Seepage Runs on Streams Draining the Viburnum Trend Subdistrict, Southeastern Missouri, August 2003–October 2006

By Michael J. Kleeschulte

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Abstract

A study was conducted to identify streams or reaches of streams that lose discharge to the ground-water system in and around active lead and zinc mining areas along the Viburnum Trend Subdistrict that have potential to release mining-related trace elements or chemicals into receiving streams. The data collection began in August 2003 and was not completed until October 2006.

All the streams in the study area have sand and gravel-filled channels (streambed sediment) that include frequent, large bars composed of loose sand, gravel, and cobbles. During low flow, a large percentage of water can be traveling through the streambed sediment instead of flowing on the surface. In many cases, the water flowing through the streambed sediment resurfaces farther downstream and is not being lost to the underlying bedrock aquifer.

Stream reaches in East Fork Huzzah Creek; Strother Creek, Neals Creek, and Brushy Creek in the Middle Fork Black River Basin; and East Fork Black River had less discharge measured in a downstream mainstem site than was expected based on the upstream discharge measurements. None of these reaches were classified as losing. This classification is based on the quantity of gravel in the stream channel, the hydrologic assessment of the personnel making the measurements, and the rated discharge measurement accuracy for the sites.

Logan Creek had about a 13-mile reach with no flow that began losing discharge downstream from Sweetwater Creek. Discharge in Logan Creek was observed again near Ellington and continued to increase downstream to Clearwater Lake.

Introduction

The lead and zinc ore deposits of the Viburnum Trend Subdistrict in southeastern Missouri are part of the largest known lead reserve within the United States (U.S. Geological Survey, 2008). The initial discovery of lead and zinc deposits near Viburnum, Missouri, was made in 1955 and initial ore production began in 1960. Continued exploration led to the eventual opening of 10 operating underground mines along a 60-mile (mi) north-south trending band (C.M. Seeger, Missouri Department of Natural Resources, Division of Geology and Land Survey, written commun., 2008) that ranges from less than 500 feet (ft) wide to, in rare cases, about 1 mi wide (Wharton, 1975).

Ore mined underground is brought to the surface and milled at several of the mines. Tailings (waste rock) and other wastes from the milling process are pumped as slurry to large surface impoundments that fill headwater stream valleys. One environmental effect of concern is water-transported trace elements from tailings piles into local streams.

The Viburnum Trend lies within a large region of well-developed karst terrain that is characterized by the presence of caves, springs, sinkholes, and gaining and losing streams. Karst terrain is used to describe a particular type of topography that forms when carbonate or other soluble rocks are dissolved by water percolating underground and enlarging subsurface openings. With time, some of these enlarged openings can cause the movement of water in the aquifer to change from diffuse flow through small, scattered openings in the rock to discrete flow that is concentrated within well-developed conduits. As these openings continue to enlarge, caves are formed and the ground-water level can decline below the level of surface streams. As the water table declines below the stream elevation, the stream loses water and any substances dissolved in water into the underlying bedrock (U.S. Geological Survey, 1985). Streams with this characteristic are known as losing streams.

Study Area Description

Much of the Viburnum Trend and study area is within the boundaries of the Mark Twain National Forest, which is managed by the U.S. Department of Agriculture, Forest Service (fig. 1). Much of the area inside the National Forest boundaries is uninhabited, hickory-oak forest. The area includes scattered parcels of private property that contain either isolated homesteads or small communities. Most of the private property is concentrated along major roads or along stream valleys.

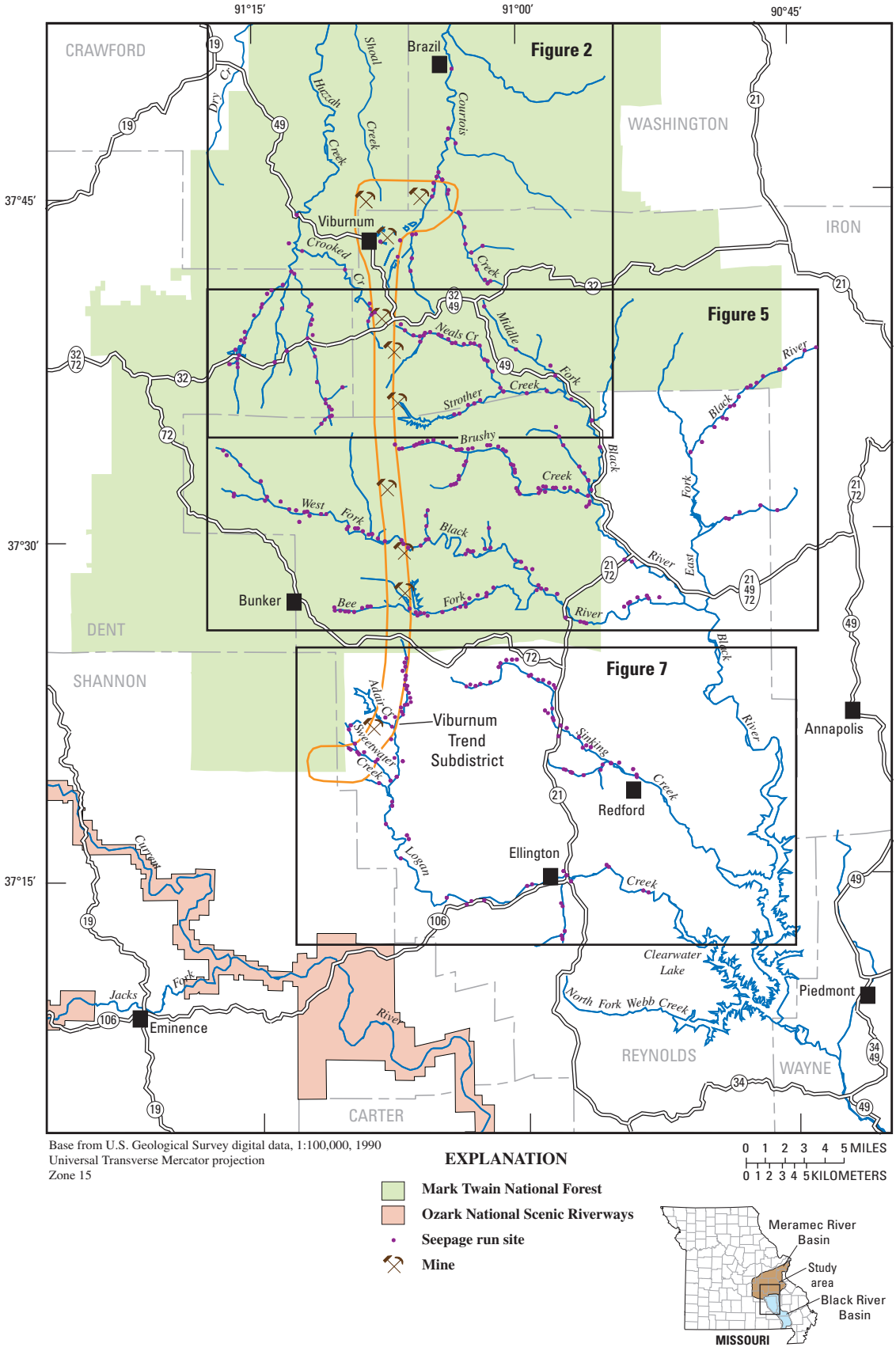

Figure 1. Study area and seepage run sites on streams draining the Viburnum Trend Subdistrict.

This area is characterized by deep, narrow valleys, and narrow, steep-sided ridges. A regional surface-water divide trends northeast across the northern part of the study area (U.S. Geological Survey, 1977). The northward flowing streams are part of the Meramec River Basin and the southward flowing streams are part of the Black River Basin. Most of the springs in the study area are small, discharging 0.1 to 1.0 cubic foot per second (ft^3/s) (Vineyard and Feder, 1974)

Purpose and Scope

The purpose of this chapter is to describe seepage runs on streams draining the Viburnum Trend Subdistrict (an active lead and zinc mining area in southeast Missouri; fig. 1) to identify streams or reaches of streams that lost discharge to the ground-water system between August 2003 and October 2006. Emphasis was placed on streams in and around active mines in the subdistrict that have potential to release mining-related trace elements or chemicals into receiving streams. Streams included Huzzah and Courtois Creeks in the Meramec River Basin and tributaries of the Black River upstream from Clearwater Lake (fig. 1).

Methodology

A seepage run is a series of discharge measurements made along a stream within a short time to identify gaining and losing reaches. Typically, measurements were made consecutively downstream at stream sections where channel morphology and velocity were favorable to make accurate discharge measurements. Seepage runs are designed to be made during periods of minimum streamflow and minimum daily fluctuations (base flow) when discharge is sustained by diffuse ground-water and spring inflow, not by surface runoff.

Discharge measurements were made using acoustic Doppler velocity and current meters and followed the methods described by Rantz and others (1982). Discharge measurements were rated according to stream channel conditions and uniformity of flow. The rated measurement accuracies are defined as follows: “good” indicates that the measured discharge is estimated to be within 5 percent of the true discharge; “fair” between 5 and 8 percent; and “poor” greater than 8 percent. The criteria for rating a discharge measurement are based on guidelines using flow and stream channel characteristics observed at the measuring section (Sauer and Meyer, 1992; Nolan and Shields, 2000). However, the measurement rating is subjective based on the assessment of the personnel making the measurement. Discharge was estimated at sites where there was minimal discharge and conditions were not adequate for making discharge measurements, either because of insufficient water depths, obstructions in the stream channel, or minimal flow velocities. Discharge was estimated by measuring the stream width, estimating an average stream depth, and estimating an average velocity for the measuring section. The product of these three components is the estimated discharge. All estimated discharges are rated poor.

The measurement accuracy and associated error defined by the measurement rating became an important determining factor in classifying several stream reaches as non-losing, even though less discharge was measured at a downstream site than was measured upstream. Along these reaches, the measurement error was considered at the adjacent mainstem measuring sites along with the measured discharge from tributary inflow between the mainstem sites. To calculate the range of possible discharge for a given measurement (error bars), a “good” measurement rating has error bars limited to plus or minus 5 percent of the actual measurement; “fair” is limited to plus or minus 8 percent; and poor is limited to plus or minus 10 percent. The resulting error bars then were compared. If successive error bars overlapped, indicating that the observed decrease in discharge could be the result of measurement error, the reach was not classified as losing.

The stream length used to identify the seepage run sites in the figures and table in this chapter was calculated from the beginning of the stream channel as defined by the hydrologic coverage from the U.S. Geological Survey 1:100,000 digital data. Stream length shown in all figures and tables increases downstream.

Specific conductance and water temperature generally were measured at the seepage-run sites at the time of the discharge measurement. These measurements were made according to procedures described by Wilde and Radtke (1998). Specific conductance was measured with a temperature compensating meter calibrated to read in microsiemens per centimeter at 25 degrees Celsius (^{o}C). Water temperature was measured with a thermistor to the nearest 0.1 ^{o}C.

The seepage runs described in this chapter were conducted on the northward flowing Huzzah Creek and Courtois Creek of the Meramec River Basin and tributaries to the Black River upstream from Clearwater Lake (fig.1). The tributaries of the Black River included three forks (West Fork, Middle Fork, and East Fork), Logan Creek, and Sinking Creek and their tributaries. The study was cursory in that the stream discharge was monitored at road crossings or at other convenient locations rather than traversing the entire length of these streams. When rainfall caused runoff to occur and base-flow conditions to cease, the seepage run was stopped and not restarted until base-flow conditions existed again. These postponements occurred several times. Discharge measurements along several reaches were repeated at later dates because of either inconsistencies or a sparse distribution in the original data, and additional streams were added. Because of these postponements, restarts, reexaminations, and expansion of the study area, the data collection for this study that began in August 2003 was not completed until October 2006. This extensive timeframe is contrary to the desired method of completing seepage runs within a short period.

All streams in the study area have sand and gravel-filled stream channels (streambed sediment) that include frequent, large bars composed of loose sand, gravel, and cobbles. Dur-

ing low flow, a large percentage of the water can be traveling through the streambed sediment instead of flowing on the surface. In many cases, the water flowing through the streambed sediment resurfaces farther downstream and is not being lost to the underlying bedrock aquifer. Discharge measurements were avoided when possible in areas where large gravel bars were present, but on occasion alternative sites were not a viable option. These features were more frequently encountered in the vicinity of a tributary mouth where the stream channels widen and gravel deposits increase in thickness. Discharge measurements at sites where flow through streambed sediment occurred hampered the analysis of the seepage run data because the quantity of water lost through the streambed sediment could not be determined, and the assigned discharge measurement rating was based solely on observed flow and stream-channel conditions. Based on the hydrologic assessment of the personnel making the discharge measurement, occasionally these reaches were not classified as losing even though considerably more discharge was measured upstream. These assessments typically were affected by hydrologic observations of smaller tributaries in the immediate area of the site of concern. If water was flowing in these smaller tributaries or if the quantity of water lost at a particular site resurfaced at the next downstream mainstem measuring site, the site or reach with decreased discharge was not classified as losing.

Seepage Runs

Huzzah Creek

No losing stream reaches were identified in Huzzah Creek or its major tributaries (figs. 2, 3; table 1, at the back of this chapter); however, the East Fork Huzzah Creek (fig. 3B) had less measured discharge at the mouth (site hce18; 2.59 ft^3/s) than at the previous upstream mainstem measuring site (site hce16; 2.99 ft^3/s). The quantity of lost discharge between the two sites exceeded that which could be attributed to the error defined by the measurement rating at the sites; therefore, the reach could be classified as losing. However, because of a large sand and gravel bar at the mouth of East Fork Huzzah Creek, a considerable quantity of water likely was flowing through the streambed sediment and could not be measured. This conclusion is supported by the discharge measured at the downstream Huzzah Creek site hc03 (figs. 2, 3A; table 1), which was larger than the combined discharge from West Fork Huzzah Creek (site hcw17), East Fork Huzzah Creek (site hce18), Crooked Creek (site hc01), and Indian Creek (site hc02).

Courtois Creek

No losing stream reaches were identified in Courtois Creek or its major tributary, Indian Creek, during this study (figs. 2, 4A, 4B; table 1). However, the Indian Creek seepage run had somewhat inconsistent results. Indian Creek and its tributaries, specifically West Prong, drain an area that has been affected by considerable anthropogenic land disturbances associated with Viburnum No. 28 Mine and contains two mine tailings ponds with outfalls (Chapter 1 of this report). In the tailings ponds areas, there were physical changes to the stream channel, a lack of adequate discharge measuring sites, and a disruption of the steady, base-flow conditions that would otherwise be present in the stream. These factors made the analyses of the Indian Creek and West Prong data difficult. A large increase in discharge between two successive mainstem measuring sites on Indian Creek—site cc14d (0.43 ft^3/s; figs. 2, 4B) and site cc14g (9.82 ft^3/s) could not be attributed to measured inflows. The most probable explanation for the larger than expected discharge at site cc14g is additional unmeasured inflow to West Prong between the downstream-most measured site in West Prong (site cc14f; 2.77 ft^3/s) and the mouth of West Prong.

