New River Gorge National River
Bluestone National Scenic River
and
Gauley River National Recreation Area

Water Quality Monitoring Program
1993

REVISED

National Park Service
New River Gorge National River
Division of Resource Management
and Visitor Protection
Resource Management Section

NEW RIVER GORGE NATIONAL RIVER

BLUESTONE NATIONAL SCENIC RIVER

GAULEY RIVER NATIONAL RECREATION AREA

Water Quality Monitoring Program
1993

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EXECUTIVE SUMMARY

This study is a continuation of the water quality monitoring programs conducted at New River Gorge National River (NERI) since 1980. From 1980 to 1984 the West Virginia Division of Natural Resources (WVDNR) Office of Water Resources conducted baseline studies for New River Gorge National River. In 1985, the National Park Service (NPS) began monitoring sites along the New River for fecal coliform bacteria using a quick determination method (Colicount samplers from Millipore Corporation). In 1986, an Environmental Protection Agency (EPA) approved standard method for monitoring water quality was adopted, and the United States Department of Agriculture (USDA) Appalachian Soil and Water Research Lab facility was used to conduct the membrane filter technique for fecal coliform bacteria analysis. Due to staff changes and inconsistencies in the 1986 data, the WVDNR was again contracted to do the studies. With the completion of the new NERI Water Resources Lab in 1991, NPS staff assumed responsibility for the Water Quality Monitoring Program and have continued to monitor the New River, adding both the Bluestone and Gauley Rivers areas in 1991.

New River Gorge National River

Water quality was analyzed for 7 mainstem sites and 11 tributaries of the New River. Those sampling sites showing probable violations regarding the presence of fecal coliform bacteria include: Madam Creek, Meadow Creek, Piney Creek, Dunloup Creek, Arbuckle Creek, Coal Run, Keeney Creek, Wolf Creek and Marr Branch.

Bluestone National Scenic River

Three mainstem sites on the Bluestone River, one mainstem site on the Little Bluestone River and one site on Mountain Creek comprised the sampling area for Bluestone National Scenic River. There were no probable violations regarding the presence of fecal coliform bacteria at any of these sites. In 1993, Mountain Creek showed an improvement over the 1992 data (2 probable violations of greater than 200 fecal coliform colonies per 100 milliliters of sample).

Gauley River National Recreation Area

Data for fecal coliform bacteria were collected from 5 sites: 3 mainstem sites along the Gauley River, one sampling site on Peters Creek, and one site on Meadow River. Peters Creek exhibited only 3 occasions when fecal coliform bacteria levels exceeded 200 colonies per 100 milliliters of sample. Timbering in the recent past and coal mining, the principle industry in this area, possibly contributed to the high turbidity readings taken on Peters Creek on every sampling date.

Overall, the water quality monitoring program for the New River reveals that water quality, in relation to animal and human waste, as well as other parameters, remains consistent with past data. Those sites that have been in probable violation in the past still reflect problems associated with high levels of fecal coliform bacteria. A review of the data for the Bluestone River indicates that analyses of biological, chemical and physical parameters mirror those recorded in 1992. However, monitoring of this park area should continue to establish solid baseline data. This statement also holds true for the Gauley River National Recreation Area. Animal and human waste levels appear within acceptable limits for the 3 mainstem sites along the Gauley River, however analysis of fecal coliform bacteria should continue for this park area.

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INTRODUCTION

This report presents the data from the 1993 water quality study and is a continuation of the water quality monitoring programs conducted at New River Gorge National River since 1980. Any visible trends between fecal coliform bacteria counts, stage level and/or 48 hour precipitation (48prcp) are discussed and recommendations for 1994 are presented.

The New River Gorge National River (NERI) was established by the United States Congress in 1978 and placed under management of the National Park Service, an agency within the United States Department of the Interior. Comprising 62,000 acres along a 53 mile corridor, the New River was set aside " . . . to conserve and interpret the outstanding natural, scenic, and historic values and objects in and around the New River Gorge and preserve as a free-flowing stream an important segment of the New River in West Virginia for the benefit and enjoyment of future generations. . ." (Figure 1). On October 26, 1988 the United States Congress approved Public Law 100-534. Title II, Section 201 of this act established the Gauley River National Recreation Area (Figure 3). Title III, Section 301 designated the Lower Bluestone as a National Scenic River (Figure 2). The purpose of the public law was "to protect and enhance the natural, scenic, cultural, and recreational values of certain segments of the New, Bluestone, Gauley and Meadow Rivers in West Virginia for the benefit of present and future generations, and for other purposes". Since this law was enacted, NERI has been in the process of developing and managing these areas in accordance with their lawful designations.

The headwaters of the New River are located in the southern Appalachian Mountains in northwestern North Carolina. From Blowing Rock, North Carolina, the New River flows in a northward direction across southwestern Virginia and enters West Virginia 163 miles from the river's source. The river continues flowing northward for 87 miles to Gauley Bridge where it joins the Gauley River and forms the Kanawha River. The Kanawha River flows northwest to Point Pleasant, West Virginia, and joins the Ohio River, which is part of the Mississippi watershed. The New River within NERI is a 53 mile stretch that flows through Summers, Raleigh, and Fayette Counties starting from below Bluestone Dam, near Hinton, West Virginia, and ending just north of the U.S. Highway 19 bridge near Fayetteville, West Virginia.

From New River's headwaters in Blowing Rock, to Nitro, West Virginia, the courses of the New River and Kanawha River follow that of the ancient Teays River, which began forming as the southern Appalachians rose out of an ancient ocean. Mountain uplift and subsequent erosion have exposed many types of rock in the basin; most typical are shales, sandstones and limestones. On its journey to the gorge, the New River passes through an extensive

area of limestone formations and gathers water from other streams that drain these calcareous lands. Consequently, New River is a well-buffered, biologically productive aquatic environment (WVDNR, 1987-88).

The Bluestone National Scenic River (BLUE) consists of a 10.5 mile segment of the Bluestone River located in Summers and Mercer Counties. BLUE flows northeast through a forested corridor from the southern boundary of Pipestem State Park to the southern boundary of Bluestone State Park (Figure 2). This downstream border (the southern boundary of Bluestone State Park) corresponds with the summer pool elevation, 1410 feet above sea level, of Bluestone Lake (Reservoir). The upper (southern) 3.5 miles of BLUE lie within the boundaries of Pipestem State Park; the last 7.0 miles lie within the Bluestone Wildlife Management Area (Sprague 1991).

The headwaters of the Bluestone River begin above 3500′ on the north facing slope of East River Mountain, near Springville, Virginia. The river flows east and then north for 17 miles before entering West Virginia, west of Bluefield, Virginia. The river then turns northeasterly for 60 miles where it joins the New River south of Hinton. On its journey to the New River, the Bluestone cuts through the linear Appalachians and then, as it turns northeast, follows the margin between the Allegheny Plateau and the folded Appalachians. At Eades Mill, West Virginia, the river begins to constrict in its gorge. The wall elevations vary from 300′ up to 1200′ (NPS, 1983a).

An early report of the lower section of the Bluestone River indicated satisfactory water quality (NPS, 1983a). It is also classified by the state as a high quality warm water stream, in relation to fisheries. Most water quality problems lie upstream, where the river runs through a wider floodplain, making it more suitable for human development and subject to domestic and municipal sources of pollution. The river is affected slightly by strip mining activities that contribute acid mine drainage and siltation. Agriculture, construction, and exposed soils due to fire and logging, also contribute siltation loads to the river (NPS, 1983a).

The Gauley River National Recreation Area (GARI), a major segment of the Gauley River mainstem, flows through Nicholas and Fayette Counties of southeastern and south central West Virginia. From its source on Gauley Mountain in northwestern Pocahontas County, to its mouth in Fayette County, the Gauley River drains 1,422 square miles over a length of 107 miles.

GARI includes a 25 mile portion of the Gauley River between the Summersville Dam and Swiss (near its confluence with the New River), and a 5.5 mile portion of the Meadow River (Figure 3). The GARI segment of Gauley River flows west-southwest, from an

elevation of 1400' at the base of Summersville Dam, to 720 feet where the river leaves GARI at its western boundary. Dropping approximately 26 feet per mile through a gorge that averages 500 feet in depth, the Gauley River is noted for its outstanding whitewater and is recognized as one of the most technically demanding and popular commercially-run rivers in the nation. The Meadow River gradient averages 71 feet per mile and is considered runable by only a handful of world-class kayakers.

The authorized area within the GARI boundary includes approximately 10,300 acres. A large percentage of the land is steep, second-growth forest, undeveloped, and held in large tracts by individuals or corporations primarily for coal or timber production. NPS land acquisition has only recently begun.

The water quality for the Gauley River, as it flows through GARI, is considered to be good, with two exceptions. The Summersville Dam releases water from the lower half of Summersville Lake, releasing water at temperatures as low as 10°C and not exceeding 16°C. These low temperatures limit the quality of the warm water fishery that used to occur in this area (EPA, 1981). A second degrading effect is a result of the silt and sediment introduced by poor timbering and strip mining practices in the Gauley watershed (NPS, 1983b).

With the addition of both BLUE and GARI to NPS administration in 1988, NERI staff decided to bring them on line in 1991 with the water quality studies being performed on the New River.

HISTORICAL OVERVIEW

In 1980, NERI began a water quality monitoring program on the New River to establish baseline data. At that time NERI, lacking proper laboratory facilities to carry out the program, joined in a Cooperative Agreement with the West Virginia Division of Natural Resources. From 1980 to 1984 the WVDNR Office of Water Resources conducted water quality studies for NERI and for its own water quality data baseline. These studies examined several parameters commonly related to commercial and domestic pollution, i.e. total aluminum, manganese, total iron, fecal coliform bacteria, etc. After examining the data from 1980-1984, NERI determined that sewage and/or animal wastes were a major cause for concern because of the large number of river recreationists who have bodily contact with the New River. In 1985, NERI began monitoring fecal coliform bacteria, the accepted indicator for sewage and animal waste contamination, with Colicount samplers from Millipore Corporation. This method is quick and inexpensive, but it is not an EPA approved method. An unpublished report by NERI on the 1985 sampling effort recommended the use of an approved standard method and an approved laboratory for future bacteria monitoring efforts. In 1986, based on these recommendations, NERI coordinated with the USDA Appalachian Soil and Water Research Lab facilities to use their lab

to analyze surface water samples. The membrane filter technique from Standard Methods for the Examination of Water and Waste Water, 16th Edition, 1985, Method 909C (hereafter referred to as SM_#___), an EPA approved analytical method, was used with mixed results. In 1987, because of staff changes at NERI and inconsistencies in the 1986 data, it was decided to again contract with the WVDNR to conduct fecal coliform bacteria studies on the New River and selected tributaries. The result of this agreement was the "New River Gorge National River Fecal Coliform Study, April-September, 1987-1988" done by WVDNR, to enhance its own water quality data baseline and to assist the NPS. In 1990, in an effort to train personnel and begin the establishment of an approved water quality lab, NERI staff took over the bacteria studies from WVDNR and again conducted the studies with assistance from the USDA lab in Beckley. Over the winter of 1990 to 1991, much preparation was done for the debut of the 1991 fecal coliform study, which was to be performed by NERI staff in the newly equipped NERI Water Resources Lab. The 1991 study involved not only New River, but also the Bluestone and Gauley Rivers. A similar study was continued in 1992.

MATERIALS AND METHODS

1. SAMPLING SITES/SCHEDULE

The 1993 Water Quality Monitoring was conducted in the New River Gorge National River, the Bluestone National Scenic River and the Gauley River National Recreation Area. There are 18 sample sites within NERI, all but three are within the park boundaries. The three outside are: 01-M, New River at Hinton Visitor Center, 02-T, Madam Creek across the river from Hinton, and 16-T, Keeney Creek in Winona. There are five sample sites within BLUE, all but one of the sites are within BLUE's boundary. The one site outside the boundary is: 01-M, Bluestone River near the southern boundary of Bluestone State Park. There are five sample sites within GARI, all of which are within the boundary. Sampling sites are listed in Table 1. Their relative locations are shown in Figure 1, Figure 2, and Figure 3. In Figures 1, 2, 3 and Table 1, **"M"** denotes mainstem sites while **"T"** indicates tributary sampling sites. Mainstem sites were sampled at areas of high public contact or as close to the main river current as possible. Tributary sites were also sampled as close to the main current as possible in order to give an adequate assessment of the waste load carried by each tributary.

The sampling sites for NERI were divided into two districts, north and south. The south district included the sites 01-M through 09-T and the north district included sites 11-T through 19-T. BLUE and GARI each were designated as separate districts. Each district was sampled on a bi-weekly basis.

The time period of collection coincided with the summer recreation season for the three rivers, which is roughly April through October. There are approximately 23 commercial whitewater rafting

companies that operate during this period. In addition, New River is used for swimming, fishing, camping and other activities throughout the year. Use by rafters, kayakers, canoeists, anglers and swimmers is concentrated on weekends. Occasionally, temporary high seasonal flows in the fall, winter, and spring will attract recreationists, but this use is small compared with the summer season.

The Bluestone River is subject to seasonal flows since it is not impounded by any upstream dams. Thus, the typical flow regime is high in the late winter and early spring (825 cubic feet per second (cfs)), and low (40 cfs) in late summer and early fall (Bluestone River Wild and Scenic River Study, 1983a). Therefore, the Bluestone River is used by rafters more frequently and in larger numbers in early spring or during heavy rain events. It is also used for canoeing and fishing all year long, and a few companies run guided fishing trips on the Bluestone River.

The Gauley River within GARI is unusual because the upper end lies at the foot of the Summersville Dam. Therefore it does not demonstrate the unregulated flow regime of the Bluestone River. The river within GARI can run "high" in the spring if the spring runoff brings lake levels up, but because of the dam, the flow will only be about 1500-1800 cfs. This is minuscule compared to the record flow in 1929, of 105,000 cfs when the dam was absent (NPS, 1983b). In summer months, the Gauley runs not lower than 200 cfs, usually somewhat higher, due to the constant dam control. In the fall, instead of being at its lowest (the record low since 1929 is 3 cfs), it runs at 2500 to 3000 cfs. One reason for these abnormally high flows is that the Army Corps of Engineers is lowering the level of Summersville Lake to make room for winter and spring runoff. A second reason for high flows is the Water Resources Development Act of 1986. This act specifically directs that "Whitewater recreation on the Gauley River downstream of the Summersville Lake Project in West Virginia is a project purpose of that project." It further specifies that there shall be minimum releases of 2500 cfs on at least 20 days during the 6-week period beginning on Labor Day each year.

The Gauley River is also used for fishing, camping and other activities throughout the year. In summer, weekday use is low, but the weekends in September and the first part of October (Gauley Season) are crowded with rafters, kayakers, and canoeists. Occasionally, temporary high flows in the spring and summer will attract recreationists, but this use is small compared to peak season crowds.

2. SAMPLING PARAMETERS

Since most recreational opportunities on these rivers involve bodily contact, it was decided to focus on fecal coliform bacteria,

the accepted monitoring standard where public health is a concern. In addition, alkalinity (Alk), aluminum (AL), manganese (Mn), and iron (Fe) levels were selected because of their ability to indicate the impacts of coal mining on water resources.

a. FECAL COLIFORM BACTERIA

As in previous years, the fecal coliform bacteria group was chosen as the parameter that best represents sewage and animal waste loads. The group itself does not consist of pathogenic organisms, but the presence of such bacteria is a good indication of pollution from disease-causing organisms usually associated with sewage and mammalian and avian feces. The water samples were collected in 250ml and 500ml plastic Nalgene bottles. In order to bind any residual chlorine that may have been released into the streams, a dechlorinating agent was added to the sample bottles, as required (SM 906 A.2.). The bottles were then sterilized in an autoclave for at least 15 minutes at 127°C and placed in the drying cycle for another 15 minutes. Water samples were collected according to SM 906 A.3.e. After collection, the sample bottles were placed in a cooler with ice and transported to the NERI lab. Analysis began within 6 hours, as required by SM 906 B.

Once in the Water Resources Lab, the samples were analyzed for fecal coliform bacteria based on procedures described in SM 909 C. The filtering apparatus was a Millipore OM 037 glass 47mm filter holder. Commercially prepared M-FC media and sterile pads/filters (sterilized MSI cellulosic, white grid, 0.45 micron, 47mm., with pad) were used in the filtration. The sample filters were placed in disposable plastic petri dishes and heat sealed in a plastic bag. The bags with filtered samples were incubated for 24 hours (+ or - 2 hours) at 44.5°C (+ or - 0.2°C). After incubation, the fecal coliform bacteria densities were calculated according to the SM 909 C. 3 general formula:

$$\text{Fecal coliform bacteria colonies /100ml} = \frac{\text{Coliform colonies counted} \times 100}{\text{ml sample filtered}}$$

The West Virginia Water Resources Board for Protection of Recreational Use and Public Water Supply (WVWRB) has set a standard of no more than 200 counts of fecal coliform bacteria per 100ml of sample (WVDNR 1987-88) expressed as a geometric mean based on no less than five samples per month[1]. The geometric mean can be calculated by the following formula:

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[1]Due to fiscal restraints, only 2 to 3 samples were taken per month. Thus, the results of this report are considered indicators of streams that **may** have exceeded the above standard.

$$GM = \sqrt[n]{[(FC1)\ (FC2)...(FCn)]}$$

GM = monthly geometric mean

FC1, FC2...Fcn = fecal coliform bacteria value for sample number 1,2...n.

n = total number of samples during month (WVDNR 1987-88).

When the samples were collected, date and time were noted, as well as 7 other parameters (Appendix 1 Sample Data Collection Form). The parameters are water temperature, air temperature, pH, stage level (where applicable), turbidity (water condition), dissolved oxygen, and conductivity. In the absence of a staff gauge, a visual level was recorded as "high", "normal" or "low". Water temperature and conductivity were determined with a YSI model 33 conductivity meter. Dissolved oxygen (DO) was determined with a YSI model 51B dissolved oxygen meter. An alcohol thermometer was used to determine air temperature. To measure pH, a Fisher Scientific, Accumet model 1001, portable temperature compensating pH meter was used. Turbidity was determined by two methods: 1, a Hach model 16800 turbidimeter and 2, visually determined by the sample technician and noted as either turbid (TR), murky (MR), milky (MI), or clear (CL). The weather conditions were recorded using the weather codes illustrated in Appendix 2. All equipment was calibrated prior to each sampling run as per instructions provided by the manufacturer.

The stage levels for NERI sites 05-T, 06-T, 07-T, 09-T, 13-T, 19-T, were determined by staff gauges, site 11-T was determined by a weighted cable gauge, and site 12-M was determined by a remote gauging station near Thurmond, West Virginia. These various gauges were installed and maintained by the United States Geological Survey. Gauge readings at 17-M were calculated from 12-M by using the following formula:

Thurmond Reading x 1.33 - 4.67

The stage levels for the south district sites were obtained from the recorded phone message at the Bluestone Dam.

Forty-eight hour precipitation (48prcp) for New River sites 07-09 and 11-15 were obtained at NPS Park Headquarters in Glen Jean, WV. Sites 01-06 were received from the recorded phone message at Bluestone Dam. For the northern sites (16-19) of the New River, 48prcp was obtained from Canyon Rim Visitor Center Water Treatment Plant. Stage level and 48prcp for BLUE was obtained from the recorded phone message at Bluestone Dam. The same information for GARI was obtained from personnel at Summersville Dam. Gauge phone numbers and information are listed in Appendix 3.

b. METALS

Sampling for metals was performed quarterly and consisted of collecting a single sample at each sample site. Parameters sampled under the baseline water quality monitoring strategy included total iron, aluminum, manganese, and alkalinity. Total iron was tested according to procedures in the Handbook for Water and Waste Water Analysis: Digestion and selected methods for the determination of metals and minerals (Hach, 1991). All data for total iron were derived from this method without deviation. Aluminum was tested according to procedures in the DR/3000 Spectrophotometer Manual (Hach, 1990), procedure code A.3 for a range of 0.0 to 0.250 mg/L (Eriochrome Cyanine R Method). A 0.100 mg/L aluminum standard solution was prepared according to note C in the DR/3000 Manual for the accuracy check. Manganese was also tested according to the procedures in the DR/3000 Spectrophotometer Manual, procedure code M.2 (P.A.N. Method) for low range (0 to 0.800 mg/L) was followed without deviation. The accuracy check was performed as indicated in Water Analysis Handbook (Hach, 1989). Alkalinity was tested according to procedures in Digital Titrator Model 16900-01 Manual (Hach, 1988). Using sulfuric acid titration cartridges of 0.1600N and 1.600N concentration. Phenolphthalein alkalinity was zero for all samples, and they were titrated to their specified 4.8 pH end point. The standard additions method in the titrator manual was used for an accuracy check.

When the samples were collected the date, time, pH, DO, etc., was recorded. Samples were collected in a manner approved by the EPA. In most cases lab analysis could not begin within 1 to 2 hours after collection as required by EPA standards. Therefore, samples were preserved with nitric acid (HNO_3) to a pH of <2. Due to fiscal and personnel constraints, only the first three quarters of testing were completed. Therefore, interpretation of these results is limited in scope. Additional parameters being considered for future reports are total dissolved solids (TDS) and hot acidity.

RESULTS AND DISCUSSION

This section presents the results of water quality analyses of the New, Bluestone and Gauley Rivers, along with a discussion of probable violations of accepted water quality standards in relation to 48prcp and water level variation.

It must be noted that the use of the term "violation" is relative in this report. In water contact recreation, the standard for fecal coliform bacteria is no more than 200 fecal coliform colonies per 100 milliliters of sample. In addition, this part of the standard is only legally valid in the context of at least 5 separate samples per month. If the geometric mean of the 5 samples exceeds 200 colonies/100ml, then the sample site is considered to be in violation of the standard. The second part of the standard

colonies/100ml, then the sample site is also in violation. Since NERI was sampled less than 5 times per month, the standard cannot be legally applied to these results. However, for this report, a reading of more than 200 colonies/100ml will be used to point out bodies of water that may be in violation of the standard.

Also, throughout the report, flow levels are referred to as "high", "normal" or "low". These categories are based upon the opinion of the technician rather than on quantifiable data. While subjective, this opinion is nonetheless drawn from several years of familiarity with the streams in this study. For the purpose of this report, a subjectively derived flow will suffice in discussing the results where actual flow measurements are not available.

In addition, "river left" and "river right" is a boating term used on rivers and streams to describe the location of the river banks from the viewpoint of a person facing downstream. This report will also use these terms to describe sampling locations.

1. NEW RIVER GORGE NATIONAL RIVER

Water quality was examined on 7 sites of the New River and 11 tributaries. Figures 4-21 display the fecal colonies/100ml, 48prcp and CFS (when available) for the 1993 sampling sites. Appendix 4 presents the data which correspond to Figures 4-21. Appendix 5 presents a summary of the raw data, arranged by site and date. Appendix 6 contains the raw data for Al, Fe, Mn, and alkalinity tests, arranged by site number and date.

01-M, New River at Hinton, NERI Visitor Center (Figure 4)

This site is located on river left behind the Visitor Center. It is approximately 1 mile downstream of the Bluestone Dam and is fairly representative of the discharge from the reservoir.

Site 01-M had no violations in 1993, with the highest reading being 131/100ml on 6/7. As evident in Figure 4, this reading corresponded with an increased runoff upstream, indicated by high turbidity and increased dam release flow (6,300cfs). Nine readings were 43/100ml or below. All of these readings closely mirror the numbers from 1991-92. Generally speaking, the results suggest acceptable levels of fecal coliform bacteria with occasional fluctuation. Since public access to the New River is provided by the NPS at this point, the potential for human exposure to water borne pathogens warrants continued monitoring.

02-T, Madam Creek near the mouth (Figure 5)

This site is located on stream left immediately downstream of the River Road bridge that crosses Madam Creek. The first sample for this creek was in 1989 and was found to have high levels of fecal coliform bacteria. Levels have remained consistently high over the

years. In 1993, nine of the 11 readings failed to meet the standard and 5 were higher than 4000/100ml, with the highest being 24,500/100ml. Although two samples were taken per month, these numbers strongly suggest that Madam Creek is in violation of the WVWRB standard.

A negative correlation exists at this site between fecal coliform bacteria and water level/precipitation. The lowest fecal coliform counts occurred during high spring flows, whereas the highest counts occurred during low summer flows. This pattern is a classic example of a continual source of sewage entering the system. Poor, failing, and/or absent sewage treatment systems (raw sewage was sometimes observed at this site) are contributing a steady amount of sewage when wheather conditions are dry or wet. During the heaviest rains, the sewage in the creek is being diluted so that the fecal coliform bacteria levels are low. As the summer progresses and the weather becomes dryer, the fecal concentration levels increase. Figure 5 shows this stair-step pattern.

On 8/20 the DO reading was 4.0 mg/l, conductivity 333 umohs (micromhos per centimeter), water temperature 26°C (same as the air), and the water level was low. This low DO reading was a violation of WVWRB standard which states not less than 5.0 mg/l of DO at any time for warm, recreation, and public waters.

03-M, New River at Sandstone Falls (Figure 6)

This is a new sampling site (1993) at Sandstone Falls. It is located approximately 7 miles downstream of site 02-T, down river of the constriction of the main falls, and is just off the end of the newly completed boardwalk. During lower flows most of the river is concentrated river right towards the falls where good vertical and horizontal mixing occurs. No violations were recorded for this site. The highest recorded reading was 132/100ml on 8/20 during a low flow period. There is not enough flow data nor sampling events to allow confidence in the correlation of the flows with the bacteria concentrations.

04-M, New River at Sandstone (Figure 7)

This sample site is located about 7 miles downstream of site 02-T. It is on river left by the Sandstone Falls campground off River Road. This site had no violations. The highest recorded count was 134/100ml on 8/2 during low flow, with a 48prcp of 0.44". This rain event possibly flushed bacteria from the surrounding area into the New River and its neighboring tributaries after a prolonged period of little to no precipitation. The next highest count was 124/100ml on 5/12 with a 48prcp of 0.92". All other readings fell below 100/100ml. Figure 7 displays the relationship of precipitation with the two highest bacteria readings. The figures from this site closely reflect the figures from the past several years and suggest that the site usually has low concentrations of

fecal coliform bacteria.

In the 1980s this site had a few concentrations of fecal coliform bacteria above the 200/100ml standard (7 in 1987, 4 in 1988, 3 in 1989). Then in 1990 and 1991 there were no violations, and one violation in 1992. No definitive explanation can be given for this apparent improvement in fecal coliform bacteria levels. Summer residences along River Road and wildlife were cited as possible past contributors of bacteria. Perhaps some residences upstream of this site have made improvements to their septic systems. Another possibility is that since 1989, NERI has improved the campsites and enforced length of stay regulations at this campground. This has concentrated human waste in proper waste facilities rather than allowing the waste to be spread across the immediate area.

05-T, Lick Creek at Stream Gauge Site (Figure 8)

No violations were recorded for this site. Only two recorded counts were above 110/100ml. The highest being 132/100ml, on 5/12. This count could be due to a 48prcp reading of 0.92" that flushed bacteria into the stream. The other readings were 88/100ml or below. Except for the reading on 5/12, the effect of stage level and rain did not indicate a relationship with elevated fecal coliform bacteria levels, as exhibited in Figure 8.

Conductivity readings were lower during high flows (spring) and increased throughout the sample period as flow decreased. This is normal for most tributaries within the boundaries of NERI. There was nothing unusual about the pH readings, which ranged between 7 and 8, with one reading of 9.1 on 6/23. There is no mining activity in this watershed.

06-T, Meadow Creek at Stream Gauge Site (Figure 9)

Meadow Creek's watershed is sparsely populated. There are two communities that could impact this watershed, Meadow Bridge and Meadow Creek. In the past, WVDNR stocked trout February to May in the stream as a put-and-take. It is unknown if this practice still takes place.

Site 06-T had three readings above the standard. The first one was 336/100ml on 5/12, the second was 480/100ml on 6/7, and the third was 240/100ml on 7/20. Figure 9 shows the higher levels of fecal coliform bacteria occurred during the months of May through July. Previous patterns of violations for Meadow Creek have followed a seasonal fluctuation affected by non-point sources of pollution (WVDNR 1987-88). The sewage treatment plant (STP) at Meadow Bridge has had some inflow problems and operational deficiencies which has occasionally contributed partially treated wastewater to Meadow Creek during high precipitation events. This condition, in addition to 48prcp, could have contributed to the violations on 5/12, 6/7, and 7/12. In 1993, a correlation between violations and

heavy rainfall (producing high levels of stream discharge) appears evident (Figure 9). The highest reading, 480/100ml on June 7, correlated with a flow of 60 cfs and 0.56" 48prcp. The next sample was 336/100ml on May 12, with a flow of 63 cfs and a 48prcp of 0.92".

07-T, Laurel Creek at Quinnimont (Figure 10)

Sampling at this site produced no readings above the standard. The highest reading was 122/100ml on 5/11, and occurred during the highest flow of the season (86 cfs). The recorded 48prcp was only 0.05", but there was a localized downpour that day. This site continues to exhibit low levels of fecal coliform bacteria. In 1988 and 1989 the stream was not sampled because of the low levels of bacteria recorded in 1987. There was only one violation recorded in 1990 and none in 1991 and 1992. Although the fecal coliform bacteria levels have been consistently low, sampling will continue in order to closely monitor pH and other parameters.

Conductivity was typically low during the spring, but as the sampling season continued into summer, an increase in conductivity occurred. Conductivity is basically a reflection of dissolved solids, metal ions, and organic compounds. If there is a high sewage and mine drainage volume year around, there will be higher conductivity levels in the summer. The conductivity levels are often lower in spring, due to dilution from spring precipitation.

