source	Elevation Datum	Secondary Name(s)
Manual map interpolation	1:24000	NAD1927	Virginia	Appomattox	02080207	740	Topographic map	Gage	
Manual map interpolation	1:24000	NAD1927	Virginia	Appomattox	02080207	640	Topographic map	Gage	
Manual map interpolation	1:24000	NAD1927	Virginia	Appomattox	02080207	770	Topographic map	Gage	
Manual map interpolation	1:24000	NAD1927	Virginia	Appomattox	02080207	660	Topographic map	Gage	

TABLE 3. WQ PARAMETERS AT APCO

PARAMETER NAME	Discharge (Q)
SAMPLE FRACTION	total
MEASUREMENT UNITS	cubic feet per second (cfs)
FIELD/LAB MEASUREMENT	field
VALUE TYPE	calculated
PREPARATION PROCEDURES	spin test
TRANSPORT/PRESERVATION	--
LAB ANALYTICAL PROCEDURE; SOURCE	current meter method; USGS
FIELD/LAB EQUIPMENT OR PROCEDURE	Wading rod and pygmy(P90267) or Price AA(A91114) velocity meter
DETECTION LIMIT	--
PERSON/AGENCY THAT ANALYZED	Mike Gearheart (USGS)
PARAMETER NAME	Water Temperature (WT)
SAMPLE FRACTION	total
MEASUREMENT UNITS	degrees Celsius (°C)
FIELD/LAB MEASUREMENT	field
VALUE TYPE	actual
PREPARATION PROCEDURES	calibration check w/ ASTM thermometer
TRANSPORT/PRESERVATION	--
LAB ANALYTICAL PROCEDURE; SOURCE	--
FIELD/LAB EQUIPMENT OR PROCEDURE	thermometer (YSI50B DO W#496703)
DETECTION LIMIT	--
PERSON/AGENCY THAT ANALYZED	Mike Gearheart (USGS)
PARAMETER NAME	Hydrogen Ion Activity (pH)
SAMPLE FRACTION	total

TABLE 3. WQ PARAMETERS AT APCO

MEASUREMENT UNITS	pH units
FIELD/LAB MEASUREMENT	field
VALUE TYPE	actual
PREPARATION PROCEDURES	calibration w/ pH buffers 4, 7, 10
TRANSPORT/PRESERVATION	--
LAB ANALYTICAL PROCEDURE; SOURCE	--
FIELD/LAB EQUIPMENT OR PROCEDURE	Beckman 12 pH meter (W#563868)
DETECTION LIMIT	--
PERSON/AGENCY THAT ANALYZED	Mike Gearheart (USGS)
PARAMETER NAME	Hydrogen Ion Activity (pH)
SAMPLE FRACTION	total
MEASUREMENT UNITS	pH units
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	raw
TRANSPORT/PRESERVATION	untreated, cooled to 4°C
LAB ANALYTICAL PROCEDURE; SOURCE	S11 USGS National Water-Quality Laboratory Major Ions + Trace (Swapper); Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	electrometric electrode, pH, lab
DETECTION LIMIT	0.100
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory
PARAMETER NAME	Specific Conductance (SC)
SAMPLE FRACTION	total
MEASUREMENT UNITS	microsiemens per centimeter (uS/cm)
FIELD/LAB MEASUREMENT	field

TABLE 3. WQ PARAMETERS AT APCO

VALUE TYPE	actual
PREPARATION PROCEDURES	calibration with SC standards 50 - 500
TRANSPORT/PRESERVATION	--
LAB ANALYTICAL PROCEDURE; SOURCE	--
FIELD/LAB EQUIPMENT OR PROCEDURE	Orion 122 SC meter (W#593055)
DETECTION LIMIT	--
PERSON/AGENCY THAT ANALYZED	Mike Gearheart (USGS)
PARAMETER NAME	Specific Conductance (SC)
SAMPLE FRACTION	total
MEASUREMENT UNITS	microsiemens per centimeter (uS/cm)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	raw
TRANSPORT/PRESERVATION	untreated, cooled to 4°C
LAB ANALYTICAL PROCEDURE; SOURCE	S11 USGS National Water-Quality Laboratory Major Ions + Trace (Swapper); Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	Wheatstone Bridge, Specific conductance, lab, WWR
DETECTION LIMIT	1.000
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory
PARAMETER NAME	Dissolved Oxygen (DO)
SAMPLE FRACTION	total
MEASUREMENT UNITS	milligrams per liter (mg/L)
FIELD/LAB MEASUREMENT	field
VALUE TYPE	actual

TABLE 3. WQ PARAMETERS AT APCO

PREPARATION PROCEDURES	zero DO check, atmospheric calibration in water
TRANSPORT/PRESERVATION	--
LAB ANALYTICAL PROCEDURE; SOURCE	--
FIELD/LAB EQUIPMENT OR PROCEDURE	YSI 50B DO meter (W#496703)
DETECTION LIMIT	0.0
PERSON/AGENCY THAT ANALYZED	Mike Gearheart (USGS)

PARAMETER NAME	Alkalinity
SAMPLE FRACTION	dissolved
MEASUREMENT UNITS	milligrams per liter as CaCO ₃ (mg/L as CaCO ₃)
FIELD/LAB MEASUREMENT	field
VALUE TYPE	calculated
PREPARATION PROCEDURES	filtration of water samples, 0.45 microns
TRANSPORT/PRESERVATION	--
LAB ANALYTICAL PROCEDURE; SOURCE	titration with H ₂ SO ₄
FIELD/LAB EQUIPMENT OR PROCEDURE	Hach alkalinity kit
DETECTION LIMIT	--
PERSON/AGENCY THAT ANALYZED	Mike Gearheart (USGS)