West Fork Black River

The seepage run on West Fork Black River, which included Bee Fork, did not identify any losing stream reaches. The headwaters of West Fork Black River (Parker Branch and Crossville Branch) (fig. 5; table 1) were first investigated in August 2003, but because of rainfall the seepage run was suspended before the mainstem of the West Fork Black River was investigated. The seepage run resumed in September 2004, and discharges at the mouths of both Parker Branch (site wfb05; fig. 6A) and Crossville Branch (site wfb08, fig. 6A) were larger than when the initial seepage run ended in 2003. Discharge continued to increase in the mainstem of the West Fork Black River to the junction with Middle Fork Black River (fig. 5; table 1), with the largest discharge contributions from Bee Fork (site wfb43) and Reeds Spring (site wfb48).

Flow began in the headwaters of Bee Fork and in Kitchel Branch upstream from its junction with Bee Fork (fig. 5). Discharge increased in Bee Fork at each successive mainstem measurement downstream to the mouth (fig. 6B). The largest contributor of inflow to Bee Fork was an unnamed tributary that discharged water from the Fletcher Mine clarifying pond (site wfb43k, fig. 5; table 1).

Middle Fork Black River

The seepage run on Middle Fork Black River and its tributaries (fig. 5) did not conclusively identify any losing stream reaches; however, three tributaries (Strother Creek, Neals Creek, and Brushy Creek) had less discharge at downstream sites than was anticipated based on previous upstream measurements. The middle reach of the Middle Fork Black River initially was investigated in August 2003 and then reexamined at a later date because of inconsistencies in the original data. This resulted in the seepage run data for this stream being

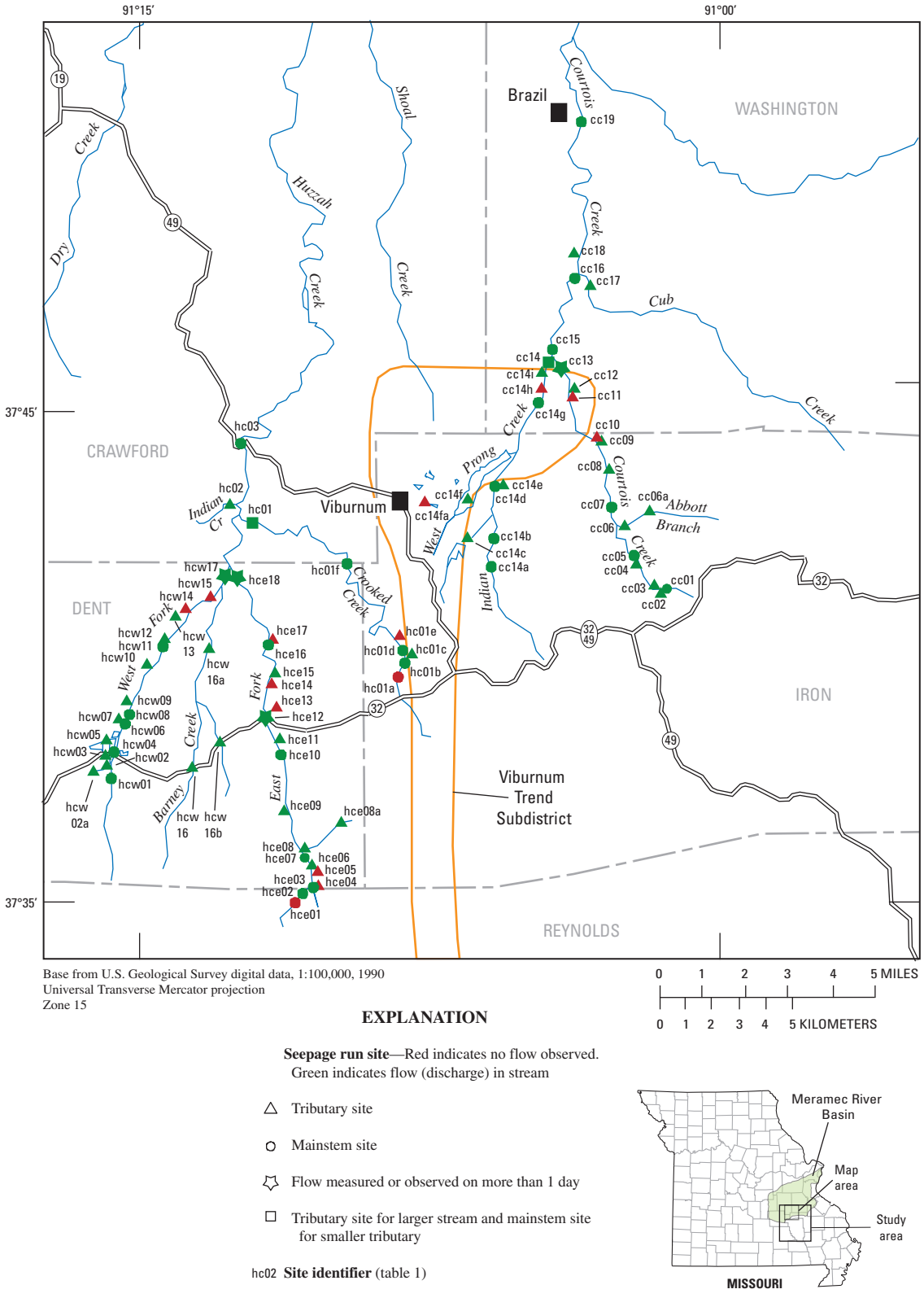

Figure 2. Seepage run sites on streams in the Meramec River Basin draining the Viburnum Trend Subdistrict.

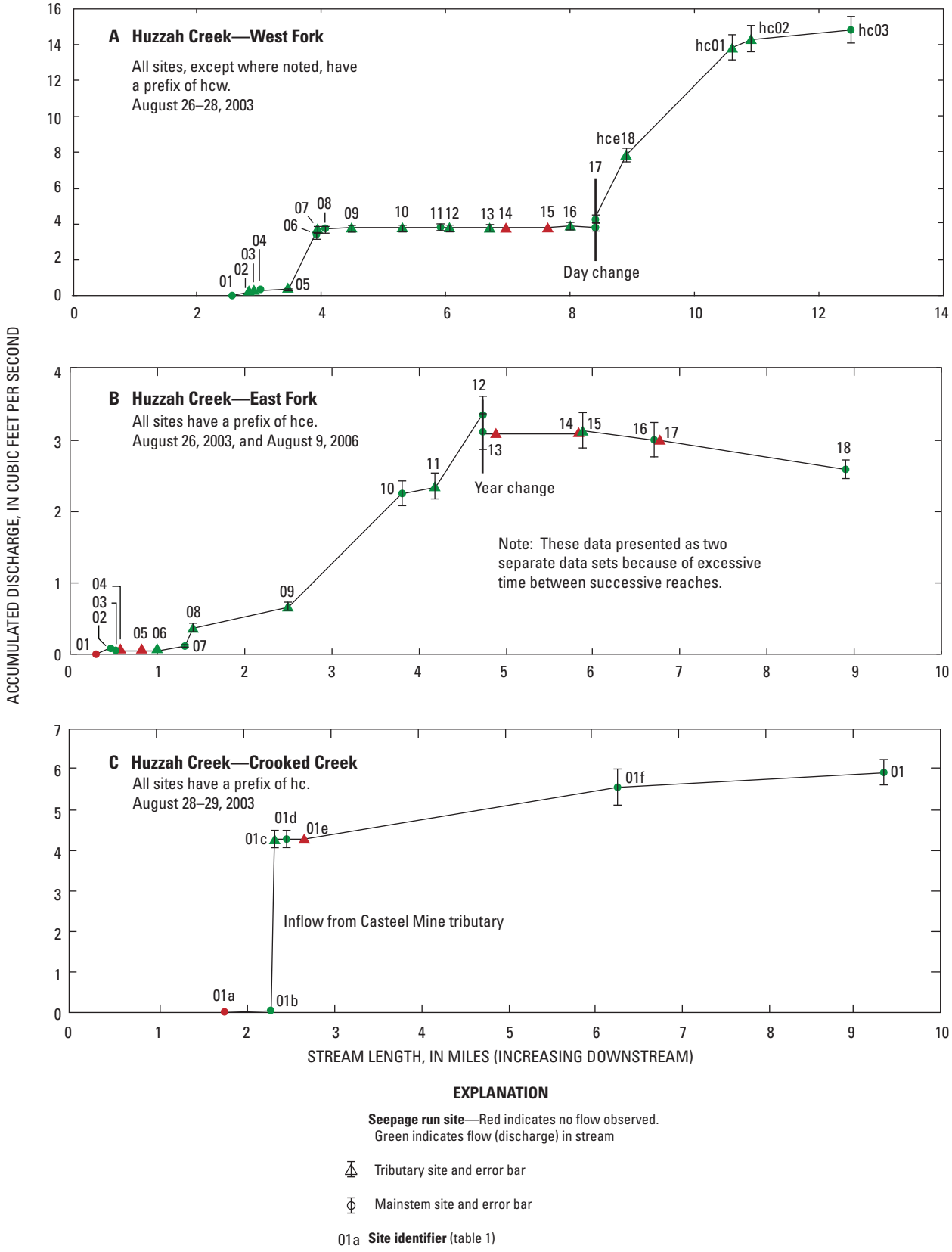

Figure 3. Seepage run data for West and East Forks Huzzah Creek and Crooked Creek, August 2003 through August 2006.

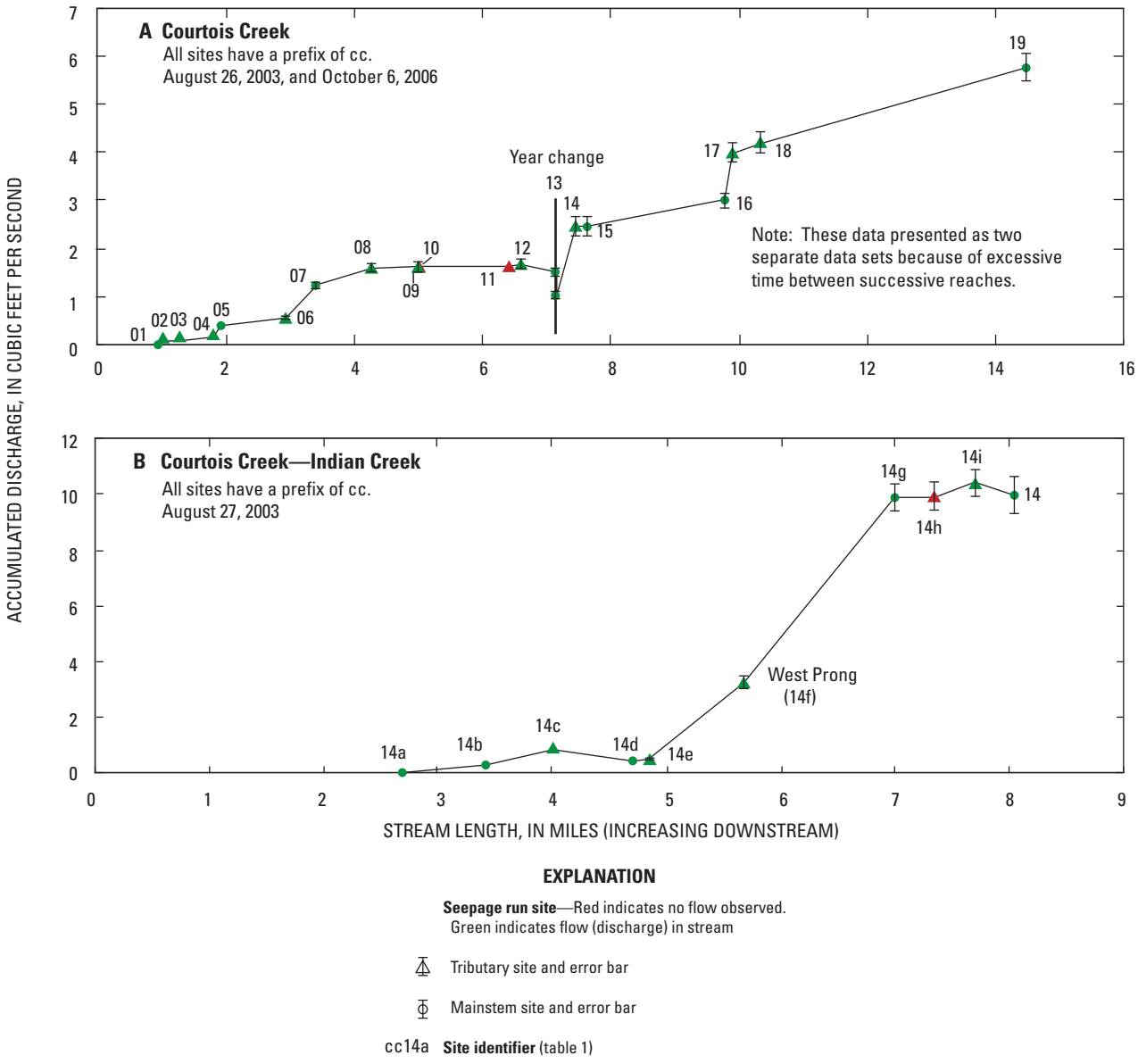

Figure 4. Seepage run data for Courtois Creek and Indian Creek, August 2003 through October 2006.

presented in three segments (fig. 6C; table 1). None of these segments indicated losing reaches.

The three aforementioned tributaries of Middle Fork Black River also were investigated (fig. 6D–F). In each of these tributaries, the sum of the measured discharge at a mainstem site and the contributing inflows from downstream tributaries was greater than the discharge at the next downstream mainstem site. For example, discharge decreased from site mf05b to site mf05d (figs. 5, 6D; table 1) along Strother Creek and from site nc18 to site nc21 along Neals Creek (figs. 5, 6E; table 1). However, if the measurement accuracy is considered for all the discharge measurements made within these two reaches, the sum of the upstream mainstem discharge plus all the downstream tributary inflows is within the error associated with the measurement rating accuracy at the downstream mainstem site (table 1). Therefore, these two reaches were not classified as losing. The reported discharge at the upstream mainstem site of each reach is thought to be greater than the actual discharge in the stream in both cases.