08-M, New River at Prince (Figure 11)

New River at Prince had no violations. The highest reading was 127/100ml on 8/30 after a 48prcp of 0.44". The effects of rainfall and stream flow upon bacteria levels is illustrated in Figure 11 and Appendix 4. The remainder of the readings were 63/100ml or below. On 8/17 a low DO reading of 5.40 mg/l was recorded. The remaining data for this midstream site coincide with data collected in previous years.

Occasional high fecal coliform bacteria levels at this site and other sites along the mainstem indicate that human health risks may occur at unpredictable times. Those occurrences cannot always be predicted by existing monitoring efforts.

09-T, Piney Creek at McCreery (Figure 12)

Piney Creek is the largest tributary to New River within the NERI boundary. While some improvements have been made to both Beckley and North Beckley STPs, inflow and infiltration problems from collection systems in the watershed still occur. These hydraulic overflow problems have resulted in past bacteria levels in the thousands and tens of thousands.

For the past three years Piney Creek has shown some improvement. Nonetheless, Piney Creek had 4 counts above the standard, up one from 1992. These were 512/100ml on 7/7, 206/100ml on 7/19, 1200/100ml on 8/3 and 466/100 on 8/17. The next highest readings were 198/100ml on 6/10, and 144/100ml on 10/4. Most violations occurred in July and August, as they had in 1991, when rainfall (if any) was minimal and stream flow was normal. Figure 12 illustrates that Piney Creek has a continual (or at least intermittent) source of sewage entering the watershed which is being diluted more in spring and late fall with increased rainfall and runoff.

The results from this year are comparable to that of 1991 and 1992. Bacteria problems still exist for this watershed even though there are improvements being made to the STP facilities in Beckley and North Beckley. Even though the sampling site is located nearly 10 miles downstream of the Beckley treatment facilities, enough fecal coliform bacteria survive or are introduced to the stream by septic systems to pose a human health risk. Because this site is a public access for middle New River boat and kayak trips, Piney Creek should be closely monitored.

11-T, Dunloup Creek at Stream Gauge Site (Figure 13)

Included in the drainage of Dunloup Creek are the town of Mount Hope and several other small communities. The White Oak Public Service District (PSD) and the town of Mount Hope have STPs that discharge into the creek. Due to storm water runoff, the STPs in Mount Hope and White Oak are often overloaded and frequently discharge partially treated sewage into Dunloup Creek. Leaching from dwellings with and without sewage systems also contributes fecal coliform bacteria to this creek. Figure 13 supports this theory. This site had 8 out of 10 readings above the standard. The two highest were 1200/100ml on 8/25, and 600/100ml on 7/12; the next four were 307/100ml or above; and the last two were above 255/100ml. These figures mirror those in the 1991 and the 1992 reports. Comparing the stage level and precipitation, a general trend of high flow and high fecal coliform bacteria is shown in Figure 13. Except for the concentration on 8/25, the highest readings occurred in the spring and early summer, with elevated counts during increased flow. However, from spring to fall an gradual decrease can be observed.

Conductivity readings were high, with only one reading below 400 umhos. Other readings ranged from 405 to 600 umhos. These readings, and the data provided in reports from the WVDNR, indicate there is a pollution source (i.e. mining activity) in the upper region of the watershed. Any mine drainage that might be entering the creek further up in the watershed was diluted and/or buffered prior to reaching the sampling site downstream. Therefore, the pH readings (7 to 8 range) did not exhibit levels typical of acid mine drainage. On 7/12 a turbidity measurement of 148 NTU (Nephelometric Turbidity Units) was recorded. This reading

occurred after a 48prcp of 0.55" and produced the second highest bacteria level reading. Often there was an offensive odor emanating from this creek. Because of the residences, heavy fishing use, and boater use, there is a continuous need to monitor this creek. In the fall of 1993 the White Oak Public Service District completed improvements to its facility which included installing a grit chamber, modifying the aeration system, and constructing a clarifier, contact tank, and post-aeration system. Improvements have been made at the Mount Hope STP as well. Continued monitoring of this stream should continue to determine if these upgrades result in lower levels of fecal coliform bacteria.

12-M, New River at Thurmond (Figure 14)

This site is located on river right at the town of Thurmond. The one violation of 780/100ml occured on 7/12 with a 48prcp of 0.55". On this date Dunloup Creek had its second highest fecal coliform level of 600/100ml, with a high stream flow of 36 cfs and a turbidity reading of 148 NTU. Since Site 12-M is below the confluence of Dunloup and Thurmond rapids, it is conceivable that during normal low flow on the New River enough lateral mixing of the inflow of Dunloup Creek occurs to impact this site. The higher readings at this site tended to occur in the spring (72/100ml on 5/20, 42/100ml on 6/2, and 54/100ml on 6/16) when New River was at a high flow. The second highest reading of 72/100ml occurred 5/20 with a 48prcp of 1.10" and a flow of 12,850 cfs.

New River at Thurmond displayed seasonal patterns of bacteria contamination that are typical of streams affected by non-point source animal waste and hydraulic overflow from point sources, such as STPs of rural communities. For this reason, continued sampling is recommended at a new site further downstream to include all the effects of point and/or non-point sources of pollution in the town of Thurmond.

13-T, Arbuckle Creek Near The Gauge Site (Figure 15)

Arbuckle Creek exhibited poor water quality during this sampling year resulting in 6 out of 10 readings above the WVWRB standard. The highest reading was on 9/7 of 2190/100ml. The other 5 violations ranged between 240 and 1030/100ml. When compared with 1992 data, these results would indicate that Arbuckle Creek is still being impacted by sewage wastewater. The Arbuckle Creek watershed has two STPs: Oak Hill STP and Arbuckle Public Service District, in Minden. These two facilities suffer from inflow/infiltration problems and discharge only partially treated sewage into Arbuckle Creek during high precipitation events.

In the past Arbuckle Creek had, on occasion, failed to meet the Al and Fe standards for troutwater and warmwater streams (WVDNR 1989). In this report Al and Fe readings met the state standards. Conductivity readings were 200 umhos in the spring and increased to

over 500 umhos in the summer. This trend has continued every year since 1990 and suggests that mine drainage still persists.

Another water quality problem associated with this site is turbidity. For every sample taken this site exhibited milky to turbid conditions, even during low flows and no precipitation. On two occasions this site exhibited turbid conditions with readings of greater than 100 NTU. These measurements are a direct reflection of the waste load and mine drainage carried by this stream.

14-M, New River at Cunard (Figure 16)

The boat access on the New River at Cunard was added to the list of Water Quality sampling sites in 1992. The highest fecal coliform bacteria count, and only violation at this site, was 330/100ml on 7/1 after a 48prcp of 0.52". This amount of rainfall was the likely reason for the violation at this site. The next highest readings were 152/100ml on 6/18, and 100/100ml on 7/13. The rest of the readings were 81/100ml or below. Thus far, data for this site appears to demonstrate the seasonal trends that are common to other New River sites, as illustrated in figure 16. Since this is the second year that samples have been collected at this site, solid conclusions and comparisons for this site are not possible. This is a very important access point maintained by the NPS for fishing and boating. Therefore, monitoring should continue at this site with the addition of a river gauge to assist the water quality program as well as the boating public.

15-T, Coal Run Near Cunard (Figure 17)

In 1993 Coal Run had 6 violations, compared to 6 violations in 1992 and 1 violation in 1991. The highest reading in 1993 was 4333/100ml on 7/13 with a 48prcp of 0.0". The next two highest readings were 666/100ml on 8/11 (48prcp of 0.54") and 1200/100ml on 9/21 (48prcp of 0.04). No definite relationship can be established between the precipitation and the level of fecal coliform bacteria at this site. However, bacteria levels did seem to increase and decrease in relation to precipitation. Since 1991, an overall decrease in the water quality of Coal Run is visible.

Every sample taken at this site exhibited milky to turbid conditions, even during normal flows and low 48prcp. With the addition of rainfall the NTU measurements went as high as 42, but not less than 5.7 NTU. The high bacteria, conductivity, and turbidity readings indicate that there were continual/intermittent disturbances in this watershed related to the community of Cunard (e.g. mining activity and/or the landfill). Sampling should continue at this site until the scope of these problems becomes clear.

16-T, Keeney Creek at Winona (Figure 18)

Site 16-T is located on creek left about 5 meters below the road bridge. This site exceeded the standard on every sample occasion. The lower readings (3000/100ml - 7860/100ml) occurred in May through June and the levels of bacteria increased greatly as the season progressed. The highest was 36,000/100ml on 8/11. Other readings for this site were 10200/100ml on 7/13, 7500/100ml on 7/27, 2400/100ml on 8/24, 7375/100ml on 9/8. This trend shows a negative correlation between fecal coliform bacteria and stage level/48prcp. The lower bacteria counts were in the spring, whereas the highest counts occurred as rainfall decreased. This phenomenon indicates that high rainfall dilutes the waste load. High levels of bacteria throughout the sample period indicate that a continual source of wastewater is being introduced into the creek, either by failing sewage systems or by straight household discharge. Since much of the creek's watershed is in an isolated forested area, and the sample site is located in the upper reaches of this watershed, it is suspected that the community of Winona is the main contributor.

A serious problem exists with bodily contact for people in and around this creek. For this reason, the monitoring of Keeney Creek should continue.

17-M, New River at Fayette Station (Figure 19)

Site 17-M is located on river left about 70 meters above the mouth of Wolf Creek and Fayette Station rapid. This area is a popular recreation spot due to its easy access, large beach area, and river put-in/take-out facilities. This site exceeded the standard three times in 1993; 300/100ml on 5/19, 274/100ml on 6/1, 403/100ml on 7/1. The discharge of Wolf Creek affects this mainstem site due to an eddy generated by New River. The eddy does not allow the outflow of Wolf Creek to be swept down river. When Wolf Creek was burdened by a heavy waste load, the effect was seen at this site by elevated fecal coliform levels. The data shown in Figure 19, when compared to figure 20, illustrates this eddy effect. The bacteria levels for May through June for both sites were almost identical. Moving the sample site upstream of this eddy was considered however, a large number of recreationists currently use the site, monitoring should continue at its present location to address possible public health risks.

18-T, Wolf Creek at Fayette Station (Figure 20)

The head waters of Wolf Creek begin in Lochgelly near an old mine site, then flow by Fayette Square Shopping Center and cross Rt-19 in several places. The creek then drains a large area around Fayetteville, which has fairly large tracts of pasture land. During heavy rain events two situations can occur: the pasture land contributes fecal coliform bacteria to the stream and, the lift

station on House Branch of Wolf Creek becomes overloaded and releases large amounts of untreated sewage into the creek. During dry to low precipitation conditions the lift station is able to pump sewage over to the STP, which lies in the Marr Branch watershed, where attempts are made to treat the waste water.

During the sampling year, 4 of the 5 violations occurred during May and June, the spring and early summer wet period. The high readings for this period were; 300/100ml on 5/19, 423/100ml on 6/1, 205/100ml on 6/18, 400/100ml on 7/1. The final violation occurred on 8/11 with a reading of 280/100ml. On 8/11 a 48prcp of 0.54" was recorded, it is probable that the lift station on House Branch of Wolf Creek was once again overloaded and discharged untreated sewage directly into Wolf Creek.

A pump at the headwaters of Wolf Creek is supposed to divert acid mine drainage from the creek, but reportedly it has been inoperative since approximately 1980. Since that time iron and manganese have seeped into Wolf Creek and Arbuckle Creek. Because of this the WVDNR, in 1990, temporarily removed Wolf Creek from their trout stocking list. All data indicate that there is mine drainage, but it either contributes little acid or its acid is assimilated by the time it reaches the sampling site near the mouth. Monitoring should continue to determine the effects of this mine drainage on the Wolf Creek watershed.

19-T, Marr Branch below Rivers, Inc., Campground (Figure 21)

Marr Branch lies along the upper part of Route 82, Fayette Station Road. The sample site is located about 1 kilometer downstream of the confluence of Marr Branch and an unnamed tributary near Rivers Inc. campground. Of all the streams sampled in NERI this stream is the most negatively impacted by sewage. The main contributor of this wasteload is the Fayetteville STP, which discharges into the unnamed tributary of Marr Branch. Frequently this STP is overwhelmed by a flow estimated to be as much as three times the amount of inflow that the facility was designed to accommodate (WVDNR 1987-88).

Spring runoff helps dilute the wastewater and the amount of inflow helps to dilute the sewage passing through the STP, causing a pattern reversal of the usual (natural) trends in most other NERI sites. Fecal coliform bacteria levels were lower in spring and early summer, then increased throughout the summer. Marr Branch exceeded the standard all 9 of the sample dates; the lowest level was 360/100ml on 5/19, and reached as high as 65,500/100ml on 7/13. Other counts were 60,000/100ml on 7/27, 60,000/100ml on 8/11, 38,000/100ml on 8/24 again 6,000/100ml on 9/8. Fecal coliform bacteria levels are up substantially from the 1992 levels.

In 1993, Marr Branch had 7 out of 9 DO readings in violation of the WVWRB standard (not less than 5.0 mg/l). Summer sampling dates

exhibited DO levels of 4.8 mg/l and as low as 0.70 mg/l (Appendix 5). These low readings could be due to high water temperatures, low cfs, and large amounts of organic material resulting in the depletion of DO.

Due to the location of Rivers Inc. campground, and the easy access to Marr Branch, a serious problem exists with bodily contact for people in and around this creek. For this reason, the monitoring of Marr Branch should continue.

2. BLUESTONE NATIONAL SCENIC RIVER

Water quality data was collected and examined on the following sites within the Bluestone National Scenic River: 3 sites on the Bluestone River, one site on the Little Bluestone River, and one site on Mountain Creek. The graphs for fecal colonies/100ml and 48prcp for each site in 1993 are displayed in Figures 22-26. Appendix 4 includes the data which correspond with Figures 22-26. Appendix 5 presents a summary of the raw data and comments arranged by site and date. Appendix 6 contains the raw data for Al, Fe, Mn, and alkalinity for the sites tested, arranged by site number and date.

Flows of the Bluestone and Little Bluestone Rivers demonstrate the characteristics of unimpounded, free flowing streams. In the spring increased runoff produces high flows, followed by lower levels in late summer and early fall. These flow patterns have been linked with fecal coliform bacteria levels, which are typically elevated during higher flows and diminished during lower flows (NPS 87-88, 90-91).

01-M, Bluestone River near Bluestone State Park (Figure 22)

This site is four-tenths of one mile upstream of the Bluestone State Park boundary. This puts Site 01-M very close to, but not inside, the boundary of BLUE. The site is in a riffle on a bend in the river. At this point the river is only accessible by foot and no dwellings are in view. This section of river is in a nearly pristine gorge with a trail (an old road bed) running along the river. The major activities in this area are hunting, fishing and boating. Most developments that exist in the watershed within BLUE are located 800 to 1000 feet above the river level. It is believed that most of the fecal coliform bacteria found at this site come from the many tributaries of the Bluestone River and upstream in its watershed.

This sample site had no counts above 200/100ml. The highest reading was 97/100ml on 7/6 after a 48prcp of 0.74", the next highest was 94/100ml on 5/14 after a 48prcp of 0.35", the remaining samples were below 70/100ml. Figure 22 shows the relationship between rainfall and fecal coliform counts at this site. As the season progressed, a trend of elevated counts during precipitation

events emerged. Fecal coliform bacteria levels for 1993 have decreased from those in 1992. However, the slight difference in means is probably not significant enough to clearly implicate any one reason for this decrease.

02-T, Little Bluestone River (Figure 23)

The Little Bluestone River is the major tributary in BLUE. It enters the Bluestone River about 8 miles downstream of the southern boundary of BLUE. The Little Bluestone watershed drains from the west through a rural, low density, housing area. In some areas where the stream valley is wide enough, pasture land and clusters of houses can be found. These are two possible sources for the waste load present in this river.

Fecal coliform bacteria levels at this site were all below the standard. The highest reading was 120/100ml on 7/6 with a 48prcp of 0.74". All other readings ranged from 6/100ml to 67/100ml. On the Little Bluestone, several miles upstream of its mouth, the river flood-plain is large enough for a few farms and domestic dwellings. It is probable that runoff during rain events from agricultural sources, as well as from domestic and natural sources, causes the elevated fecal coliform bacteria readings like the one on 7/6.

The conductivity readings were lower on the Little Bluestone than the Bluestone River mainstem sites. Perhaps this was due to the areas of development on the upper reaches of the Bluestone River towards Bluefield. Industrial waste, urban run-off, and organic loading can influence conductivity readings. Little Bluestone River appears not to have the same use demand on it as the Bluestone.

03-M, Bluestone River Near Confluence (Figure 24)

Site 03-M is located about two thirds of the way downstream from the southern boundary of BLUE. The sample was taken from a ledge in a deep pool with slow moving water. The gorge at this site is narrow, about 800' deep, and heavily forested. On top of the gorge there are farms and pastures with moderately sized herds of cattle.

All fecal coliform bacteria counts at this site were below the 200/100ml standard. The highest count was 70/100ml on 5/14, which corresponds with high readings on that date for the other mainstem sites. The next two highest readings were 56/100ml on 7/23 and 41/100ml on 8/19. The rest of the fecal coliform bacteria readings were 28/100ml or below. No real correlation for this site can be drawn between 48prcp and bacteria levels. The highest reading occurred after a 48prcp of 0.35". The next two highest occurred after a 48prcp of 0.00" and 0.30".

04-M, Bluestone River at Pipestem State Park (Figure 25)

Site 04-M is located upstream of the Pipestem Lodge on river left. The sample for this site is taken just below a riffle. At this point the gorge is narrow, deep, and heavily forested. On the west side at the edge of the gorge there are a few scattered farms. These farms are a possible waste source in addition to the natural waste loads that run off the surrounding area.

There have been no violations of the WVWRB standard at this site since 1991. In 1993 the trend continued with a bacteria reading of 94/100ml on 5/14 as the highest. All other readings were 29/100ml or below. The higher flows from up-stream contributed a small but steady source of fecal coliform bacteria. The levels generally remained consistent from one sample date to the next. Figure 25 illustrates a clear relationship between stage levels (cfs), rainfall, and the elevated bacteria counts coinciding with some of the higher counts at other sites on the Bluestone River. The water quality for this site remains good.

05-T, Mountain Creek at Pipestem State Park (Figure 26)

This site is located 2.5 miles southeast of Dunns, within BLUE's boundary. This creek drains a fairly large area with several smaller creeks contributing to its flow. The drainage consists of mostly forest land with some pasture land along ridge tops, benches and bottoms. These pastures support a moderate population of grazing cattle. A few scattered dwellings are located in the watershed as well.

Sampling for this site began in 1992 after it was determined that no past data was available for this site. There were two bacteria readings above 200/100ml in the first year (1992) and none in 1993. In 1993 the highest reading was 43/100ml on 8/19 with a 48prcp of 0.30". Figure 26 indicates that the rainfall curve and the fecal coliform bacteria counts do not coincide. There are many outside influences that can affect smaller streams however, after two years of sampling this site, there is not enough data to make any clear conclusions. Data collection for this site should continue.

3. GAULEY RIVER NATIONAL RECREATION AREA

The flow on the Gauley River inside GARI's boundary is regulated by the Summersville Dam. This regulation allows the water to flow more consistently throughout the year. Due to the dam high spring flows and lower summer flows, typical of a free flowing river, are not exhibited on this stretch of river. In the spring the flow is higher due to excess runoff, but the regulated peak flow is nowhere near a natural peak flow for an unimpounded river. The release of water from Summersville Lake in the fall raises the flow to a much higher than normal level, especially during the Gauley rafting season.

Samples were collected and examined on 5 sites at GARI. Three sites are located on the mainstem of the river, one site is on Peters Creek, and one is on Meadow River. The data indicates that the Gauley River is a poorly buffered river compared to the New River. The differences in the underlying rock formations and chemical constituents which characterize the two rivers are contributing factors. Because of the poor buffering capacity of the underlying rock formations, the Gauley River is more sensitive to acid inputs.

The bacteria levels for each site in 1993 are displayed in Figures 27-31. Appendix 4 includes the data which correspond with Figures 27-31. Appendix 5 presents a summary of the raw data and comments arranged by site and date. Appendix 6 contains the raw data for metals analyses, arranged by site number and date.

01-M, Gauley River at Summersville Dam (Figure 27)

This site is located just below the dam on river right on a flat bedrock ledge used as a boating and fishing access. During the Fall Gauley rafting season this site is an especially turbulent eddy area. As in previous years this site exhibited the best water quality, regarding fecal coliform bacteria, of any site tested. All the colony counts were below 3/100ml.

The water at this site flows out of Summersville Lake. The reservoir, with its large volume, acts as a basin which catches sediments and minimizes the effects of any toxic materials that may be introduced from upstream. The long retention time of the water in the reservoir results in lower bacteria counts due to die-off of the fecal coliform bacteria. Figure 27 illustrates the consistently low levels of fecal coliform bacteria in relation to stream level (very high cfs at times) and precipitation.

02-M, Gauley River at NARR Campsite (Figure 28)

Site 02-M is located on river right approximately one third of the way upstream from the western boundary of GARI and approximately 100 meters above the mouth of Peters Creek. In this area the gorge walls are heavily forested and approximately 600′ in height. There are no permanent dwellings near this area.

Data from this site show an increase in fecal coliform bacteria levels compared to site 01-M. This increase was possibly due to the inflows of the many tributaries (including the Meadow River) entering the Gauley River between these two sites. All readings for site 02-M were below the standard. The highest fecal coliform reading was 161/100ml on 6/14 after a 48prcp of 0.88". For the other 12 sampling dates the readings were 46/100ml or below. All locations sampled for GARI experienced the highest readings of fecal coliform bacteria levels on 6/14, which was the highest precipitation event recorded for the sampling period. The 48 hour

precipitation and stream flow did seem to influence the bacteria levels, but only under extreme conditions. Figure 28 illustrates the correlation between fecal coliform bacteria levels and high 48prcp.

03-T, Peters Creek near mouth (Figure 29)

Peters Creek is the second largest tributary to enter the Gauley River in GARI. It drains a remote rural area characterized by scattered domestic dwellings, strip mining and timbering. Peters Creek is 17.5 miles long and has a very steep gradient of 57 feet per mile. The watershed begins near Summersville in Nicholas County. The only communities of any size are the unincorporated towns of Lockwood, Gilboa, and Zela.

Peters Creek has been greatly affected by mining and timber activity around and within its basin. Timbering has occurred in the recent past, but coal mining is by far the principal industry in the area. On every sample date but one, this site exhibited milky, murky, or turbid conditions even during low flows and low 48prcp conditions. The highest turbidity reading was 19.0 NTU. The rest were below 6.0 NTU, but none were less than 2 NTU. This is an improvement over 1992 data that exhibited turbid conditions on three different occasions, with two readings greater than 100 NTU. These turbidity readings are indicative of exposed soils eroding into the creek. Although the data indicate improvement from that of 1992, it is obvious that water quality on Peters Creek is still being negatively impacted by mining and timbering.

The limited 1993 data available for Al, Fe, and Mn, indicate that the levels of these metals were relatively low (sampling for metals was done only 3 times in 1993--spring, summer, and fall). The higher pH, conductivity and alkalinity at Peters Creek may indicate that material is being added to mine discharges which neutralize acid mine drainage.

The sampling for fecal coliform bacteria on Peters Creek resulted in three readings above the standard. These occurred on 5/17 (260/100ml), 6/14 (298/100ml), and 6/30 (207/100ml). This creek exhibited higher readings in the spring and early summer months when the creek was high due to runoff. In Figure 29, rainfall levels correlate with higher bacteria counts. More collection of data will be necessary to draw any definite conclusions about the bacteria sources at this site.

04-M, Gauley River at South Side Swiss (Figure 30)

This site is located on river right, upstream of the community of Swiss. At this point the gorge widens and the walls are over 800′ in elevation. The gradient for the river lessens significantly and there is a level floodplain on each side of the river. Laurel Creek is just below the sample site.

As in previous years, the data for this site illustrates low fecal coliform bacteria levels. There was only one sample that exceeded the standard, which occurred on 6/14 with a reading of 261/100ml after a 48prcp of 0.88". A correlation between fecal coliform bacteria and rainfall was observed. However with limited data, no definite conclusions can be made regarding this correlation. The data does indicate that this site, as well as the other mainstem sites, are relatively unpolluted by domestic and animal wastes.

05-T, Meadow River above the mouth of Stickley Run (Figure 31)

Meadow River is the largest tributary of the Gauley River within the GARI boundary. The sample site is located off of Rt. 41 just above the mouth of Stickley Run on river right. 1993 was the first year for sampling this site.

The highest fecal coliform bacteria count for Site 05-T was 120/100ml on 6/14 following a rainfall event of 0.88". Data thus far indicate that the Meadow River is slightly buffered making it somewhat more tolerant to acid inputs than the Gauley River. Other data suggest that the Meadow River demonstrates the seasonal trends that are common to free-flowing streams, i.e. higher bacteria levels in spring/fall due to increased precipitation and higher flows. Meadow River is an important scenic river within GARI therefore, monitoring should continue to properly assess water quality.

CONCLUSION

1. NEW RIVER GORGE NATIONAL RIVER

As previously mentioned, only two or three samples were taken per month at each site for determining fecal coliform bacteria levels. The WVWRB standard for reporting violations is no more than 200 counts per 100ml as a geometric mean based on no less than five samples collected per month, and no more than 400 counts per 100ml in greater than 10% of all samples taken during the month. Therefore, any comments made in this report about the New River, its tributaries, sewage treatment plants, and communities have not been established statistically; these statements serve to identify possible problem areas and trends that exist at these sites. Overall, the water quality monitoring program reveals that the water quality, in relation to animal and human waste, as well as other parameters, remained consistent with past data. Previous data have indicated specific tributaries and mainstem sites that were in violation of WVWRB standards. In 1993, some of these sites have improved, while the quality of others has deteriorated.

The 1993 Water Quality Monitoring Program revealed the following tributaries as heavily impacted by overloaded STPs and faulty collection systems: Piney Creek (09-T) has demonstrated a high level of bacteria in the past. This year the creek exceeded the

standard in 4 of 11 samples taken, compared with 3 of 11 in 1992 and 5 of 10 in 1991. Some of the improvement to this stream is credited to modifications made to the Beckley and North Beckley STPs. Dunloup Creek (11-T) exceeded the standard 8 times out of 10. The violations are probably due to sewage leaching from dwellings and high levels of fecal coliform bacteria being added by Mount Hope STP and White Oak PSD. Arbuckle Creek (13-T), which is adversely affected by Oak Hill STP and Arbuckle PSD, exceeded the standard in 6 of 10 samples taken. Marr Branch (19-T), the stream that is most affected by fecal coliform bacteria, exceeded the standard all 9 of the sample dates. This is probably due to the situation where the Fayetteville STP is often overloaded, sometimes by as much as 3 times the volume of the plant capacity (WVDNR 1987-88). Wolf Creek (18-T), had 5 out of 9 samples that were above the standard, primarily due to the overloaded lift station for the Fayetteville STP.

Of these heavily impacted streams, Wolf Creek, Dunloup Creek and Marr Branch present the greatest public health risks. The mouths of both Wolf and Dunloup Creeks are used by recreationists and as access points for the New River. Marr Branch presents a risk as well, since it flows through the middle of the Rivers, Inc. rafting company and campground. The public needs to be made aware of the possible health risks involved with exposure to high fecal coliform bacteria levels. Wolf Creek could be considered a threat to public health depending on the time of year. During the spring, heavy rain events cause the lift station on House Branch to fail which contributes large amounts of untreated wastewater to Wolf Creek. This is reflected at the mouth by high levels of fecal coliform bacteria. From mid to late summer the lift station is able to pump the wastewater over to the Marr Branch watershed, somewhat reducing health risks. Although Arbuckle Creek flows mostly through uninhabited forest, it should not be considered a lesser threat to public health. The Mary Draper Ingles Trail follows along Arbuckle Creek and access to the creek along the trail presents many possibilities of exposure to people using the trail.

Madam Creek (02-T) and Keeney Creek (16-T) do not have STPs in their watersheds, yet these two creeks have some of the highest fecal coliform bacteria levels found in NERI. It is likely that these streams are being adversely affected more by the communities in their respective watersheds than by natural contributions. Madam Creek is affected by poor, failing, and/or absent domestic waste systems along its banks. Keeney Creek is probably affected by the lack of residential sewage treatment in the town of Winona.

Since 1991 Coal Run (15-T) has shown an overall decrease in water quality. The high bacteria, conductivity, and turbidity readings indicate that there are continual/intermittent disturbances in its watershed, likely due to the community of Cunard and/or mining activity.

The remaining tributaries seem to be in fair to good condition, with relatively low fecal coliform bacteria levels. Lick Creek and Laurel Creek had no violations, and Meadow Creek had three. Piney Creek is slowly showing some improvement with only four violations. These creeks seem to be in fair condition.

The interpretation of the data on the New River mainstem indicates that bacteria and physical/chemical measurements collected in 1993 are comparable to those collected in previous years. New River @ Sandstone Falls (03-M) had zero violations; New River @ Sandstone (04-M) had zero; New River @ Prince (08-M) had zero; New River @ Thurmond (12-M) had one violation; New River @ Cunard (14-M) had one violation; New River @ Fayette Station (17-M) had three violations (possibly due to the influence of Wolf Creek). Overall, the data seem to indicate that the water quality of New River within NERI, during the recreation season, is relatively good. Risks to water recreationists from fecal coliform bacteria would occur in the spring during normal to high flows, or after prolonged heavy precipitation events. As stated earlier, fecal coliform bacteria is not always a superior indicator of the presence or absence of pathogens. High bacteria levels do indicate high concentrations of sewage and or animal wastes and the associated disease agents, but low bacteria levels do not necessarily indicate the absence of pathogenic organisms.