PARAMETER NAME	Acid Neutralizing Capacity (ANC)
SAMPLE FRACTION	total
MEASUREMENT UNITS	milligrams per liter as CaCO ₃ (mg/L as CaCO ₃)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	calculated
PREPARATION PROCEDURES	raw
TRANSPORT/PRESERVATION	untreated, cooled to 4°C

TABLE 3. WQ PARAMETERS AT APCO

LAB ANALYTICAL PROCEDURE; SOURCE	S11 USGS National Water-Quality Laboratory Major Ions + Trace (Swapper); Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	Electrometric Titration, Acid Neutralizing Capacity as CaCO ₃ , lab, WWR
DETECTION LIMIT	1.000
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Nitrogen, ammonia
SAMPLE FRACTION	dissolved
MEASUREMENT UNITS	milligrams per liter as nitrogen (mg/L as N)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	filtered, 0.45 microns
TRANSPORT/PRESERVATION	untreated, cooled to 4°C
LAB ANALYTICAL PROCEDURE; SOURCE	S2702 NAWQA, Nutrients + Microkjeldahl P and N; Inorganics: Nutrients; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	Automated-segmented flow (ASF) colorimetry; Salicylate-hypochlorite
DETECTION LIMIT	0.02
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory
PARAMETER NAME	Nitrogen, ammonia + organic nitrogen
SAMPLE FRACTION	total
MEASUREMENT UNITS	milligrams per liter as nitrogen (mg/L as N)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	whole water sample
TRANSPORT/PRESERVATION	acidified to pH<2 with H ₂ SO ₄ , cooled to 4°C

TABLE 3. WQ PARAMETERS AT APCO

LAB ANALYTICAL PROCEDURE; SOURCE	S2702 NAWQA, Nutrients + Microkjeldahl P and N; Inorganics: Nutrients; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	Automated-segmented flow (ASF) colorimetry; microkjeldahl digestion
DETECTION LIMIT	0.1
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Nitrogen, ammonia + organic nitrogen
SAMPLE FRACTION	dissolved
MEASUREMENT UNITS	milligrams per liter as nitrogen (mg/L as N)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	filtered, 0.45 microns
TRANSPORT/PRESERVATION	untreated, cooled to 4°C
LAB ANALYTICAL PROCEDURE; SOURCE	S2702 NAWQA, Nutrients + Microkjeldahl P and N; Inorganics: Nutrients; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	Automated-segmented flow (ASF) colorimetry; microkjeldahl digestion
DETECTION LIMIT	0.1
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Nitrogen, nitrite
SAMPLE FRACTION	dissolved
MEASUREMENT UNITS	milligrams per liter as nitrogen (mg/L as N)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	filtered, 0.45 microns
TRANSPORT/PRESERVATION	untreated, cooled to 4°C

TABLE 3. WQ PARAMETERS AT APCO

LAB ANALYTICAL PROCEDURE; SOURCE	S2702 NAWQA, Nutrients + Microkjeldahl P and N; Inorganics: Nutrients; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	Automated-segmented flow (ASF) colorimetry
DETECTION LIMIT	0.01
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Nitrogen, nitrite + nitrate
SAMPLE FRACTION	dissolved
MEASUREMENT UNITS	milligrams per liter as nitrogen (mg/L as N)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	filtered, 0.45 microns
TRANSPORT/PRESERVATION	untreated, cooled to 4°C
LAB ANALYTICAL PROCEDURE; SOURCE	S2702 NAWQA, Nutrients + Microkjeldahl P and N; Inorganics: Nutrients; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	Automated-segmented flow (ASF) colorimetry, cadmium reduction-diazotization
DETECTION LIMIT	0.05
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Phosphorous
SAMPLE FRACTION	total
MEASUREMENT UNITS	milligrams per liter as phosphorous (mg/L as P)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	whole water sample
TRANSPORT/PRESERVATION	acidified to pH<2 with H ₂ SO ₄ , cooled to 4°C

TABLE 3. WQ PARAMETERS AT APCO

LAB ANALYTICAL PROCEDURE; SOURCE	S2702 NAWQA, Nutrients + Microkjeldahl P and N; Inorganics: Nutrients; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	Automated-segmented flow (ASF) colorimetry; microkjeldahl digestion
DETECTION LIMIT	0.01
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Phosphorous
SAMPLE FRACTION	dissolved
MEASUREMENT UNITS	milligrams per liter as phosphorous (mg/L as P)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	filtered, 0.45 microns
TRANSPORT/PRESERVATION	untreated, cooled to 4°C
LAB ANALYTICAL PROCEDURE; SOURCE	S2702 NAWQA, Nutrients + Microkjeldahl P and N; Inorganics: Nutrients; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	Automated-segmented flow (ASF) colorimetry; microkjeldahl digestion
DETECTION LIMIT	0.01
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Phosphorous, phosphate, ortho
SAMPLE FRACTION	dissolved
MEASUREMENT UNITS	milligrams per liter as phosphorous (mg/L as P)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	filtered, 0.45 microns
TRANSPORT/PRESERVATION	untreated, cooled to 4°C