The 3-mi reach upstream from the mouth of Brushy Creek was another occurrence of discharge decreasing downstream (figs. 5, 6F; table 1). Because of limited access along this reach, the mainstem measurements were widely spaced. At the upstream mainstem site mf11zf, a discharge of 5.44 ft^3/s was measured in September 2004. Between this site and the mouth of Brushy Creek (site mf11), 1.42 ft^3/s was added from tributary inflow and springs; however, the measured discharge at the mouth of Brushy Creek (site mf11) was 0.69 ft^3/s, about 6.2 ft^3/s less discharge than expected.

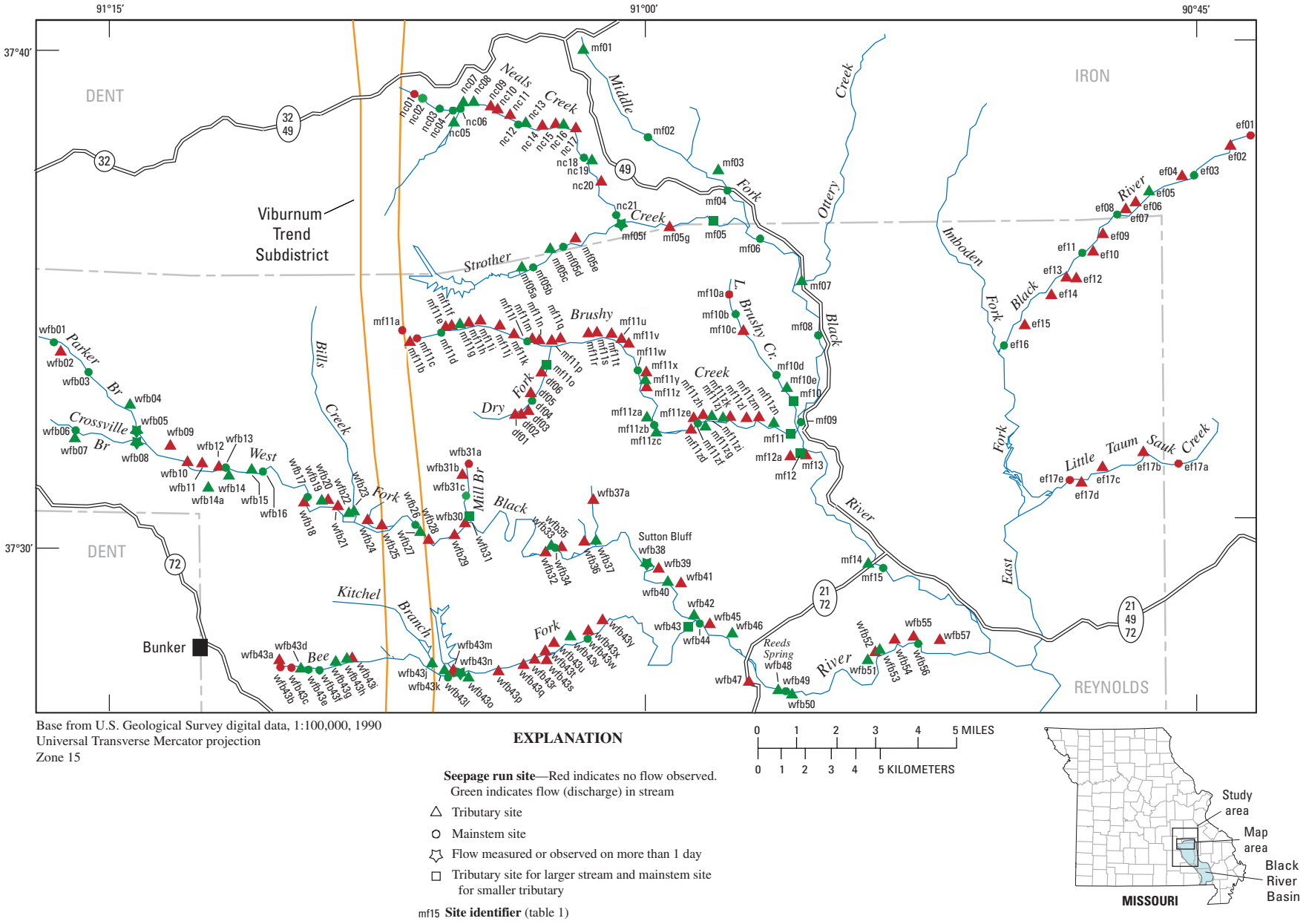

Figure 5. Seepage run sites on streams in the Black River Basin draining the central part of the Viburnum Trend Subdistrict.

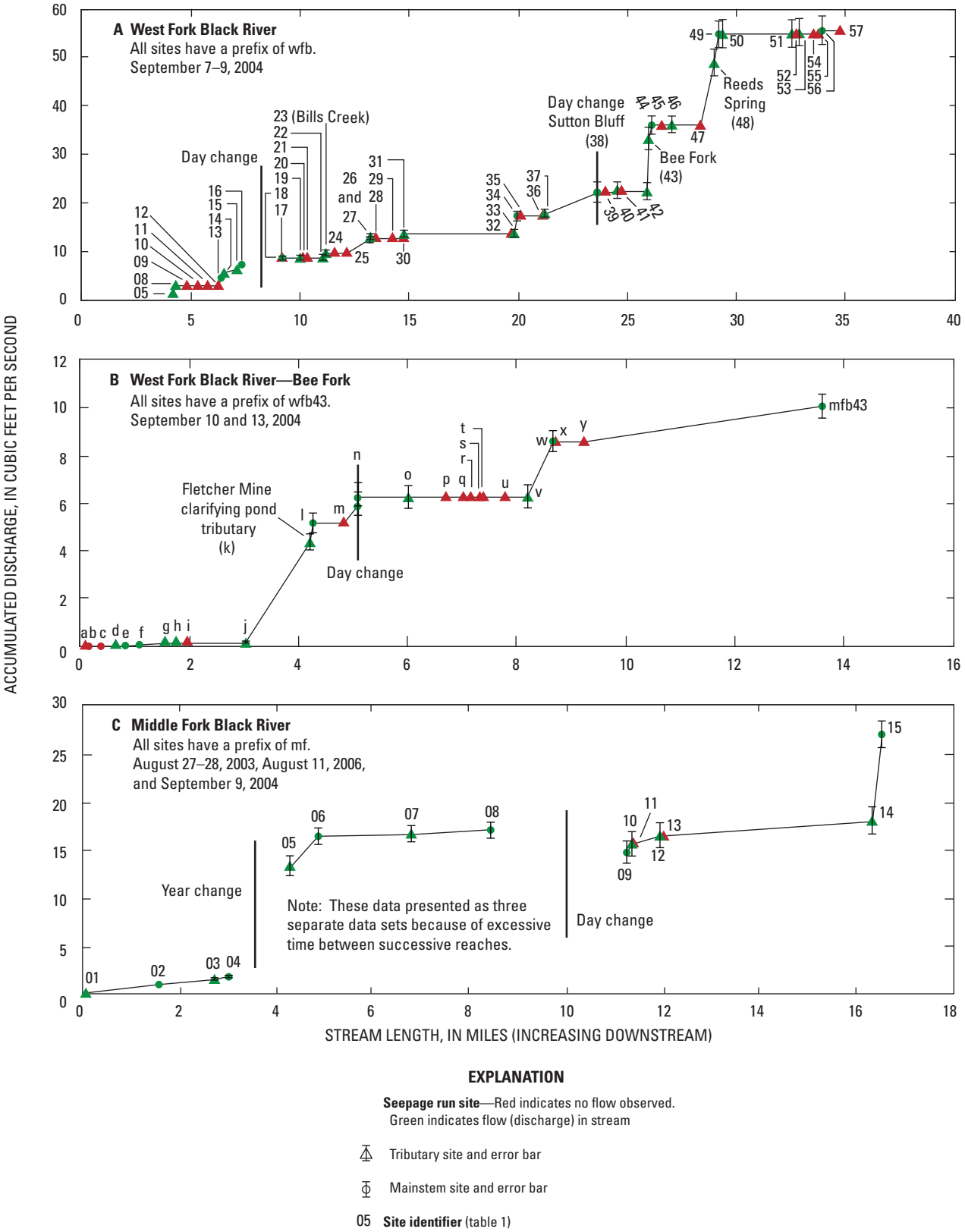

Figure 6. Seepage run data for the upper Black River Basin, August 2003 through August 2006.

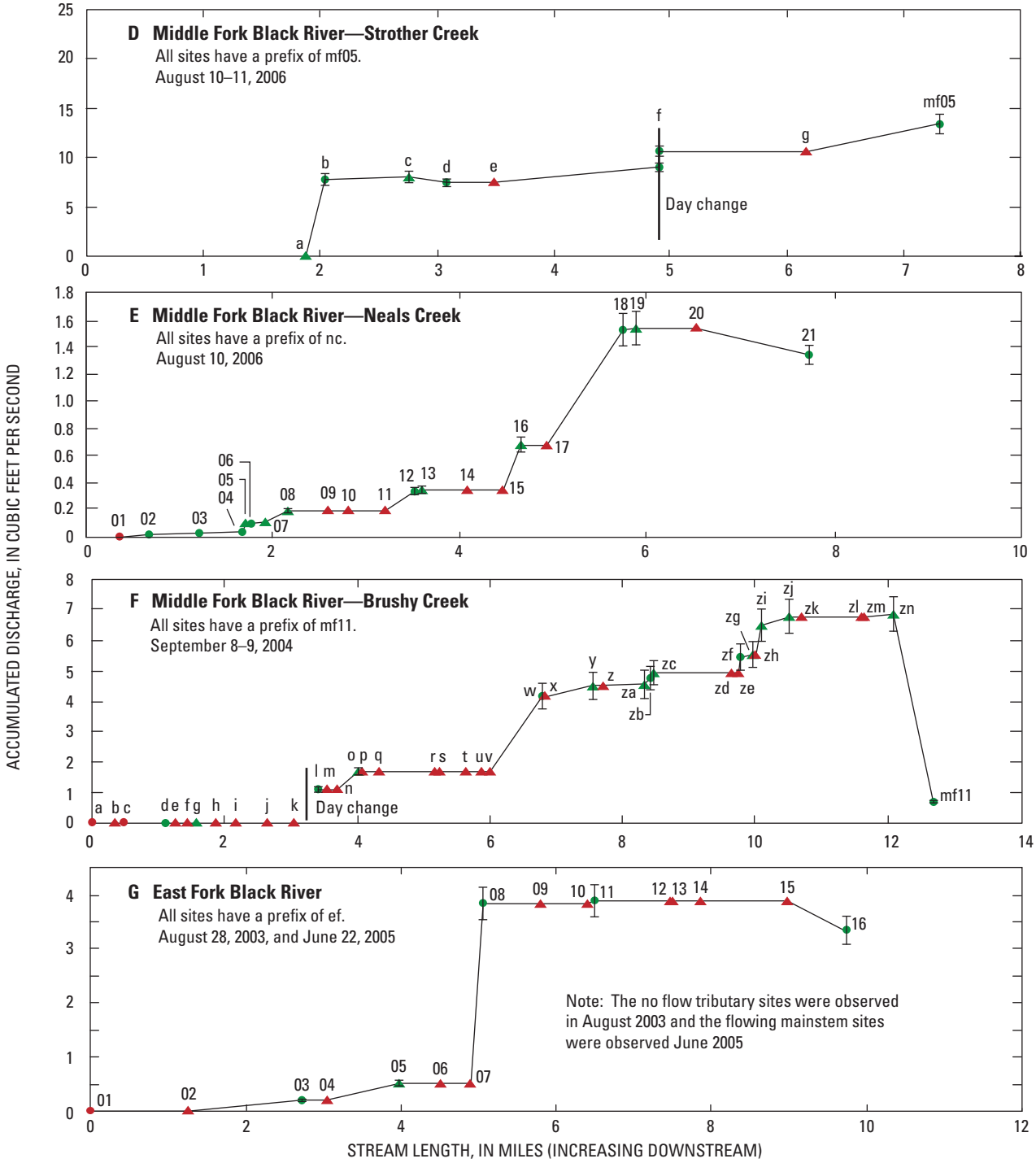

Figure 6. Seepage run data for the upper Black River Basin, August 2003 through August 2006.—Continued

No conclusive explanation is available as how this discharge was lost; however, circumstantial evidence indicates that this water is not lost to the bedrock aquifer, but instead continued to flow through the gravel-filled channel at the mouth of Brushy Creek. A year earlier, on August 28, 2003, the reach of Middle Fork Black River containing the mouth of Brushy Creek was being investigated, and no visible discharge was observed at the mouth (site mf11). The discharge of the Middle Fork Black River upstream from Brushy Creek (site mf09; figs. 5, 6C; table 1) was 14.7 ft^3/s and the discharge downstream from Brushy Creek was 26.9 ft^3/s (site mf15). Between these two mainstem sites, an additional 3.31 ft^3/s was contributed to the Middle Fork Black River from the tributaries Little Brushy Creek (site mf10), Carty Branch (site mf12), and Paynes Branch (site mf14). Consequently, the additional 8.9 ft^3/s measured at site mf15 could not be attributed to tributary inflow. Because Brushy Creek had no visible discharge at the mouth, no further inspection of Brushy Creek was performed at that time. Much of the additional discharge (8.9 ft^3/s) at site mf15 probably resurfaced in the mainstem of Middle Fork Black River from subsurface flow in the sand and gravel-filled channel at the mouth of Brushy Creek; therefore, the lost discharge in Brushy Creek was not lost to the bedrock aquifer.

East Fork Black River

The East Fork Black River was studied from its headwaters to the junction with Imboden Fork (fig. 5). No flow was observed in tributary sites in August 2003 and only the mainsteam sites were measured in June 2005 (table 1). No reaches were classified as losing in the East Fork Black River. Discharge increased in each successive mainstem measurement between the headwaters of East Fork Black River and Imboden Fork, except at the last discharge measurement site near the junction. This measurement (site ef16; figs. 5, 6G; table 1) indicated a decrease in discharge of 0.55 ft^3/s from the previous upstream measurement (site ef11). The stream channel at site ef16 is wide and filled with sand and gravel. Substantial flow likely is through the subsurface into the streambed sediment at this site. The flow is contained in the channel and is not considered to be lost to the bedrock aquifer. Little Taum Sauk Creek also was investigated in August 2004 and had no observed discharge.