Other mainstem locations that could present health risks due to wastewater pollution are near the mouth of some polluted tributaries: New River just below Madam Creek, Piney Creek, Dunloup Creek, Arbuckle Creek, Coal Run, Keeney Creek, Wolf Creek, and Marr Branch. Based on 1993, and past data, all of these tributaries carry relatively high concentrations of fecal coliform bacteria into the New River.

2. BLUESTONE NATIONAL SCENIC RIVER

The flow of the Bluestone River demonstrates the characteristics of an unimpounded, free flowing stream. In the spring it has a high flow due to increased run off, followed by lower levels in late summer and early fall. These flow regimes have been linked to fecal coliform bacteria levels, with typically higher bacteria levels occurring during high spring flows and lower bacteria levels during lower summer/fall flows. A review of the data for the Bluestone River indicates that the biological and physical/chemical measurements collected, mirror those collected in 1992. The Bluestone River at Bluestone State Park (01-M) had zero violations; Bluestone River near the confluence of Little Bluestone River (03-M) had zero violations; Bluestone River at Pipestem State Park (04-M) also had zero violations. In reference to fecal coliform bacteria data, the Bluestone River water quality seems good. Risks to recreationists would be minimal, but may occur in the spring during normal to high flows, or after a substantial precipitation event. There have been many problems reported in the upper reaches

of the Bluestone River watershed near the Virginia border, i.e. fish kills. Although the physical/chemical data presented in this report exhibit levels that are within normal parameters, it does not indicate anything definitive. It is likely that any problems that occur in the upper watershed become diluted by the time they reach the sampling locations in BLUE.

The two tributaries sampled within BLUE seem to be in good condition. Fecal coliform levels for the Little Bluestone River (02-T) and Mountain Creek (05-T) were all below the standard. It is probable that runoff from agricultural sources during rain events, as well as some domestic and natural source additions, caused some of the elevated readings to occur.

3. GAULEY RIVER NATIONAL RECREATION AREA

The overall water quality for the three mainstem sites in GARI are within acceptable limits. Gauley River at Summersville Dam (01-M) had zero violations; Gauley River at NARR Campsite (02-M) also had zero; Gauley River at South Side Swiss (04-M) had one violation. The physical/chemical results in this report are inconclusive. Like most reservoirs, Summersville Lake acts as a basin to catch sediment and decrease the effect of pathogens and any toxins that may be introduced from upstream.

Of the two tributaries sampled, data reveal that Peters Creek (03-T), which had three violations, is being impacted by fecal coliform bacteria and high turbidity readings. A continued influx of domestic waste from dwellings in the upper reaches of the watershed result in consistently elevated bacteria levels. The frequent high turbidity readings indicate that there are soil disturbances in the watershed, possibly related to poor mining and timbering practices. Meadow River (05-T) had zero violations recorded. Keeping in mind that 1993 was the first year of data collection for Meadow River, this stream appears to be in fair condition.

RECOMMENDATIONS

When considering a long-term monitoring program, it is important to determine what is plausible in terms of budget, personnel, equipment, etc. Sampling frequency, in terms of obtaining valid data, is another factor to consider. With the current staff and budget, the NERI Water Quality Monitoring Program produces valid baseline data for fecal coliform bacteria and the presence of metals. The NERI Long-Term Ecological Monitoring System is producing baseline data for aquatic macroinvertebrates and fish on 5 sites along the New River mainstem. Depending upon the above mentioned factors, one recommendation is for implementing biological assessment on selected tributaries mentioned in this report.

Sewage problems associated with some of the tributaries sampled are likely to remain problems, at least until the STPs within the watersheds are upgraded. A monitoring program, like the one outlined in this report, can be used to determine the level of water quality improvement for negatively impacted streams. As for those tributaries being impacted by the absence of sewage collection, i.e. straight pipe discharge, the NPS should work with the West Virginia Department of Environmental Protection and with the local health departments regarding this method of disposal. With the cooperation of state and local agencies, the NPS can be a valuable source of information regarding the water quality of this area. The NPS can accomplish much toward the education of park visitors and local communities on the health risks associated with these waste disposal problems.

Several tributaries to the New, Bluestone, and Gauley Rivers have not been sampled in several years, or not at all. Some of these tributaries were reported by the WVDNR to be of high water quality and therefore not included in the park's water quality monitoring program. Other sites used to be monitored by the NPS but were dropped from the program because of a consistent pattern of good water quality. Because water quality is not constant it would be beneficial to, in the future, reevaluate these tributaries to determine their water quality.

Over the past several years, the monitoring program has revealed that there is much that is unknown about the biological, physical, and chemical attributes of the parks' water resources. More study is needed to gain a better understanding of human influences, seasonal trends, and baseline conditions. The NPS is closing this gap through inventory and research in order to preserve and enhance the natural qualities of our water resources.

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U.S. Geological Survey, Charleston, West Virginia. 1989. Hydraulic Characteristics of the New River in the New River Gorge National River, West Virginia.

TABLE 1.

WATER QUALITY MONITORING SITE LOCATIONS

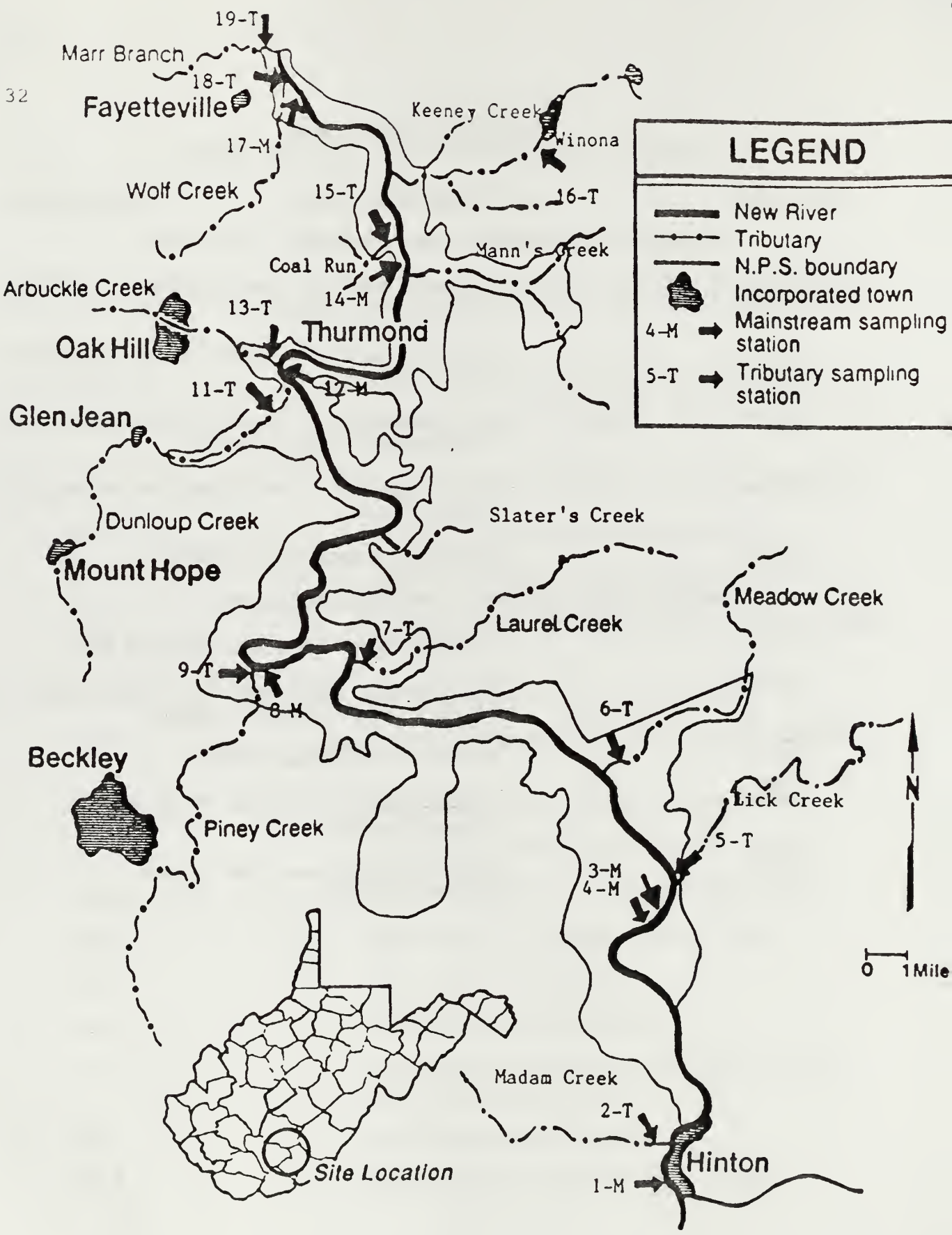
Site Code	Site Location
New River Gorge National River	
01-M	New River (Hinton) at New River Gorge National River Visitor Center (river left)
02-T	Madam Creek near mouth (creek left)
03-M	New River @ Sandstone Falls (river left)
04-M	New River @ Sandstone (camping area)
05-T	Lick Creek (stream gauge site)
06-T	Meadow Creek (stream gauge site)
07-T	Laurel Creek @ Quinnimont (stream gauge site)
08-M	New River @ Prince (bridge)
09-T	Piney Creek @ McCreery (stream gauge site)
11-T	Dunloup Creek (stream gauge site)
12-M	New River @ Thurmond (river right)
13-T	Arbuckle Creek (stream gauge site)
14-M	New River @ Cunard (river left)
15-T	Coal Run near mouth
16-T	Keeney Creek at Winona
17-M	New River @ Fayette Station (river left, swimming area)
18-T	Wolf Creek near mouth
19-T	Marr Branch below Rivers, Inc.

TABLE 1., continued

Site Code	Site Locations
Bluestone National Scenic River	
01-M	Bluestone River above Bluestone State Park (river left)
02-T	Little Bluestone River near the mouth (river right)
03-M	Bluestone River above Little Bluestone Confluence (river left)
04-M	Bluestone River at Pipestem State Park (river left)
05-T	Mountain Creek near mouth
Gauley River National Recreation Area	
01-M	Gauley River at Summersville Dam
02-M	Mid Gauley upstream of the mouth of Peters Creek (river right)
03-T	Peters Creek near mouth
04-M	Gauley River at South Side Swiss (river right)
05-T	Meadow River near New Haven (river right)

New as of 1993

FIGURE 1. SAMPLING AREA FOR THE NEW RIVER GORGE NATIONAL RIVER



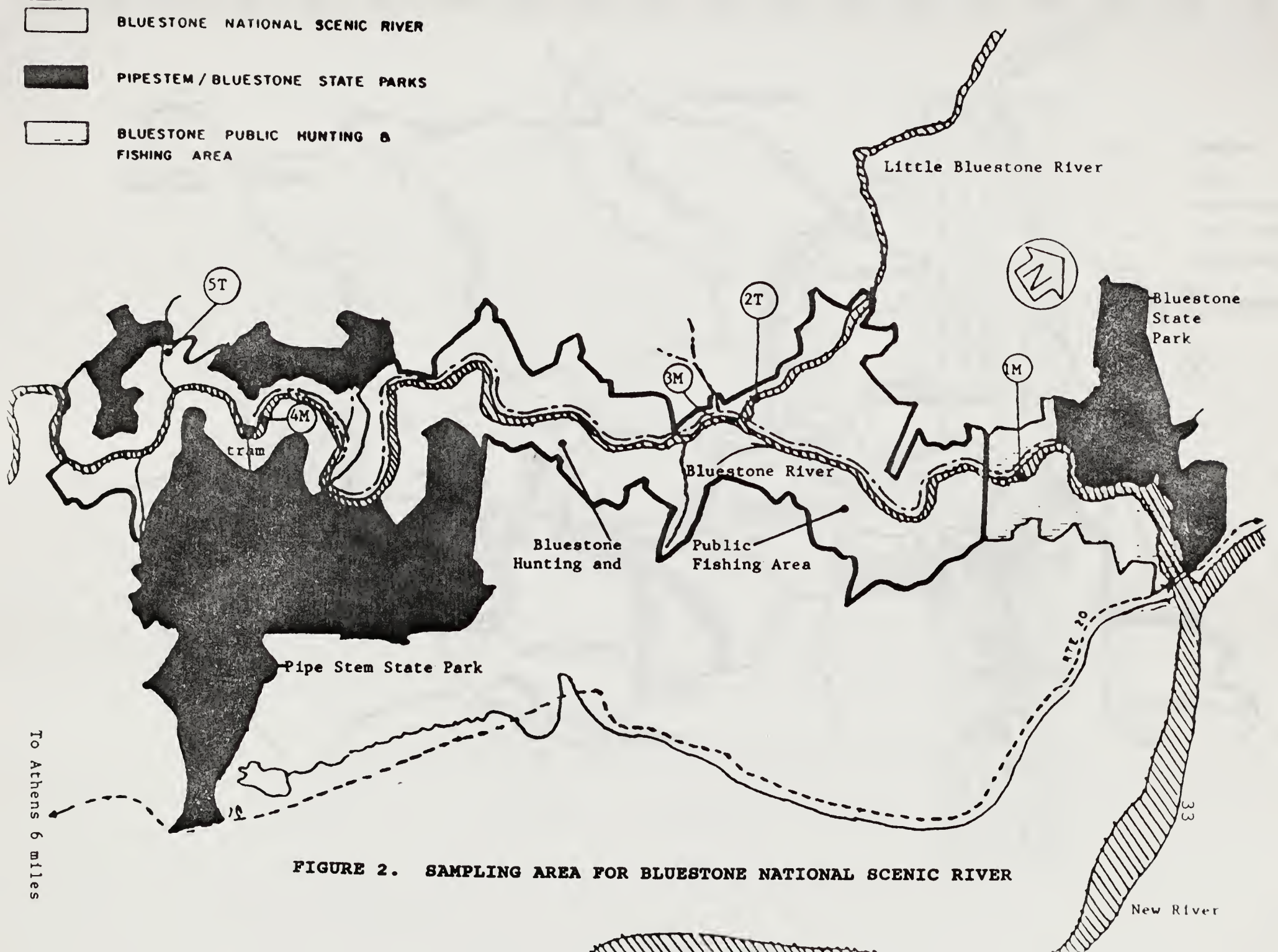
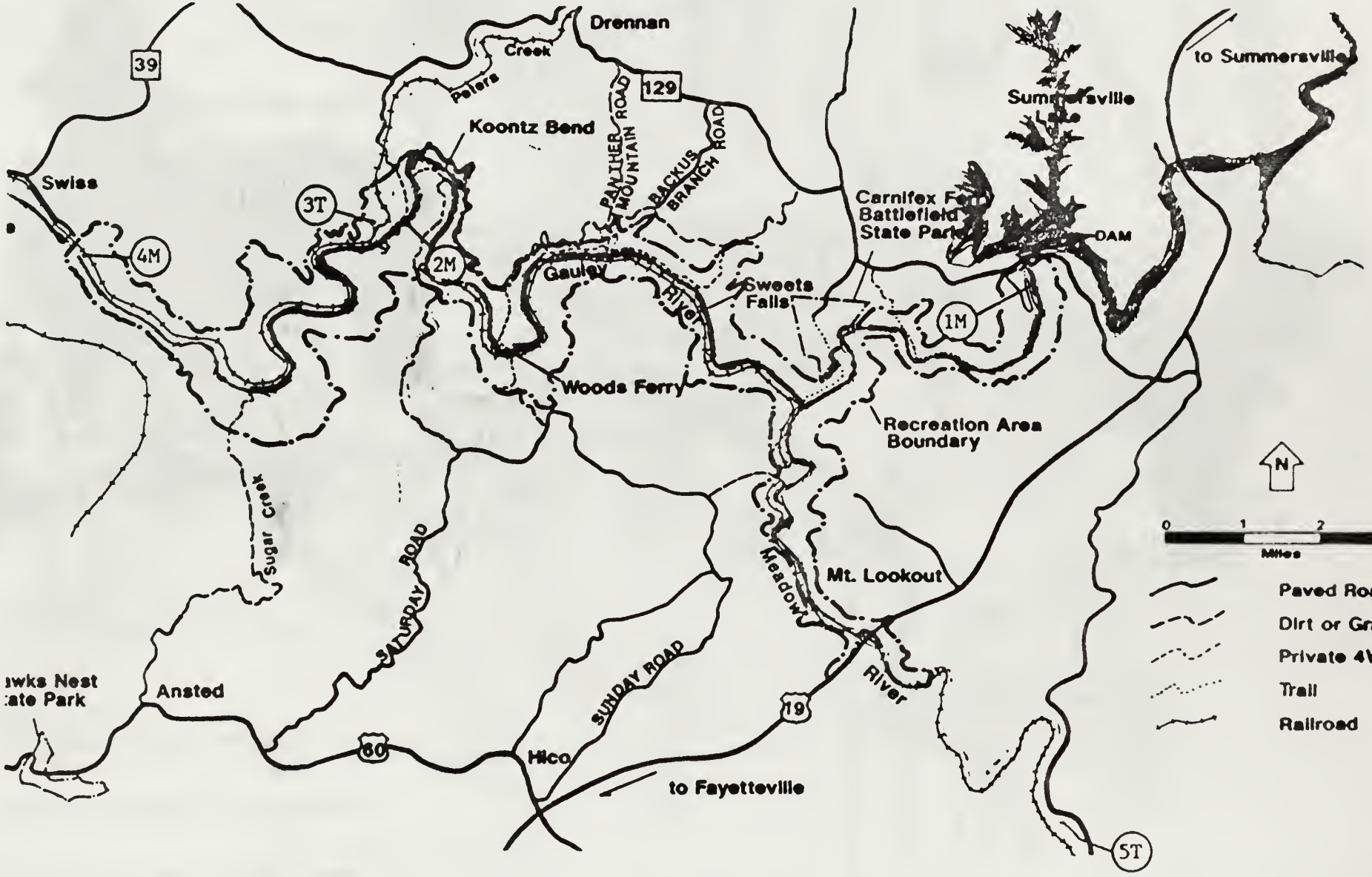


FIGURE 2. SAMPLING AREA FOR BLUESTONE NATIONAL SCENIC RIVER


Drennan
Creek
Peters
39
129
Koontz Bend
PANTHER MOUNTAIN ROAD
BACKUS BRANCH ROAD
to Summersville
Summersville
Lake
Swiss
3T
4M
2M
Gauley
River
Carnifex Ferry
Battlefield
State Park
DAM
Sweets Falls
1M
Woods Ferry
Recreation Area
Boundary
N
0 1 2
Miles
Sugar Creek
SATURDAY ROAD
Meadow
Mt. Lookout
Paved Roa
Dirt or Gra
Private 4W
Trail
Railroad
Hawks Nest
State Park
Ansted
SUNDAY ROAD
River
19
60
Hico
to Fayetteville
5T

EXPLANATION OF FIGURES 4. THROUGH 31.

The following figures represent the fecal coliform bacteria data for the 1993 NERI, BLUE and GARI Water Quality Monitoring Program. It should be noted that each chart should be looked at separately. The vertical "y" axis changes from chart to chart, so the figures cannot be compared directly. Also note that the stream level units are in cubic feet per second. The rainfall is the amount of precipitation in inches, that fell within a 48 hour time period prior to the sampling date.