TABLE 3. WQ PARAMETERS AT APCO

LAB ANALYTICAL PROCEDURE; SOURCE	S2702 NAWQA, Nutrients + Microkjeldahl P and N; Inorganics: Nutrients; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	Automated-segmented flow (ASF) colorimetry; phosphomolybdate
DETECTION LIMIT	0.01
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Boron
SAMPLE FRACTION	dissolved
MEASUREMENT UNITS	micrograms per liter as boron (ug/L as B)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	filtered, 0.45 microns
TRANSPORT/PRESERVATION	acidified to pH<2 with HNO ₃ , cooled to 4°C
LAB ANALYTICAL PROCEDURE; SOURCE	S11 USGS National Water-Quality Laboratory Major Ions + Trace (Swapper); Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	Inductively Coupled Plasma (ICP)
MAX/MIN QUANTIFICATION LIMITS	
DETECTION LIMIT	16
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Calcium
SAMPLE FRACTION	dissolved
MEASUREMENT UNITS	milligrams per liter as calcium (mg/L as Ca)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	filtered, 0.45 microns
TRANSPORT/PRESERVATION	acidified to pH<2 with HNO ₃ , cooled to 4°C

TABLE 3. WQ PARAMETERS AT APCO

LAB ANALYTICAL PROCEDURE; SOURCE	S11 USGS National Water-Quality Laboratory Major Ions + Trace (Swapper); Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	Inductively Coupled Plasma (ICP)
DETECTION LIMIT	0.02
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Chloride
SAMPLE FRACTION	dissolved
MEASUREMENT UNITS	milligrams per liter as chloride (mg/L as Cl)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	filtered, 0.45 microns
TRANSPORT/PRESERVATION	cooled to 4°C
LAB ANALYTICAL PROCEDURE; SOURCE	S11 USGS National Water-Quality Laboratory Major Ions + Trace (Swapper); Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	Ion chromatography (IC)
MAX/MIN QUANTIFICATION LIMITS	
DETECTION LIMIT	0.1
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Fluoride
SAMPLE FRACTION	dissolved
MEASUREMENT UNITS	milligrams per liter as fluoride (mg/L as F)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	filtered, 0.45 microns
TRANSPORT/PRESERVATION	cooled to 4°C

TABLE 3. WQ PARAMETERS AT APCO

LAB ANALYTICAL PROCEDURE; SOURCE	S11 USGS National Water-Quality Laboratory Major Ions + Trace (Swapper); Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	Automated-segmented flow (ASF), ion selective electrode
DETECTION LIMIT	0.1
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Iron
SAMPLE FRACTION	dissolved
MEASUREMENT UNITS	micrograms per liter as iron (ug/L as Fe)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	filtered, 0.45 microns
TRANSPORT/PRESERVATION	acidified to pH<2 with HNO ₃ , cooled to 4°C
LAB ANALYTICAL PROCEDURE; SOURCE	S11 USGS National Water-Quality Laboratory Major Ions + Trace (Swapper); Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	Inductively Coupled Plasma (ICP)
DETECTION LIMIT	10
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory
PARAMETER NAME	Magnesium
SAMPLE FRACTION	dissolved
MEASUREMENT UNITS	milligrams per liter as magnesium (mg/L as Mg)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	filtered, 0.45 microns
TRANSPORT/PRESERVATION	acidified to pH<2 with HNO ₃ , cooled to 4°C
LAB ANALYTICAL PROCEDURE; SOURCE	S11 USGS National Water-Quality Laboratory Major Ions + Trace (Swapper); Inorganics:

TABLE 3. WQ PARAMETERS AT APCO

	Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	Inductively Coupled Plasma (ICP)
MAX/MIN QUANTIFICATION LIMITS	
DETECTION LIMIT	0.004
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory
PARAMETER NAME	Manganese
SAMPLE FRACTION	dissolved
MEASUREMENT UNITS	micrograms per liter as manganese (ug/L as Mn)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	filtered, 0.45 microns
TRANSPORT/PRESERVATION	acidified to pH<2 with HNO ₃ , cooled to 4°C
LAB ANALYTICAL PROCEDURE; SOURCE	S11 USGS National Water-Quality Laboratory Major Ions + Trace (Swapper); Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	Inductively Coupled Plasma (ICP)
DETECTION LIMIT	4
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory
PARAMETER NAME	Potassium
SAMPLE FRACTION	dissolved
MEASUREMENT UNITS	milligrams per liter as potassium (mg/L as K)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	filtered, 0.45 microns
TRANSPORT/PRESERVATION	acidified to pH<2 with HNO ₃ , cooled to 4°C

TABLE 3. WQ PARAMETERS AT APCO

LAB ANALYTICAL PROCEDURE; SOURCE	S11 USGS National Water-Quality Laboratory Major Ions + Trace (Swapper); Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	Atomic absorption (AA), flame
DETECTION LIMIT	0.1
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory
PARAMETER NAME	Silica
SAMPLE FRACTION	dissolved
MEASUREMENT UNITS	milligrams per liter is silica dioxide (mg/L as SiO ₂)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	filtered, 0.45 microns
TRANSPORT/PRESERVATION	cooled to 4°C
LAB ANALYTICAL PROCEDURE; SOURCE	S11 USGS National Water-Quality Laboratory Major Ions + Trace (Swapper); Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	Automated-segmented flow (ASF) colorimetry, molybdate blue
DETECTION LIMIT	0.1
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory
PARAMETER NAME	Sodium
SAMPLE FRACTION	dissolved
MEASUREMENT UNITS	milligrams per liter as sodium (mg/L as Na)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	filtered, 0.45 microns
TRANSPORT/PRESERVATION	acidified to pH<2 with HNO ₃ , cooled to 4°C