Logan Creek

Logan Creek was studied from its headwaters to Clearwater Lake (fig. 7) and contained about a 13-mi losing stream reach (from sites lc28 to lc36; figs. 7, 8A; table 1). Discharge increased in the headwaters of Logan Creek (sites lc05 to lc25) from various sources, such as tributary streams, flowing wells, and springs. The discharge in Adair Creek (site lc19) was greater than the discharge in the mainstem of Logan Creek upstream from the junction of these two streams at site lc17 (figs. 7, 8A). The accumulated discharge in Logan Creek continued to increase downstream to site lc25 (table 1). Between sites lc26 and lc28, Logan Creek lost all its discharge and went dry. No discharge was observed in Logan Creek or its tributaries downstream to mainstem site lc36. The next observed discharge was in Dry Valley (fig. 7; site lc38, 0.49 ft^3/s) which entered Logan Creek near Ellington (fig. 7). Downstream from Ellington, discharge continued to increase in Logan Creek from tributary and spring inflow. This increase continued to Clearwater Lake.

Sweetwater Creek also was investigated and no reaches were classified as losing, in spite of the less than expected discharge measured at site lc24h (figs. 7, 8B; table 1). The reach of Sweetwater Creek from where tributary discharge enters the creek at site lc24g (accumulated discharge of 0.87 ft^3/s) to site lc24h (0.55 ft^3/s) was not classified as losing because of the measurement accuracy ratings (poor; measurement error greater than 8 percent) at both these sites. Also, the discharge further downstream at the mouth of Sweetwater Creek (site lc24; 0.95 ft^3/s) was consistent with the accumulated discharge calculated at site lc24g (fig. 8B; table 1). The discharge at site lc24h possibly was under-measured because water may have been flowing through the streambed sediment.

Sinking Creek

No losing stream reaches were identified in Sinking Creek. The upper 8-mi reach of Sinking Creek had no discharge until Pyrtle Spring (site sk21; figs. 7, 8C; table 1), where the first visible discharge (0.34 ft^3/s) was measured. Between Pyrtle Spring and the next Sinking Creek mainstem measurement (site sk26), discharge had increased in the stream to 5.76 ft^3/s (fig. 8C). Discharge continued to increase in Sinking Creek to the downstream most measuring site at Redford (site sk34, fig. 7), where the study ended.

Summary

A study was conducted to identify streams or reaches of streams that lose discharge to the ground-water system in and around active lead and zinc mining areas along the Viburnum Trend Subdistrict that have potential to release mining-related trace elements or chemicals into receiving streams. The study was cursory in that the discharge was monitored at road crossings or at other convenient locations rather than traversing the entire length of these streams. Rainfall caused the seepage run to be stopped and restarted several times, several completed reaches were reexamined, and additional streams were added; therefore, the data collection that began in August 2003 was not completed until October 2006.

All the streams in the study area have sand and gravel-filled channels (streambed sediment) that include frequent, large bars composed of loose sand, gravel, and cobbles. During low flow, a large percentage of water can be travel-

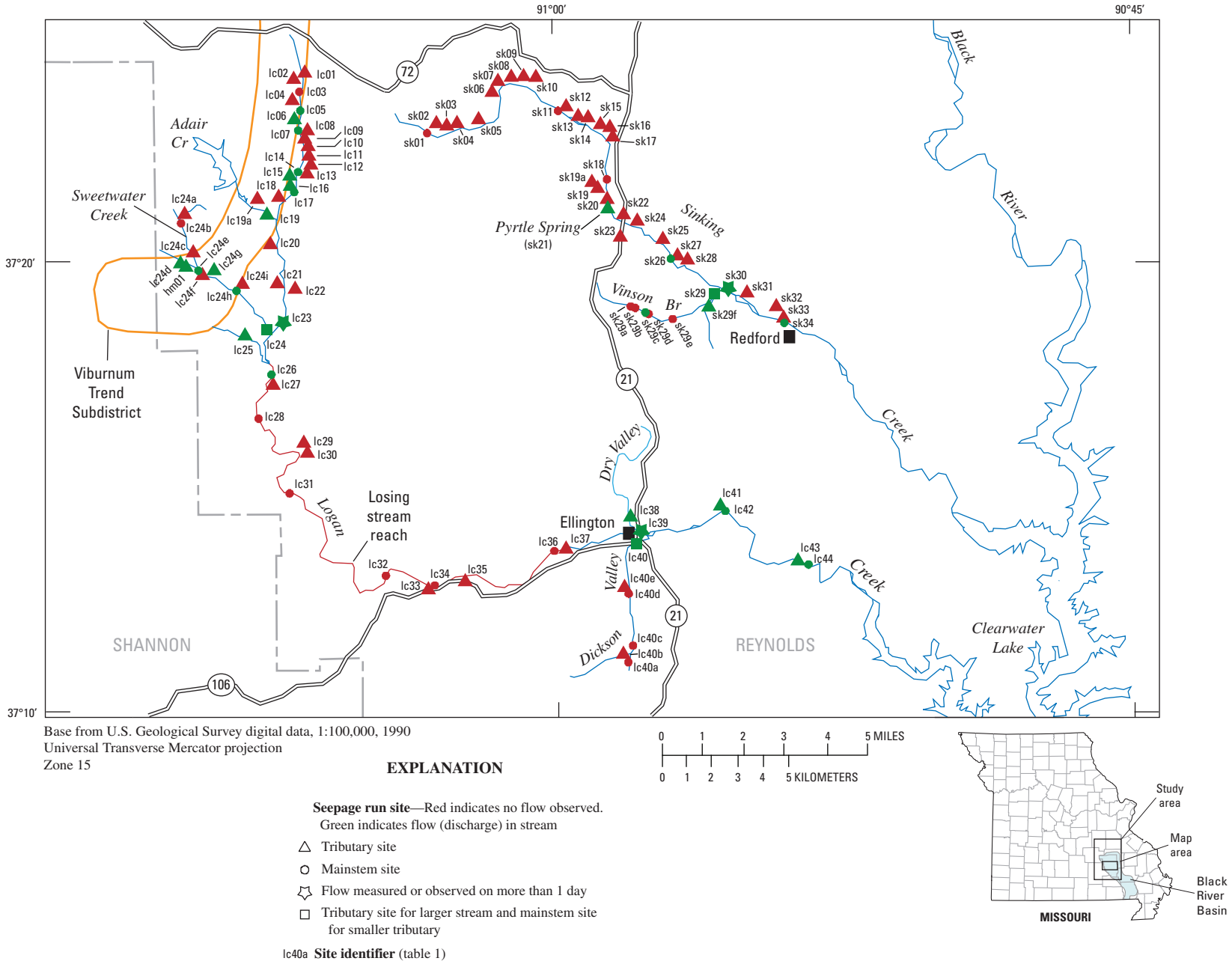

Figure 7. Seepage run sites on streams in the Black River Basin draining the southern part of the Viburnum Trend Subdistrict.

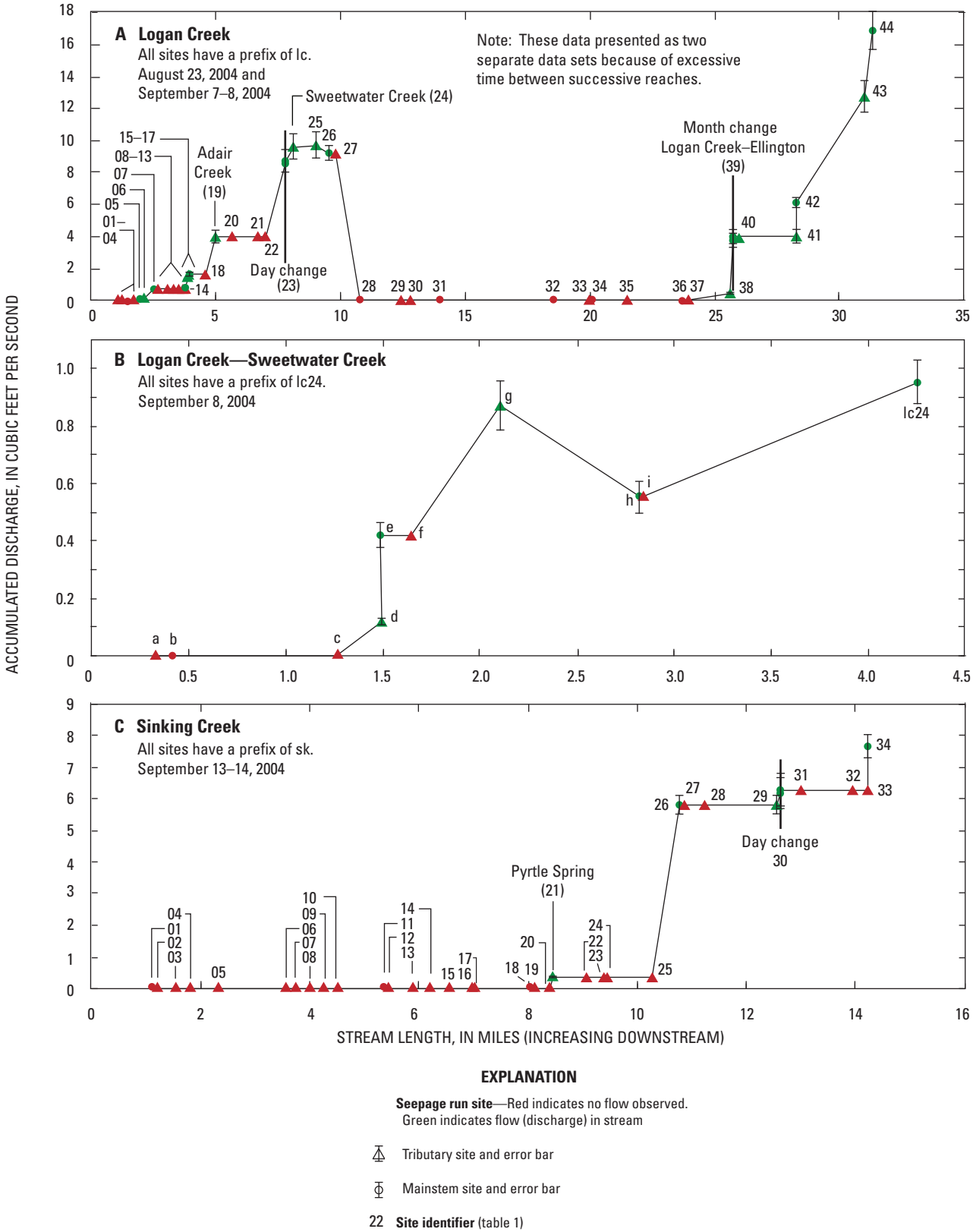

Figure 8. Seepage run data for the Black River Basin, August 2004 through September 2004.

ing through the streambed sediment instead of flowing on the surface. In many cases, the water flowing through the streambed sediment resurfaces farther downstream and is not being lost to the underlying bedrock aquifer. Based on the hydrologic assessment of the personnel making the discharge measurement, occasionally these reaches were not classified as losing even though considerably more discharge was measured upstream. These assessments typically were influenced by hydrologic observations of smaller tributaries in the immediate area of the site of concern. If water was flowing in these smaller tributaries, or if the quantity of water lost at a particular site resurfaced at the next downstream mainstem measuring site, the site or reach with decreased discharge was not classified as losing.

The measurement accuracy and associated error defined by the measurement rating also became an important determining factor in classifying several stream reaches as non losing even though less discharge was measured at a downstream site than was measured upstream. Whenever a decrease in discharge was observed downstream, the measurement error (defined by measurement rating) of the relevant upstream discharge measurements (mainstem and tributary measurements) was considered and the range of discharges as defined by the associated error bars was compared. If successive error bars overlapped, the reach was not classified as losing.

Stream reaches in East Fork Huzzah Creek; Strother Creek, Neals Creek, and Brushy Creek in the Middle Fork Black River Basin; and East Fork Black River had less discharge measured in a downstream mainstem site than was expected based on the upstream discharge measurements; however, none of these reaches were classified as losing. This classification is based on the quantity of gravel in the stream channel, the hydrologic assessment of the personnel making the measurements, and the rated discharge measurement accuracy for the sites.

Logan Creek had about a 13-mile reach with no flow that began losing discharge downstream from Sweetwater Creek. Discharge in Logan Creek was observed again near Ellington and continued to increase downstream to Clearwater Lake.

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Table

Table 1. Seepage run data for streams draining the Viburnum Trend Subdistrict.

[DDMMSS, degrees, minutes, seconds; MM/DD/YYY, month/day/year; mi, mile; ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 degrees Celsius; ºC, degrees Celsius; --, no data; WFHC, West Fork Huzzah Creek; Est, estimated; trib, tributary; Calc, calculated; Obs, observation; shaded boxes are identical sites measured on different days; EFHC, East Fork Huzzah Creek; WFBR, West Fork Black River; MFBR, Middle Fork Black River; EFBR, East Fork Black River]

Stream site	Site identifier	Latitude (DDMMSS)	Longitude (DDDMMSS)	Date (MM/DD/YYYY)	Stream length (mi)	Measurement location		Accumulated discharge (figs. 3, 4, 6, 8) (ft^3/s)	Measurement rating	Specific conductance (µS/cm at 25 °C)	Temperature (°C)
						Tributary (ft^3/s)	Mainstem (ft^3/s)				
Huzzah Creek - West Fork (figs. 2, 3A)											
WFHC	hcw01	373734	0911541	08/26/2003	2.6	--	0.02	0.02	Est	383	26.9
WFHC - Rowe Branch	hcw02	373747	0911542	08/26/2003	2.8	0.15	--	.17	Good	445	21.2
WFHC - trib	hcw03	373752	0911539	08/26/2003	2.9	.04	--	.21	Fair	321	24.0
WFHC	hcw04	373756	0911534	08/26/2003	3.0	--	.30	.30	Good	415	23.0
WFHC - trib	hcw05	373816	0911545	08/26/2003	3.5	.01	--	.31	Est	477	20.2
WFHC	hcw06	373840	0911516	08/26/2003	3.9	--	3.48	3.48	Good	358	21.7
WFHC - Martin Spring Branch	hcw07	373841	0911526	08/26/2003	3.9	.20	--	3.68	Calc[a]	447	22.2
WFHC	hcw08	373844	0911514	08/26/2003	4.0	--	3.68	3.68	Good	366	22.5
WFHC - trib	hcw09	373903	0911513	08/26/2003	4.5	.04	--	3.72	Est	391	27.7
WFHC - Rooney Hollow	hcw10	373942	0911441	08/26/2003	5.3	.05	--	3.77	Est	391	27.2
WFHC	hcw11	374010	0911417	08/26/2003	5.9	--	3.72	3.72	Good	366	26.2
WFHC - Bates Hollow	hcw12	374016	0911413	08/26/2003	6.1	.03	--	3.75	Est	400	30.1
WFHC - trib	hcw13	374043	0911356	08/26/2003	6.7	.02	--	3.77	Est	418	23.6
WFHC - trib	hcw14	374052	0911341	08/26/2003	7.0	0	--	3.77	Obs	--	--
WFHC - trib	hcw15	374106	0911303	08/26/2003	7.6	0	--	3.77	Obs	--	--
WFHC - Barney Creek	hcw16	373741	0911335	08/26/2003	8.0	.05	--	3.82	Good	440	22.2
WFHC mouth	hcw17	374141	0911234	08/26/2003	8.4	--	3.77	3.77	Good	334	25.7
WFHC mouth	hcw17	374141	0911234	08/28/2003	8.4	--	4.23	4.23	Good	381	25.2
EFHC mouth	hce18	374140	0911230	08/28/2003	8.9	3.61	--	7.84	Good	393	24.4
Huzzah Creek - Crooked Creek	hc01	374238	0911153	08/28/2003	10.6	5.93	--	13.8	Good	604	25.6
Huzzah Creek - Indian Creek	hc02	374256	0911240	08/28/2003	10.9	.40	--	14.2	Fair	440	23.5
Huzzah Creek	hc03	374411	0911212	08/28/2003	12.5	--	14.7	14.7	Good	490	28.3
Miscellaneous tributary and headwater measurement or observation sites (not shown on fig. 3A)											
WFHC - Rowe Branch	hcw02a	373738	0911607	08/26/2003	--	.01	--	--	Obs	--	--
WFHC - Barney Creek	hcw16a	374003	0911307	08/28/2003	--	0.66	--	--	Good	415	23.1
WFHC - Barney Creek trib	hcw16b	373810	0911254	08/26/2003	--	.01	--	--	Est	301	21.1