Figure 4. Fecal Coliform Data for New River at Hinton Visitor Center

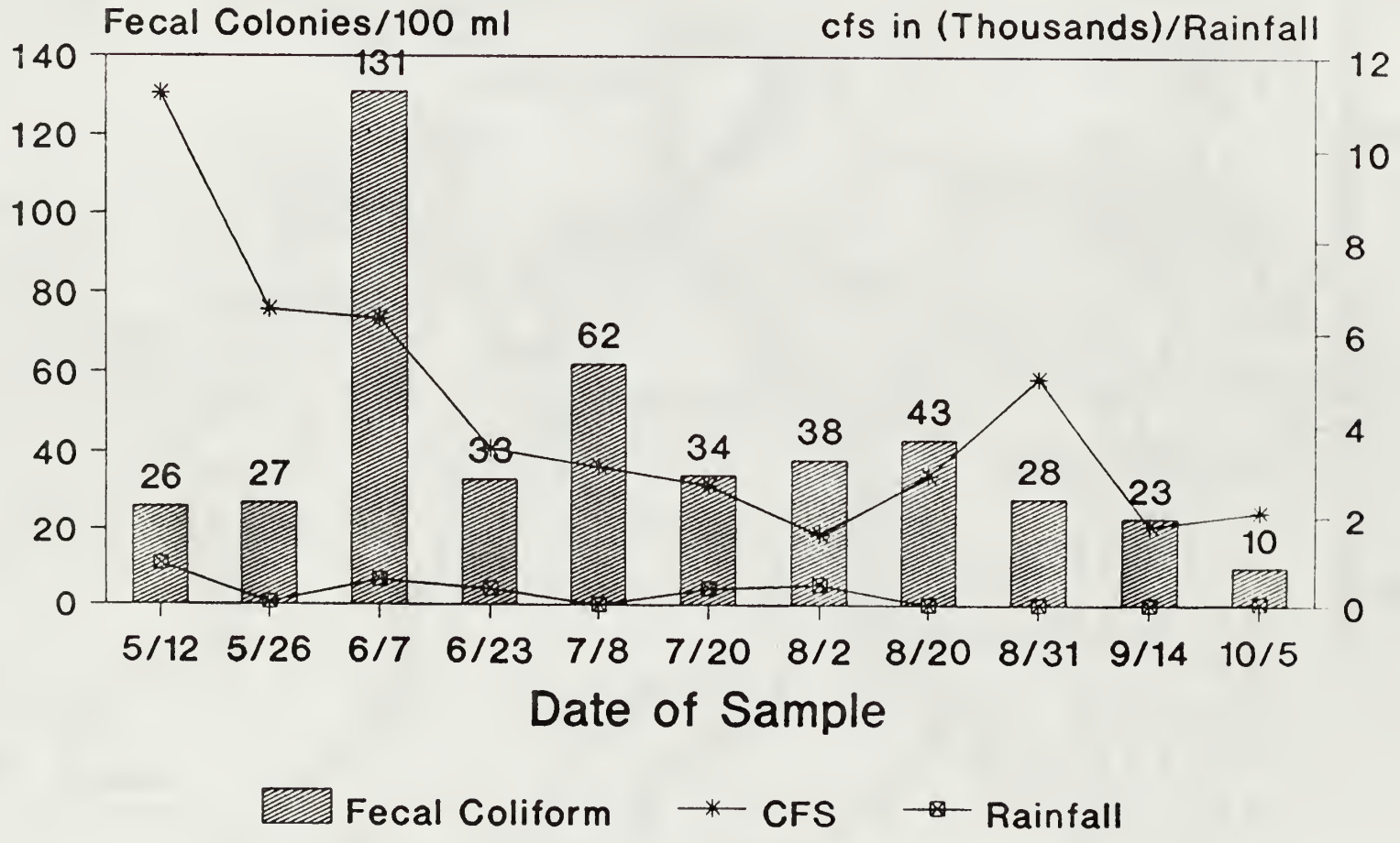


Figure 5. Fecal Coliform Data for Madam Creek

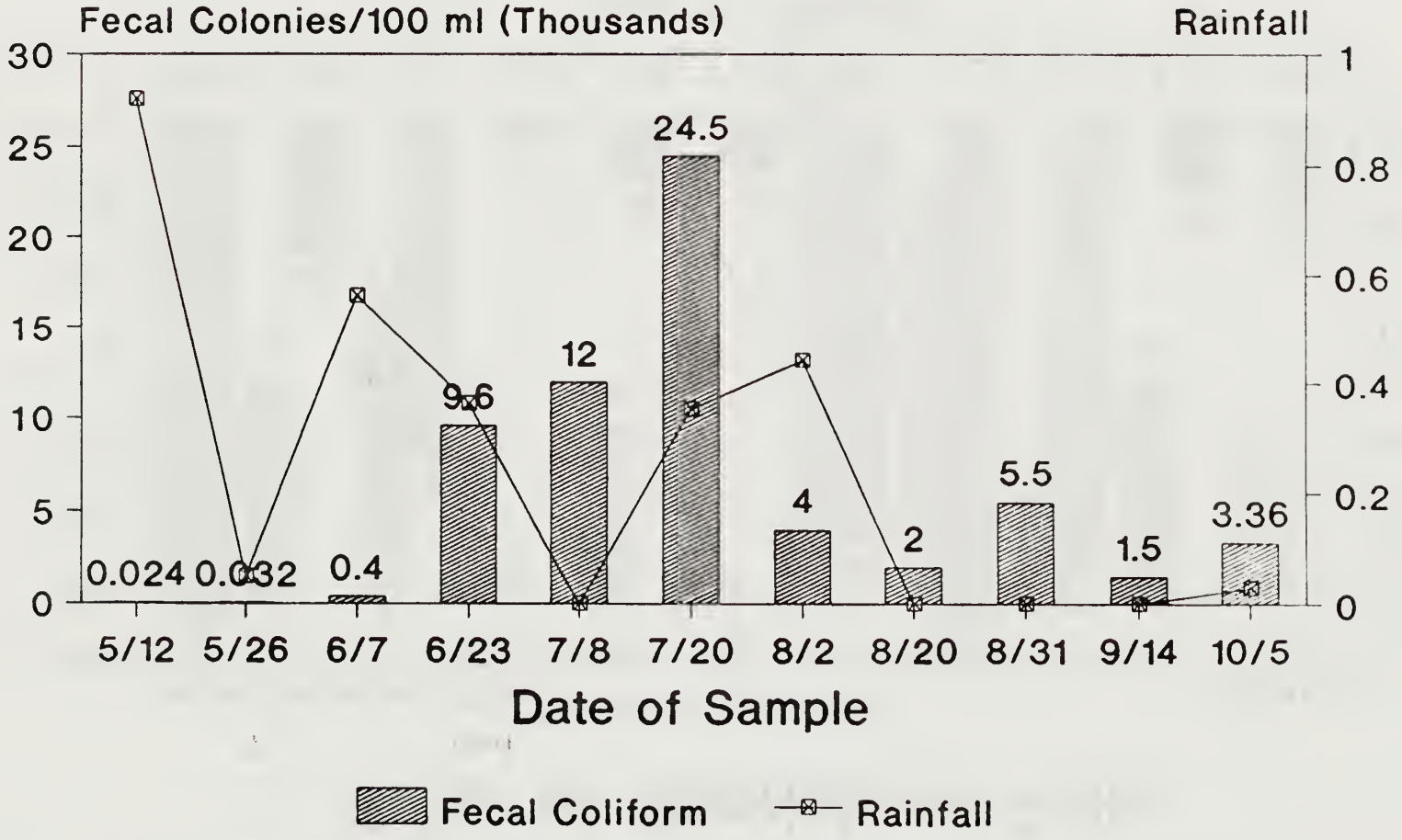


Figure 6. Fecal Coliform Data for New River at Sandstone Falls

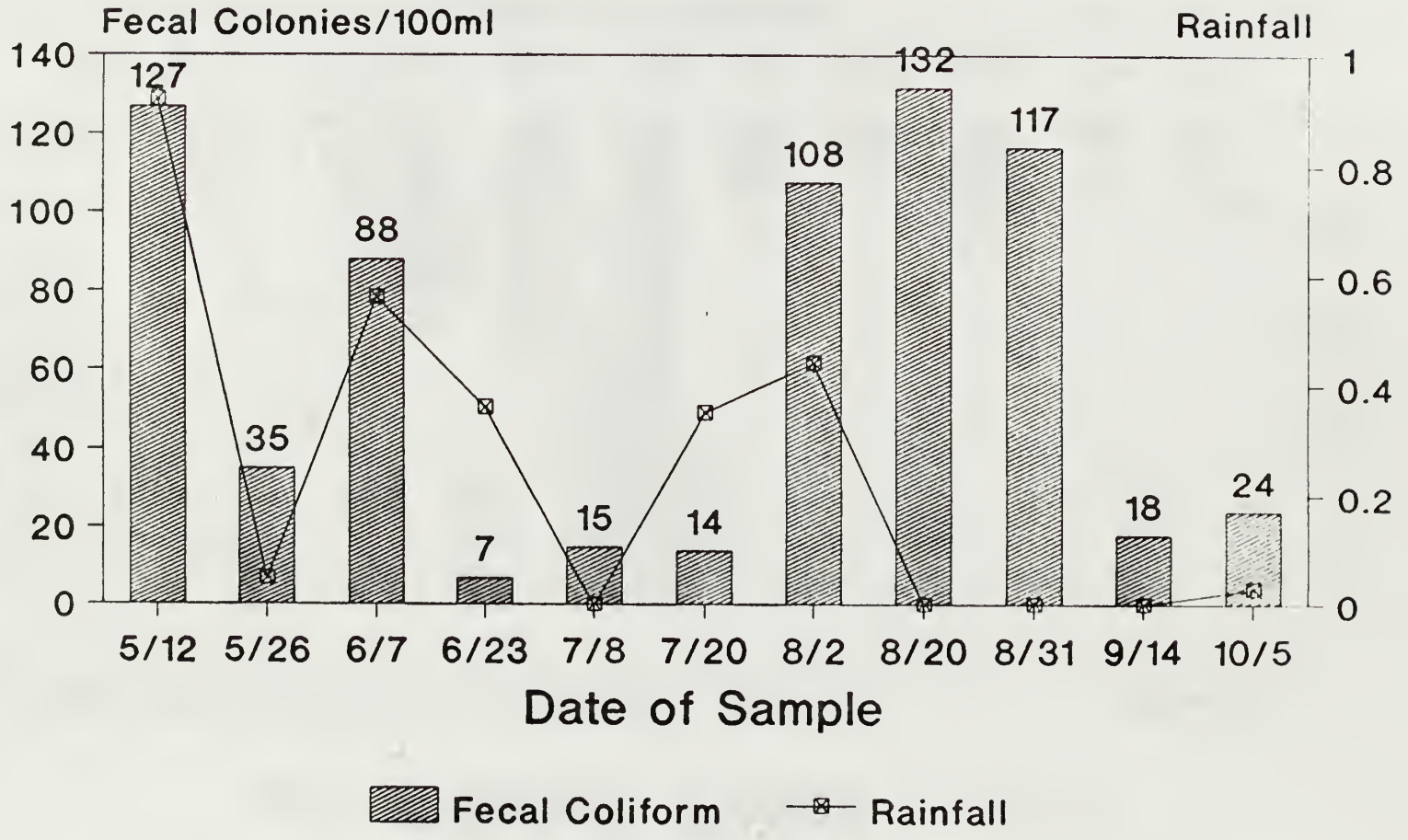
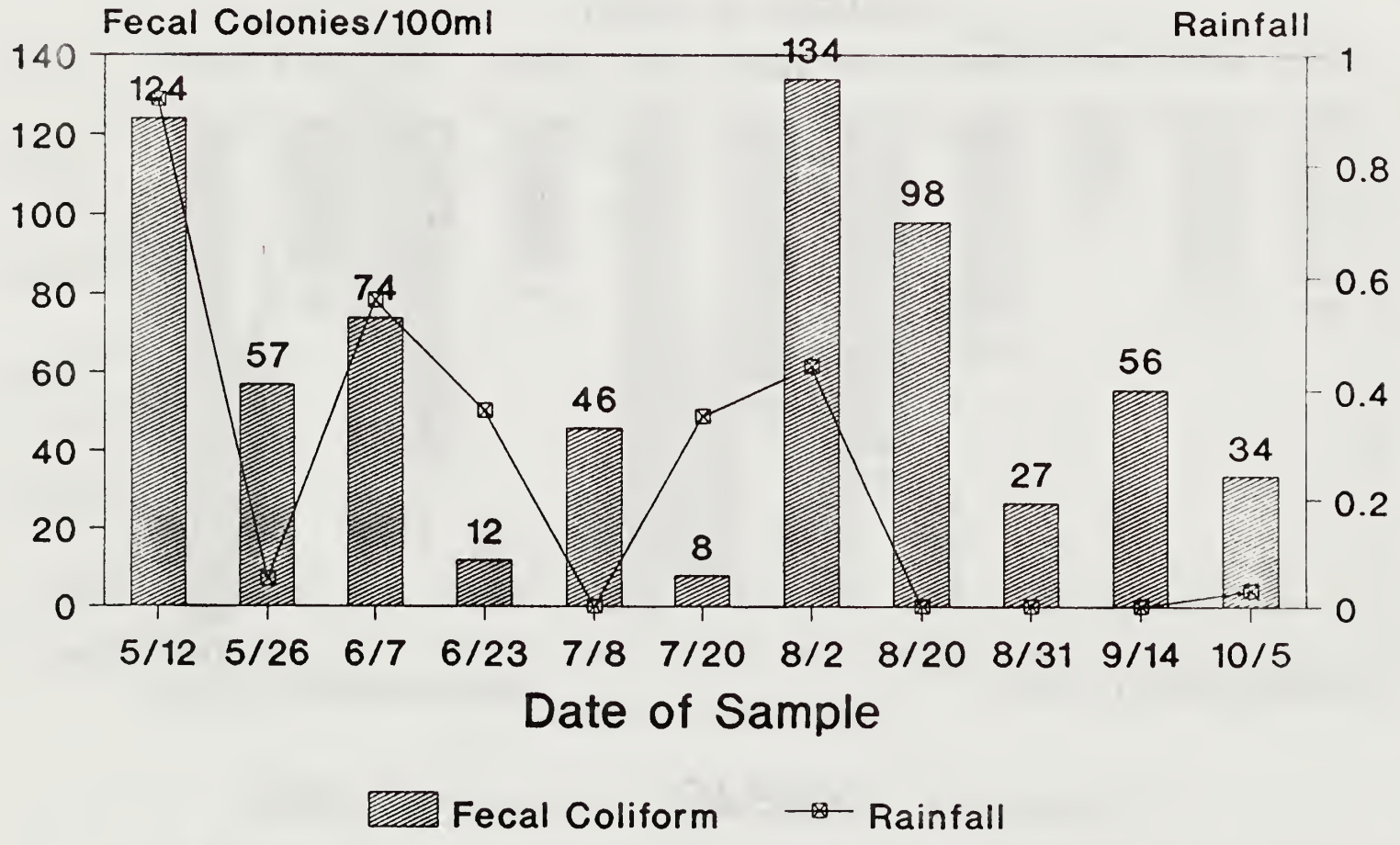