TABLE 3. WQ PARAMETERS AT APCO

LAB ANALYTICAL PROCEDURE; SOURCE	S11 USGS National Water-Quality Laboratory Major Ions + Trace (Swapper); Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	Inductively Coupled Plasma (ICP)
DETECTION LIMIT	0.1
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Sulfate
SAMPLE FRACTION	dissolved
MEASUREMENT UNITS	milligrams per liter as sulfate (mg/L as SO ⁴)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	filtered, 0.45 microns
TRANSPORT/PRESERVATION	cooled to 4°C
LAB ANALYTICAL PROCEDURE; SOURCE	S11 USGS National Water-Quality Laboratory Major Ions + Trace (Swapper); Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	Ion chromatography (IC)
DETECTION LIMIT	0.1
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Chromium
SAMPLE FRACTION	total
MEASUREMENT UNITS	micrograms per liter as chromium (ug/L as Cr)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	raw
TRANSPORT/PRESERVATION	acidified to pH<2 with HNO ₃ ; cooled to 4°C

TABLE 3. WQ PARAMETERS AT APCO

LAB ANALYTICAL PROCEDURE; SOURCE	S197 USGS National Water-Quality Laboratory Trace Metals, WWR; Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	GFAA, chromium, WWR
DETECTION LIMIT	1.000
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Arsenic
SAMPLE FRACTION	total
MEASUREMENT UNITS	micrograms per liter as arsenic (ug/L as As)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	raw
TRANSPORT/PRESERVATION	acidified to pH<2 with HNO ₃ ; cooled to 4°C
LAB ANALYTICAL PROCEDURE; SOURCE	S197 USGS National Water-Quality Laboratory Trace Metals, WWR; Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	GFAA, arsenic, WWR
DETECTION LIMIT	1.000
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Cadmium
SAMPLE FRACTION	total
MEASUREMENT UNITS	micrograms per liter as cadmium (ug/L as Cd)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	raw
TRANSPORT/PRESERVATION	acidified to pH<2 with HNO ₃ ; cooled to 4°C

TABLE 3. WQ PARAMETERS AT APCO

LAB ANALYTICAL PROCEDURE; SOURCE	S197 USGS National Water-Quality Laboratory Trace Metals, WWR; Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	GFAA, cadmium, WWR
DETECTION LIMIT	1.000
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Molybdenum
SAMPLE FRACTION	total
MEASUREMENT UNITS	micrograms per liter as molybdenum (ug/L as Mo)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	raw
TRANSPORT/PRESERVATION	acidified to pH<2 with HNO ₃ ; cooled to 4°C
LAB ANALYTICAL PROCEDURE; SOURCE	S197 USGS National Water-Quality Laboratory Trace Metals, WWR; Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	GFAA, molybdenum, WWR
DETECTION LIMIT	1.000
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Zinc
SAMPLE FRACTION	total
MEASUREMENT UNITS	micrograms per liter as zinc (ug/L as Zn)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	raw
TRANSPORT/PRESERVATION	acidified to pH<2 with HNO ₃ ; cooled to 4°C

TABLE 3. WQ PARAMETERS AT APCO

LAB ANALYTICAL PROCEDURE; SOURCE	S197 USGS National Water-Quality Laboratory Trace Metals, WWR; Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	ZINC WWR-ICP
MAX/MIN QUANTIFICATION LIMITS	
DETECTION LIMIT	40
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Nickel
SAMPLE FRACTION	total
MEASUREMENT UNITS	micrograms per liter as nickel (ug/L as Ni)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	raw
TRANSPORT/PRESERVATION	acidified to pH<2 with HNO ₃ ; cooled to 4°C
LAB ANALYTICAL PROCEDURE; SOURCE	S197 USGS National Water-Quality Laboratory Trace Metals, WWR; Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	GFAA, nickel, WWR
DETECTION LIMIT	1.000
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Lithium
SAMPLE FRACTION	total
MEASUREMENT UNITS	micrograms per liter as lithium (ug/L as Li)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	raw

TABLE 3. WQ PARAMETERS AT APCO

TRANSPORT/PRESERVATION	acidified to pH<2 with HNO ₃ ; cooled to 4°C
LAB ANALYTICAL PROCEDURE; SOURCE	S197 USGS National Water-Quality Laboratory Trace Metals, WWR; Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	LITHIUM WWR-ICP
DETECTION LIMIT	12
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Selenium
SAMPLE FRACTION	total
MEASUREMENT UNITS	micrograms per liter as selenium (ug/L as Se)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	raw
TRANSPORT/PRESERVATION	acidified to pH<2 with HNO ₃ ; cooled to 4°C
LAB ANALYTICAL PROCEDURE; SOURCE	S197 USGS National Water-Quality Laboratory Trace Metals, WWR; Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	GFAA, selenium, water, WWR
DETECTION LIMIT	1.0
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Silver
SAMPLE FRACTION	total
MEASUREMENT UNITS	micrograms per liter as silver (ug/L as Ag)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	raw

TABLE 3. WQ PARAMETERS AT APCO

TRANSPORT/PRESERVATION	acidified to pH<2 with HNO ₃ ; cooled to 4°C
LAB ANALYTICAL PROCEDURE; SOURCE	S197 USGS National Water-Quality Laboratory Trace Metals, WWR; Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	GFAA, silver, WWR
DETECTION LIMIT	1.000
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Lead
SAMPLE FRACTION	total
MEASUREMENT UNITS	micrograms per liter as lead (ug/L as Pb)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	raw
TRANSPORT/PRESERVATION	acidified to pH<2 with HNO ₃ ; cooled to 4°C
LAB ANALYTICAL PROCEDURE; SOURCE	S197 USGS National Water-Quality Laboratory Trace Metals, WWR; Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	GFAA, lead, WWR
DETECTION LIMIT	1.000
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Iron
SAMPLE FRACTION	total
MEASUREMENT UNITS	micrograms per liter as iron (ug/L as Fe)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	raw