Table 1. Seepage run data for streams draining the Viburnum Trend Subdistrict.—Continued

[DDMMSS, degrees, minutes, seconds; MM/DD/YYY, month/day/year; mi, mile; ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 degrees Celsius; ºC, degrees Celsius; --, no data; WFHC, West Fork Huzzah Creek; Est, estimated; trib, tributary; Calc, calculated; Obs, observation; shaded boxes are identical sites measured on different days; EFHC, East Fork Huzzah Creek; WFBR, West Fork Black River; MFBR, Middle Fork Black River; EFBR, East Fork Black River]

Stream site	Site identifier	Latitude (DDMMSS)	Longitude (DDDMMSS)	Date (MM/DD/YYYY)	Stream length (mi)	Measurement location		Accumulated discharge (figs. 3, 4, 6, 8) (ft^3/s)	Measurement rating	Specific conductance (µS/cm at 25 °C)	Temperature (°C)
						Tributary (ft^3/s)	Mainstem (ft^3/s)				
Huzzah Creek - East Fork (figs. 2, 3b)											
EFHC	hce01	373455	0911103	08/26/2003	0.3	--	0	0	Obs	--	--
EFHC	hce02	373513	0911035	08/26/2003	.4	--	.10	.10	Est	74	20.1
EFHC	hce03	373510	0911049	08/26/2003	.5	--	.05	.05	Est	--	--
EFHC - trib	hce04	373516	0911028	08/26/2003	.5	0	--	.05	Obs	--	--
EFHC - trib	hce05	373532	0911028	08/26/2003	.8	0	--	.05	Obs	--	--
EFHC - trib	hce06	373542	0911033	08/26/2003	1.0	.01	--	.06	Obs	--	--
EFHC	hce07	373554	0911052	08/26/2003	1.3	--	.11	.11	Poor	--	25.1
EFHC - Asher Creek	hce08	373557	0911048	08/26/2003	1.4	.25	--	.36	Poor	--	23.5
EFHC - Bucksnort Fork	hce09	373646	0911115	08/26/2003	2.5	.29	--	.65	Poor	418	24.1
EFHC	hce10	373756	0911119	08/26/2003	3.8	--	2.26	2.26	Fair	--	26.5
EFHC - Big Branch	hce11	373815	0911118	08/26/2003	4.2	.08	--	2.34	Poor	--	22.8
EFHC	hce12	373841	0911141	08/26/2003	4.7	--	3.34	3.34	Fair	384	24.7
EFHC	hce12	373841	0911141	08/09/2006	4.7	--	3.10	3.10	Fair	423	24.9
EFHC - trib	hce13	373841	0911125	08/09/2006	4.8	0	--	3.10	Obs	--	--
EFHC - trib	hce14	373919	0911132	08/09/2006	5.8	0	--	3.10	Obs	--	--
EFHC - Tinker Branch	hce15	373932	0911127	08/09/2006	5.9	.02	--	3.12	Est	520	23.3
EFHC	hce16	374007	0911136	08/09/2006	6.7	--	2.99	2.99	Fair	414	26.6
EFHC - trib	hce17	374008	0911135	08/09/2006	6.8	0	--	2.99	Obs	--	--
EFHC mouth	hce18	374140	0911230	08/09/2006	8.9	--	2.59	2.59	Good	420	26.2
Miscellaneous tributary and headwater measurement or observation sites (not shown on fig. 3B)											
EFHC - Asher Creek	hce08a	373633	0910947	08/26/2003	--	0.05	--	--	Est	--	--
Huzzah Creek - Crooked Creek (figs 2, 3C)											
Crooked Creek	hc01a	373925	0910820	08/29/2003	1.8	--	0	0	Obs	--	--
Crooked Creek	hc01b	373950	0910809	08/28/2003	2.3	--	0.05	.05	Est	2,305	22.3
Crooked Creek trib - Casteel Mine	hc01c	373949	0910802	08/28/2003	2.4	4.22	--	4.27	Calc[a]	825	23.8
Crooked Creek	hc01d	373957	0910812	08/28/2003	2.5	--	4.27	4.27	Good	840	24.0
Crooked Creek trib	hc01e	374008	0910811	08/28/2003	2.7	0	--	4.27	Obs	--	--
Crooked Creek	hc01f	374144	0910938	08/28/2003	6.3	--	5.57	5.57	Fair	808	25.5
Crooked Creek - near mouth	hc01	374238	0911153	08/28/2003	9.4	--	5.93	5.93	Good	604	25.6

Table 1. Seepage run data for streams draining the Viburnum Trend Subdistrict.—Continued

[DDMMSS, degrees, minutes, seconds; MM/DD/YYY, month/day/year; mi, mile; ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 degrees Celsius; ºC, degrees Celsius; --, no data; WFHC, West Fork Huzzah Creek; Est, estimated; trib, tributary; Calc, calculated; Obs, observation; shaded boxes are identical sites measured on different days; EFHC, East Fork Huzzah Creek; WFBR, West Fork Black River; MFBR, Middle Fork Black River; EFBR, East Fork Black River]

Stream site	Site identifier	Latitude (DDMMSS)	Longitude (DDDMMSS)	Date (MM/DD/YYYY)	Stream length (mi)	Measurement location		Accumulated discharge (figs. 3, 4, 6, 8) (ft^3/s)	Measure-ment rating	Specific conductance (µS/cm at 25 °C)	Temperature (°C)
						Tributary (ft^3/s)	Mainstem (ft^3/s)				
Courtois Creek (figs 2, 4A)											
Courtois Creek	cc01	374050	0910136	08/26/2003	0.9	--	0.01	0.01	Est	--	--
Courtois Creek - spring	cc02	374054	0910138	08/26/2003	1.0	0.05	--	.06	Est	--	--
Courtois Creek - spring	cc03	374109	0910147	08/26/2003	1.2	.05	--	.11	Est	--	--
Courtois Creek - Hoover Hollow	cc04	374136	0910213	08/26/2003	1.8	.05	--	.16	Est	--	--
Courtois Creek	cc05	374146	0910217	08/26/2003	1.9	--	.40	.40	Good	346	21.0
Courtois Creek - Abbott Branch	cc06	374222	0910230	08/26/2003	2.9	.14	--	.54	Good	294	23.6
Courtois Creek	cc07	374245	0910250	08/26/2003	3.4	--	1.22	1.22	Good	143	26.7
Courtois Creek - Warren Hollow	cc08	374330	0910252	08/26/2003	4.3	.36	--	1.58	Good	434	22.0
Courtois Creek - spring	cc09	374405	0910304	08/26/2003	5.0	.05	--	1.63	Est	--	--
Courtois Creek - Cave Hollow	cc10	374413	0910305	08/26/2003	5.0	0	--	1.63	Obs	--	--
Courtois Creek - trib	cc11	374505	0910346	08/26/2003	6.4	0	--	1.63	Obs	--	--
Courtois Creek - Andys Branch	cc12	374509	0910343	08/26/2003	6.6	.05	--	1.68	Est	--	--
Courtois Creek	cc13	374537	0910403	08/26/2003	7.2	--	1.52	1.52	Good	358	25.2
Courtois Creek	cc13	374537	0910403	10/06/2006	7.2	--	1.03	1.03	Fair	382	18.0
Courtois Creek - Indian Creek	cc14	374545	0910421	10/06/2006	7.4	1.41	--	2.44	Calc[a]	--	--
Courtois Creek	cc15	374557	0910415	10/06/2006	7.6	--	2.44	2.44	Fair	465	17.4
Courtois Creek	cc16	374725	0910342	10/06/2006	9.8	--	3.01	3.01	Good	473	18.7
Courtois Creek - Cub Creek	cc17	374713	0910316	10/06/2006	9.9	.96	--	3.97	Good	435	17.5
Courtois Creek - Bailey Branch	cc18	374753	0910339	10/06/2006	10.3	.20	--	4.17	Est	460	14.0
Courtois Creek	cc19	375031	0910324	10/06/2006	14.5	--	5.74	5.74	Good	448	19.0
Miscellaneous tributary and headwater measurement or observation sites (not shown on fig. 4A)											
Courtois Creek - Abbott Branch	cc06a	374239	0910152	08/26/2003	--	0.01	--	--	Est	--	--
Courtois Creek - Indian Creek (figs. 2, 4B)											
Indian Creek	cc14a	374136	0910555	8/27/2003	2.7	--	0.01	0.01	Est	420	28.6
Indian Creek	cc14b	374210	0910550	8/27/2003	3.4	--	.28	.28	Good	904	25.1
Indian Creek - tailings discharge	cc14c	374215	0910650	8/27/2003	4.0	0.56	--	.84	Good	3,818	28.3
Indian Creek	cc14d	374313	0910547	8/27/2003	4.7	--	.43	.43	Fair	688	22.4
Indian Creek - East Prong	cc14e	374314	0910541	8/27/2003	4.8	.03	--	.46	Est	415	22.7
Indian Creek - West Prong	cc14f	374258	0910628	8/27/2003	5.7	2.77	--	3.23	Fair	706	19.9
Indian Creek	cc14g	374453	0910438	8/27/2003	7.0	--	9.82	9.82	Good	614	28.6
Indian Creek - Mason Hollow	cc14h	374510	0910433	8/27/2003	7.4	0	--	9.82	Obs	--	--
Indian Creek - trib	cc14i	374529	0910432	8/27/2003	7.7	.55	--	10.4	Fair	504	23.3
Indian Creek	cc14	374545	0910421	8/27/2003	8.1	--	9.94	9.94	Fair	599	27.3

Table 1. Seepage run data for streams draining the Viburnum Trend Subdistrict.—Continued

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Stream site	Site identifier	Latitude (DDMMSS)	Longitude (DDDMMSS)	Date (MM/DD/YYYY)	Stream length (mi)	Measurement location		Accumulated discharge (figs. 3, 4, 6, 8) (ft^3/s)	Measurement rating	Specific conductance (µS/cm at 25 °C)	Temperature (°C)
						Tributary (ft^3/s)	Mainstem (ft^3/s)				
Miscellaneous tributary and headwater measurement or observation sites (not shown on fig. 4b)											
Indian Creek - West Prong trib	cc14fa	374256	0910734	8/27/2003	--	0	--	--	Obs	--	--
West Fork Black River (figs. 5, 6A)											
WFBR - Parker Branch mouth	wfb05	373133	0911402	09/07/2004	4.2	1.25	--	1.25	Good	267	21.0
WFBR - Crossville Branch mouth	wfb08	373133	0911403	09/07/2004	4.3	1.63	--	2.88	Good	317	22.5
WFBR - Moore Branch	wfb09	373130	0911324	09/07/2004	4.8	0	--	2.88	Obs	--	--
WFBR - trib	wfb10	373109	0911256	09/07/2004	5.3	0	--	2.88	Obs	--	--
WFBR - trib	wfb11	373106	0911233	09/07/2004	5.8	0	--	2.88	Obs	--	--
WFBR - trib	wfb12	373101	0911205	09/07/2004	6.3	0	--	2.88	Obs	--	--
WFBR	wfb13	373057	0911202	09/07/2004	6.4	--	4.53	4.53	Good	321	23.0
WFBR - Henpeck Creek	wfb14	373046	0911155	09/07/2004	6.5	.84	--	5.37	Good	312	18.7
WFBR - McMurtrey Creek	wfb15	373055	0911110	09/07/2004	7.1	.80	--	6.17	Good	420	19.1
WFBR	wfb16	373052	0911059	09/07/2004	7.3	--	7.14	7.14	Good	343	20.9
WFBR	wfb17	373020	0910940	09/08/2004	9.2	--	8.44	8.44	Good	341	18.5
WFBR - Smalls Creek	wfb18	373019	0910945	09/08/2004	9.2	0	--	8.44	Obs	--	--
WFBR - trib	wfb19	373015	0910911	09/08/2004	10.0	.03	--	8.47	Est	395	18.0
WFBR - trib	wfb20	373015	0910908	09/08/2004	10.1	0	--	8.47	Obs	--	--
WFBR - trib	wfb21	373007	0910852	09/08/2004	10.3	0	--	8.47	Obs	--	--
WFBR - Bills Creek	wfb22	372958	0910826	09/08/2004	11.0	.18	--	8.65	Good	517	20.0
WFBR - Bills Creek	wfb23	372959	0910821	09/08/2004	11.1	.79	--	9.44	Fair	495	21.2
WFBR - trib	wfb24	372947	0910802	09/08/2004	11.5	0	--	9.44	Obs	--	--
WFBR - trib	wfb25	372939	0910739	09/08/2004	12.1	0	--	9.44	Obs	--	--
WFBR	wfb26	372931	0910637	09/08/2004	13.2	--	12.2	12.2	Good	359	21.8
WFBR - Toms Creek	wfb27	372931	0910638	09/08/2004	13.2	.27	--	12.5	Good	288	19.9
WFBR - Brown Branch	wfb28	372921	0910622	09/08/2004	13.4	0	--	12.5	Obs	--	--
WFBR - trib pools	wfb29	372926	0910540	09/08/2004	14.3	0	--	12.5	Obs	--	--
WFBR - trib pools	wfb30	372941	0910516	09/08/2004	14.7	0	--	12.5	Obs	--	--
WFBR - Mill Branch mouth	wfb31	372943	0910513	09/08/2004	14.8	1.03	--	13.5	Fair	300	19.0
WFBR - trib	wfb32	372901	0910311	09/08/2004	19.7	0	--	13.5	Obs	--	--
WFBR - Radford Hollow	wfb33	372911	0910303	09/08/2004	19.8	.23	--	13.7	Fair	374	17.5
WFBR	wfb34	372907	0910255	09/08/2004	20.0	--	17.1	17.1	Good	377	23.2
WFBR - trib	wfb35	372908	0910245	09/08/2004	20.1	0	--	17.1	Obs	--	--
WFBR - trib	wfb36	372914	0910206	09/08/2004	21.2	0	--	17.1	Obs	--	--
WFBR - Cooks Spring	wfb37	372916	0910147	09/08/2004	21.2	.57	--	17.7	Fair	296	16.0
WFBR - Sutton Bluff	wfb38	372835	0910026	09/08/2004	23.6	--	21.9	21.9	Poor	358	21.8