Figure 7. Fecal Coliform Data for New River at Sandstone



camping area

Figure 8. Fecal Coliform Data for Lick Creek

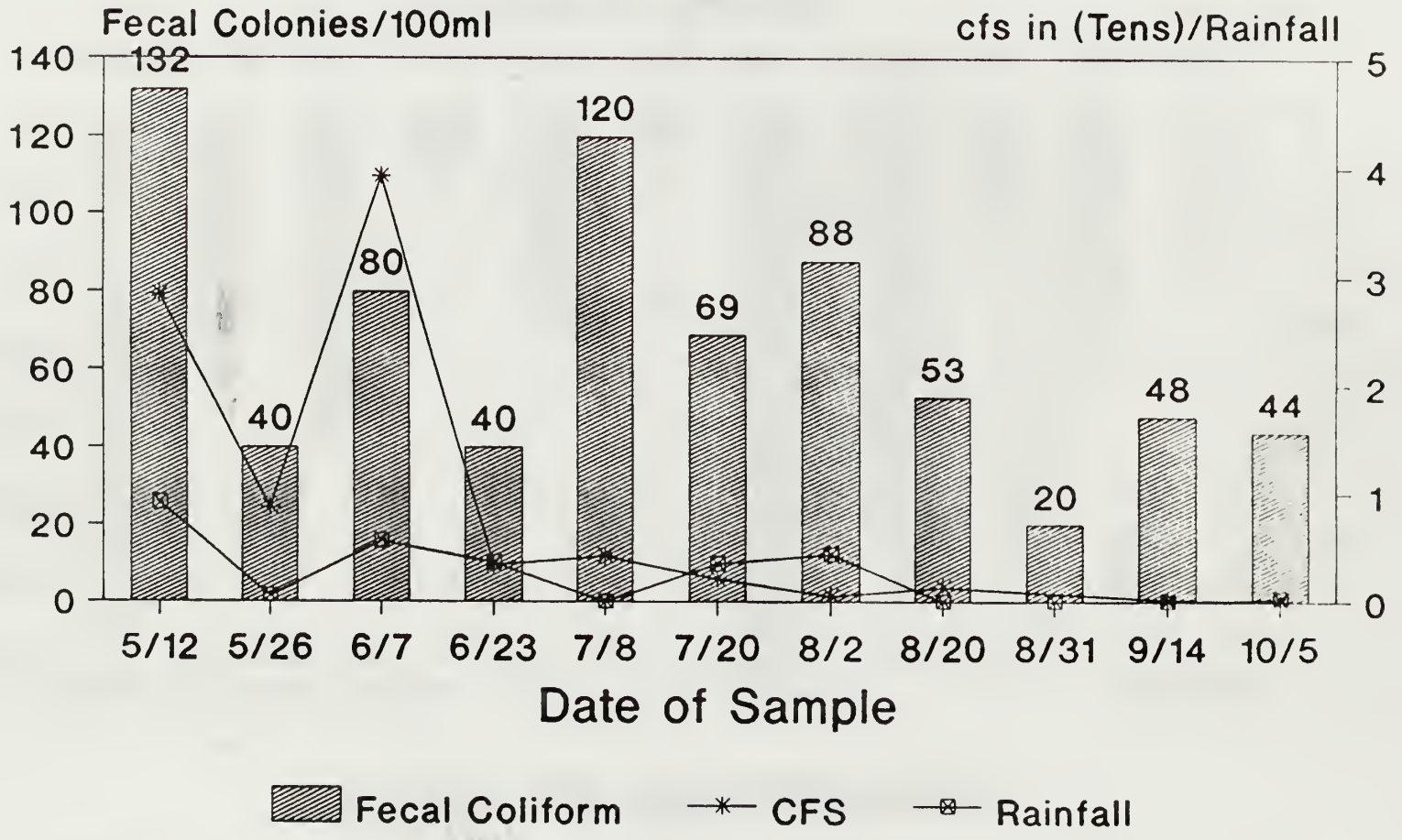


Figure 9. Fecal Coliform Data for Meadow Creek

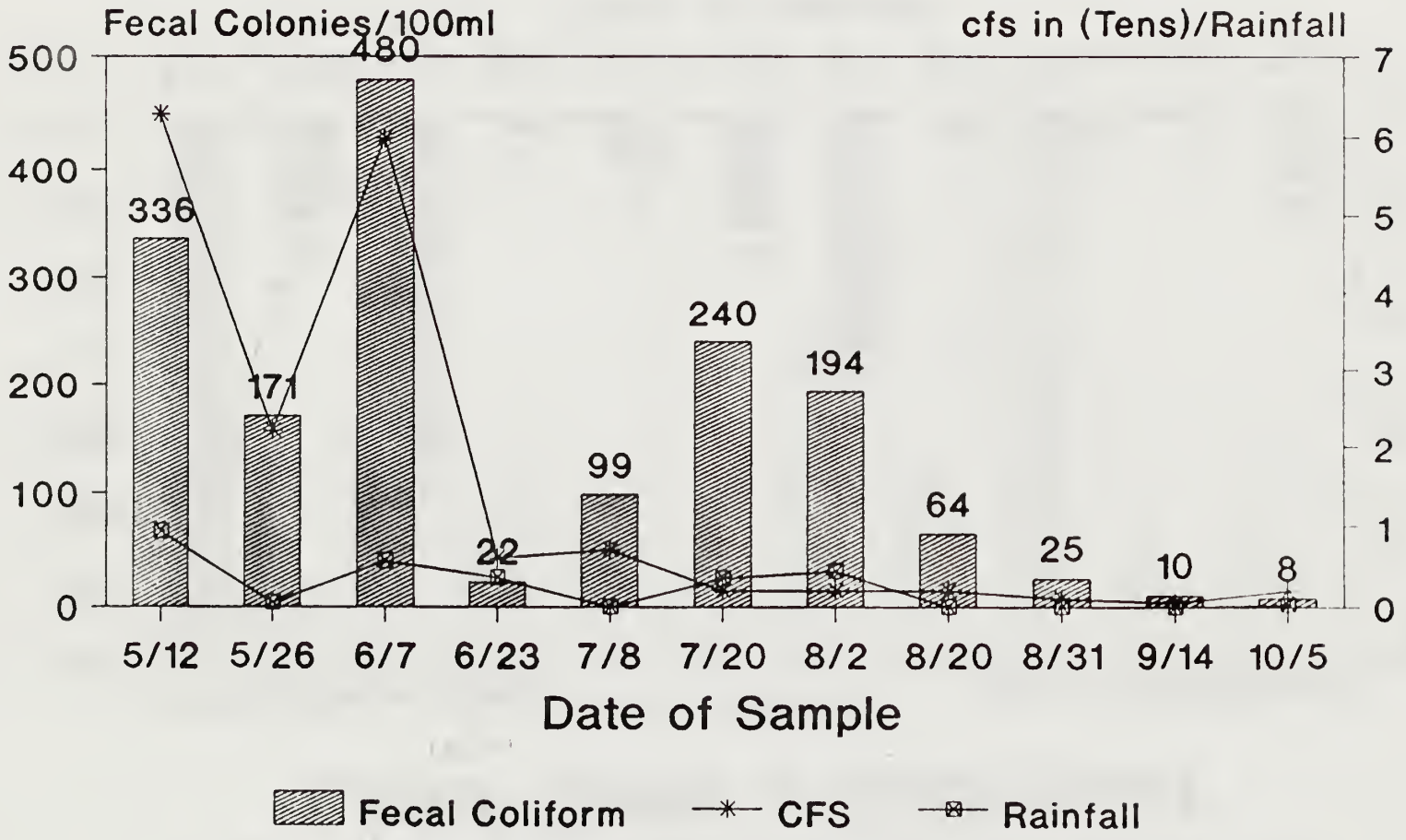


Figure 10. Fecal Coliform Data for Laurel Creek @ Quinnimont

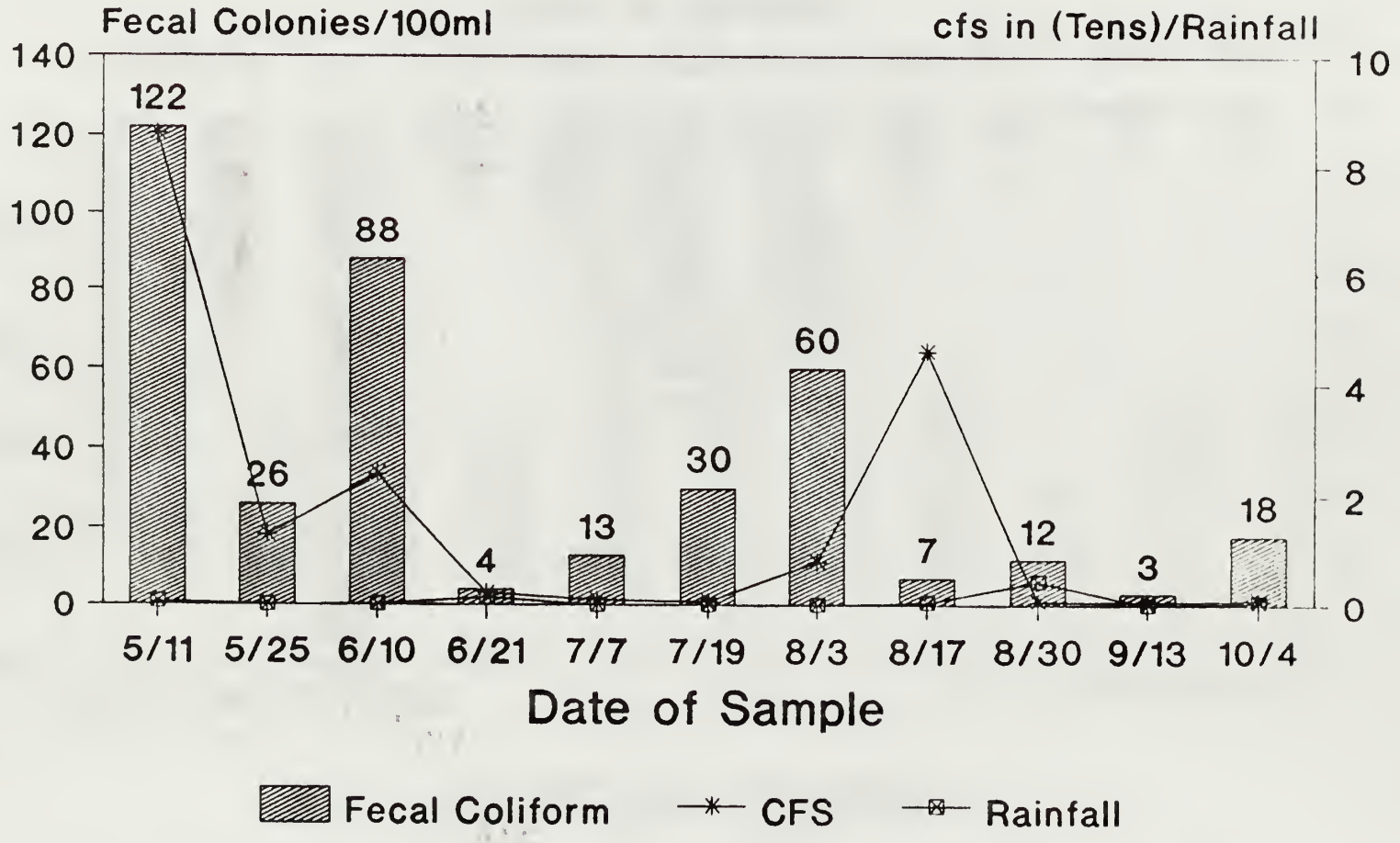


Figure 11. Fecal Coliform Data for New River @ Prince

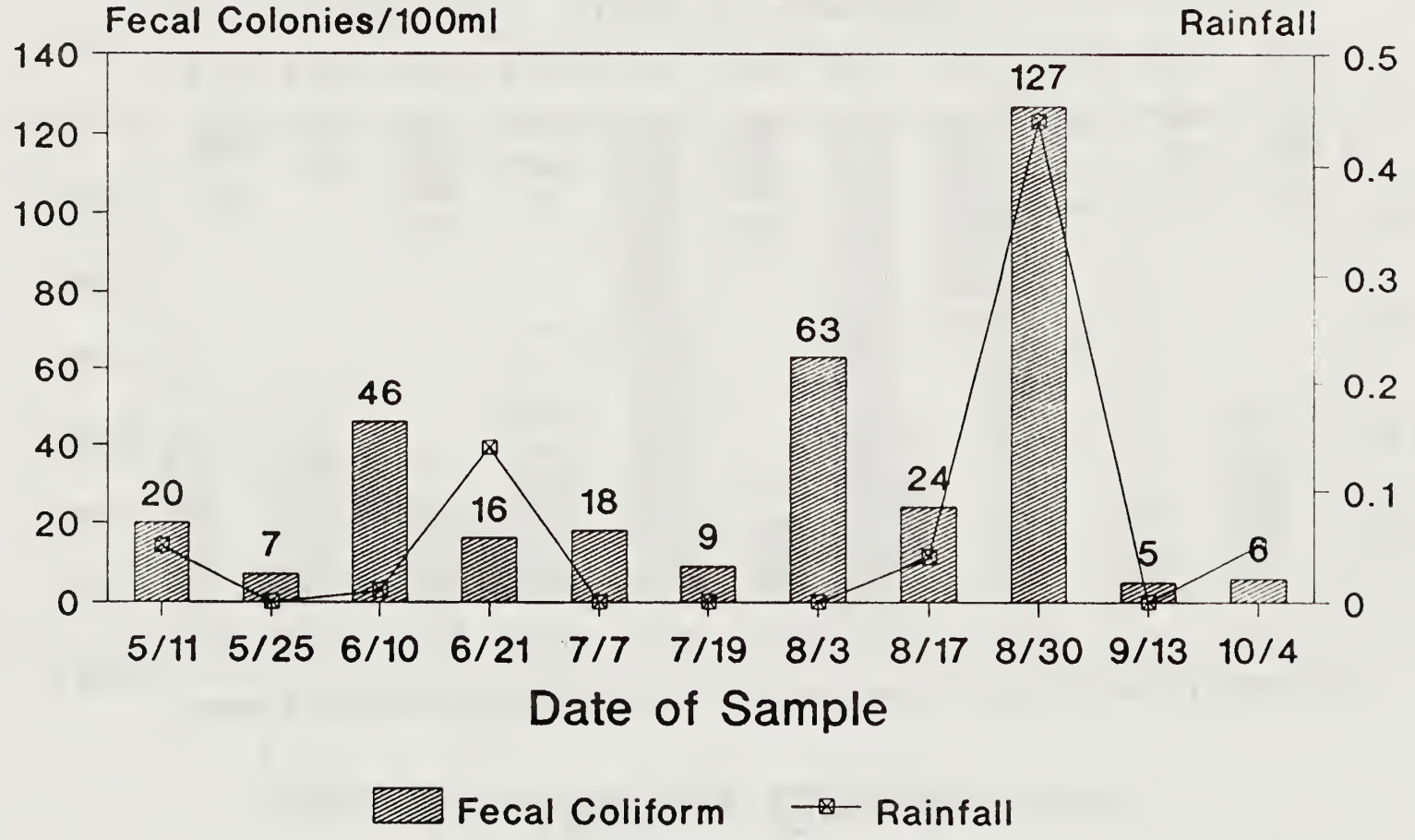


Figure 12. Fecal Coliform Data for Piney Creek

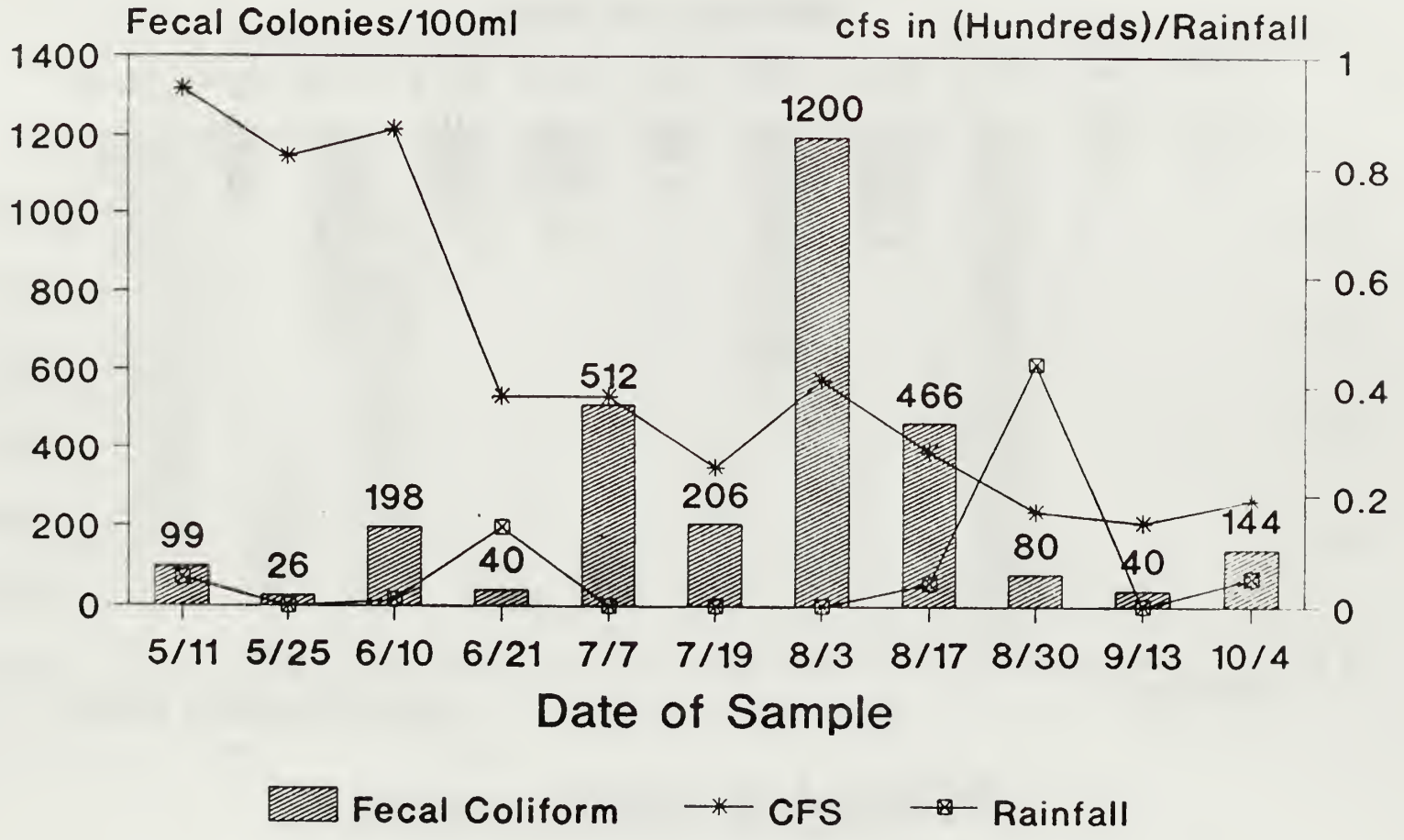


Figure 13. Fecal Coliform Data for Dunloup Creek

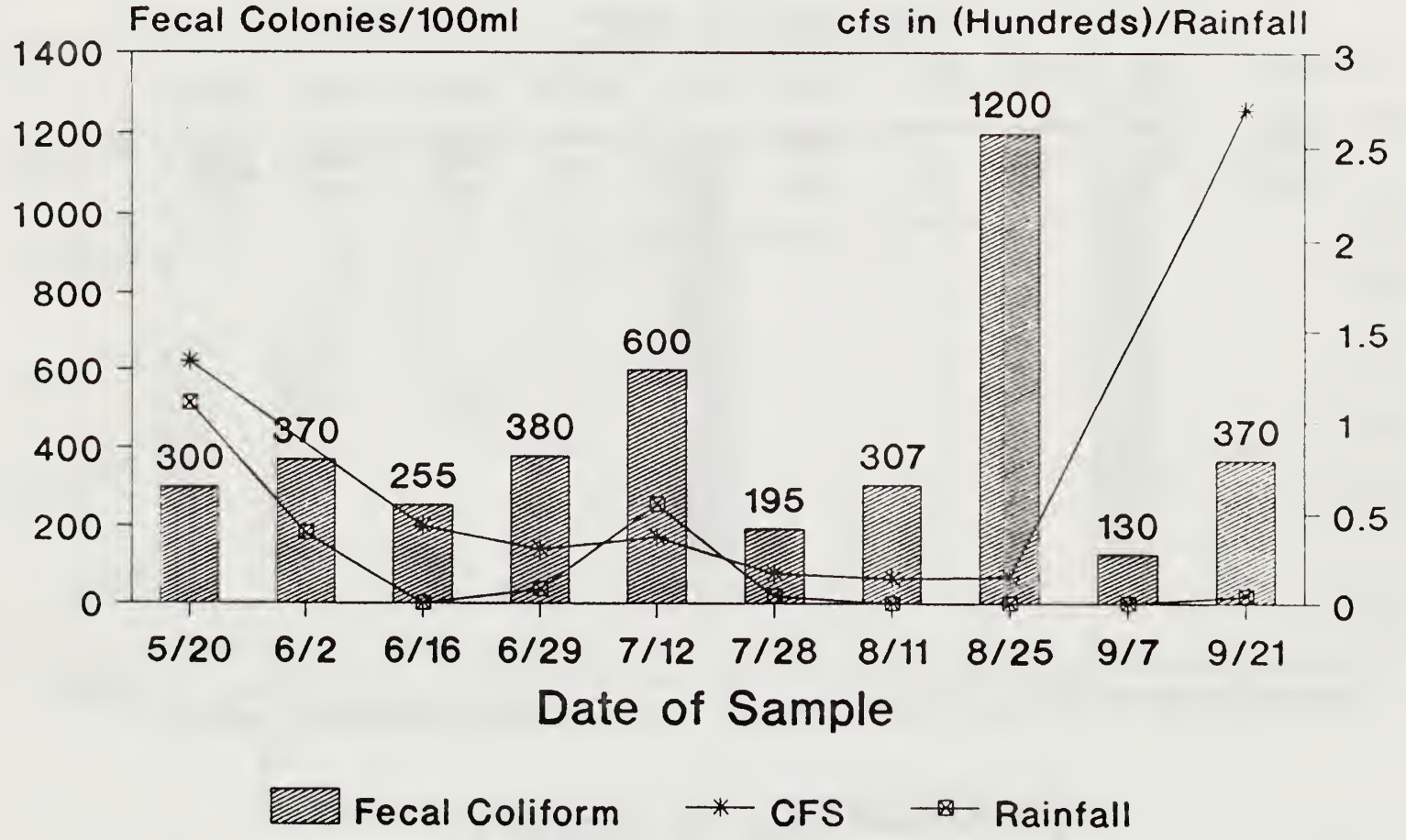


Figure 14. Fecal Coliform Data for New River @ Thurmond

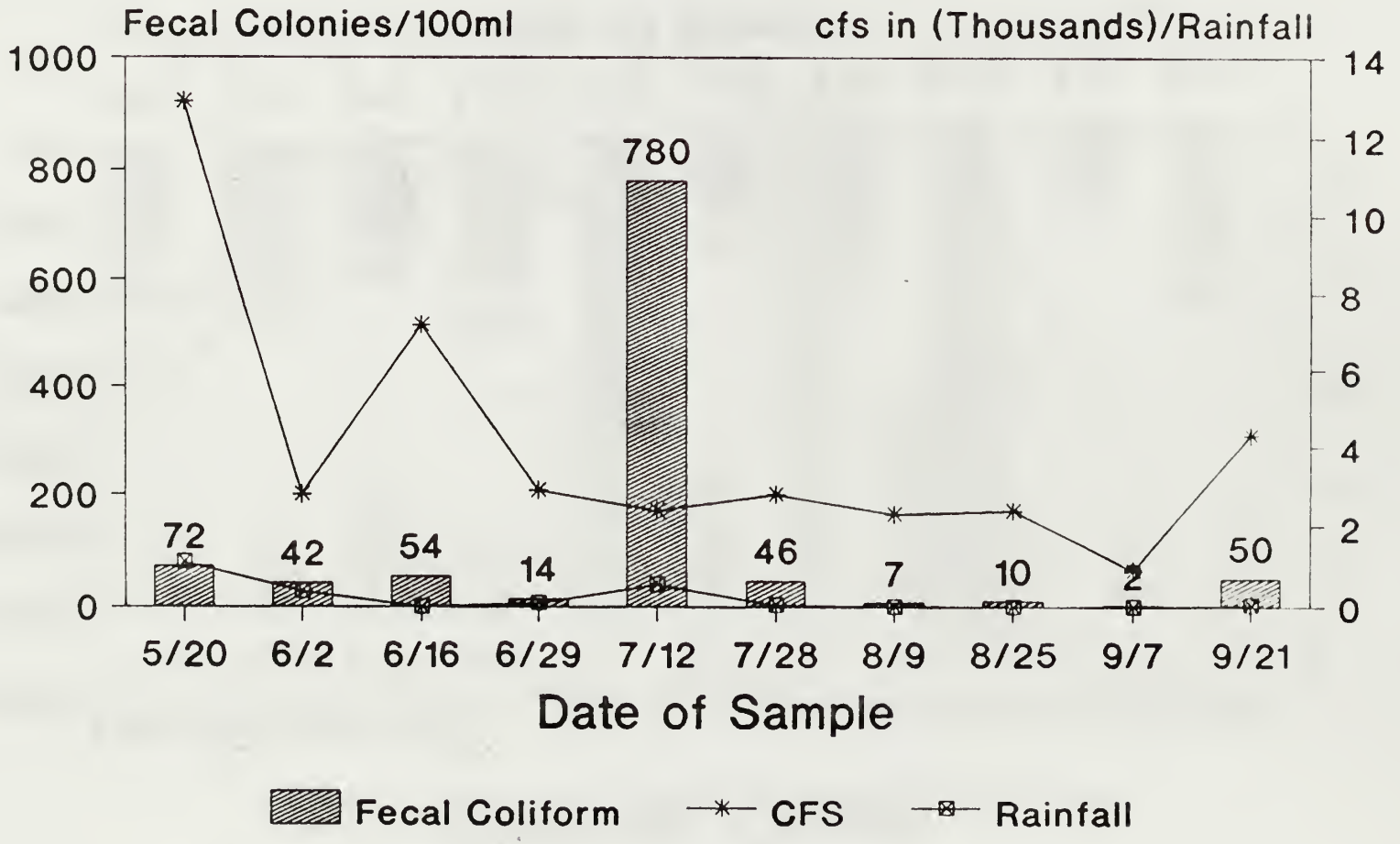


Figure 15. Fecal Coliform Data for Arbuckle Creek

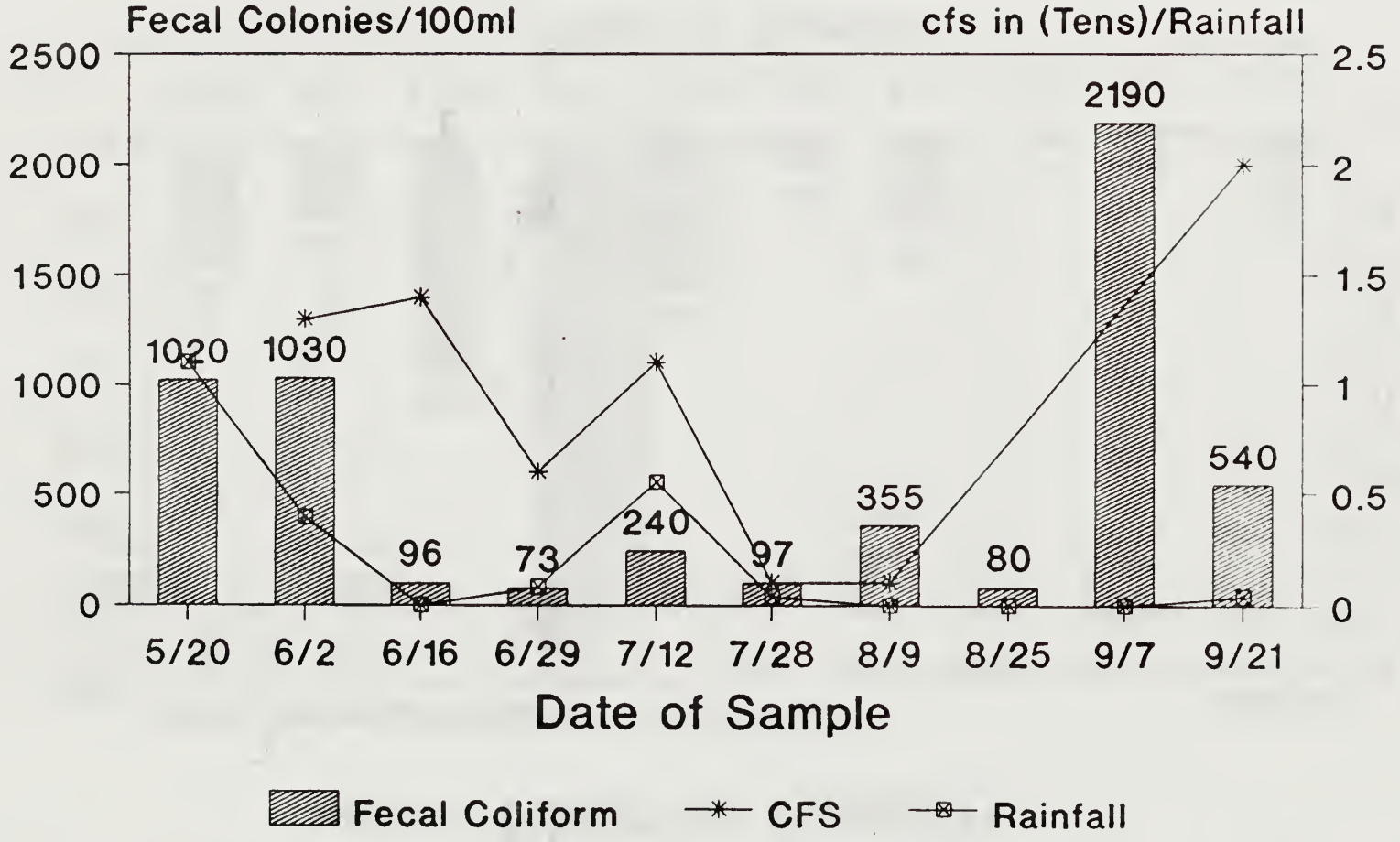


Figure 16. Fecal Coliform Data for New River @ Cunard

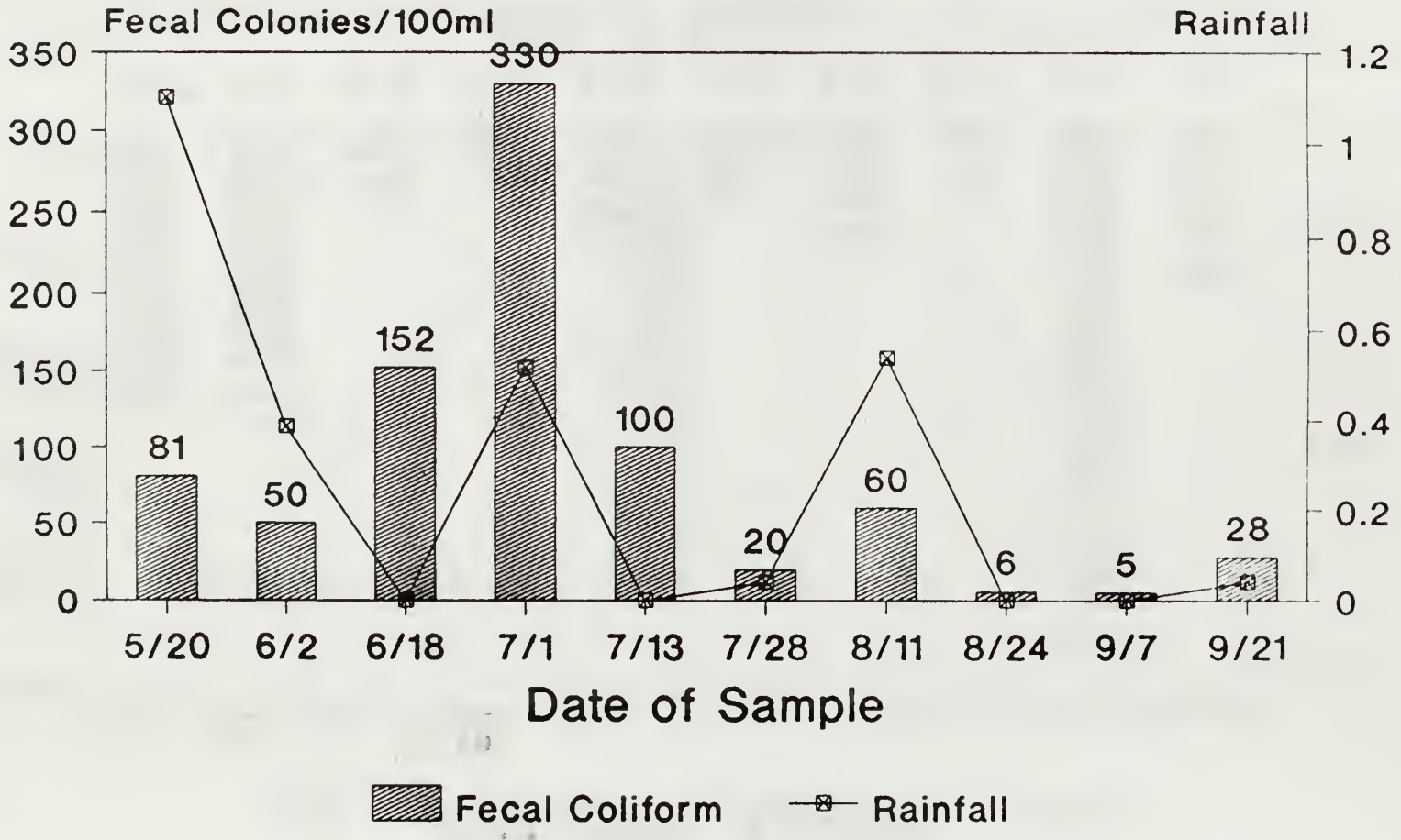
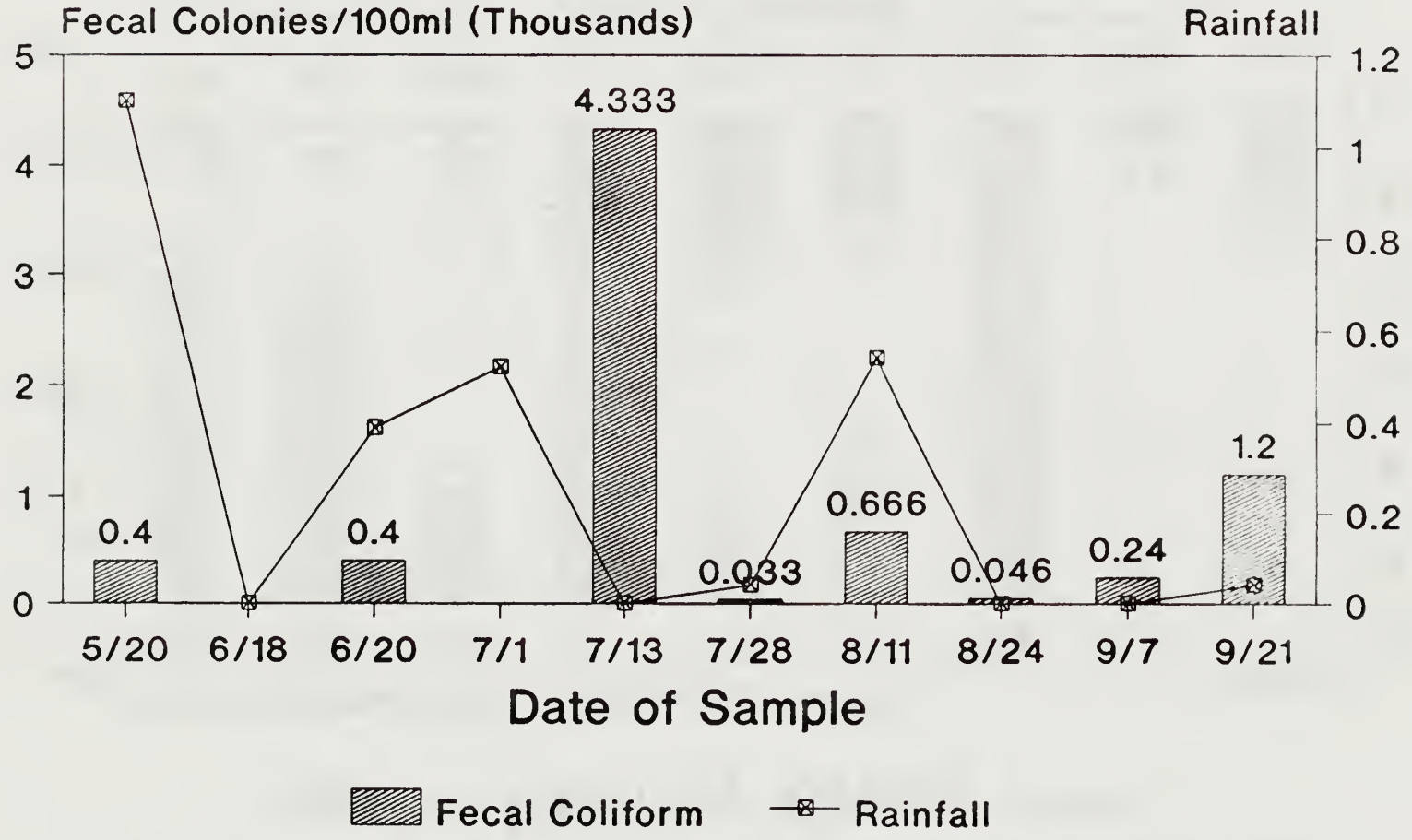