TABLE 3. WQ PARAMETERS AT APCO

TRANSPORT/PRESERVATION	acidified to pH<2 with HNO ₃ ; cooled to 4°C
LAB ANALYTICAL PROCEDURE; SOURCE	S197 USGS National Water-Quality Laboratory Trace Metals, WWR; Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	IRON WWR-ICP
DETECTION LIMIT	14
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Mercury
SAMPLE FRACTION	total
MEASUREMENT UNITS	micrograms per liter as mercury (ug/L as Hg)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	raw
TRANSPORT/PRESERVATION	acidified to pH<2 with HNO ₃ +K ₂ Cr ₂ O ₇ ; cooled to 4°C
LAB ANALYTICAL PROCEDURE; SOURCE	S197 USGS National Water-Quality Laboratory Trace Metals, WWR; Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	AA, manual cold vapor, mercury, WWR
DETECTION LIMIT	0.100
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Barium
SAMPLE FRACTION	total
MEASUREMENT UNITS	micrograms per liter as barium (ug/L as Ba)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	raw

TABLE 3. WQ PARAMETERS AT APCO

TRANSPORT/PRESERVATION	acidified to pH<2 with HNO ₃ ; cooled to 4°C
LAB ANALYTICAL PROCEDURE; SOURCE	S197 USGS National Water-Quality Laboratory Trace Metals, WWR; Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	BARIUM WWR-ICP
DETECTION LIMIT	1.2
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Beryllium
SAMPLE FRACTION	total
MEASUREMENT UNITS	micrograms per liter as beryllium (ug/L as Be)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	raw
TRANSPORT/PRESERVATION	acidified to pH<2 with HNO ₃ ; cooled to 4°C
LAB ANALYTICAL PROCEDURE; SOURCE	S197 USGS National Water-Quality Laboratory Trace Metals, WWR; Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	BERYLLIUM WWR-ICP
DETECTION LIMIT	4
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Copper
SAMPLE FRACTION	total
MEASUREMENT UNITS	micrograms per liter as copper (ug/L as Cu)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual

TABLE 3. WQ PARAMETERS AT APCO

PREPARATION PROCEDURES	raw
TRANSPORT/PRESERVATION	acidified to pH<2 with HNO ₃ ; cooled to 4°C
LAB ANALYTICAL PROCEDURE; SOURCE	S197 USGS National Water-Quality Laboratory Trace Metals, WWR; Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	GFAA, copper, WWR
DETECTION LIMIT	1.000
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Cobalt
SAMPLE FRACTION	total
MEASUREMENT UNITS	micrograms per liter as cobalt (ug/L as Co)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	raw
TRANSPORT/PRESERVATION	acidified to pH<2 with HNO ₃ ; cooled to 4°C
LAB ANALYTICAL PROCEDURE; SOURCE	S197 USGS National Water-Quality Laboratory Trace Metals, WWR; Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	GFAA, cobalt, WWR
DETECTION LIMIT	1.000
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Aluminum
SAMPLE FRACTION	total
MEASUREMENT UNITS	micrograms per liter as aluminum (ug/L as Al)
FIELD/LAB MEASUREMENT	lab

TABLE 3. WQ PARAMETERS AT APCO

VALUE TYPE	actual
PREPARATION PROCEDURES	raw
TRANSPORT/PRESERVATION	acidified to pH<2 with HNO ₃ ; cooled to 4°C
LAB ANALYTICAL PROCEDURE; SOURCE	S197 USGS National Water-Quality Laboratory Trace Metals, WWR; Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	ALUMINUM WWR-ICP
DETECTION LIMIT	28
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Manganese
SAMPLE FRACTION	total
MEASUREMENT UNITS	micrograms per liter as manganese (ug/L as Mn)
FIELD/LAB MEASUREMENT	lab
VALUE TYPE	actual
PREPARATION PROCEDURES	raw
TRANSPORT/PRESERVATION	acidified to pH<2 with HNO ₃ ; cooled to 4°C
LAB ANALYTICAL PROCEDURE; SOURCE	S197 USGS National Water-Quality Laboratory Trace Metals, WWR; Inorganics: Major Ions and Trace Metals; USGS National Water-Quality Laboratory
FIELD/LAB EQUIPMENT OR PROCEDURE	MANGANESE WWR-ICP
DETECTION LIMIT	3
PERSON/AGENCY THAT ANALYZED	USGS National Water-Quality Laboratory

PARAMETER NAME	Total Coliform (TC)
SAMPLE FRACTION	total
MEASUREMENT UNITS	colonies per 100 milliliters (col/100mL)
FIELD/LAB MEASUREMENT	field

TABLE 3. WQ PARAMETERS AT APCO

VALUE TYPE	calculated
PREPARATION PROCEDURES	filtered, 0.45 microns
TRANSPORT/PRESERVATION	incubated, 24 hours at 35 °C
LAB ANALYTICAL PROCEDURE; SOURCE	membrane/vacuum filtration
FIELD/LAB EQUIPMENT OR PROCEDURE	hand-dip method
DETECTION LIMIT	--
PERSON/AGENCY THAT ANALYZED	Mike Gearheart (USGS)

PARAMETER NAME	Fecal Coliform (FC)
SAMPLE FRACTION	total
MEASUREMENT UNITS	colonies per 100 milliliters (col/100mL)
FIELD/LAB MEASUREMENT	field
VALUE TYPE	calculated
PREPARATION PROCEDURES	filtered, 0.65 microns
TRANSPORT/PRESERVATION	incubated, 24 hours at 44.5 °C
LAB ANALYTICAL PROCEDURE; SOURCE	membrane/vacuum filtration
FIELD/LAB EQUIPMENT OR PROCEDURE	hand-dip method
DETECTION LIMIT	--
PERSON/AGENCY WHO ANALYZED	Mike Gearheart (USGS)