Table 1. Seepage run data for streams draining the Viburnum Trend Subdistrict.—Continued

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Stream site	Site identifier	Latitude (DDMMSS)	Longitude (DDDMMSS)	Date (MM/DD/YYYY)	Stream length (mi)	Measurement location		Accumulated discharge (figs. 3, 4, 6, 8) (ft^3/s)	Measurement rating	Specific conductance (µS/cm at 25 °C)	Temperature (°C)
						Tributary (ft^3/s)	Mainstem (ft^3/s)				
West Fork Black River (figs. 5, 6A)—Continued											
WFBR - Sutton Bluff	wfb38	372835	0910026	09/09/2004	23.6	--	22.0	22.0	Fair	359	20.6
WFBR - trib	wfb39	372837	0910006	09/09/2004	24.0	0	--	22.0	Obs	--	--
WFBR - Stillwell Hollow	wfb40	372820	0905951	09/09/2004	24.6	.29	--	22.3	Good	268	18.4
WFBR - trib	wfb41	372817	0905929	09/09/2004	24.8	0	--	22.3	Obs	--	--
WFBR - trib	wfb42	372734	0905910	09/09/2004	25.9	.03	--	22.3	Est	410	15.6
WFBR - Bee Fork mouth	wfb43	372731	0905916	09/09/2004	26.0	10.8	--	33.1	Good	372	19.6
WFBR	wfb44	372725	0905901	09/09/2004	26.1	--	36.1	36.1	Good	358	21.2
WFBR - trib	wfb45	372723	0905844	09/09/2004	26.6	0	--	36.1	Obs	--	--
WFBR - McLean Hollow	wfb46	372710	0905808	09/09/2004	27.0	.02	--	36.1	Est	290	20.5
WFBR - Hunter Hollow	wfb47	372606	0905742	09/09/2004	28.3	0	--	36.1	Obs	--	--
WFBR - Reeds Spring	wfb48	372555	0905653	09/09/2004	29.0	11.9	--	48.0	Fair	229	13.2
WFBR	wfb49	372553	0905641	09/09/2004	29.2	--	55.0	55.0	Good	313	20.8
WFBR - Russell Hollow	wfb50	372550	0905633	09/09/2004	29.3	.04	--	55.0	Est	187	18.9
WFBR - Barn Hollow	wfb51	372632	0905426	09/09/2004	32.6	.02	--	55.1	Est	350	23.0
WFBR - trib	wfb52	372641	0905412	09/09/2004	32.8	0	--	55.1	Obs	--	--
WFBR - Middle Hollow	wfb53	372644	0905406	09/09/2004	32.8	.01	--	55.1	Est	339	20.7
WFBR - Russell Hollow	wfb54	372656	0905341	09/09/2004	33.7	0	--	55.1	Obs	--	--
WFBR - trib	wfb55	372700	0905303	09/09/2004	33.9	0	--	55.1	Obs	--	--
WFBR	wfb56	372653	0905304	09/09/2004	34.0	--	55.6	55.6	Good	311	23.0
WFBR - Hawk Hollow	wfb57	372655	0905228	09/09/2004	34.8	0	--	55.6	Obs	--	--
Miscellaneous tributary and headwater measurement or observation sites (not shown on fig. 6A)											
WFBR - Henpeck Creek	wfb14a	373035	0911223	09/07/2004	--	0.09	--	--	Good	112	19.5
WFBR - Cooks Creek	wfb37a	373009	0910157	09/08/2004	--	0	--	--	Obs	--	--
West Fork Black River - Parker Branch (not shown on fig. 6A)											
Parker Branch	wfb01	373349	0911632	08/29/2003	0.4	--	0.05	0.05	Est	192	23.1
Parker Branch trib	wfb02	373336	0911621	08/29/2003	.7	0	--	.05	Obs	--	--
Parker Branch	wfb03	373309	0911536	08/29/2003	1.7	--	.17	.17	Good	240	21.9
Parker Branch - Radford Branch	wfb04	373225	0911429	08/29/2003	3.2	.02	--	.19	Est	391	23.6
Parker Branch mouth	wfb05	373133	0911402	08/29/2003	4.2	--	.54	.54	Fair	333	23.8
West Fork Black River - Crossville Branch (not shown on fig. 6A)											
Crossville Branch	wfb06	373153	0911559	08/29/2003	--	--	0.05	0.05	Est	313	27.3
Crossville Branch - Hayes Branch	wfb07	373151	0911600	08/29/2003	--	0.02	--	.07	Est	--	--
Crossville Branch mouth	wfb08	373133	0911403	08/29/2003	--	--	.39	.39	Fair	335	22.5

Table 1. Seepage run data for streams draining the Viburnum Trend Subdistrict.—Continued

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Stream site	Site identifier	Latitude (DDMMSS)	Longitude (DDDMMSS)	Date (MM/DD/YYYY)	Stream length (mi)	Measurement location		Accumulated discharge (figs. 3, 4, 6, 8) (ft^3/s)	Measure-ment rating	Specific conductance (µS/cm at 25 °C)	Temperature (°C)
						Tributary (ft^3/s)	Mainstem (ft^3/s)				
West Fork Black River - Mill Branch (not shown on fig. 6A)											
Mill Branch	wfb31a	373103	0910519	09/08/2004	--	--	0	0	Obs	--	--
Mill Branch trib	wfb31b	373052	0910521	09/08/2004	--	0	--	0	Obs	--	--
Mill Branch	wfb31c	373023	0910517	09/08/2004	--	--	1.00	1.00	Est	293	17.4
Mill Branch mouth	wfb31	372943	0910513	09/08/2004	--	--	1.03	1.03	Fair	300	19.0
West Fork Black River - Bee Fork (figs. 5, 6B)											
Bee Fork trib	wfb43a	372641	0911032	09/10/2004	0.1	0	--	0	Obs	--	--
Bee Fork	wfb43b	372638	0911030	09/10/2004	.1	--	0	0	Obs	64	16.3
Bee Fork spring pool	wfb43c	372637	0911012	09/10/2004	.4	--	0	0	Obs	--	--
Bee Fork trib	wfb43d	372635	0910956	09/10/2004	.6	.01	--	.01	Est	146	15.3
Bee Fork	wfb43e	372634	0910944	09/10/2004	.8	--	.02	.02	Est	213	15.4
Bee Fork	wfb43f	372633	0910926	09/10/2004	1.1	--	.06	.06	Fair	126	14.3
Bee Fork spring	wfb43g	372643	0910859	09/10/2004	1.6	.02	--	.08	Est	290	14.3
Bee Fork spring	wfb43h	372647	0910841	09/10/2004	1.8	.01	--	.09	Est	391	16.9
Bee Fork trib	wfb43i	372647	0910837	09/10/2004	1.9	0	--	.09	Obs	--	--
Bee Fork - Kitchel Branch	wfb43j	372702	0910743	09/10/2004	3.0	.05	--	.14	Est	164	16.9
Bee Fork - Fletcher Mine CP trib	wfb43k	372639	0910621	09/10/2004	4.2	4.17	--	4.31	Fair	633	21.5
Bee Fork	wfb43l	372629	0910620	09/10/2004	4.3	--	5.13	5.13	Fair	453	20.8
Bee Fork - West Fork Hollow	wfb43m	372627	0910546	09/10/2004	4.8	0	--	5.13	Obs	--	--
Bee Fork	wfb43n	372626	0910533	09/10/2004	5.1	--	5.82	5.82	Fair	507	22.4
Bee Fork	wfb43n	372626	0910533	09/13/2004	5.1	--	5.86	5.86	Fair	515	22.5
Bee Fork - Grasshopper Hollow	wfb43o	372625	0910530	09/13/2004	5.1	.38	--	6.24	Fair	228	19.9
Bee Fork trib	wfb43p	372628	0910432	09/13/2004	6.0	0	--	6.24	Obs	--	--
Bee Fork trib	wfb43q	372636	0910351	09/13/2004	6.7	0	--	6.24	Obs	--	--
Bee Fork trib	wfb43r	372641	0910332	09/13/2004	7.0	0	--	6.24	Obs	--	--
Bee Fork trib	wfb43s	372645	0910322	09/13/2004	7.2	0	--	6.24	Obs	--	--
Bee Fork trib	wfb43t	372651	0910315	09/13/2004	7.3	0	--	6.24	Obs	--	--
Bee Fork trib	wfb43u	372703	0910301	09/13/2004	7.8	0	--	6.24	Obs	--	--
Bee Fork trib	wfb43v	372711	0910233	09/13/2004	8.2	.03	--	6.27	Est	291	19.5
Bee Fork	wfb43w	372712	0910158	09/13/2004	8.7	--	8.53	8.53	Good	416	22.1
Bee Fork trib	wfb43x	372716	0910203	09/13/2004	8.7	0	--	8.53	Obs	--	--
Bee Fork trib	wfb43y	372730	0910140	09/13/2004	9.2	0	--	8.53	Obs	--	--
Bee Fork mouth	wfb43	372731	0905916	09/13/2004	13.6	--	10.1	10.1	Good	372	21.3

Table 1. Seepage run data for streams draining the Viburnum Trend Subdistrict.—Continued

[DDMMSS, degrees, minutes, seconds; MM/DD/YYY, month/day/year; mi, mile; ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 degrees Celsius; ºC, degrees Celsius; --, no data; WFHC, West Fork Huzzah Creek; Est, estimated; trib, tributary; Calc, calculated; Obs, observation; shaded boxes are identical sites measured on different days; EFHC, East Fork Huzzah Creek; WFBR, West Fork Black River; MFBR, Middle Fork Black River; EFBR, East Fork Black River]

Stream site	Site identifier	Latitude (DDMMSS)	Longitude (DDDMMSS)	Date (MM/DD/YYYY)	Stream length (mi)	Measurement location		Accumulated discharge (figs. 3, 4, 6, 8) (ft^3/s)	Measurement rating	Specific conductance (µS/cm at 25 °C)	Temperature (°C)
						Tributary (ft^3/s)	Mainstem (ft^3/s)				
Middle Fork Black River (figs. 5, 6C)											
MFBR - Brooks Creek	mf01	373958	0910151	08/27/2003	0	0.15	--	0.15	Est	--	--
MFBR	mf02	373802	0910008	08/27/2003	1.6	--	0.94	.94	Good	319	25.0
MFBR - Clayton Creek	mf03	373717	0905814	08/27/2003	2.7	.63	--	1.57	Good	332	23.6
MFBR	mf04	373650	0905759	08/27/2003	3.0	--	1.81	1.81	Good	318	25.0
MFBR - Strother Creek near mouth	mf05	373610	0905828	08/11/2006	4.3	13.3	--	15.1	Fair	708	23.8
MFBR	mf06	373546	0905707	08/11/2006	4.9	--	16.4	16.4	Good	646	23.5
MFBR - Ottery Creek	mf07	373449	0905600	08/11/2006	6.8	.25	--	16.7	Good	252	23.5
MFBR	mf08	373338	0905535	08/11/2006	8.4	--	17.0	17.0	Good	545	25.2
MFBR	mf09	373107	0905559	08/28/2003	11.2	--	14.7	14.7	Fair	469	27.1
MFBR - Little Brushy Creek near mouth	mf10	373210	0905616	08/28/2003	11.4	.85	--	15.6	Est	--	--
MFBR - Brushy Creek mouth	mf11	373129	0905618	08/28/2003	11.4	0	--	15.6	Obs	--	--
MFBR - Carty Branch mouth	mf12	373106	0905609	08/28/2003	11.9	.85	--	16.4	Good	262	23.4
MFBR - trib	mf13	373112	0905607	09/09/2004	12.0	0	--	16.4	Obs	--	--
MFBR - Paynes Branch	mf14	372837	0905415	08/28/2003	16.3	1.61	--	18.0	Good	190	24.1
MFBR	mf15	372834	0905403	08/28/2003	16.5	--	26.9	26.9	Good	369	25.8
Middle Fork Black River - Little Brushy Creek (not shown on fig. 6C)											
Little Brushy Creek	mf10a	373434	0905760	09/09/2004	1.7	--	0	0	Obs	--	--
Little Brushy Creek	mf10b	373408	0905750	09/09/2004	2.0	--	.01	.01	Est	298	19.6
Little Brushy Creek trib	mf10c	373345	0905737	09/09/2004	2.5	0	--	.01	Obs	--	--
Little Brushy Creek	mf10d	373247	0905645	09/09/2004	3.9	--	.05	.05	Est	440	16.8
Little Brushy Creek - spring	mf10e	373229	0905629	09/09/2004	4.8	.25	--	.30	Est	388	13.3
Little Brushy Creek near mouth	mf10	373210	0905616	09/09/2004	5.1	--	1.14	1.14	Fair	270	19.8
Middle Fork Black River sites (not shown on fig. 6C)											
MFBR - Carty Branch trib	mf12a	373060	0905618	09/09/2004	--	0	--	--	Obs	--	--
MFBR - Carty Branch mouth	mf12	373106	0905609	09/09/2004	--	1.61	--	--	Fair	251	19.2

Table 1. Seepage run data for streams draining the Viburnum Trend Subdistrict.—Continued