Figure 17. Fecal Coliform Data for Coal Run



absent bacteria data on 6/18 & 7/1

Figure 18. Fecal Coliform Data for Keeney Creek

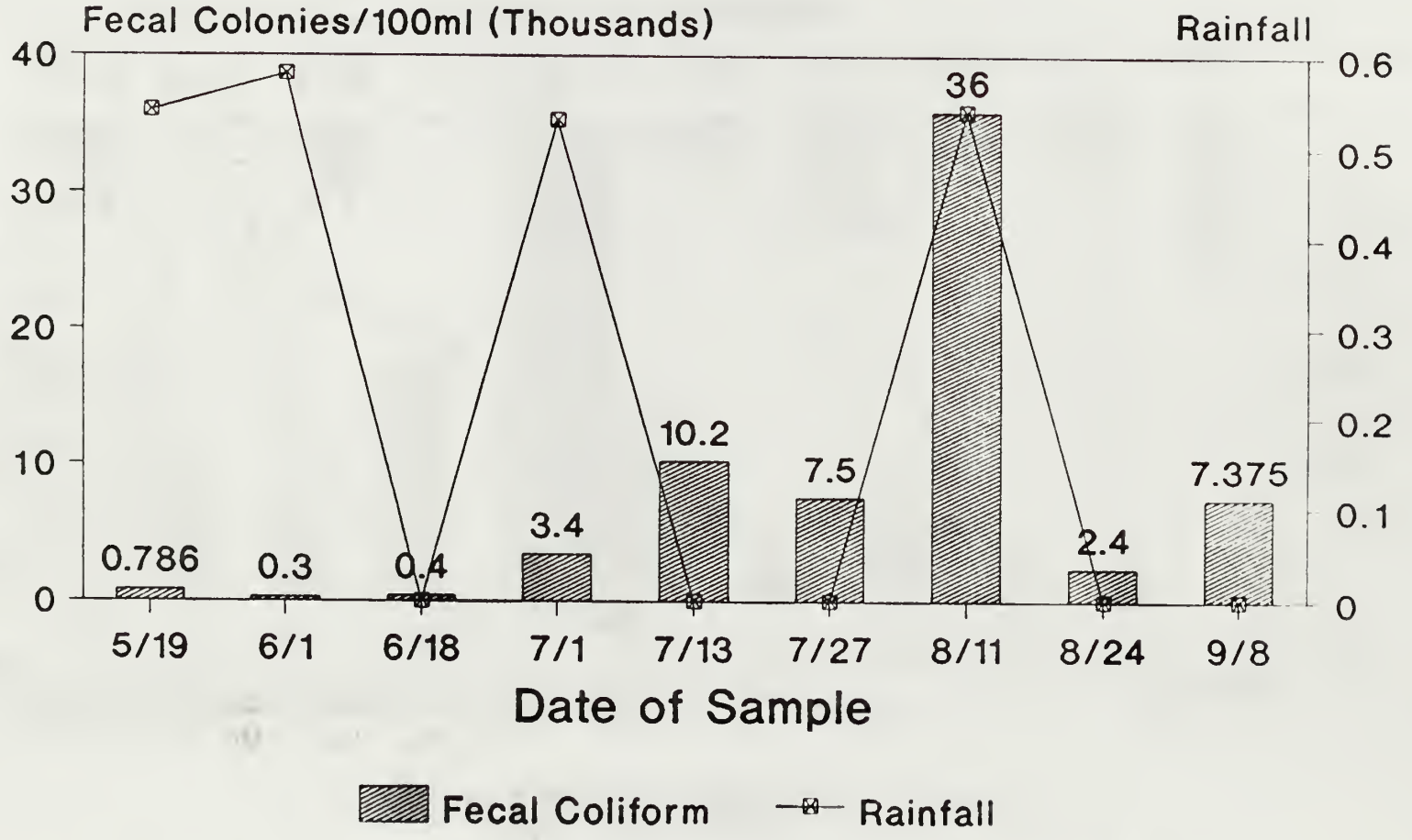


Figure 19. Fecal Coliform Data for New River @ Fayette Station

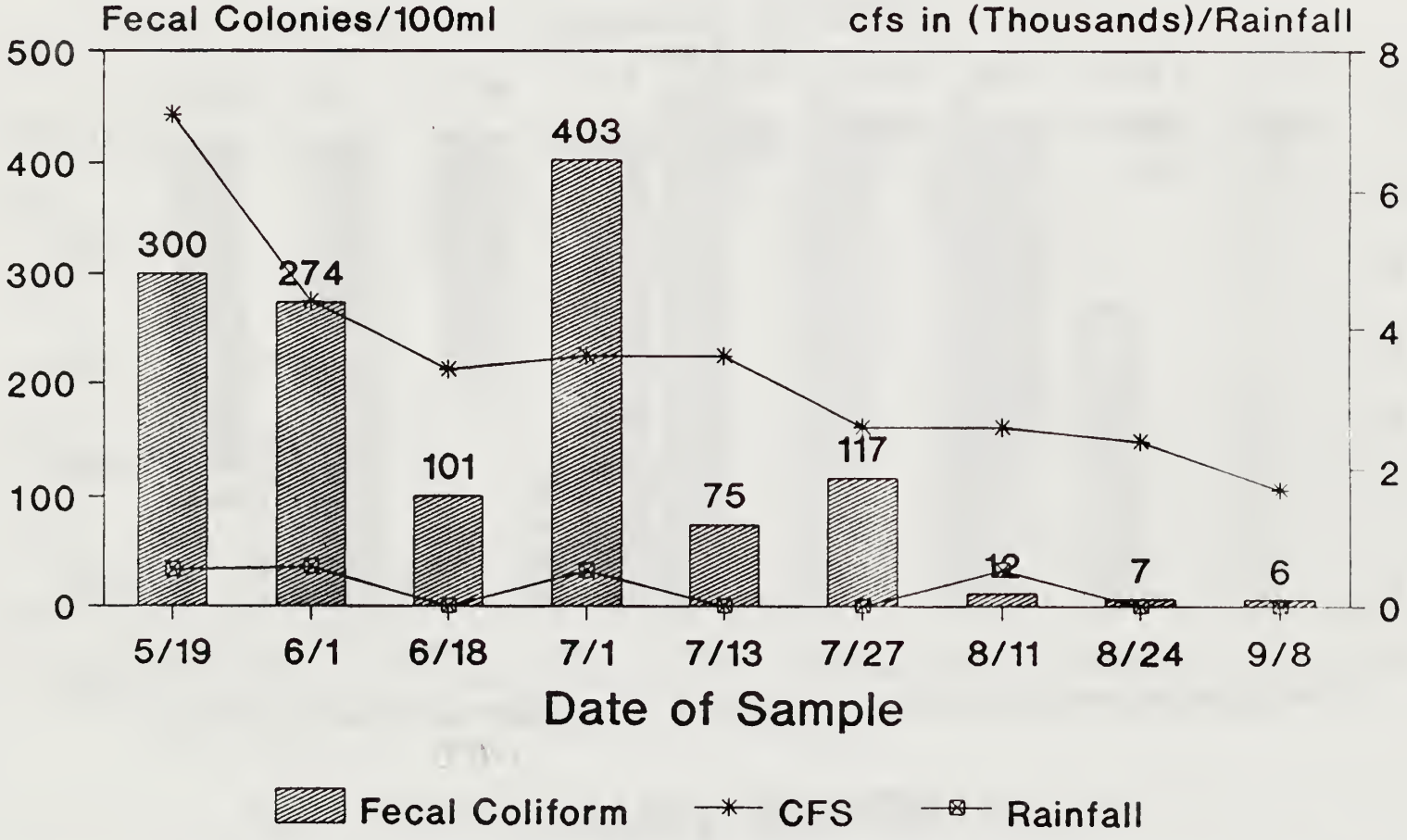


Figure 20. Fecal Coliform Data for Wolf Creek

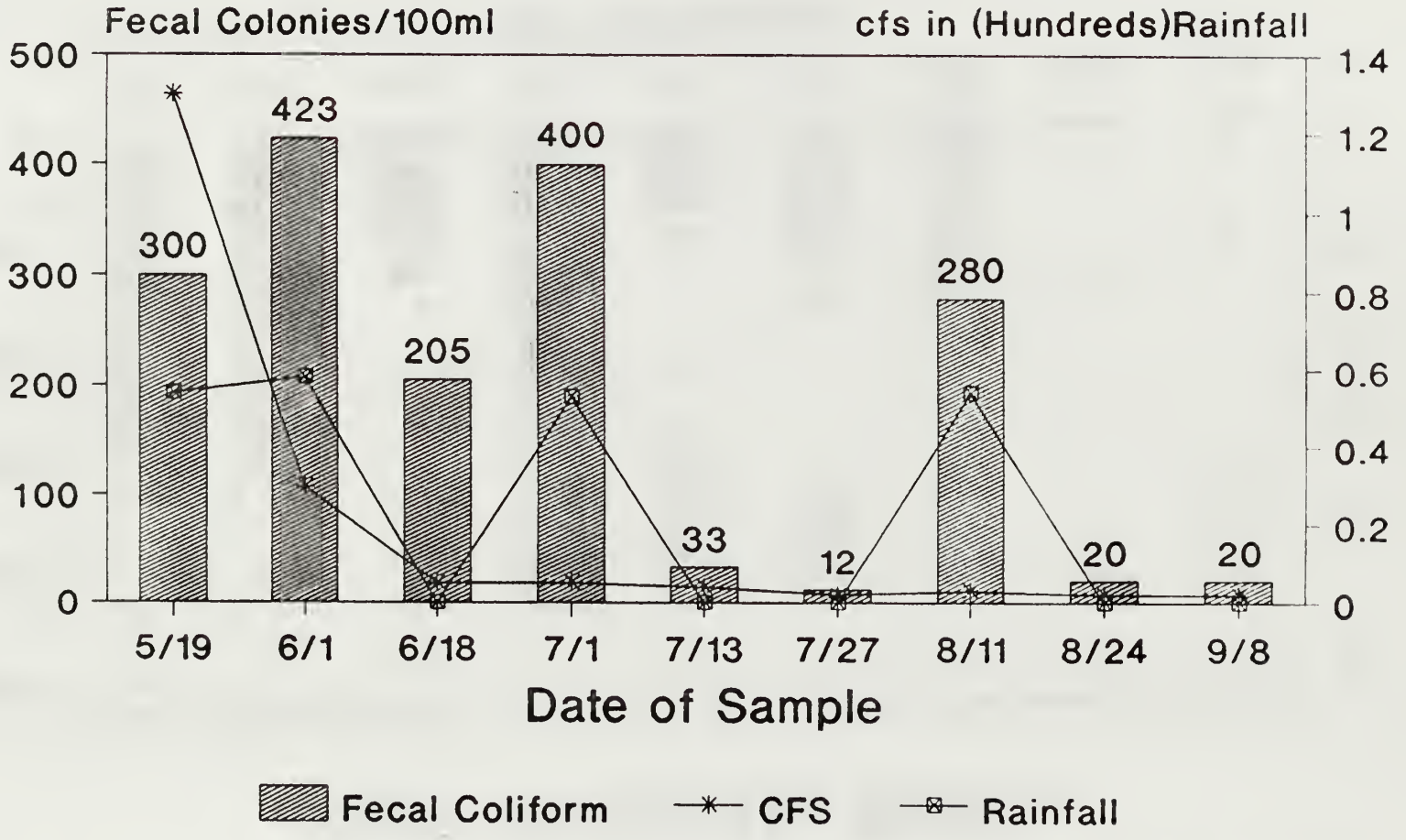


Figure 21. Fecal Coliform Data for Marr Branch

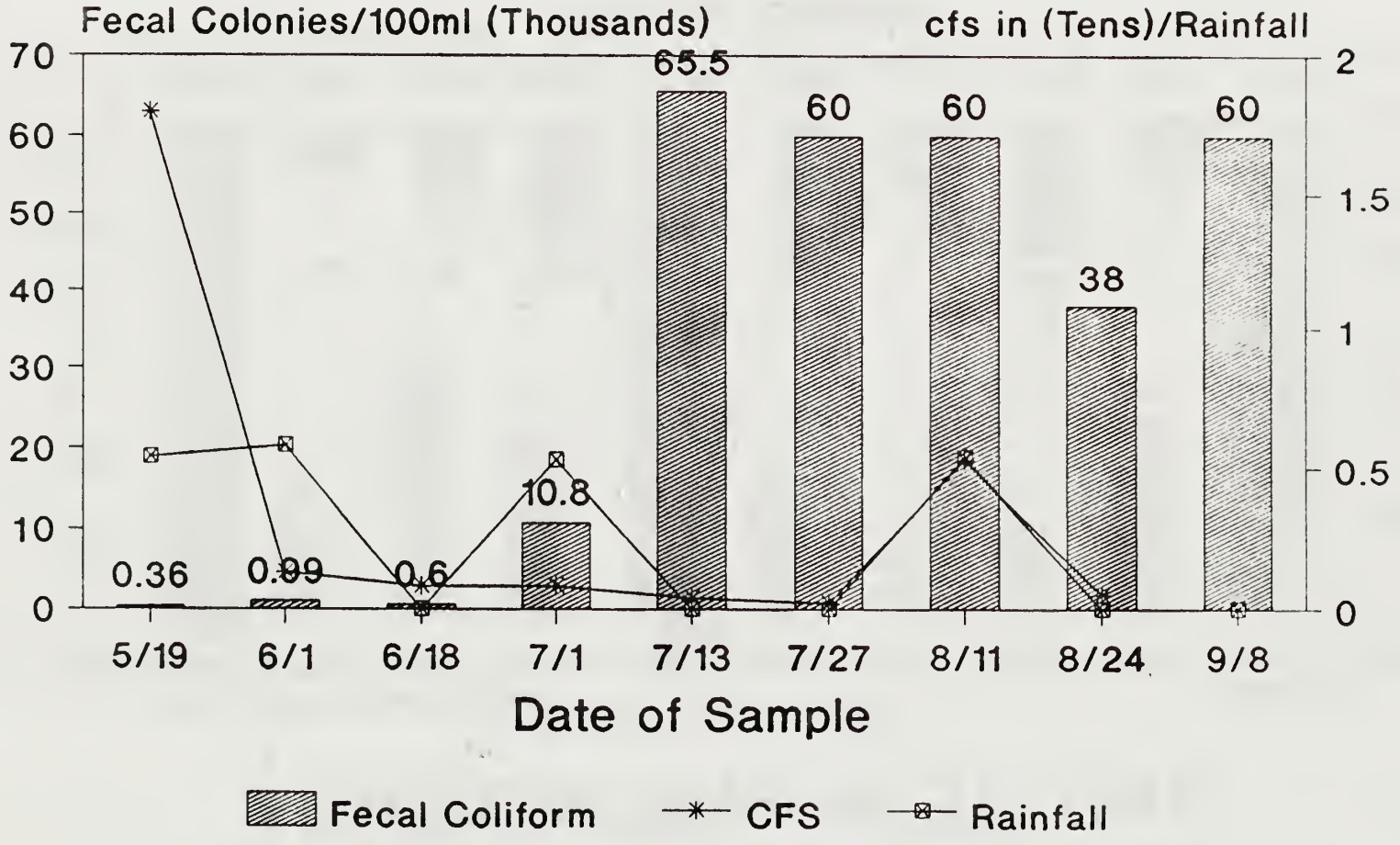


Figure 22. Fecal Coliform Data for Bluestone River @ ST. Park

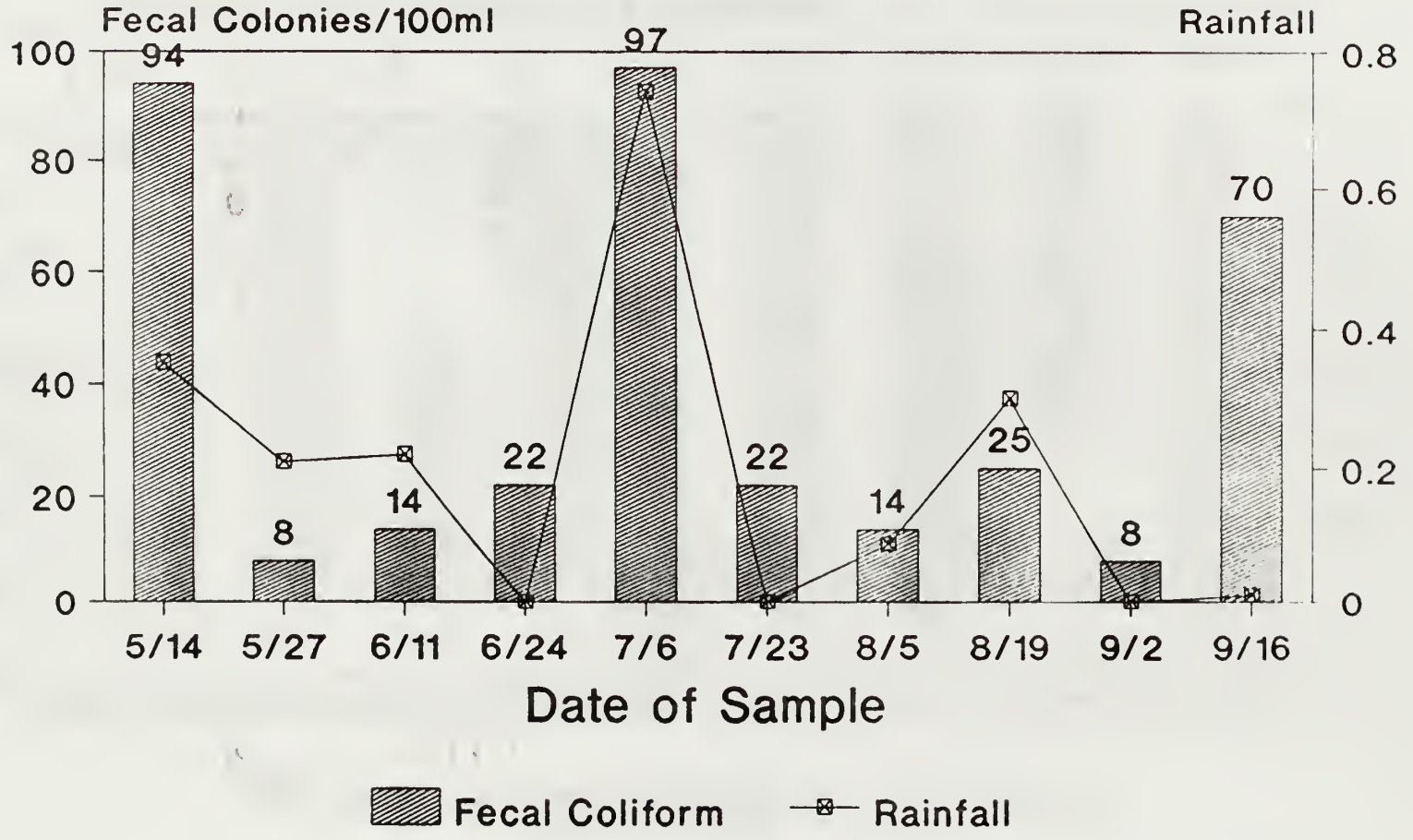


Figure 23. Fecal Coliform Data for Little Bluestone River

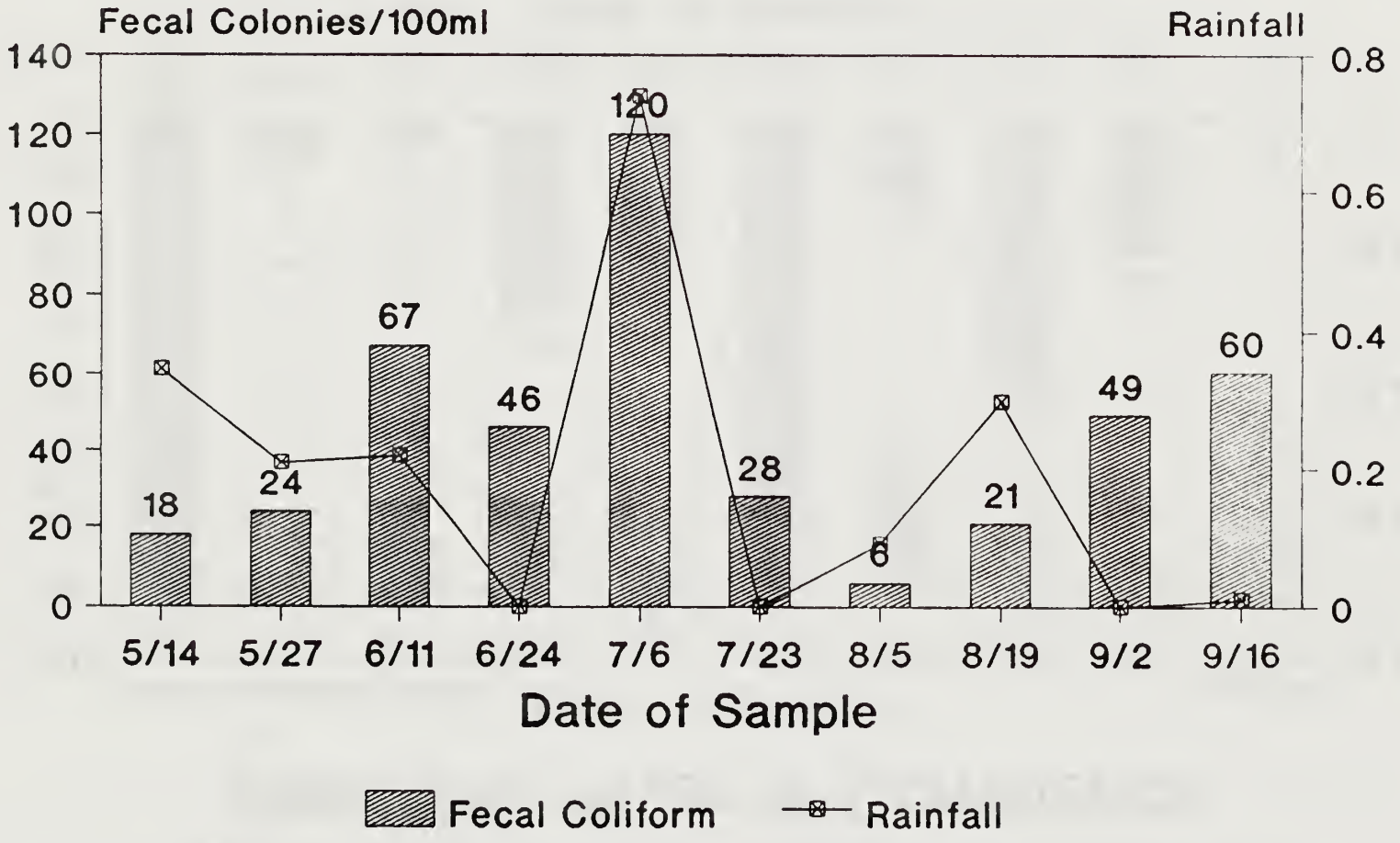


Figure 24. Fecal Coliform Data for Bluestone River @ Confluence

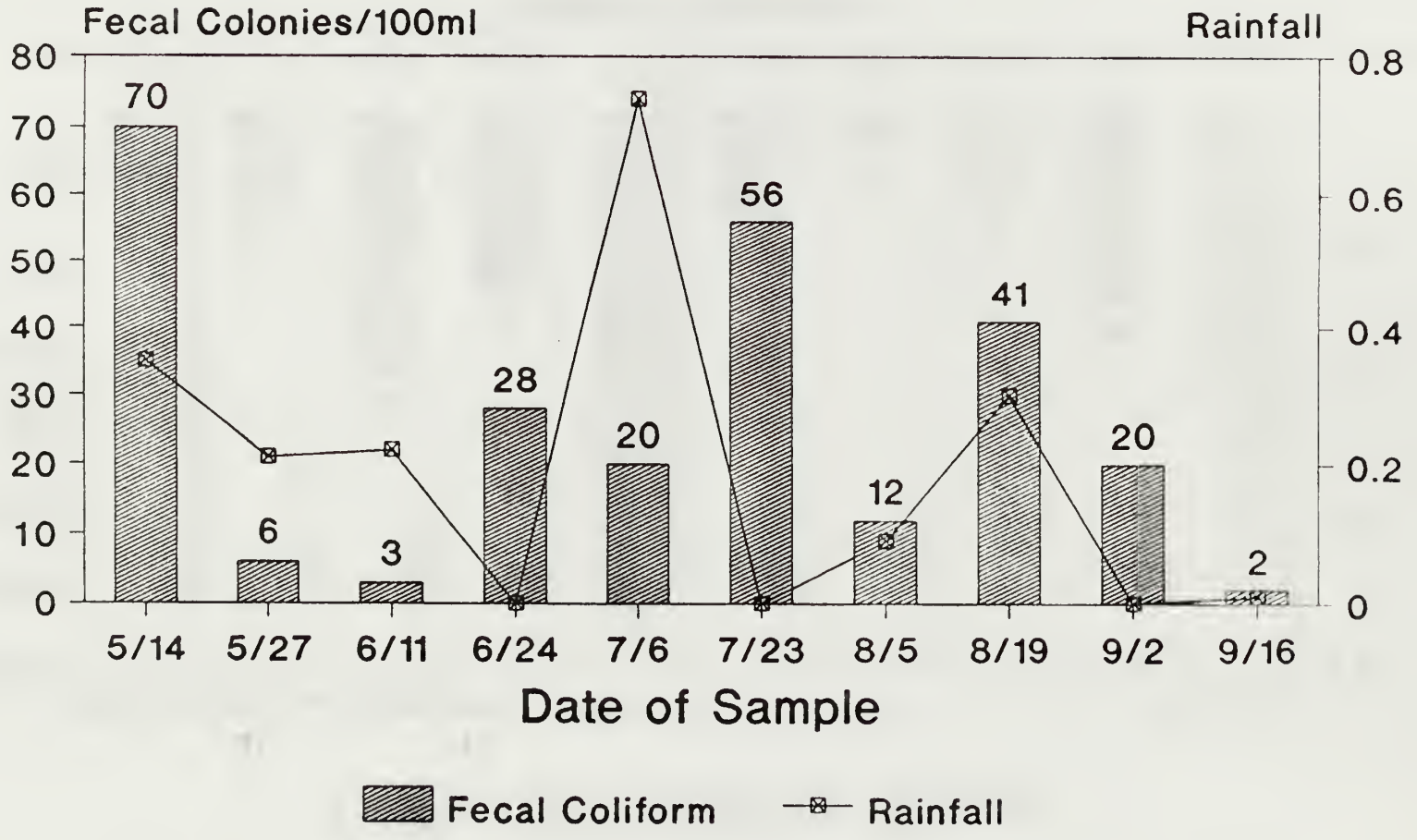
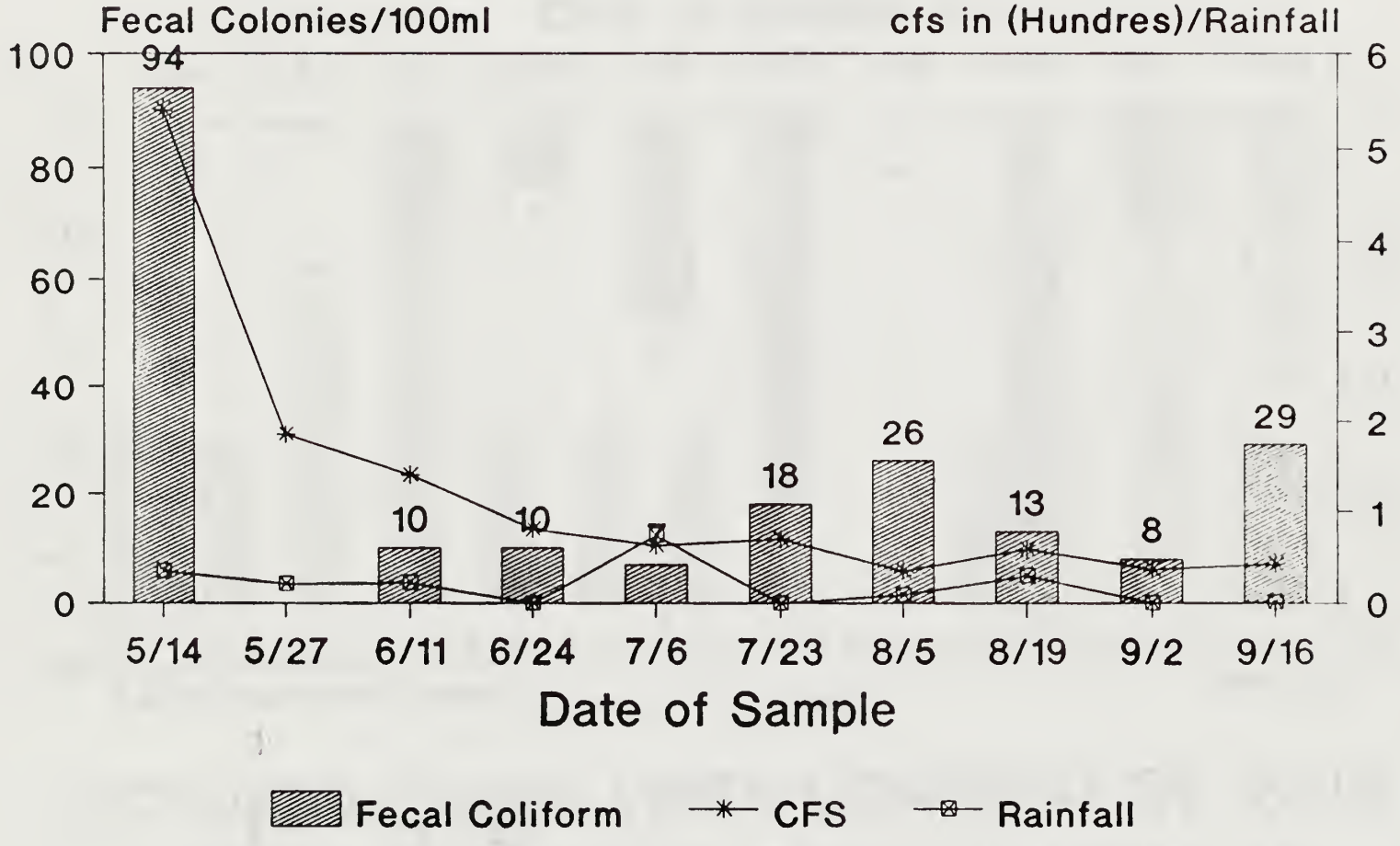
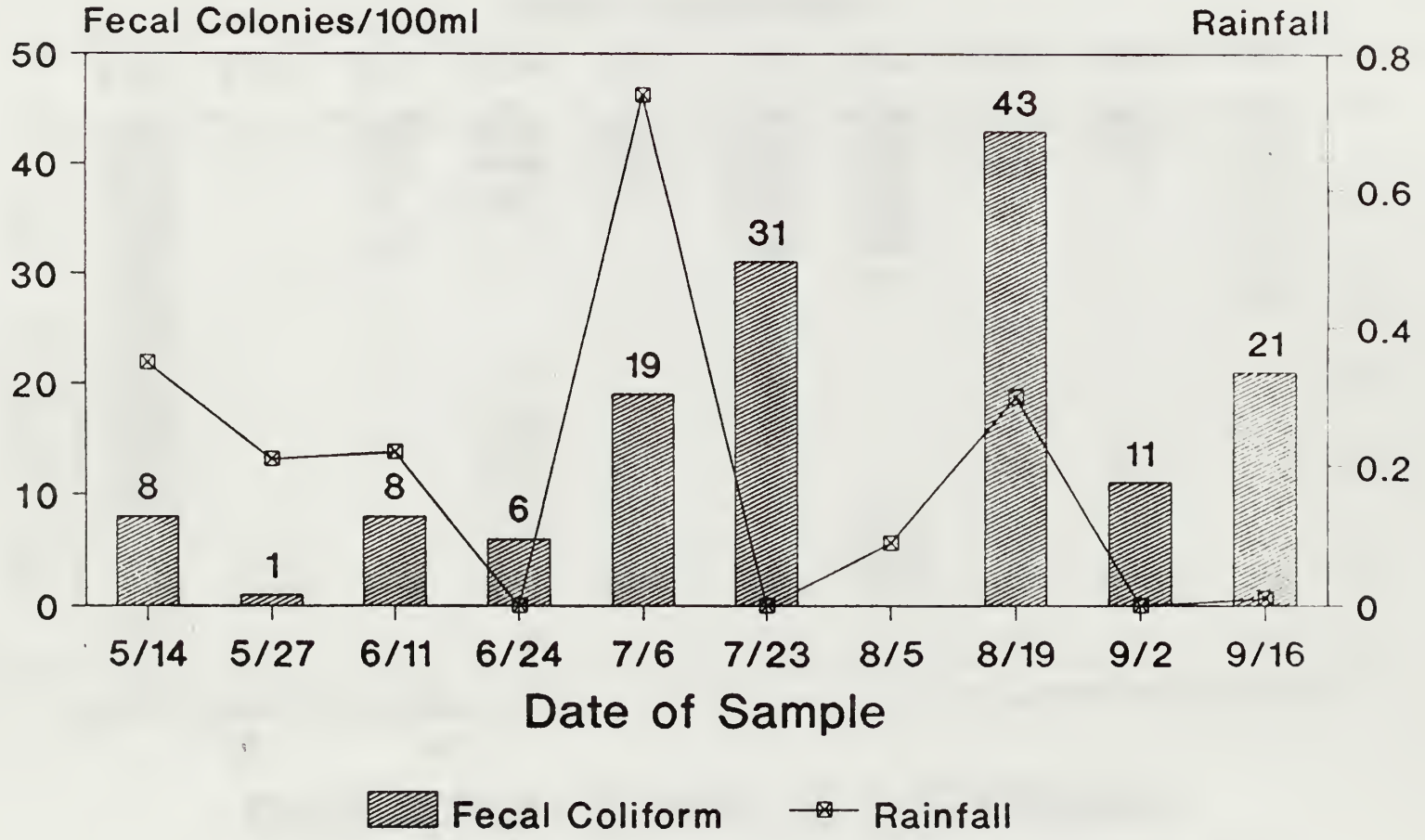