PARAMETER NAME	Fecal Streptococcus (FS)
SAMPLE FRACTION	total
MEASUREMENT UNITS	colonies per 100 milliliters (col/100mL)
FIELD/LAB MEASUREMENT	field
VALUE TYPE	calculated
PREPARATION PROCEDURES	filtered, 0.45 microns
TRANSPORT/PRESERVATION	incubated, 48 hours at 35 °C
LAB ANALYTICAL PROCEDURE; SOURCE	membrane/vacuum filtration

TABLE 3. WQ PARAMETERS AT APCO

FIELD/LAB EQUIPMENT OR PROCEDURE	hand-dip method
DETECTION LIMIT	--
PERSON/AGENCY THAT ANALYZED	Mike Gearheart (USGS)

TABLE 2. WQ DATA AT APCO

[--, no data available]

Station Name	Station ID	Date	Time	Medium	Sampling Depth
		mm/dd/yy	hh:mm:ss		feet
Appomattox River at SR656 nr Appomattox, VA	0203879450	3/1/1999	12:30:00	Water	0.7
Appomattox River at SR656 nr Appomattox, VA	0203879450	6/29/1999	10:05:00	Water	0.8
Appomattox River at SR656 nr Appomattox, VA	0203879450	9/29/1999	11:20:00	Water	1.0
Appomattox River at SR656 nr Appomattox, VA	0203879450	12/9/1999	8:25:00	Water	0.8
Appomattox River at East Park Boundary nr Appomattox, VA	0203880250	3/1/1999	15:00:00	Water	1.0
Appomattox River at East Park Boundary nr Appomattox, VA	0203880250	6/29/1999	12:55:00	Water	1.0
Appomattox River at East Park Boundary nr Appomattox, VA	0203880250	9/29/1999	14:30:00	Water	0.8
Appomattox River at East Park Boundary nr Appomattox, VA	0203880250	12/9/1999	11:10:00	Water	1.0
Plain Run Branch at Appomattox, VA	0203880090	3/2/1999	8:50:00	Water	0.5
Plain Run Branch at Appomattox, VA	0203880090	6/29/1999	15:15:00	Water	0.8
Plain Run Branch at Appomattox, VA	0203880090	9/30/1999	8:30:00	Water	1.4
Plain Run Branch at Appomattox, VA	0203880090	12/8/1999	13:10:00	Water	0.5
Plain Run Branch at Mouth nr Appomattox, VA	0203880175	3/2/1999	11:45:00	Water	0.5
Plain Run Branch at Mouth nr Appomattox, VA	0203880175	6/29/1999	17:25:00	Water	0.4
Plain Run Branch at Mouth nr Appomattox, VA	0203880175	9/30/1999	11:40:00	Water	0.8
Plain Run Branch at Mouth nr Appomattox, VA	0203880175	12/8/1999	15:40:00	Water	0.5

TABLE 2. WQ DATA AT APCO

Station ID	Sample Collector
0203879450	J. Michael Gearheart (USGS)
0203879450	J. Michael Gearheart (USGS)
0203879450	J. Michael Gearheart (USGS)
0203879450	J. Michael Gearheart (USGS)
0203880250	J. Michael Gearheart (USGS)
0203880250	J. Michael Gearheart (USGS)
0203880250	J. Michael Gearheart (USGS)
0203880250	J. Michael Gearheart (USGS)
0203880090	J. Michael Gearheart (USGS)
0203880090	J. Michael Gearheart (USGS)
0203880090	J. Michael Gearheart (USGS)
0203880090	J. Michael Gearheart (USGS)
0203880175	J. Michael Gearheart (USGS)
0203880175	J. Michael Gearheart (USGS)
0203880175	J. Michael Gearheart (USGS)
0203880175	J. Michael Gearheart (USGS)

TABLE 2. WQ DATA AT APCO

Station ID	Discharge	Specific Conductance - field	pH - field	Water Temperature	Dissolved Oxygen	Total Coliform
	cubic feet per second	microsiemens per centimeter at 25 degrees Celsius	standard pH units	degrees Celsius	milligrams per liter	colonies/100mL
0203879450	1.4	56	7.3	7.0	11.2	410
0203879450	0.426	68	6.8	20.8	5.8	2,900
0203879450	2.97	70	6.7	19.2	7.7	3,200
0203879450	0.718	58	6.9	5.9	11.0	440
0203880250	6.8	76	7.5	6.9	13.9	240
0203880250	1.97	93	7.4	24.5	6.5	1,300
0203880250	16.1	86	6.9	19.0	8.2	5,300
0203880250	3.83	82	7.5	4.7	12.1	112
0203880090	0.14	94	6.9	5.5	10.6	220
0203880090	0.081	123	6.6	26.8	7.3	260
0203880090	2.72	111	7.1	16.4	8.8	5,800
0203880090	0.11	97	6.8	8.9	12.0	48
0203880175	1.3	93	7.5	5.8	13.1	110
0203880175	0.357	106	7.5	23.9	5.4	920
0203880175	14.8	73	7.0	16.8	9.0	6,200
0203880175	0.862	97	7.8	7.1	11.5	62

TABLE 2. WQ DATA AT APCO

Station ID	Fecal Coliform	Fecal Streptococcus
	colonies/100mL	colonies/100mL
0203879450	330	340
0203879450	1,500 non-ideal colony count	2,500
0203879450	1,900	3,200 estimated count
0203879450 non-ideal colony count	320 non-ideal colony count	520 non-ideal colony count
0203880250	190	100
0203880250	190 non-ideal colony count	230
0203880250	850	2,700
0203880250	55	43
0203880090 estimated count	20 non-ideal colony count	37 non-ideal colony count
0203880090	67	>100
0203880090	1,200	2,200
0203880090	12 non-ideal colony count	16 non-ideal colony count
0203880175 non-ideal colony count	43 non-ideal colony count	10 non-ideal colony count
0203880175	170	260
0203880175	850	2,100
0203880175	7 non-ideal colony count	25 non-ideal colony count