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Stream site	Site identifier	Latitude (DDMMSS)	Longitude (DDDMMSS)	Date (MM/DD/YYYY)	Stream length (mi)	Measurement location		Accumulated discharge (figs. 3, 4, 6, 8) (ft^3/s)	Measurement rating	Specific conductance (µS/cm at 25 ºC)	Temperature (ºC)
						Tributary (ft^3/s)	Mainstem (ft^3/s)				
Middle Fork Black River - Strother Creek (figs. 5, 6D)											
Strother Creek trib	mf05a	373513	0910339	08/10/2006	1.9	0.02	--	0.02	Est	--	--
Strother Creek	mf05b	373515	0910328	08/10/2006	2.0	--	7.63	7.63	Fair	1,155	29.9
Strother Creek - Little Creek	mf05c	373537	0910252	08/10/2006	2.8	.37	--	8.00	Fair	409	25.7
Strother Creek	mf05d	373541	0910231	08/10/2006	3.1	--	7.37	7.37	Good	1,093	28.6
Strother Creek trib	mf05e	373549	0910211	08/10/2006	3.5	0	--	7.37	Obs	--	--
Strother Creek	mf05f	373611	0910053	08/10/2006	4.9	--	8.90	8.90	Good	774	25.3
Strother Creek	mf05f	373611	0910053	08/11/2006	4.9	--	10.5	10.5	Good	829	24.7
Strother Creek trib	mf05g	373605	0905935	08/11/2006	6.2	0	--	10.5	Obs	--	--
Strother Creek near mouth	mf05	373610	0905828	08/11/2006	7.3	--	13.3	13.3	Fair	708	23.8
Middle Fork Black River - Neals Creek (figs. 5, 6E)											
Neals Creek	nc01	373915	0910631	08/10/2006	0.4	--	0	0	Obs	--	--
Neals Creek	nc02	373859	0910618	08/10/2006	.7	--	.01	.01	Est	--	--
Neals Creek	nc03	373845	0910550	08/10/2006	1.2	--	.03	.03	Est	410	24.5
Neals Creek	nc04	373842	0910522	08/10/2006	1.7	--	.04	.04	Est	445	23.3
Neals Creek - Left Fork	nc05	373838	0910521	08/10/2006	1.7	0.05	--	.09	Est	379	23.6
Neals Creek	nc06	373844	0910516	08/10/2006	1.8	--	.09	.09	Fair	408	23.5
Neals Creek trib	nc07	373851	0910511	08/10/2006	1.9	.02	--	.11	Est	486	23.3
Neals Creek trib	nc08	373853	0910454	08/10/2006	2.2	.08	--	.19	Fair	449	22.6
Neals Creek trib	nc09	373846	0910426	08/10/2006	2.6	0	--	.19	Obs	--	--
Neals Creek trib	nc10	373842	0910416	08/10/2006	2.8	0	--	.19	Obs	--	--
Neals Creek trib	nc11	373833	0910354	08/10/2006	3.2	0	--	.19	Obs	--	--
Neals Creek	nc12	373822	0910335	08/10/2006	3.5	--	.33	.33	Fair	434	23.5
Neals Creek trib	nc13	373823	0910330	08/10/2006	3.6	.01	--	.34	Est	--	--
Neals Creek trib	nc14	373819	0910302	08/10/2006	4.1	0	--	.34	Obs	--	--
Neals Creek trib	nc15	373821	0910240	08/10/2006	4.5	0	--	.34	Obs	--	--
Neals Creek - Henderson Creek	nc16	373820	0910227	08/10/2006	4.7	.34	--	.68	Fair	372	23.5
Neals Creek trib	nc17	373814	0910209	08/10/2006	4.9	0	--	.68	Obs	--	--
Neals Creek	nc18	373737	0910154	08/10/2006	5.7	--	1.52	1.52	Fair	393	24.0
Neals Creek - Gunstock Hollow	nc19	373733	0910150	08/10/2006	5.9	.02	--	1.54	Est	440	24.6
Neals Creek trib	nc20	373705	0910128	08/10/2006	6.5	0	--	1.54	Obs	--	--
Neals Creek	nc21	373616	0910103	08/10/2006	7.7	--	1.35	1.35	Good	512	24.5

Table 1. Seepage run data for streams draining the Viburnum Trend Subdistrict.—Continued

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Stream site	Site identifier	Latitude (DDMMSS)	Longitude (DDDMMSS)	Date (MM/DD/YYYY)	Stream length (mi)	Measurement location		Accumulated discharge (figs. 3, 4, 6, 8) (ft^3/s)	Measurement rating	Specific conductance (µS/cm at 25 ºC)	Temperature (ºC)
						Tributary (ft^3/s)	Mainstem (ft^3/s)				
Middle Fork Black River - Brushy Creek (figs. 5, 6F)											
Brushy Creek	mf11a	373356	0910659	09/08/2004	0	--	--	0	Obs	--	--
Brushy Creek - Bowen Branch	mf11b	373344	0910645	09/08/2004	.4	0	--	0	Obs	--	--
Brushy Creek	mf11c	373345	0910635	09/08/2004	.5	--	0	0	Obs	333	19.1
Brushy Creek	mf11d	373352	0910555	09/08/2004	1.1	--	.01	.01	Est	317	20.5
Brushy Creek trib	mf11e	373355	0910547	09/08/2004	1.2	0	--	.01	Obs	--	--
Brushy Creek trib	mf11f	373358	0910537	09/08/2004	1.4	0	--	.01	Obs	--	--
Brushy Creek trib	mf11g	373401	0910527	09/08/2004	1.6	.01	--	.02	Est	255	17.7
Brushy Creek trib	mf11h	373404	0910510	09/08/2004	1.9	0	--	.02	Obs	--	--
Brushy Creek trib	mf11i	373406	0910450	09/08/2004	2.2	0	--	.02	Obs	--	--
Brushy Creek trib	mf11j	373359	0910419	09/08/2004	2.6	0	--	.02	Obs	210	20.7
Brushy Creek trib	mf11k	373348	0910355	09/08/2004	3.0	0	--	.02	Obs	--	--
Brushy Creek	mf11l	373338	0910334	09/09/2004	3.4	--	1.09	1.09	Fair	313	17.1
Brushy Creek trib	mf11m	373339	0910326	09/09/2004	3.5	0	--	1.09	Obs	--	--
Brushy Creek trib	mf11n	373340	0910317	09/09/2004	3.7	0	--	1.09	Obs	--	--
Brushy Creek - Dry Fork near mouth	mf11o	373307	0910303	09/09/2004	4.0	.63	--	1.72	Good	194	17.1
Brushy Creek trib	mf11p	373340	0910255	09/09/2004	4.0	0	--	1.72	Obs	--	--
Brushy Creek trib	mf11q	373342	0910240	09/09/2004	4.3	0	--	1.72	Obs	--	--
Brushy Creek trib	mf11r	373349	0910144	09/09/2004	5.1	0	--	1.72	Obs	--	--
Brushy Creek trib	mf11s	373349	0910141	09/09/2004	5.2	0	--	1.72	Obs	--	--
Brushy Creek - Henry Branch	mf11t	373345	0910114	09/09/2004	5.6	0	--	1.72	Obs	--	--
Brushy Creek - Tucker Hollow	mf11u	373337	0910059	09/09/2004	5.9	0	--	1.72	Obs	--	--
Brushy Creek trib	mf11v	373332	0910049	09/09/2004	6.0	0	--	1.72	Obs	--	--
Brushy Creek	mf11w	373252	0910033	09/09/2004	6.8	--	4.15	4.15	Poor	246	19.7
Brushy Creek - Black Hollow	mf11x	373254	0910025	09/09/2004	6.8	0	--	4.15	Obs	--	--
Brushy Creek - spring	mf11y	373243	0910021	09/09/2004	7.6	.34	--	4.49	Poor	224	13.2
Brushy Creek trib	mf11z	373240	0910020	09/09/2004	7.7	0	--	4.49	Obs	--	--
Brushy Creek trib	mf11za	373148	0910017	09/09/2004	8.3	.05	--	4.54	Est	290	22.6
Brushy Creek	mf11zb	373145	0910012	09/09/2004	8.4	--	4.77	4.77	Fair	248	21.0
Brushy Creek - Gunnis Creek	mf11zc	373143	0910012	09/09/2004	8.5	.16	--	4.93	Poor	294	17.9
Brushy Creek trib	mf11zd	373139	0905902	09/09/2004	9.6	0	--	4.93	Obs	--	--
Brushy Creek trib	mf11ze	373152	0905903	09/09/2004	9.8	0	--	4.93	Obs	--	--
Brushy Creek	mf11zf	373146	0905856	09/09/2004	9.8	--	5.44	5.44	Fair	255	22.3
Brushy Creek - Cash Hollow	mf11zg	373142	0905847	09/09/2004	10.0	.05	--	5.49	Est	236	18.7

Table 1. Seepage run data for streams draining the Viburnum Trend Subdistrict.—Continued

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Stream site	Site identifier	Latitude (DDMMSS)	Longitude (DDDMMSS)	Date (MM/DD/YYYY)	Stream length (mi)	Measurement location		Accumulated discharge (figs. 3, 4, 6, 8) (ft^3/s)	Measure-ment rating	Specific conductance (µS/cm at 25 ºC)	Temperature (ºC)
						Tributary (ft^3/s)	Mainstem (ft^3/s)				
Middle Fork Black River - Brushy Creek (figs. 5, 6F)—Continued											
Brushy Creek trib	mf11zh	373156	0905847	09/09/2004	10.0	0	--	5.49	Obs	--	--
Brushy Creek trib	mf11zi	373155	0905838	09/09/2004	10.1	1.00	--	6.49	Est	268	17.0
Brushy Creek - spring	mf11zj	373152	0905814	09/09/2004	10.5	.25	--	6.74	Est	412	14.4
Brushy Creek trib	mf11zk	373152	0905805	09/09/2004	10.7	0	--	6.74	Obs	--	--
Brushy Creek trib	mf11zl	373151	0905736	09/09/2004	11.6	0	--	6.74	Obs	--	--
Brushy Creek trib	mf11zm	373152	0905717	09/09/2004	11.6	0	--	6.74	Obs	--	--
Brushy Creek trib	mf11zn	373143	0905653	09/09/2004	12.1	.12	--	6.86	Est	348	22.6
Brushy Creek mouth	mf11	373129	0905618	09/09/2004	12.7	--	0.69	.69	Fair	259	22.3
Middle Fork Black River - Brushy Creek - Dry Fork (not shown on fig. 6F)											
Brushy Creek - Dry Fork trib	df01	373205	0910355	09/09/2004	1.2	0	--	0	Obs	--	--
Brushy Creek - Dry Fork trib	df02	373207	0910345	09/09/2004	1.3	0	--	0	Obs	--	--
Brushy Creek - Dry Fork trib	df03	373209	0910338	09/09/2004	1.4	0	--	0	Obs	--	--
Brushy Creek - Dry Fork	df04	373220	0910328	09/09/2004	1.7	--	0.05	.05	Est	214	14.2
Brushy Creek - Dry Fork trib	df05	373229	0910328	09/09/2004	1.9	0	--	.05	Obs	--	--
Brushy Creek - Dry Fork trib	df06	373257	0910310	09/09/2004	2.5	0	--	.05	Obs	--	--
Brushy Creek - Dry Fork near mouth	mf11o	373307	0910303	09/09/2004	2.7	--	.63	.63	Good	194	17.1
East Fork Black River (figs. 5, 6G)											
EFBR	ef03	373656	0904511	06/22/2005	2.7	--	0.20	0.20	Fair	349	20.4
EFBR - Womble Hollow	ef05	373636	0904625	06/22/2005	4.0	0.32	--	.52	Fair	330	22.7
EFBR	ef08	373607	0904719	06/22/2005	5.1	--	3.82	3.82	Fair	161	23.1
EFBR	ef11	373518	0904818	06/22/2005	6.5	--	3.86	3.86	Fair	170	22.4
EFBR	ef16	373319	0905033	06/22/2005	9.8	--	3.31	3.31	Fair	181	27.0
EFBR	ef01	373759	0904254	08/28/2003	0	--	0	0	Obs	--	--
EFBR trib	ef02	373742	0904404	08/28/2003	1.2	0	--	0	Obs	--	--
EFBR trib	ef04	373653	0904530	08/28/2003	3.0	0	--	.20	Obs	--	--
EFBR trib	ef06	373619	0904647	08/28/2003	4.5	0	--	.52	Obs	--	--
EFBR trib	ef07	373612	0904707	08/28/2003	4.9	0	--	.52	Obs	--	--
EFBR trib	ef09	373543	0904748	08/28/2003	5.8	0	--	3.82	Obs	--	--
EFBR trib	ef10	373521	0904804	08/28/2003	6.4	0	--	3.82	Obs	--	--
EFBR trib	ef12	373445	0904830	08/28/2003	7.5	0	--	3.86	Obs	--	--
EFBR trib	ef13	373443	0904837	08/28/2003	7.5	0	--	3.86	Obs	--	--
EFBR trib	ef14	373424	0904911	08/28/2003	7.9	0	--	3.86	Obs	--	--
EFBR trib	ef15	373345	0904954	08/28/2003	9.0	0	--	3.86	Obs	--	--

Table 1. Seepage run data for streams draining the Viburnum Trend Subdistrict.—Continued