Figure 25. Fecal Coliform Data for Bluestone River @ Pipestem



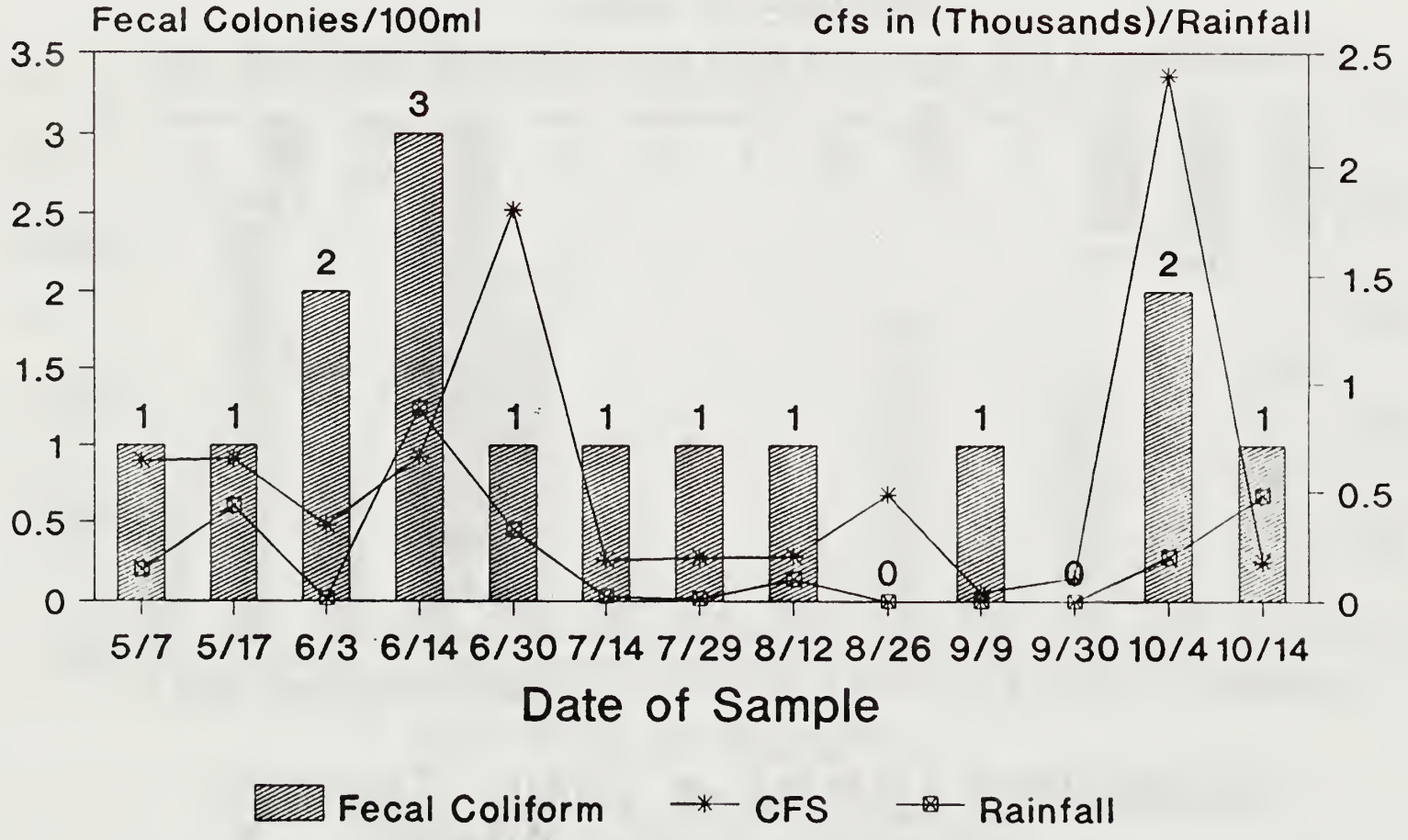
absent bacteria data on 5/27

Figure 26. Fecal Coliform Data for Mountain Creek Near Pipestem St. Park



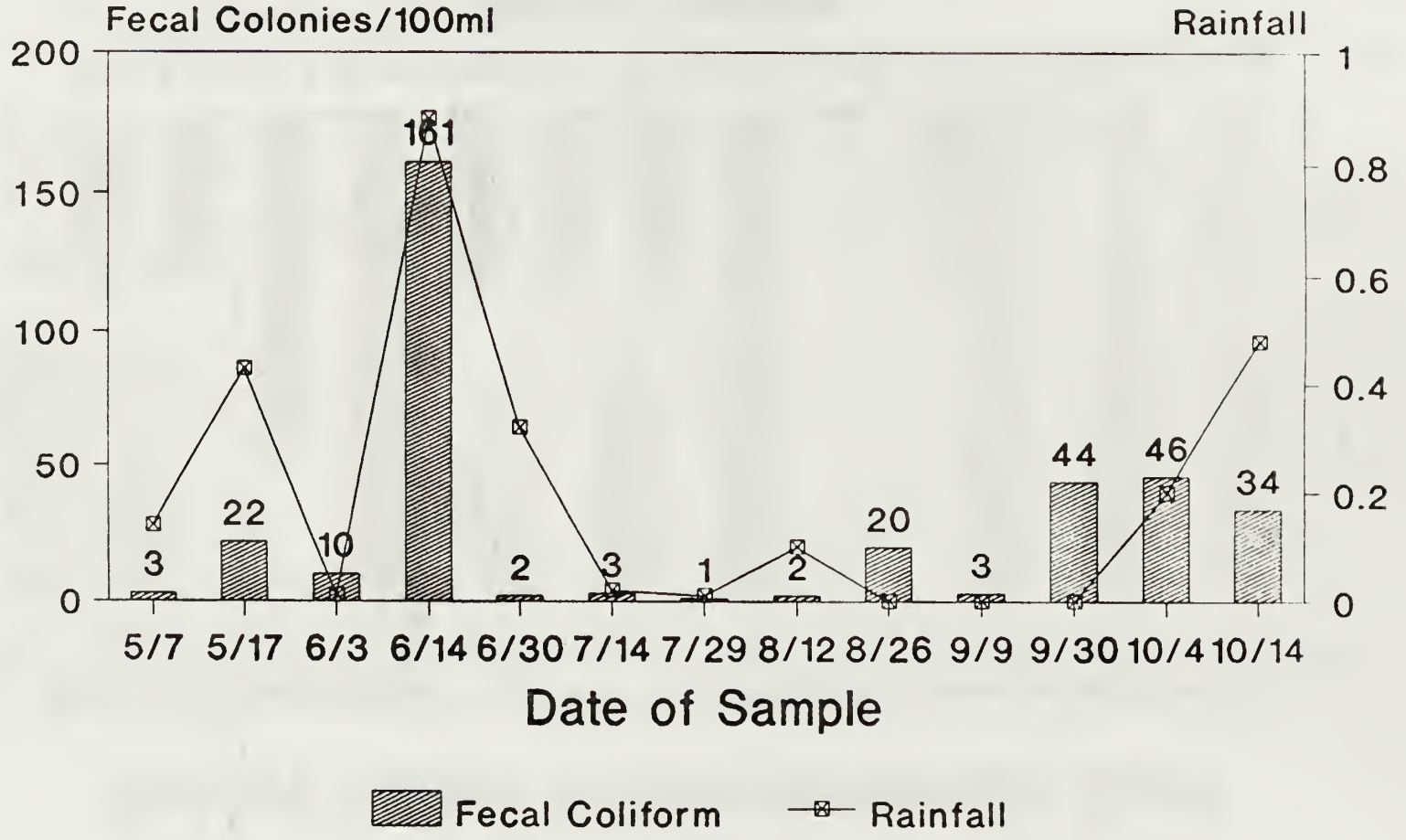
absent data for 8/5

Figure 27. Fecal Coliform Data for Gauley River @ Summersville Dam



tailwaters

Figure 28. Fecal Coliform Data for Gauley River @ NARR Campsite



above Peter's Creek

Figure 29. Fecal Coliform Data for Peters Creek Near Mouth

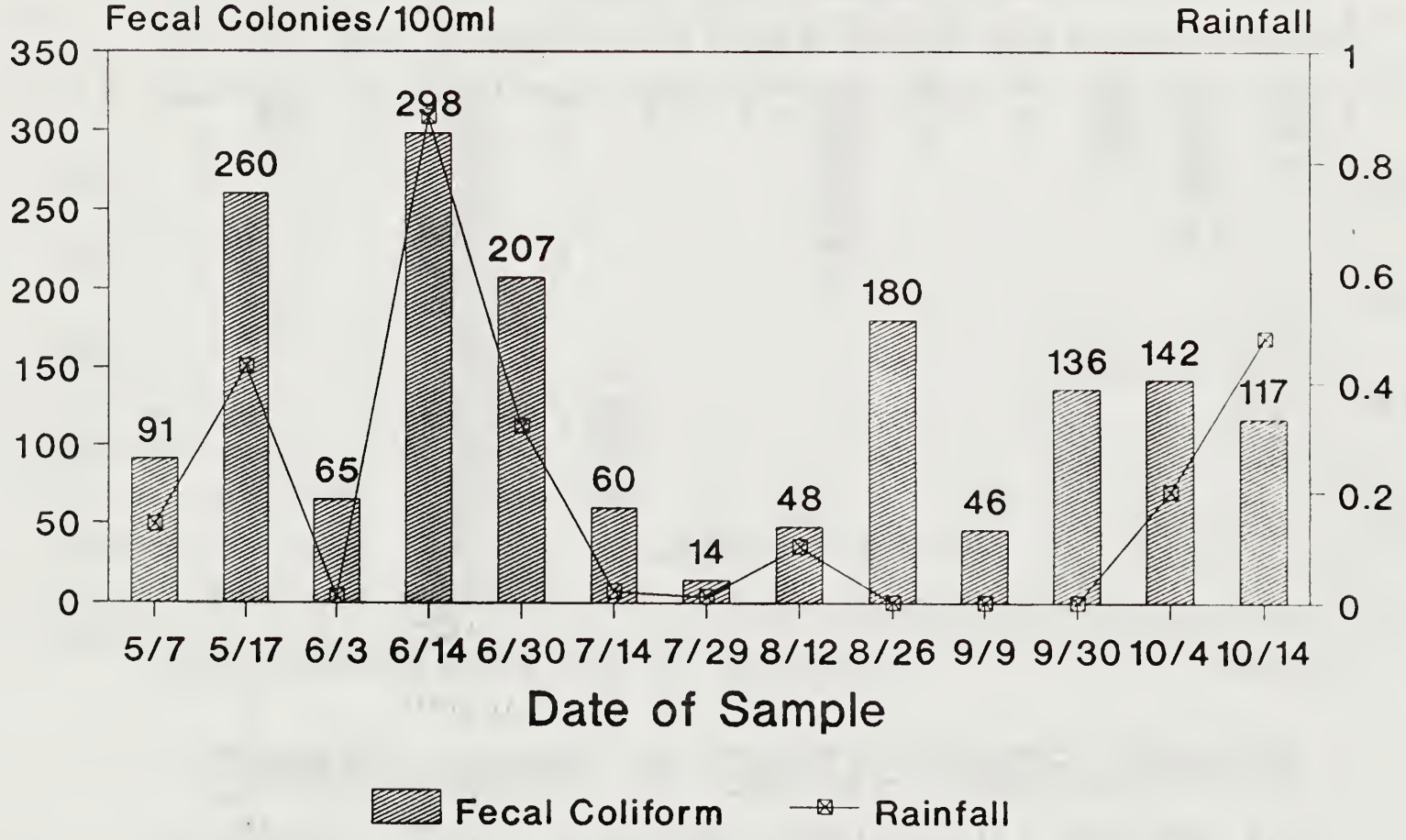


Figure 30. Fecal Coliform Data for Gauley River @ South Side Swiss

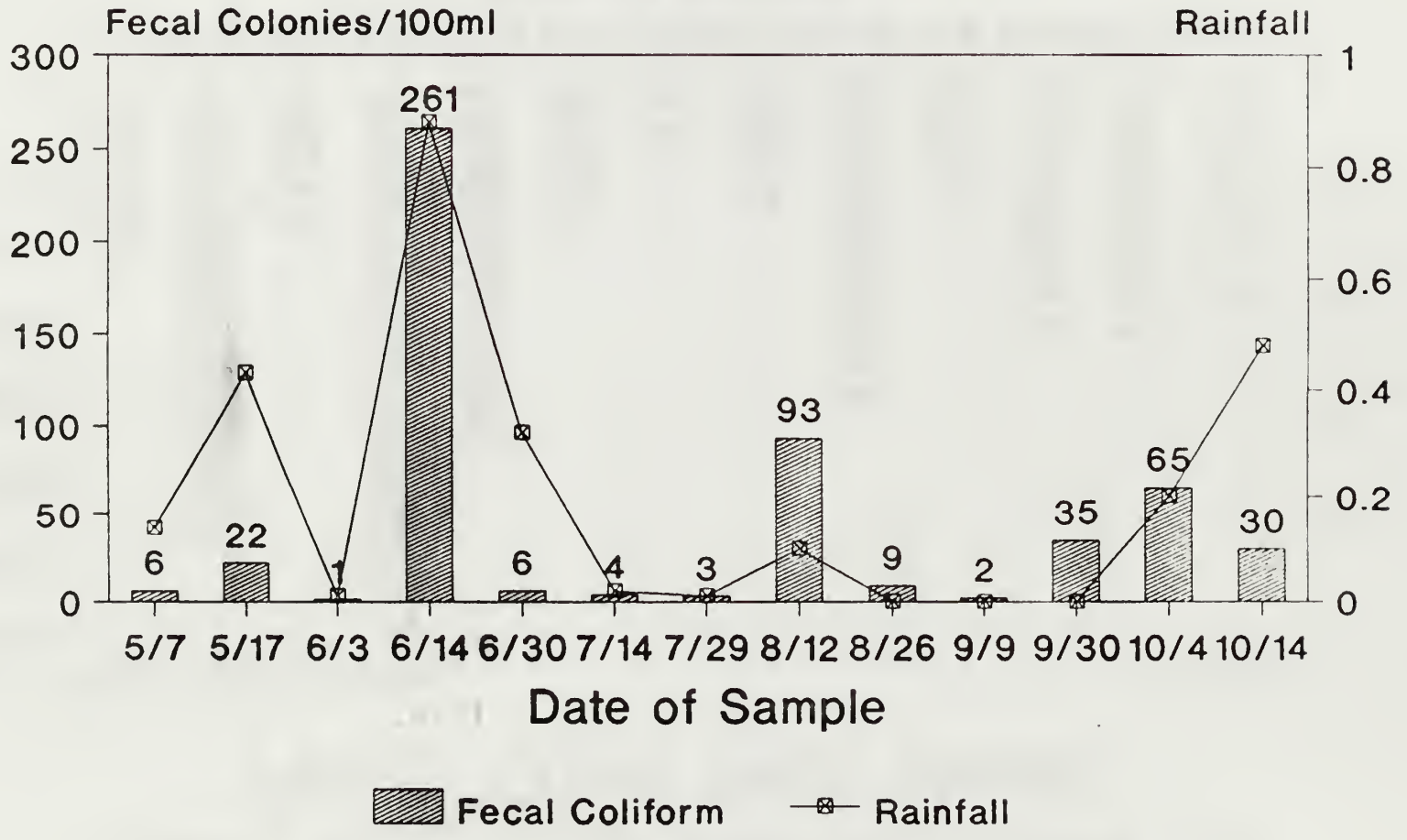
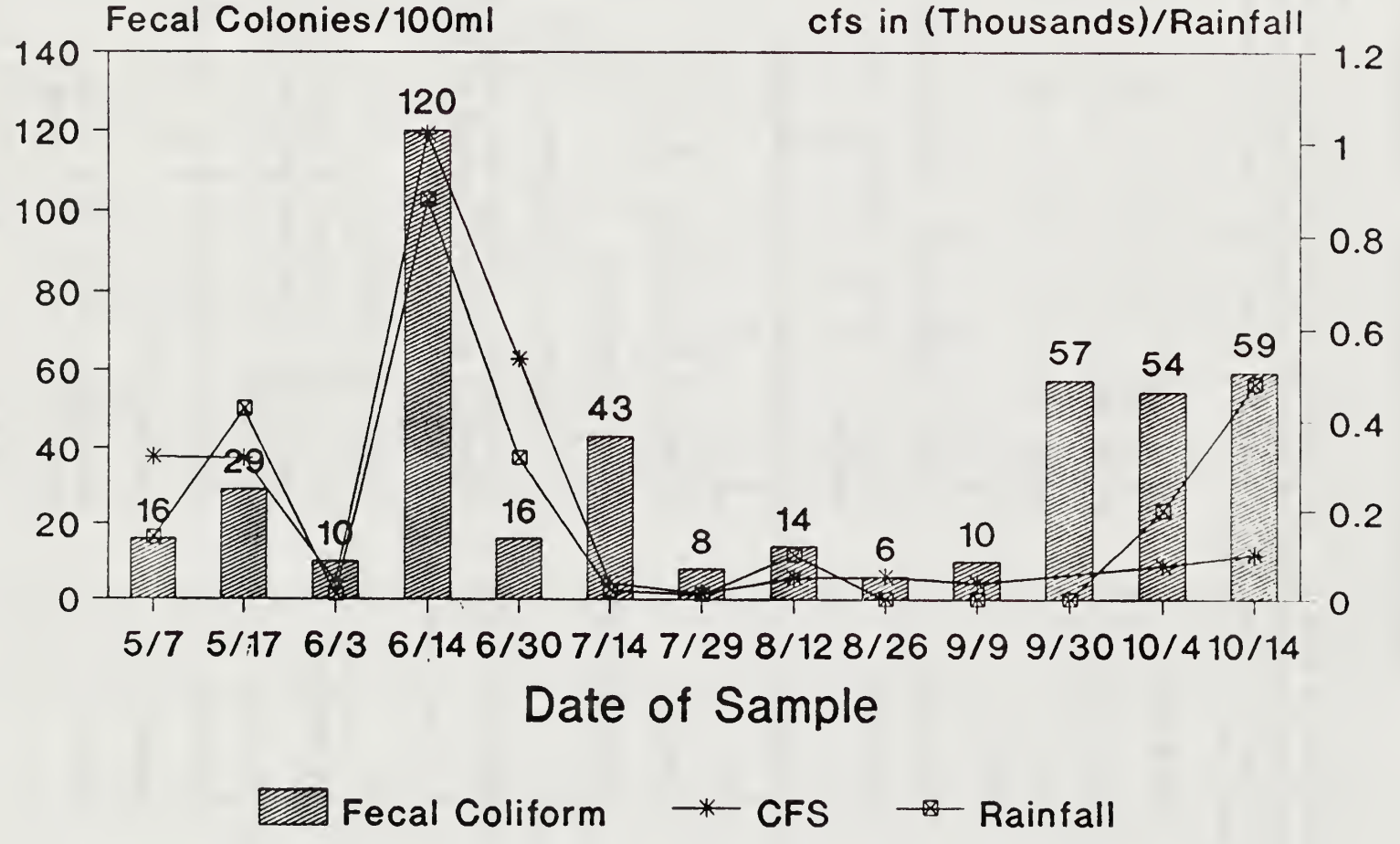


Figure 31. Fecal Coliform Data for Meadow River



Off Rt. 41 up stream of Stickley Run

EXPLANATION OF APPENDICES 1. THROUGH 6.

This section contains the appendices referred to in the report. In Appendices 5 and 6, the 99.999 values are not accurate. The data base program printed 99.999 in place of blank spaces where data were absent. The following is a key to the abbreviations used in Appendices 4 and 5.

SITE NO	Site Number
SITE NAME	Site Name
DATE	Date
TIME	Time
WaterTEMP	Water Temperature (in celsius)
FC/100ml	Fecal coliform colonies per 100 ml of sample
AIRTEMP	Air Temperature (in celsius)
pH	pH
STRMLVL	Stream level/Stage level
H2OCONDITION	Water condition
NTU	Nephelometric turbidity units
INCUB	The amount of time the fecal coliform colonies were incubated in the hot water bath
DO	Dissolved oxygen
DILUTIONS	The dilutions used to get the accepted fecal coliform bacteria colony reading (20 - 60)
WEATHER	Weather (referred to in appendix - 2)
CONDUCT	Conductivity
PRECIP	Precipitation in the 48 hour period preceding the date listed

APPENDIX 1. SAMPLE DATA COLLECTION FORM

Sample Site	Date	Sample Time	H2O Temp	Air Temp	pH	Stage Level	H2O CND Trbidty	DO	Weather	Conductivity	Dilution		Fecals /100ml	Comments
01. BLUE STONE ST. PARK	8/6/92	9:50	22°C	20°C	8.6	2.35'	N, M 2.8 NTU	8.2	OVC	285	100 / 12	150 / 30	20	
2. LITTLE BLUE STONE	8/6/92	11:04	18°C	20°C	8.1		N. SL 1.1 NTU	6.5	OVC	100	50 / 9	100 / 15	EST. 15	
03. CON-FLUENCE	8/6/92	11:36	21°C	21°C	8.4	2.35'	N, SL. NTU	1.2	OVC	210	100 / 17	150 / 23	15.33	
05. MT. CREEK Tribu.	8/6/92	12:29	17°C	19°C	8.0		N, M 0.7 NTU	8.7	OVC	175	75 / 4	125 / 1	EST 5.33	
04. PIPE STEM ST. PARK	8/6/92	12:57	21°C	21°C	8.7	2.35'	N, M 2.5 NTU	8.7	OVC	291	125 / 24	175 / 18	19.2	

Stage Level	8/6 2.35' 71 CFS	
Precip W/IN	8/6	

BLUESTONE DAM PRECP. (LIVE PERSON) 1-466-1234
BLUESTONE RIVER STAGE (RECORDING) 1-466-0156
Other Observations and Comments:

CONTROL BEFORE: OK OK
CONTROL AFTER: OK OK

Time In: 4:03 8/6
Time Out: 4:00 8/7

Time In:
Time Out:

APPENDIX 2. WEATHER CODES

I. Cloud Cover

CLR	Clear: less than 1% sky cover
SCT	Scattered: 1% to 50% sky cover
BKN	Broken: 60% to 90% sky cover
OVC	Overcast: More than 90% sky cover
-	Thin (When prefixed to the above symbols)
-x	Partial obscuration: 1% to less than 10% sky hidden by precipitation or obstruction to vision
x	Obscuration: 10% sky hidden by precipitation or obstruction to vision

II. Physical Weather

A. Weather and Obstruction to Vision Symbols

A	Hail
BS	Blowing Snow
D	Dust
F	Fog
GF	Ground Fog
H	Haze
K	Smoke
L	Drizzle
R	Rain
RW	Rain Showers
S	Snow
SW	Snow Showers
T	Thunderstorms
T+	Severe Thunderstorms
ZL	Freezing Drizzles
ZR	Freezing Rain

B. Precipitation Intensities

(-)	Light
(no sign)	Moderate
(+)	Heavy

C. Stream Conditions

First letter (volume):	Second letter(s) (velocity):	Third letter(s) (opacity):
L = low	SL = slow	C = clear
N = normal	M = moderate	MI = milky
H = high	SW = swift	MR = murky
		TR = turbid

APPENDIX 3. STAGE LEVEL TELEPHONE NUMBERS

The following is a list of operating gauges for several area rivers.

PHONE	RIVERS	COMMENTS
465-0493	New River (Thurmond)	Beeper gauge, 24-hours continuous update
466-0156	New (Bluestone Dam release)	Updated 8:00 AM each day.
529- 5127	GAULEY & NEW Watersheds	* Updated 10:00 AM each day.

* Stage, flow, and 24-hour change on all gauging stations on the New, Bluestone, Gauley, Meadow, Greenbrier, Cranberry, and Elk Rivers

Gauge Correlations For New River:

FAYETTE STA. (visual)	HINTON	THURMOND	FLOW (cfs)
-2	1.55	2.00	1240
-1	1.78	2.75	1875
0	2.00	3.50	2580
1	2.24	4.26	3472
2	2.50	5.01	4516
3	2.77	5.76	5820
4	3.10	6.51	7425
5	3.42	7.26	9300
6	3.74	8.02	11460
7	4.05	8.77	13710
8	4.33	9.52	15960
9	4.65	10.27	18880
10	5.99	11.02	21900

APPENDIX C: FECAL COLIFORM BACTERIA VALUES FOR NEW RIVER GORGE NATIONAL RIVER

Site No.	Site Name	Date	FC/100ml	Level	Precip
	68				
01M	NEW RIVER @ HINTON VC	05/12/93	e 26	11200	.92"
01M	NEW RIVER @ HINTON VC	05/26/93	27	6,500	.05"
01M	NEW RIVER @ HINTON VC	06/07/93	e 131	6,300	.56"
01M	NEW RIVER @ HINTON VC	06/23/93	33	3,500	.36"
01M	NEW RIVER @ HINTON VC	07/08/93	e 62	3,072	.00"
01M	NEW RIVER @ HINTON VC	07/20/93	34	2,738	.35"
01M	NEW RIVER @ HINTON VC	08/02/93	38	1,550	.44"
01M	NEW RIVER @ HINTON VC	08/20/93	43	2,900	.00"
01M	NEW RIVER @ HINTON VC	08/31/93	28	5,000	.00"
01M	NEW RIVER @ HINTON VC	09/14/93	23	1,840	.00"
01M	NEW RIVER @ HINTON VC	10/05/93	e 10	2,060	.03"
02T	MADAM CREEK	05/12/93	e 24	HIGH	.92"
02T	MADAM CREEK	05/26/93	e 32	NORM	.05"
02T	MADAM CREEK	06/07/93	>* 400	NORM	.56"
02T	MADAM CREEK	06/23/93	e* 9600	LOW	.36"
02T	MADAM CREEK	07/08/93	>* 12000	LOW	.00"
02T	MADAM CREEK	07/20/93	* 24500	LOW	.35"
02T	MADAM CREEK	08/02/93	e* 4000	LOW	.44"
02T	MADAN CREEK	08/20/93	e* 2000	LOW	.00"
02T	MADAM CREEK	08/31/93	e* 5500	LOW	.00"
02T	MADAM CREEK	09/14/93	e* 1500	LOW	.00"
02T	MADAM CREEK	10/05/93	* 3360	LOW	.03"
03M	NEW RIVER @ SANDSTONE FALLS	05/12/93	127	HIGH	.92"
03M	NEW RIVER @ SANDSTONE FALLS	05/26/93	35	HIGH	.05"
03M	NEW RIVER @ SANDSTONE FALLS	06/07/93	88	HIGH	.56"
03M	NEW RIVER @ SANDSTONE FALLS	06/23/93	e7	NORM	.36"
03M	NEW RIVER @ SANDSTONE FALLS	07/08/93	15	NORM	.00"
03M	NEW RIVER @ SANDSTONE FALLS	07/20/93	14	NORM	.35"
03M	NEW RIVER @ SANDSTONE FALLS	08/02/93	e 108	LOW	.44"
03M	NEW RIVER @ SANDSTONE FALLS	08/20/93	e 132	LOW	.00"
03M	NEW RIVER @ SANDSTONE FALLS	08/31/93	117	NORM	.00"
03M	NEW RIVER @ SANDSTONE FALLS	09/14/93	e 18	LOW	.00"
03M	NEW RIVER @ SANDSTONE FALLS	10/05/93	24	LOW	.03"
04M	NEW RIVER @ SANDSTONE	05/12/93	e 124	HIGH	.92"
04M	NEW RIVER @ SANDSTONE	05/26/93	57	HIGH	.05"
04M	NEW RIVER @ SANDSTONE	06/07/93	74	HIGH	.56"
04M	NEW RIVER @ SANDSTONE	06/23/93	e 12	NORM	.36"
04M	NEW RIVER @ SANDSTONE	07/08/93	46	NORM	.00"
04M	NEW RIVER @ SANDSTONE	07/20/93	e 8	LOW	.35"
04M	NEW RIVER @ SANDSTONE	08/02/93	e 134	LOW	.44"
04M	NEW RIVER @ SANDSTONE	08/20/93	e 98	LOW	.00"
04M	NEW RIVER @ SANDSTONE	08/31/93	27	NORM	.00"
04M	NEW RIVER @ SANDSTONE	09/14/93	56	LOW	.00"
04M	NEW RIVER @ SANDSTONE	10/05/93	e 34	LOW	.03"
05T	LICK CREEK	05/12/93	e 132	28.33	.92"
05T	LICK CREEK	05/26/93	40	8.800	.05"
05T	LICK CREEK	06/07/93	> 80	39.15	.56"
05T	LICK CREEK	06/23/93	40	3.40	.36"
05T	LICK CREEK	07/08/93	120	4.25	.00"
05T	LICK CREEK	07/20/93	69	2.12	.35"
05T	LICK CREEK	08/02/93	88	.489	.44"

The FECAL COLIFORM PER 100ml of SAMPLE means the number of fecal coliform bacteria colonies counted on the membrane filter and then adjusted for 100ml of sample.

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- < That the value is estimated as being less than the one displayed
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Site No.	Site Name	Date	FC/100ml	Level	Precip
05T	LICK CREEK	08/02/93	88	.489	.44"
05T	LICK CREEK	08/20/93	53	1.33	.00"
05T	LICK CREEK	08/31/93	e 20	LOW	.00"
05T	LICK CREEK	09/14/93	48	.247	.00"
05T	LICK CREEK	10/05/93	44	1.000	.03"
06T	MEADOW CREEK	05/12/93	e* 336	63.00	.92"
06T	MEADOW CREEK	05/26/93	> 171	22.10	.05"
06T	MEADOW CREEK	06/07/93	* 480	60.00	.56"
06T	MEADOW CREEK	06/23/93	e 22	6.10	.36"
06T	MEADOW CREEK	07/08/93	99	6.50	.00"
06T	MEADOW CREEK	07/20/93	>* 240	1.80	.35"
06T	MEADOW CREEK	08/02/93	e 194	1.80	.44"
06T	MEADOW CREEK	08/20/93	e 64	2.02	.00"
06T	MEADOW CREEK	08/31/93	e 25	1.30	.00"
06T	MEADOW CREEK	09/14/93	e 10	.500	.00"
06T	MEADOW CREEK	10/05/93	8	1.800	.03"
07T	LAUREL CREEK @ QUINNMNT	05/11/93	122	85.77	.05"
07T	LAUREL CREEK @ QUINNMNT	05/25/93	26	12.77	.00"
07T	LAUREL CREEK @ QUINNMNT	06/10/93	88	24.10	.01"
07T	LAUREL CREEK @ QUINNMNT	06/21/93	e4	2.15	.14"
07T	LAUREL CREEK @ QUINNMNT	07/07/93	13	.900	.00"
07T	LAUREL CREEK @ QUINNMNT	07/19/93	30	.550	.00"
07T	LAUREL CREEK @ QUINNMNT	08/03/93	>60	8.06	.00"
07T	LAUREL CREEK @ QUINNMNT	08/17/93	e7	45.50	.04"
07T	LAUREL CREEK @ QUINNMNT	08/30/93	12	.550	.44"
07T	LAUREL CREEK @ QUINNMNT	09/13/93	e3	.555	.00"
07T	LAUREL CREEK @ QUINNMNT	10/04/93	18	.900	.05"
08M	NEW RIVER @ PRINCE	05/11/93	20	HIGH	.05"
08M	NEW RIVER @ PRINCE	05/25/93	e7	HIGH	.00"
08M	NEW RIVER @ PRINCE	06/10/93	46	HIGH	.01"
08M	NEW RIVER @ PRINCE	06/21/93	16	NORM	.14"
08M	NEW RIVER @ PRINCE	07/07/93	e 18	NORM	.00"
08M	NEW RIVER @ PRINCE	07/19/93	e9	NORM	.00"
08M	NEW RIVER @ PRINCE	08/03/93	e 63	LOW	.00"
08M	NEW RIVER @ PRINCE	08/17/93	24	NORM	.04"
08M	NER RIVER @ PRINCE	08/30/93	e 127	NORM	.44"
08M	NEW RIVER @ PRINCE	09/13/93	e5	NORM	.00"
08M	NEW RIVER @ PRINCE	10/04/93	e6	LOW	.05"
09T	PINEY CREEK @ McCREERY	05/11/93	99	93.6	.05"
09T	PINEY CREEK @ McCREERY	05/25/93	e 26	81.80	.00"
09T	PINEY CREEK @ McCREERY	06/10/93	198	87.00	.01"
09T	PINEY CREEK @ McCREERY	06/21/93	e 40	38.0	.14"
09T	PINEY CREEK @ McCREERY	07/07/93	e* 512	38.0	.00"
09T	PINEY CREEK @ McCREERY	07/19/93	* 206	25.00	.00"
09T	PINEY CREEK @ McCREERY	08/03/93	> * 1200	40.80	.00"
09T	PINEY CREEK @ McCREERY	08/17/93	e* 466	28.00	.04"
09T	PINEY CREEK @ McCREERY	08/30/93	e 80	16.50	.44"
09T	PINEY CREEK @ McCREERY	09/13/93	e 40	14.90	.00"
09T	PINEY CREEK @ McCREERY	10/04/93	144	19.20	.05"
11T	DUNLOUP CREEK	05/20/93	* 300	132.6	1.10"
11T	DUNLOUP CREEK	06/02/93	* 370	NORM	.39"
11T	DUNLOUP CREEK	06/16/93	* 255	43.00	.00"
11T	DUNLOUP CREEK	06/29/93	* 380	29.50	.08"

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Site No.	Site Name	Date	FC/100ml	Level	Precip
11T	DUNLOUP CREEK	06/29/93	* 380	29.50	.08"
11T	DUNLOUP CREEK	07/12/93	>* 600	36.50	.55"
11T	DUNLOUP CREEK	07/28/93	195	16.75	.04"
11T	DUNLOUP CREEK	08/11/93	* 307	14.00	.00"
11T	DUNLOUP CREEK	08/25/93	e* 1200	15.00	.00"
11T	DUNLOUP CREEK	09/07/93	130	LOW	.00"
11T	DUNLOUP CREEK	09/21/93	e* 370	267.0	.04"
12M	NEW RIVER @ THURMOND	05/20/93	72	12850	1.10"
12M	NEW RIVER @ THURMOND	06/02/93	42	2,860	.39"
12M	NEW RIVER @ THURMOND	06/16/93	54	7,150	.00"
12M	NEW RIVER @ THURMOND	06/29/93	e 14	2,890	.08"
12M	NEW RIVER @ THURMOND	07/12/93	>* 780	2,440	.55"
12M	NEW RIVER @ THURMOND	07/28/93	e 46	2,800	.04"
12M	NEW RIVER @ THURMOND	08/09/93	e7	2,270	.00"
12M	NEW RIVER @ THURMOND	08/25/93	e 10	2360	.00"
12M	NEW RIVER @ THURMOND	09/07/93	e2	900	.00"
12M	NEW RIVER @ THURMOND	09/21/93	e 50	4340	.04"
13T	ARBUCKLE CREEK	05/29/93	e* 1020	HIGH	1.10"
13T	ARBUCKLE CREEK	06/02/93	e* 1030	13.00	.39"
13T	ARBUCKLE CREEK	06/16/93	96	14.00	.00"
13T	ARBUCKLE CREEK	06/29/93	e 73	6.000	.08"
13T	ARBUCKLE CREEK	07/12/93	* 240	10.50	.55"
13T	ARBUCKLE CREEK	07/28/93	97	1.000	.04"
13T	ARBUCKLE CREEK	08/09/93	e* 355	1.000	.00"
13T	ARBUCKLE CREEK	08/25/93	e 80	LOW	.00"
13T	ARBUCLKE CREEK	09/07/93	e* 2190	LOW	.00"
13T	ARBUCKLE CREEK	09/21/93	* 540	20.00	.04"
14M	NEW RIVER @ CUNARD	05/20/93	81	HIGH	1.10"
14M	NEW RIVER @ CUNARD	06/02/93	50	HIGH	.39"
14M	NEW RIVER @ CUNARD	06/18/93	152	HIGH	.00"
14M	NEW RIVER @ CUNARD	07/01/93	* 330	NORM	.52"
14M	NEW RIVER @ CUNARD	07/13/93	e 100	NORM	.00"
14M	NEW RIVER @ CUNARD	07/28/93	e 20	LOW	.04"
14M	NEW RIVER @ CUNARD	08/11/93	e 60	LOW	.54"
14M	NEW RIVER @ CUNARD	08/24/93	e6	LOW	.00"
14M	NEW RIVER @ CUNARD	09/07/93	5	LOW	.00"
14M	NEW RIVER @ CUNARD	09/21/93	e 28	NORM	.04"
15T	COAL RUN	05/20/93	* 400	HIGH	1.10"
15T	COAL RUN	06/18/93	******	NORM	.00"
15T	COAL RUN	06/20/93	e* 400	NORM	.39"
15T	COAL RUN	07/01/93	******	NORM	.52"
15T	COAL RUN	07/13/93	e* 4333	NORM	.00"
15T	COAL RUN	07/28/93	e 33	LOW	.04"
15T	COAL RUN	08/11/93	e* 666	LOW	.54"
15T	COAL RUN	08/24/93	e 46	LOW	.00"
15T	COAL RUN	09/07/93	* 240	LOW	.00"
15T	COAL RUN	09/21/93	>* 1200	LOW	.04"
16T	KEENEY CREEK	05/19/93	e* 786	HIGH	.54"
16T	KEENEY CREEK	06/01/93	>* 300	NORM	.58"
16T	KEENEY CREEK	06/18/93	>* 400	LOW	.00"
16T	KEENEY CREEK	07/01/93	* 3400	LOW	.53"
16T	KEENEY CREEK	07/13/93	e* 10200	NORM	.00"
16T	KEENEY CREEK	07/27/93	e* 7500	LOW	.00"

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Site No.	Site Name	Date	FC/100ml	Level	Precip
16T	KEENEY CREEK	07/27/93	e* 7500	LOW	.00"
16T	KEENEY CREEK	08/11/93	* 36000	LOW	.54"
16T	KEENEY CREEK	08/24/93	e* 2400	LOW	.00"
16T	KEENEY CREEK	09/08/93	e* 7375	LOW	.00"
17M	NEW RIVER @ FAYETTE STATION	05/19/93	>*300	7,100	.54"
17M	NEW RIVER @ FAYETTE STATION	06/01/93	e* 274	4,400	.58"
17M	NEW RIVER @ FAYETTE STATION	06/18/93	101	3,350	.00"
17M	NEW RIVER @ FAYETTE STATION	07/01/93	* 403	3,600	.53"
17M	NEW RIVER @ FAYETTE STATION	07/13/93	e75	3,600	.00"
17M	NEW RIVER @ FAYETTE STATION	07/27/93	117	2,600	.00"
17M	NEW RIVER @ FAYETTE STATION	08/11/93	12	2,600	.54"
17M	NEW RIVER @ FAYETTE STATION	08/24/93	e7	2,400	.00"
17M	NEW RIVER @ FAYETTE STATION	09/08/93	e6	1,700	.00"
18T	WOLF CREEK	05/19/93	>* 300	130.1	.54"
18T	WOLF CREEK	06/01/93	* 423	29.65	.58"
18T	WOLF CREEK	06/18/93	* 205	5.330	.00"
18T	WOLF CREEK	07/01/93	>* 400	5.330	.53"
18T	WOLF CREEK	07/13/93	e33	4.209	.00"
18T	WOLF CREEK	07/27/93	12	2.450	.00"
18T	WOLF CREEK	08/11/93	* 280	2.782	.54"
18T	WOLF CREEK	08/24/93	e20	1.602	.00"
18T	WOLF CREEK	09/08/93	e20	2.322	.00"
19T	MARR BRANCH	05/19/93	* 360	18.20	.54"
19T	MARR BRANCH	06/01/93	e* 990	1.250	.58"
19T	MARR BRANCH	06/18/93	>* 600	.750	.00"
19T	MARR BRANCH	07/01/93	* 10800	.7800	.53"
19T	MARR BRANCH	07/13/93	e* 65500	.3600	.00"
19T	MARR BRANCH	07/27/93	>* 60000	.2000	.00"
19T	MARR BRANCH	08/11/93	>* 60000	5.270	.54"
19T	MARR BRANCH	08/24/93	* 38000	.500	.00"
19T	MARR BRANCH	09/08/93	* 60000	LOW	.00"

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BLUESTONE NATIONAL SCENIC RIVER

Site No.	Site Name	Date	FC/100ml	Level	Precip
01M	BLUESTONE RIVER @ ST. PARK	05/14/93	94	HIGH	.35"
01M	BLUESTONE RIVER @ ST. PARK	05/27/93	e 8	NORM	.21"
01M	BLUESTONE RIVER @ ST. PARK	06/11/93	e14	NORM	.22"
01M	BLUESTONE RIVER @ ST. PARK	06/24/93	22	NORM	.00"
01M	BLUESTONE RIVER @ ST. PARK	07/06/93	97	LOW	.74"
01M	BLUESTONE RIVER @ ST. PARK	07/23/93	22	LOW	.00"
01M	BLUESTONE RIVER @ ST. PARK	08/05/93	e14	LOW	.09"
01M	BLUESTONE RIVER @ ST. PARK	08/19/93	e25	LOW	.30"
01M	BLUESTONE RIVER @ ST. PARK	09/02/93	e 8	LOW	.00"
01M	BLUESTONE RIVER @ ST. PARK	09/16/93	e70	LOW	.01"
02T	LITTLE BLUESTONE RIVER	05/14/93	e18	NORM	.35"
02T	LITTLE BLUESTONE RIVER	05/27/93	e24	NORM	.21"
02T	LITTLE BLUESTONE RIVER	06/11/93	e67	NORM	.22"
02T	LITTLE BLUESTONE RIVER	06/24/93	46	NORM	.00"
02T	LITTLE BLUESTONE RIVER	07/06/93	>120	LOW	.74"
02T	LITTLE BLUESTONE RIVER	07/23/93	e28	LOW	.00"
02T	LITTLE BLUESTONE RIVER	08/05/93	e 6	LOW	.09"
02T	LITTLE BLUESTONE RIVER	08/19/93	e21	LOW	.30"
02T	LITTLE BLUESTONE RIVER	09/02/93	49	LOW	.00"
02T	LITTLE BLUESTONE RIVER	09/16/93	60	LOW	.01"
03M	BLUESTONE RIVER @ CONFLUENCE	05/14/93	70	NORM	.35"
03M	BLUESTONE RIVER @ CONFLUENCE	05/27/93	e 6	NORM	.21"
03M	BLUESTONE RIVER @ CONFLUENCE	06/11/93	e 3	NORM	.22"
03M	BLUESTONE RIVER @ CONFLUENCE	06/24/93	28	NORM	.00"
03M	BLUESTONE RIVER @ CONFLUENCE	07/06/93	e20	LOW	.74"
03M	BLUESTONE RIVER @ CONFLUENCE	07/23/93	56	LOW	.00"
03M	BLUESTONE RIVER @ CONFLUENCE	08/05/93	e12	LOW	.09"
03M	BLUESTONE RIVER @ CONFLUENCE	08/19/93	41	LOW	.30"
03M	BLUESTONE RIVER @ CONFLUENCE	09/02/93	20	LOW	.00"
03M	BLUESTONE RIVER @ CONFLUENCE	09/16/93	e 2	LOW	.01"
04M	BLUESTONE RIVER @ PIPESTEM	05/14/93	47	542	.35"
04M	BLUESTONE RIVER @ PIPESTEM	05/27/93		186	
04M	BLUESTONE RIVER @ PIPESTEM	06/11/93	e10	140	.22"
04M	BLUESTONE RIVER @ PIPESTEM	06/24/93	e10	81	.00"
04M	BLUESTONE RIVER @ PIPESTEM	07/06/93	e 7	63	.74"
04M	BLUESTONE RIVER @ PIPESTEM	07/23/93	18	70	.00"
04M	BLUESTONE RIVER @ PIPESTEM	08/05/93	26	35	.09"
04M	BLUESTONE RIVER @ PIPESTEM	08/19/93	13	59	.30"
04M	BLUESTONE RIVER @ PIPESTEM	09/02/93	e 8	37	.00"
04M	BLUESTONE RIVER @ PIPESTEM	09/16/93	29	43	.01"
05T	MT. CREEK	05/14/93	8	NORM	.35"
05T	MT. CREEK	05/27/93	1	NORM	.21"
05T	MT. CREEK	06/11/93	8	LOW	.22"
05T	MT. CREEK	06/24/93	6	NORM	.00"
05T	MT. CREEK	07/06/93	19	LOW	.74"
05T	MT. CREEK	07/23/93	****31	LOW	.00"
05T	MT. CREEK	08/19/93	43	LOW	.30"
05T	MT. CREEK	09/02/93	e11	LOW	.00"
05T	MT. CREEK	09/16/93	21	LOW	.01"

The FECAL COLIFORM PER 100ML of SAMPLE means the number of fecal coliform bacter
colonies counted on the membrane filter and then adjusted for 100ml of sample.