TABLE 2. WQ DATA AT APCO

Station ID	Calcium - Dissolved <i>detection limit = 0.020</i> micrograms per liter as calcium	Magnesium - Dissolved <i>detection limit = 0.004</i> milligrams per liter as magnesium	Sodium - Dissolved <i>detection limit = 0.06</i> milligrams per liter as sodium	Potassium - Dissolved <i>detection limit = 0.100</i> milligrams per liter as potassium
0203879450	--	--	--	--
0203879450	--	--	--	--
0203879450	--	--	--	--
0203879450	4.3	2.1	3.4	1.5
0203880250	--	--	--	--
0203880250	--	--	--	--
0203880250	--	--	--	--
0203880250	7.3	3.4	4.1	1.4
0203880090	--	--	--	--
0203880090	--	--	--	--
0203880090	--	--	--	--
0203880090	11.0	2.2	4.8	1.2
0203880175	--	--	--	--
0203880175	--	--	--	--
0203880175	--	--	--	--
0203880175	9.9	3.8	4.7	1.0

TABLE 2. WQ DATA AT APCO

Station ID	Alkalinity - field milligrams per liter as calcium carbonate	Alkalinity - lab <i>detection limit = 1</i> milligrams per liter as calcium carbonate	Sulfate - Dissolved <i>detection limit = 0.100</i> milligrams per liter as sulfate	Chloride - Dissolved <i>detection limit = 0.100</i> micrograms per liter as chloride	Fluoride - Dissolved <i>detection limit = 0.100</i> micrograms per liter as fluoride
0203879450	16	--	--	--	--
0203879450	21.0	--	--	--	--
0203879450	20.9	--	--	--	--
0203879450	23	22.968	1.4	3.1	<0.1
0203880250	21	--	--	--	--
0203880250	35.1	--	--	--	--
0203880250	23.5	--	--	--	--
0203880250	32	34.883	2.2	3.6	<0.1
0203880090	20	--	--	--	--
0203880090	33.5	--	--	--	--
0203880090	36.9	--	--	--	--
0203880090	33.2	34.772	2.1	7.5	<0.1
0203880175	26	--	--	--	--
0203880175	39.6	--	--	--	--
0203880175	20.0	--	--	--	--
0203880175	38.5	41.435	4.0	4.9	<0.1

TABLE 2. WQ DATA AT APCO

Station ID	Silica - Dissolved <i>detection limit = 0.100</i> milligrams per liter as silica dioxide	Nitrogen, Nitrite - Dissolved <i>detection limit = 0.010</i> milligrams per liter as nitrogen	NO2 + NO3 - Dissolved <i>detection limit = 0.050</i> milligrams per liter as nitrogen	Nitrogen Ammonia - Dissolved <i>detection limit = 0.10</i> milligrams per liter as nitrogen
0203879450	--	0.01	0.35	<0.02
0203879450	--	<0.01	0.52	0.05
0203879450	--	<0.01	0.22	0.05
0203879450	18	<0.01	0.39	0.03
0203880250	--	0.02	0.28	<0.02
0203880250	--	<0.01	0.48	0.02
0203880250	--	<0.01	0.26	<0.02
0203880250	23	<0.01	0.39	<0.02
0203880090	--	0.01	0.89	<0.02
0203880090	--	<0.01	0.65	0.04
0203880090	--	<0.01	0.49	<0.02
0203880090	9.5	<0.01	0.90	<0.02
0203880175	--	0.01	0.14	<0.02
0203880175	--	<0.01	0.38	0.02
0203880175	--	<0.01	0.14	<0.02
0203880175	21	<0.01	0.19	<0.02

TABLE 2. WQ DATA AT APCO

Station ID	Nitrogen, Amn & Org - Total <i>detection limit = 0.10</i> milligrams per liter as nitrogen	Nitrogen, Amn & Org - Dissolved <i>detection limit = 0.10</i> milligrams per liter as nitrogen	Phosphorous - Total <i>detection limit = 0.005</i> milligrams per liter as phosphorous
0203879450	0.3	0.2	0.027
0203879450	0.3	<0.1	0.028
0203879450	0.7	0.4	0.085
0203879450	0.2	0.2	0.016
0203880250	0.2	0.1	0.018
0203880250	0.2	0.1	0.027
0203880250	0.4	0.3	0.053
0203880250	0.2	0.1	0.009
0203880090	0.06 estimated value	0.060 estimated value	0.007
0203880090	0.2	0.2	0.017
0203880090	0.5	0.4	0.043
0203880090	0.2	0.080 estimated value	0.014
0203880175	0.1	0.080 estimated value	0.010
0203880175	0.1	0.070 estimated value	0.012
0203880175	0.4	0.3	0.042
0203880175	0.1	0.07 estimated value	0.006

TABLE 2. WQ DATA AT APCO

Station ID	Phosphorous - Dissolved <i>detection limit = 0.005</i> milligrams per liter as phosphorous	Orthophosphate - Dissolved <i>detection limit = 0.010</i> milligrams per liter as phosphorous	Aluminum - Total <i>detection limit = 28</i> micrograms per liter as aluminum
0203879450	0.009	<0.01	--
0203879450	0.010	0.01	45.4
0203879450	0.029	0.02	--
0203879450	0.008	<0.01	--
0203880250	0.006	<0.01	--
0203880250	0.010	0.01	84.1
0203880250	0.017	0.01	--
0203880250	0.006	<0.01	--
0203880090	<0.004	<0.01	--
0203880090	<0.004	<0.01	217
0203880090	0.013	<0.01	--
0203880090	<0.006	<0.01	--
0203880175	<0.004	<0.01	--
0203880175	0.008	0.01	55.6
0203880175	0.011	0.02	--
0203880175 estimated value	0.003 estimated value	<0.01	--