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Stream site	Site identifier	Latitude (DDMMSS)	Longitude (DDDMMSS)	Date (MM/DD/YYYY)	Stream length (mi)	Measurement location		Accumulated discharge (figs. 3, 4, 6, 8) (ft^3/s)	Measurement rating	Specific conductance (µS/cm at 25 ºC)	Temperature (ºC)
						Tributary (ft^3/s)	Mainstem (ft^3/s)				
East Fork Black River - Little Taum Sauk (not shown on fig. 6G)											
Little Taum Sauk	ef17a	373039	0904548	8/23/2004	1.8	--	0	0	Obs	--	--
Little Taum Sauk trib	ef17b	373053	0904644	8/23/2004	2.7	0	--	0	Obs	--	--
Little Taum Sauk trib	ef17c	373036	0904754	8/23/2004	4.0	0	--	0	Obs	--	--
Little Taum Sauk trib	ef17d	373019	0904830	8/23/2004	4.6	0	--	0	Obs	--	--
Little Taum Sauk	ef17e	373021	0904834	8/23/2004	15.7	--	0	0	Obs	--	--
Logan Creek (figs. 7, 8A)											
Logan Creek trib	lc01	372422	0910635	09/07/2004	1.1	0	--	0	Obs	--	--
Logan Creek trib	lc02	372416	0910635	09/07/2004	1.3	0	--	0	Obs	--	--
Logan Creek	lc03	372405	0910639	09/07/2004	1.5	--	0	0	Obs	--	--
Logan Creek trib	lc04	372354	0910642	09/07/2004	1.7	0	--	0	Obs	--	--
Logan Creek	lc05	372341	0910638	09/07/2004	1.9	--	.05	.05	Est	342	11.8
Logan Creek well	lc06	372331	0910640	09/07/2004	2.1	.09	--	.14	Poor	325	14.9
Logan Creek	lc07	372316	0910642	09/07/2004	2.5	--	.65	.65	Poor	67	20.1
Logan Creek trib	lc08	372314	0910640	09/07/2004	2.5	0	--	.65	Obs	--	--
Logan Creek trib	lc09	372305	0910637	09/07/2004	2.7	0	--	.65	Obs	--	--
Logan Creek - Willis Branch	lc10	372255	0910629	09/07/2004	2.9	0	--	.65	Obs	--	--
Logan Creek - Corridon Hollow	lc11	372242	0910625	09/07/2004	3.1	0	--	.65	Obs	--	--
Logan Creek trib	lc12	372229	0910629	09/07/2004	3.6	0	--	.65	Obs	--	--
Logan Creek trib	lc13	372215	0910636	09/07/2004	3.7	0	--	.65	Obs	--	--
Logan Creek	lc14	372215	0910648	09/07/2004	3.8	--	.75	.75	Poor	97	20.3
Logan Creek trib	lc15	372215	0910647	09/07/2004	3.8	.64	--	1.39	Poor	62	21.8
Logan Creek spring	lc16	372210	0910649	09/07/2004	3.9	.09	--	1.48	Poor	334	13.9
Logan Creek	lc17	372208	0910650	09/07/2004	3.9	--	1.60	1.60	Fair	117	21.5
Logan Creek trib	lc18	372152	0910723	09/07/2004	4.6	0	--	1.60	Obs	--	--
Logan Creek - Adair Creek	lc19	372124	0910723	09/07/2004	5.0	2.39	--	3.99	Poor	492	21.2
Logan Creek trib	lc20	372053	0910731	09/07/2004	5.7	0	--	0	Obs	--	--
Logan Creek trib	lc21	372003	0910715	09/07/2004	6.7	0	--	0	Obs	--	--
Logan Creek - Dixon Hollow	lc22	371954	0910654	09/08/2004	7.0	0	--	0	Obs	--	--
Logan Creek	lc23	371913	0910715	09/07/2004	7.7	--	8.58	8.58	Fair	344	21.0
Logan Creek	lc23	371913	0910715	09/08/2004	7.7	--	8.68	8.68	Fair	344	18.4
Logan Creek - Sweetwater Creek	lc24	371903	0910736	09/08/2004	8.1	.95	--	9.63	Fair	146	20.8
Logan Creek - Suses Branch	lc25	371857	0910814	09/08/2004	9.0	.08	--	9.71	Poor	156	19.2
Logan Creek	lc26	371801	0910738	09/08/2004	9.5	--	9.22	9.22	Good	322	22.6
Logan Creek - Crabtree Hollow	lc27	371756	0910732	09/08/2004	9.8	0	--	9.22	Obs	--	--

Table 1. Seepage run data for streams draining the Viburnum Trend Subdistrict.—Continued

[DDMMSS, degrees, minutes, seconds; MM/DD/YYY, month/day/year; mi, mile; ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 degrees Celsius; ºC, degrees Celsius; --, no data; WFHC, West Fork Huzzah Creek; Est, estimated; trib, tributary; Calc, calculated; Obs, observation; shaded boxes are identical sites measured on different days; EFHC, East Fork Huzzah Creek; WFBR, West Fork Black River; MFBR, Middle Fork Black River; EFBR, East Fork Black River]

Stream site	Site identifier	Latitude (DDMMSS)	Longitude (DDDMMSS)	Date (MM/DD/YYYY)	Stream length (mi)	Measurement location		Accumulated discharge (figs. 3, 4, 6, 8) (ft^3/s)	Measurement rating	Specific conductance (µS/cm at 25 °C)	Temperature (°C)
						Tributary (ft^3/s)	Mainstem (ft^3/s)				
Logan Creek (figs. 7, 8A)—Continued											
Logan Creek	lc28	371708	0910754	09/08/2004	10.7	--	0	0	Obs	--	--
Logan Creek trib	lc29	371637	0910645	09/08/2004	12.5	0	--	0	Obs	--	--
Logan Creek trib	lc30	371627	0910639	09/08/2004	12.8	0	--	0	Obs	--	--
Logan Creek	lc31	371536	0910707	09/08/2004	13.9	--	0	0	Obs	--	--
Logan Creek	lc32	371349	0910437	09/08/2004	18.6	--	0	0	Obs	--	--
Logan Creek - Pumpkin Hollow	lc33	371330	0910331	09/08/2004	20.0	0	--	0	Obs	--	--
Logan Creek	lc34	371334	0910315	09/08/2004	20.0	--	0	0	Obs	--	--
Logan Creek - Brawley Hollow	lc35	371340	0910232	09/08/2004	21.4	0	--	0	Obs	--	--
Logan Creek	lc36	371420	0905948	09/08/2004	23.8	--	0	0	Obs	249	22.9
Logan Creek trib	lc37	371423	0910003	09/08/2004	23.9	0	--	0	Obs	--	--
Logan Creek - Dry Valley	lc38	371443	0905801	09/08/2004	25.6	.49	--	.49	Poor	257	20.7
Logan Creek - Ellington	lc39	371442	0905757	09/08/2004	25.7	--	3.62	3.62	Fair	272	23.1
Logan Creek - Ellington	lc39	371442	0905757	08/23/2004	25.7	--	4.03	4.03	Poor	300	22.0
Logan Creek - Dickson Valley mouth	lc40	371426	0905808	08/23/2004	26.0	.03	--	4.06	Poor	269	23.5
Logan Creek - Spring Valley	lc41	371507	0905537	08/23/2004	28.2	.01	--	4.07	Est	--	--
Logan Creek	lc42	371502	0905536	08/23/2004	28.3	--	6.13	6.13	Good	276	23.1
Logan Creek spring	lc43	371357	0905343	08/23/2004	31.0	6.59	--	12.7	Poor	247	15.5
Logan Creek	lc44	371352	0905326	08/23/2004	31.3	--	17.0	17.0	Fair	261	20.6
Miscellaneous tributary and headwater measurement or observation sites (not shown on fig. 8A)											
Logan Creek - Adair Creek trib	lc19a	372151	0910749	09/07/2004		0	--	--	Obs	--	--
Logan Creek - Dickson Valley (not shown on fig. 8A)											
Dickson Valley	lc40a	371153	0905815	08/23/2004	0.2	--	0	0	Obs	--	--
Dickson Valley - Darr Valley	lc40b	371202	0905818	08/23/2004	.4	0	--	0	Obs	--	--
Dickson Valley	lc40c	371214	0905807	08/23/2004	.7	--	0	0	Obs	--	--
Dickson Valley	lc40d	371323	0905811	08/23/2004	2.0	--	0	0	Obs	--	--
Dickson Valley trib	lc40e	371325	0905812	08/23/2004	2.1	0	--	0	Obs	--	--
Dickson Valley mouth	lc40	371426	0905808	08/23/2004	3.5	--	.03	.03	Poor	269	23.5

Table 1. Seepage run data for streams draining the Viburnum Trend Subdistrict.—Continued

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Stream site	Site identifier	Latitude (DDMMSS)	Longitude (DDDMMSS)	Date (MM/DD/YYYY)	Stream length (mi)	Measurement location		Accumulated discharge (figs. 3, 4, 6, 8) (ft^3/s)	Measurement rating	Specific conductance (µS/cm at 25 °C)	Temperature (°C)
						Tributary (ft^3/s)	Mainstem (ft^3/s)				
Logan Creek - Sweetwater Creek (figs. 7, 8B)											
Sweetwater Creek trib	lc24a	372127	0910951	09/08/2004	0.3	0	--	0	Obs	--	--
Sweetwater Creek	lc24b	372121	0910951	09/08/2004	.4	--	0	0	Obs	--	--
Sweetwater Creek trib	lc24c	372043	0910932	09/08/2004	1.3	0	--	0	Obs	--	--
Sweetwater Creek - Hominy Creek	lc24d	372032	0910940	09/08/2004	1.5	.12	--	.12	Poor	86	18.6
Sweetwater Creek	lc24e	372031	0910931	09/08/2004	1.5	--	.42	.42	Poor	95	17.2
Sweetwater Creek trib	lc24f	372025	0910925	09/08/2004	1.6	0	--	.42	Obs	--	--
Sweetwater Creek tailings trib	lc24g	372020	0910902	09/08/2004	2.1	.45	--	.87	Poor	374	19.0
Sweetwater Creek	lc24h	371954	0910825	09/08/2004	2.8	--	.55	.55	Poor	136	21.4
Sweetwater Creek trib	lc24i	371955	0910824	09/08/2004	2.8	0	--	.55	Obs	--	--
Sweetwater Creek	lc24	371903	0910736	09/08/2004	4.3	--	.95	.95	Fair	146	20.8
Miscellaneous tributary and headwater measurement or observation sites (not shown on fig. 8B)											
Hominy Creek spring	hm01	372031	0910940	09/08/2004	--	0.02	--	--	Est	136	17.7
Sinking Creek (figs. 7, 8C)											
Sinking Creek	sk01	372259	0910311	09/13/2004	1.1	--	0	0	Obs	--	--
Sinking Creek trib	sk02	372304	0910304	09/13/2004	1.2	0	--	0	Obs	--	--
Sinking Creek trib	sk03	372310	0910246	09/13/2004	1.6	0	--	0	Obs	--	--
Sinking Creek trib	sk04	372315	0910230	09/13/2004	1.8	0	--	0	Obs	--	--
Sinking Creek trib	sk05	372319	0910157	09/13/2004	2.3	0	--	0	Obs	--	--
Sinking Creek trib	sk06	372359	0910128	09/13/2004	3.6	0	--	0	Obs	--	--
Sinking Creek trib	sk07	372409	0910122	09/13/2004	3.8	0	--	0	Obs	--	--
Sinking Creek trib	sk08	372417	0910102	09/13/2004	4.0	0	--	0	Obs	--	--
Sinking Creek trib	sk09	372418	0910043	09/13/2004	4.3	0	--	0	Obs	--	--
Sinking Creek trib	sk10	372418	0910027	09/13/2004	4.5	0	--	0	Obs	--	--
Sinking Creek	sk11	372334	0905948	09/13/2004	5.4	--	0	0	Obs	--	--
Sinking Creek trib	sk12	372336	0905941	09/13/2004	5.5	0	--	0	Obs	--	--
Sinking Creek trib	sk13	372323	0905918	09/13/2004	5.9	0	--	0	Obs	--	--
Sinking Creek trib	sk14	372322	0905901	09/13/2004	6.2	0	--	0	Obs	--	--
Sinking Creek trib	sk15	372314	0905841	09/13/2004	6.6	0	--	0	Obs	--	--
Sinking Creek trib	sk16	372308	0905826	09/13/2004	7.0	0	--	0	Obs	--	--
Sinking Creek trib	sk17	372305	0905821	09/13/2004	7.0	0	--	0	Obs	--	--
Sinking Creek	sk18	372155	0905836	09/13/2004	8.0	--	0	0	Obs	--	--
Sinking Creek - Amsden Hollow	sk19	372201	0905857	09/13/2004	8.1	0	--	0	Obs	--	--
Sinking Creek trib	sk20	372141	0905832	09/13/2004	8.4	0	--	0	Obs	--	--
Sinking Creek - Pyrtle Spring	sk21	372135	0905829	09/13/2004	8.5	.34	--	.34	Good	169	19.2

Table 1. Seepage run data for streams draining the Viburnum Trend Subdistrict.—Continued

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Stream site	Site identifier	Latitude (DDMMSS)	Longitude (DDDMMSS)	Date (MM/DD/YYYY)	Stream length (mi)	Measurement location		Accumulated discharge (figs. 3, 4, 6, 8) (ft^3/s)	Measure-ment rating	Specific conductance (µS/cm at 25 °C)	Temperature (°C)
						Tributary (ft^3/s)	Mainstem (ft^3/s)				
Sinking Creek (figs. 7, 8C)—Continued											
Sinking Creek trib	sk22	372120	0905806	09/14/2004	9.1	0	--	0.34	Obs	--	--
Sinking Creek - Brawley Hollow	sk23	372052	0905814	09/13/2004	9.4	0	--	.34	Obs	--	--
Sinking Creek trib	sk24	372113	0905746	09/14/2004	9.5	0	--	.34	Obs	--	--
Sinking Creek trib	sk25	372048	0905706	09/14/2004	10.3	0	--	.34	Obs	--	--
Sinking Creek	sk26	372020	0905654	09/14/2004	10.8	--	5.76	5.76	Good	246	18.8
Sinking Creek - Pogue Hollow	sk27	372026	0905642	09/14/2004	10.9	0	--	5.76	Obs	--	--
Sinking Creek trib	sk28	372021	0905627	09/14/2004	11.3	0	--	5.76	Obs	--	--
Sinking Creek - Vinson Branch mouth	sk29	371934	0905549	09/13/2004	12.6	.04	--	5.80	Est	160	19.3
Sinking Creek	sk30	371937	0905521	09/13/2004	12.6	--	6.16	6.16	Fair	225	20.6
Sinking Creek	sk30	371937	0905521	09/14/2004	12.6	--	6.31	6.31	Fair	225	19.9
Sinking Creek trib	sk31	371938	0905454	09/14/2004	13.0	0	--	6.31	Obs	--	--
Sinking Creek - Harrison Valley	sk32	371920	0905408	09/14/2004	14.0	0	--	6.31	Obs	--	--
Sinking Creek - Harrison Valley	sk33	371905	0905357	09/14/2004	14.2	0	--	6.31	Obs	--	--
Sinking Creek at Redford	sk34	371859	0905356	09/14/2004	14.2	--	7.65	7.65	Good	218	19.6
Miscellaneous tributary and headwater measurement or observation sites (not shown on fig. 8C)											
Sinking Creek - Amsden Hollow	sk19a	372159	0905847	09/13/2004	--	0	--	--	Obs	--	--
Sinking Creek - Vinson Branch (not shown on fig. 8C)											
Vinson Branch	sk29a	371924	0905753	09/13/2004	1.2	--	0	0.00	Obs	--	--
Vinson Branch	sk29b	371922	0905752	09/13/2004	1.3	--	0	0.00	Obs	--	--
Vinson Branch	sk29c	371916	0905736	09/13/2004	1.6	--	.01	0.01	Est	430	21.2
Vinson Branch	sk29d	371914	0905731	09/13/2004	1.7	--	0	0.00	Obs	--	--
Vinson Branch	sk29e	371907	0905653	09/13/2004	2.3	--	0	0.00	Obs	--	--
Vinson Branch trib	sk29f	371933	0905548	09/13/2004	3.6	0.02	--	0.02	Est	166	21.1
Vinson Branch mouth	sk29	371934	0905549	09/13/2004	3.9	--	.04	0.04	Est	160	19.3

[a] Site discharge calculated by subtracting discharge measured immediately upstream from site from discharge measured immediately downstream from site.