TABLE 2. WQ DATA AT APCO

Station ID	Arsenic - Total <i>detection limit = 1.000</i> micrograms per liter as arsenic	Barium - Total <i>detection limit = 1.2</i> micrograms per liter as barium	Beryllium - Total <i>detection limit = 4</i> micrograms per liter as beryllium	Boron - Dissolved <i>detection limit = 16</i> micrograms per liter as boron
0203879450	--	--	--	--
0203879450	<1	20.1	<4	--
0203879450	--	--	--	--
0203879450	--	--	--	16.259
0203880250	--	--	--	--
0203880250	<1	21.1	<4	--
0203880250	--	--	--	--
0203880250	--	--	--	13.773
0203880090	--	--	--	--
0203880090	<1	24.5	<4	--
0203880090	--	--	--	--
0203880090	--	--	--	13.811
0203880175	--	--	--	--
0203880175	<1	20.0	<4	--
0203880175	--	--	--	--
0203880175	--	--	--	14.244

TABLE 2. WQ DATA AT APCO

Station ID	Cadmium - Total	Chromium - Total	Cobalt - Total
	<i>detection limit = 1.000</i> micrograms per liter as cadmium	<i>detection limit = 1.000</i> micrograms per liter as chromium	<i>detection limit = 1.000</i> micrograms per liter as cobalt
0203879450	--	--	--
0203879450	<1	<1.0	<1
0203879450	--	--	--
0203879450	--	--	--
0203880250	--	--	--
0203880250	<1	<1.0	<1
0203880250	--	--	--
0203880250 estimated value	--	--	--
0203880090	--	--	--
0203880090	<1	<1.0	<1
0203880090	--	--	--
0203880090 estimated value	--	--	--
0203880175	--	--	--
0203880175	<1	<1.0	<1
0203880175	--	--	--
0203880175 estimated value	--	--	--

TABLE 2. WQ DATA AT APCO

Station ID	Copper - Total <i>detection limit = 1.000</i> micrograms per liter as copper	Iron - Total <i>detection limit = 14</i> micrograms per liter as iron	Iron - Dissolved <i>detection limit = 10.000</i> micrograms per liter as iron	Lead - Total <i>detection limit = 1.000</i> micrograms per liter as lead
0203879450	--	--	--	--
0203879450	2	1,070	--	<1
0203879450	--	--	--	--
0203879450	--	--	271.19	--
0203880250	--	--	--	--
0203880250	2	754	--	<1
0203880250	--	--	--	--
0203880250	--	--	185.61	--
0203880090	--	--	--	--
0203880090	2	879	--	<1
0203880090	--	--	--	--
0203880090	--	--	79.796	--
0203880175	--	--	--	--
0203880175	3	235	--	<1
0203880175	--	--	--	--
0203880175	--	--	42.211	--

TABLE 2. WQ DATA AT APCO

Station ID	Lithium - Total <i>detection limit = 12</i> micrograms per liter as lithium	Manganese - Total <i>detection limit = 3</i> micrograms per liter as manganese	Manganese - Dissolved <i>detection limit = 3.0</i> micrograms per liter as manganese	Mercury - Total <i>detection limit = 0.100</i> micrograms per liter as mercury
0203879450	--	--	--	--
0203879450	<12	75.4	--	<0.1
0203879450	--	--	--	--
0203879450	--	--	54.383	--
0203880250	--	--	--	--
0203880250	<12	41.4	--	<0.1
0203880250	--	--	--	--
0203880250	--	--	32.579	--
0203880090	--	--	--	--
0203880090	<12	92.1	--	<0.1
0203880090	--	--	--	--
0203880090	--	--	41.169	--
0203880175	--	--	--	--
0203880175	<12	17.7	--	<0.1
0203880175	--	--	--	--
0203880175	--	--	7.054	--

TABLE 2. WQ DATA AT APCO

Station ID	Molybdenum - Total <i>detection limit = 1.000</i> micrograms per liter as molybdenum	Nickel - Total <i>detection limit = 1.000</i> micrograms per liter as nickel	Selenium - Total <i>detection limit = 1.0</i> micrograms per liter as selenium	Silver - Total <i>detection limit = 1.000</i> micrograms per liter as silver
0203879450	--	--	--	--
0203879450	<1.0	<1	<1	<1
0203879450	--	--	--	--
0203879450	--	--	--	--
0203880250	--	--	--	--
0203880250	<1.0	<1	<1	<1
0203880250	--	--	--	--
0203880250	--	--	--	--
0203880090	--	--	--	--
0203880090	<1.0	<1	<1	<1
0203880090	--	--	--	--
0203880090	--	--	--	--
0203880175	--	--	--	--
0203880175	<1.0	<1	<1	<1
0203880175	--	--	--	--
0203880175	--	--	--	--

TABLE 2. WQ DATA AT APCO

Station ID	Zinc - Total
	<i>detection limit = 40</i> micrograms per liter as zinc
0203879450	--
0203879450	<40
0203879450	--
0203879450	--
0203880250	--
0203880250	<40
0203880250	--
0203880250	--
0203880090	--
0203880090	<40
0203880090	--
0203880090	--
0203880175	--
0203880175	<40
0203880175	--
0203880175	--