- e Indicates that the value is estimated
- > That the value is estimated as being greater than the one displayed
- < That the value is estimated as being less than the one displayed
- * Indicates values greater than 200 counts per 100ml

APPENDIX 4. FECAL COLIFORM BACTERIA VALUES FOR GAULEY RIVER NATIONAL RECREATION AREA

Site No.	Site Name	Date	FC/100ml	Level	Precip
01M	SUMMERSVILLE DAM	08/12/92	e 1	203	.10"
01M	SUMMERSVILLE DAM	05/07/93	e 1	640	.14"
01M	SUMMERSVILLE DAM	05/17/93	e 1	650	.43"
01M	SUMMERSVILLE DAM	06/03/93	e 2	343	.01"
01M	SUMMERSVILLE DAM	06/14/93	e 3	660	.88"
01M	SUMMERSVILLE DAM	06/30/93	e 1	1,754	.32"
01M	SUMMERSVILLE DAM	07/14/93	<1	186	.02"
01M	SUMMERSVILLE DAM	07/29/93	e 1	196	.01"
01M	SUMMERSVILLE DAM	08/26/93	e 0	484	.00"
01M	SUMMERSVILLE DAM	09/09/93	e 1	41	.00"
01M	SUMMERSVILLE DAM	09/30/93	e 0	110	.00"
01M	SUMMERSVILLE DAM	10/04/93	e 2	2,350	.20"
01M	SUMMERSVILLE DAM	10/14/93	1	182	.48"
02M	MID GAULEY	05/07/93	e 3	NORM	.14"
02M	MID GAULEY	05/17/93	22	HIGH	.43"
02M	MID GAULEY	06/03/93	e10	NORM	.01"
02M	MID GAULEY	06/14/93	e161	HIGH	.88"
02M	MID GAULEY	06/30/93	e 2	NORM	.32"
02M	MID GAULEY	07/14/93	e 3	LOW	.02"
02M	MID GAULEY	07/29/93	e 1	LOW	.01"
02M	MID GAULEY	08/12/93	e 2	LOW	.10"
02M	MID GAULEY	08/26/93	20	LOW	.00"
02M	MID GAULEY	09/09/93	e 3	LOW	.00"
02M	MID GAULEY	09/30/93	44	LOW	.00"
02M	MID GAULEY	10/04/93	46	HIGH	.20"
02M	MID GAULEY	10/14/93	34	NORM	.48"
03T	PETER'S CREEK	05/07/93	91	NORM	.14:
03T	PETER'S CREEK	05/17/93	*260	HIGH	.43"
03T	PETER'S CREEK	06/03/93	e65	NORM	.01"
03T	PETER'S CREEK	06/14/93	*298	NORM	.88"
03T	PETER'S CREEK	06/30/93	*207	NORM	.32"
03T	PETER'S CREEK	07/14/93	e60	LOW	.02"
03T	PETER'S CREEK	07/29/93	e14	LOW	.01"
03T	PETER'S CREEK	08/12/93	48	LOW	.10"
03T	PETER'S CREEK	08/26/93	e180	NORM	.00"
03T	PETER'S CREEK	09/09/93	e46	LOW	.00"
03T	PETER'S CREEK	09/30/93	136	LOW	.00"
03T	PETER'S CREEK	10/04/93	142	NORM	.20"
03T	PETER'S CREEK	10/14/93	117	NORM	.48"
04M	SOUTH SIDE SWISS	05/07/93	e 6	NORM	.14"
04M	SOUTH SIDE SWISS	05/17/93	22	HIGH	.43"
04M	SOUTH SIDE SWISS	06/03/93	e 1	NORM	.01"
04M	SOUTH SIDE SWISS	06/14/93	e*261	HIGH	.88"
04M	SOUTH SIDE SWISS	06/30/93	e 6	NORM	.32"
04M	SOUTH SIDE SWISS	07/14/93	e 4	LOW	.02"
04M	SOUTH SIDE SWISS	07/29/93	e 3	NORM	.01"
04M	SOUTH SIDE SWISS	08/12/93	e93	LOW	.10"
04M	SOUTH SIDE SWISS	08/26/93	e 9	NORM	.00"
04M	SOUTH SIDE SWISS	09/09/93	e 2	NORM	.00"
04M	SOUTH SIDE SWISS	09/30/93	35	LOW	.00"
04M	SOUTH SIDE SWISS	10/04/93	e65	HIGH	.20"

The FECAL COLIFORM PER 100ml of SAMPLE means the number of fecal coliform bacteria colonies counted on the membrane filter and then adjusted for 100ml of sample.

- e Indicates that the value is estimated
- > That the value is estimated as being greater than the one displayed
- < That the value is estimated as being less than the one displayed
- * Indicates values greater than 200 counts per 100ml

APPENDIX 5. RAW DATA FOR 1993 FECAL COLIFORM BACTERIA
NEW RIVER GORGE NATIONAL RIVER

SITE NO	SITE NAME	DATE	TIME	WaterTEMP	FC/100ml	AIRTEMP	pH	STRMLVL	H2OCONDITION/NTU	INCUB	DO	DILUTIONS	WEATHER	CONDUCT	PRECIP	COMMENTS
01M	NEW RIVER @ HINTON VC	05/12/93	12:04	20.5	26	21.0	8.0	11200	N,M,MI	7.7NTU	24:14	8.00	50ML:13/75ML:4	OVC,M	120.0.92"	F/C VALUE IS EST
01M	NEW RIVER @ HINTON VC	05/26/93	10:25	19.0	27	19.0	8.0	6,500	N,SL,MR	6.6NTU	22:00	9.20	50ML:16/100ML:27	OVC	120.0.05"	MANY BROWN COLONIES COVERING THE PLATE
01M	NEW RIVER @ HINTON VC	06/07/93	12:15	22.0	131	24.0	7.9	6,300	N,M,MI	9.9NTU	22:00	9.00	75ML:98/100ML:139	SCT	138.0.56"	F/C VALUE IS EST
01M	NEW RIVER @ HINTON VC	06/23/93	12:20	26.0	33	25.0	8.1	3,500	N,SL,MI	7.3NTU	22:00	8.00	100ML:29/125ML:47	SCT,H-	160.0.36"	F/C VALUE IS 33.3/100ML
01M	NEW RIVER @ HINTON VC	07/08/93	12:55	29.0	62	29.0	8.4	3,072	N,M,MI	3.3NTU	22:23	7.30	100ML:62/125ML:83	SCT	163.0.00"	F/C VALUE IS EST
01M	NEW RIVER @ HINTON VC	07/20/93	12:20	29.0	34	29.0	8.1	2,738	N,SL,MI	3.0NTU	24:00	7.20	50ML:10/75ML:26	CLR	175.0.35"	F/C VALUE IS 34.71/100ML
01M	NEW RIVER @ HINTON VC	08/02/93	12:30	27.0	38	25.0	7.7	1,550	L,SL,CLR	2.8NTU	22:00	6.90	50ML:21/100ML:33	OVC,R-	180.0.44"	F/C VALUE IS 37.5/100ML
01M	NEW RIVER @ HINTON VC	08/20/93	2:05	27.0	43	25.0	7.9	2,900	N,SL,MR	2.4NTU	24:00	6.60	100ML:46/125ML:51	OVC	175.0.00"	F/C VALUE IS 43.4/100ML
01M	NEW RIVER @ HINTON VC	08/31/93	12:48	29.0	28	31.0	8.0	5,000	N,SL,CLR	3.9NTU	22:00	7.00	100ML:25/125ML:41	SCT	190.0.00"	F/C VALUE IS 28.9/100ML
01M	NEW RIVER @ HINTON VC	09/14/93	12:35	25.0	23	21.0	8.0	1,840	N,SL,CLR	3.5NTU	23:00	8.40	100ML:20/125ML:27	CLR	189.0.00"	F/C VALUE IS 23.5/100ML
01M	NEW RIVER @ HINTON VC	10/05/93	12:55	20.0	10	20.0	8.1	2,060	N,SW,CLR	2.3NTU	23:35	99.99	100ML:5/125ML:13	SCT	160.0.03"	F/C VALUE IS EST AT 10.4/100ML
02T	MADAM CREEK	05/12/93	11:48	16.7	24	21.0	8.0	HIGH	N,M,MI	5.4NTU	24:14	8.80	25ML:183/50ML:TNTC	OVC,M	80.0.92"	F/C VALUE IS EST
02T	MADAM CREEK	05/26/93	10:50	15.5	32	18.0	8.2	NORM	N,SL,MI	3.0NTU	22:00	9.80	15ML:5/25ML:8	BKN	110.0.05"	F/C VALUE IS EST
02T	MADAM CREEK	06/07/93	12:03	22.5	400	24.0	8.3	NORM	N,N,CLR	8.0NTU	22:00	8.80	15ML:TNTC/25ML:TNTC	SCT	275.0.56"	F/C VALUE IS >400/100ML - HUMAN WASTE VISIBLE
02T	MADAM CREEK	06/23/93	12:45	24.0	9600	27.0	8.4	LOW	L,SL,MR	10.3NTU	22:00	8.40	1.0ML:96/3.0ML:TNTC	CLR,M-	210.0.36"	F/C VALUE IS EST
02T	MADAM CREEK	07/08/93	12:10	28.0	12000	31.0	8.6	LOW	L,M,MI	6.7NTU	22:23	10.90	0.5ML:TNTC/1.0ML:TNTC	CLR	260.0.00"	F/C VALUE IS > 12000/100ML HUMAN EXCREMENT VISIBLE AT SITE
02T	MADAM CREEK	07/20/93	12:00	29.0	24500	30.0	8.3	LOW	L,SL,MR	20.0NTU	24:00	7.40	0.1ML:36/0.2ML:26	CLR	398.0.35"	F/C VALUE IS 24500/100ML
02T	MADAM CREEK	08/02/93	12:50	23.5	4000	25.0	7.7	LOW	L,SL,MR	15.0NTU	22:00	5.60	0.1ML:4/0.2ML:3	BKN,	450.0.44"	F/C VALUE IS EST - NO FLOW
02T	MADAM CREEK	08/20/93	1:30	26.0	2000	26.0	7.6	LOW	L,SL,MI	4.0NTU	24:00	4.00	.1ML:2/.2ML/4	OVC	333.0.00"	F/C VALUE IS EST
02T	MADAM CREEK	08/31/93	12:05	29.0	5500	35.0	8.1	LOW	L,SL,CLR	3.2NTU	22:00	8.20	.1ML:3/.2ML:11	SCT	344.0.00"	F/C VALUE IS EST
02T	MADAM CREEK	09/14/93	12:00	24.0	1500	31.0	7.8	LOW	L,SL,MI	9.4NTU	23:00	7.30	.2ML:3/.3ML:1	CLR	390.0.00"	F/C VALUE IS EST
02T	MADAM CREEK	10/05/93	12:20	18.0	3360	22.0	7.7	LOW	L,SL,CLR	1.9NTU	23:35	99.99	5ML:168/10ML:TNTC	SCT	240.0.03"	F/C VALUE IS EST
03M	NEW RIVER @ SANDSTONE FALLS	05/12/93	11:17	20.2	127	19.0	8.0	HIGH	N,M,TB	16.0NTU	24:14	8.00	50ML:26/75ML:95	OVC,M	120.0.92"	
03M	NEW RIVER @ SANDSTONE FALLS	05/26/93	11:25	19.0	35	18.0	8.3	HIGH	N,SW,MI	5.7NTU	22:00	9.40	50ML:18/100ML:35	BKN	120.0.05"	
03M	NEW RIVER @ SANDSTONE FALLS	06/07/93	11:34	21.5	88	24.0	8.2	HIGH	N,SW,MR	11.0NTU	22:00	8.80	75ML:65/100ML:87	CLR	130.0.56"	
03M	NEW RIVER @ SANDSTONE FALLS	06/23/93	1:15	26.0	7	28.0	8.8	NORM	N,SW,MI	6.5NTU	22:00	8.00	50ML:3/100ML:7	CLR,M-	152.0.36"	F/C VALUE IS EST - MANY BROWN COLONIES COVERING THE PLATE
03M	NEW RIVER @ SANDSTONE FALLS	07/08/93	11:15	28.0	15	33.0	8.5	NORM	N,SW,MI	3.4NTU	22:23	7.40	50ML:4/100ML:15	CLR	163.0.00"	F/C VALUE IS 15/100ML
03M	NEW RIVER @ SANDSTONE FALLS	07/20/93	11:00	28.0	14	27.0	8.6	NORM	N,SW,MI	3.1NTU	24:00	7.30	75ML:9/150ML:22	SCT	170.0.35"	F/C VALUE IS 14.7/100ML
03M	NEW RIVER @ SANDSTONE FALLS	08/02/93	01:35	27.0	108	28.0	8.4	LOW	L,SW,CLR	03.3NTU	22:00	7.50	100ML:108/125ML:122	BKN,M-	173.0.44"	F/C VALUE IS EST
03M	NEW RIVER @ SANDSTONE FALLS	08/20/93	12:20	28.0	132	27.0	8.7	LOW	L,SW,MI	2.0NTU	24:00	7.30	100ML:132/125ML:141	OVC	180.0.00"	F/C VALUE IS EST
03M	NEW RIVER @ SANDSTONE FALLS	08/31/93	11:20	28.0	117	31.0	8.1	NORM	N,SW,CLR	6.8NTU	22:00	7.20	50ML:40/75ML:28	OVC	185.0.00"	F/C VALUE IS 117.3/100ML
03M	NEW RIVER @ SANDSTONE FALLS	09/14/93	11:55	25.0	18	28.0	8.4	LOW	L,SW,CLR	2.7NTU	23:00	8.00	50ML:8/75ML:14	CLR	188.0.00"	F/C VALUE IS EST
03M	NEW RIVER @ SANDSTONE FALLS	10/05/93	11:30	19.0	24	18.0	8.8	LOW	L,SW,CLR	1.5NTU	23:35	99.99	100ML:19/125ML:31	SCT	150.0.03"	F/C VALUE IS EST 24.8/100ML
04M	NEW RIVER @ SANDSTONE	05/12/93	11:01	19.6	124	19.0	7.8	HIGH	N,SL,TB	15.0NTU	24:14	6.80	50ML:5/75ML:93	OVC,M	115.0.92"	
04M	NEW RIVER @ SANDSTONE	05/26/93	11:45	19.0	57	18.0	8.1	HIGH	N,SL,MR	5.2NTU	22:00	9.00	35ML:23/50ML:25	BKN	120.0.05"	F/C VALUE IS 57.9/100ML
04M	NEW RIVER @ SANDSTONE	06/07/93	11:19	21.5	74	27.0	8.1	HIGH	N,M,MI	8.1NTU	22:00	9.00	35ML:24/50ML:39	CLR	130.0.56"	
04M	NEW RIVER @ SANDSTONE	06/23/93	1:35	27.0	12	28.0	8.6	NORM	N,SL,MR	4.4NTU	22:00	8.30	100ML:--/125ML:15	CLR,M-	153.0.36"	F/C VALUE IS EST - 100ML WAS COVERED WITH BROWN COLONIES
04M	NEW RIVER @ SANDSTONE	07/08/93	10:55	28.0	46	30.0	8.2	NORM	N,SW,MI	3.5NTU	22:23	7.50	50ML:15/100ML:46	CLR	151.0.00"	F/C VALUE IS 46/100ML

SITE NO	SITE NAME	DATE	TIME	WaterTEMP	FC/100ml	AIRTEMP	pH	STRMLVL	H2OCONDITION/NTU	INCUB	DO	DILUTIONS	WEATHER	CONDUCT	PRECIP	COMMENTS
04M	NEW RIVER @ SANDSTONE	08/02/93	01:20	26.0	134	28.0	8.0	LOW	L,M,MI 4.1NTU	22:00	7.20	50ML:67/100ML:114	BKN,H-	172.0.44"		F/C VALUE IS EST
04M	NEW RIVER @ SANDSTONE	08/20/93	12:15	29.0	98	29.0	8.9	LOW	L,SW,MI 2.8NTU	24:00	9.10	100ML:98/125ML:112	OVC	183.0.00"		F/C VALUE IS EST
04M	NEW RIVER @ SANDSTONE	08/31/93	10:55	28.0	27	31.0	8.0	NORM	N,M,CLR 2.8NTU	22:00	7.80	75ML:15/100ML:27	OVC	182.0.00"		
04M	NEW RIVER @ SANDSTONE	09/14/93	10:50	25.0	56	25.0	8.4	LOW	L,SL,CLR 2.3NTU	23:00	8.50	80ML:52/100ML:48	CLR	180.0.00"		F/C VALUE IS 56.2/100ML
04M	NEW RIVER @ SANDSTONE	10/05/93	10:55	18.0	34	20.0	8.6	LOW	L,SL,CLR 1.7NTU	23:35	99.99	90ML:46/120ML:51	SCT	150.0.03"		F/C VALUE IS EST 34.3/100ML
05T	LICK CREEK	05/12/93	10:13	17.6	132	18.0	7.9	28.33	N,SW,MI 4.3NTU	24:14	8.80	75ML:99/100ML:137	OVC,H	120.0.92"		F/C VALUE IS EST
05T	LICK CREEK	05/26/93	12:45	17.0	40	22.0	99.9	8.800	N,SL,CLR 2.6NTU	22:00	10.00	50ML:14/100ML:40	BKN	152.0.05"		
05T	LICK CREEK	06/07/93	10:35	14.8	80	24.0	8.0	39.15	N,SW,MR 9.5NTU	22:00	9.80	75ML:TNTC/100ML:TNTC	CLR	110.0.56"		F/C VALUE IS >80/100ML
05T	LICK CREEK	06/23/93	2:30	24.0	40	28.0	9.1	3.40	L,SL,CLR 1.5NTU	22:00	8.80	50ML:29/100ML:51	SCT,H-	250.0.36"		F/C VALUE IS 40.0/100ML
05T	LICK CREEK	07/08/93	10:00	23.0	120	26.0	8.3	4.25	L,M,MI 3.8NTU	22:23	8.20	50ML:60/75ML:92	CLR	250.0.00"		F/C VALUE IS 120/100ML
05T	LICK CREEK	07/20/93	09:30	24.0	69	25.0	8.2	2.12	L,SL,CLR 4.3NTU	24:00	8.00	50ML:34/70ML:49	SCT	330.0.35"		F/C VALUE IS 69/100ML
05T	LICK CREEK	08/02/93	02:25	24.0	88	29.0	8.2	.489	L,SL,CLR 3.0NTU	22:00	9.10	35ML:36/50ML:39	BKN,H-	400.0.44"		F/C VALUE IS 87.6/100ML
05T	LICK CREEK	08/20/93	10:30	23.0	53	25.0	8.3	1.33	L,SW,MR 2.0NTU	24:00	8.30	50ML:29/70ML:34	SCT	370.0.00"		F/C VALUE IS 53.3/100ML
05T	LICK CREEK	08/31/93	09:55	23.0	20	29.0	8.0	LOW	L,SL,CLR 2.0NTU	22:00	8.20	50ML:11/70ML:14	OVC	440.0.00"		F/C VALUE IS EST
05T	LICK CREEK	09/14/93	09:45	18.0	48	12.0	7.9	.247	L,SL,MI 3.2NTU	23:00	8.60	55ML:33/75ML:28	OVC	435.0.00"		F/C VALUE IS 48.6/100ML
05T	LICK CREEK	10/05/93	09:55	12.0	44	11.0	8.3	1.000	L,SL,CLR 0.7NTU	23:35	99.99	80ML:33/100ML:47	CLR	340.0.03"		F/C VALUE IS 44.1/100ML
06T	MEADOW CREEK	05/12/93	9:52	15.7	336	17.0	7.6	63.00	N,SW,TB 17.0NTU	24:14	9.50	50ML:168/75ML:TNTC	OVC	65.0.92"		F/C VALUE IS EST
06T	MEADOW CREEK	05/26/93	12:35	16.0	171	20.0	7.9	22.10	N,SW,MI 2.5NTU	22:00	9.80	35ML:TNTC/50ML:TNTC	BKN	90.0.05"		F/C VALUE IS >171.4/100ML
06T	MEADOW CREEK	06/07/93	10:15	13.5	480	19.0	7.8	60.00	N,SW,MR 16.5NTU	22:00	10.40	10ML:48/20ML:89	CLR	62.0.56"		
06T	MEADOW CREEK	06/23/93	2:45	22.0	22	30.0	8.9	6.10	N,M,CLR 1.3NTU	22:00	8.70	25ML:4/50ML:11	SCT,H-	152.0.36"		F/C VALUE IS EST
06T	MEADOW CREEK	07/08/93	09:47	21.0	99	24.0	8.1	6.50	N,M,CLR 3.6NTU	22:23	9.00	75ML:74/100ML:129	CLR	173.0.00"		F/C VALUE IS 99/100ML
06T	MEADOW CREEK	07/20/93	08:55	23.0	240	24.0	8.1	1.80	L,M,CLR 2.6NTU	24:00	8.20	25ML:TNTC/50ML:TNTC	OVC,F	220.0.35"		F/C VALUE IS > 240/100ML
06T	MEADOW CREEK	08/02/93	2:45	23.0	194	29.0	8.5	1.80	L,SL,CLR 2.8NTU	22:00	8.90	50ML:97/100ML:189	SCT,H-	240.0.44"		F/C VALUE IS EST
06T	MEADOW CREEK	08/20/93	09:55	21.0	64	22.0	8.4	2.02	L,SW,MI 2.1NTU	24:00	9.10	15ML:7/25ML:16	OVC	190.0.00"		F/C VALUE IS EST
06T	MEADOW CREEK	08/31/93	09:15	22.0	25	22.0	8.1	1.30	L,M,CLR 3.9NTU	22:00	8.60	20ML:5/30ML:3	OVC	240.0.00"		F/C VALUE IS EST
06T	MEADOW CREEK	09/14/93	09:05	17.0	10	19.0	7.9	.500	L,M,CLR 2.4NTU	23:00	9.10	40ML:4/50ML:1	OVC	230.0.00"		F/C VALUE IS EST
06T	MEADOW CREEK	10/05/93	09:20	11.0	8	11.0	8.0	1.800	L,M,CLR 0.9NTU	23:35	99.99	100ML:6/150ML:13	CLR	159.0.03"		F/C VALUE IS 8.7/100ML
07T	LAUREL CREEK @ QUINNMNT	05/11/93	11:15	16.0	122	23.0	7.4	85.77	N,SW,TB 25.0NTU	22:30	8.80	25ML:75/50ML:61	SCT,H	50.0.05"		
07T	LAUREL CREEK @ QUINNMNT	05/25/93	10:00	13.0	26	18.0	7.6	12.77	N,SW,CLR 2.6NTU	23:10	10.40	20ML:2/40ML:5	OVC	78.0.00"		F/C VALUE IS 12.5/100ML
07T	LAUREL CREEK @ QUINNMNT	06/10/93	8:23	16.0	88	18.0	7.8	24.10	N,M,CLR 2.6NTU	23:00	9.30	20ML:9/40ML:35	OVC	82.0.01"		
07T	LAUREL CREEK @ QUINNMNT	06/21/93	11:23	21.0	4	21.0	8.0	2.15	N,S,CLR .75NTU	23:00	9.90	25ML:1/50ML:1	OVC	121.0.14"		F/C VALUE IS EST
07T	LAUREL CREEK @ QUINNMNT	07/07/93	01:55	24.0	13	34.0	8.4	.900	N,SW,CLR 1.3NTU	22:02	8.30	100ML:11/150ML:20	CLR	155.0.00"		F/C VALUE IS 13/100ML
07T	LAUREL CREEK @ QUINNMNT	07/19/93	10:55	21.0	30	27.0	7.9	.550	L,SW,CLR 1.1NTU	24:39	8.60	75ML:23/100ML:19	OVC,L	172.0.00"		F/C VALUE IS 30.7/100ML - WATER LEVEL IS BELOW GAUGE LEVI
07T	LAUREL CREEK @ QUINNMNT	08/03/93	2:00	21.0	60	22.0	7.9	8.06	N,SW,MR 22.0NTU	24:00	8.60	100ML:TNTC/125ML:TNTC	SCT	90.0.00"		F/C VALUE IS > 60/100ML
07T	LAUREL CREEK @ QUINNMNT	08/17/93	02:20	21.0	7	26.0	8.3	45.50	L,SW,MI 2.2NTU	24:00	8.10	50ML:3/100ML:7	OVC	140.0.04"		F/C VALUE IS EST
07T	LAUREL CREEK @ QUINNMNT	08/30/93	10:25	21.0	12	24.0	8.2	.550	L,M,CLR 1.5NTU	24:00	9.00	150ML:10/250ML:32	OVC	187.0.44"		F/C VALUE IS 12.8/100ML
07T	LAUREL CREEK @ QUINNMNT	09/13/93	10:25	16.0	3	11.0	8.1	.555	L,M,CLR 0.6NTU	24:00	10.00	175ML:5/250ML:8	OVC	170.0.00"		F/C VALUE IS EST AT 3.2ML/100ML
07T	LAUREL CREEK @ QUINNMNT	10/04/93	10:00	10.0	18	6.0	8.0	.900	L,M,CLR 0.6NTU	24:30	99.99	200ML:37/250ML:108	SCT	123.0.05"		F/C VALUE IS 18.5/100ML
08M	NEW RIVER @ PRINCE	05/11/93	10:54	21.0	20	24.0	7.8	HIGH	N,M,TB 20.0NTU	22:30	8.00	25ML:5/50ML:--	SCT,H	115.0.05"		BOTH DILUTIONS HADY WHITE AND YELLOW GROWTH PRESENT
08M	NEW RIVER @ PRINCE	05/25/93	10:25	19.0	7	20.0	7.9	HIGH	N,SW,MI 6.6NTU	23:10	8.60	50ML:1/100ML:7	OVC	112.0.00"		F/C VALUE IS EST
08M	NEW RIVER @ PRINCE	06/10/93	8:10	23.0	46	19.0	7.9	HIGH	N,SW,MI 5.8NTU	23:00	7.60	100ML:46/150ML:91	OVC,F	130.0.01"		
08M	NEW RIVER @ PRINCE	06/21/93	11:09	25.5	16	23.0	7.9	NORM	N,S,MI 7.1NTU	23:00	8.30	75ML:11/125ML:20	OVC	145.0.14"		F/C VALUE IS 16/100ML

SITE NO	SITE NAME	DATE	TIME	WaterTEMP	FC/100ml	AIRTEMP	pH	STRMLVL	H2OCONDITION/NTU	INCUB	DO	DILUTIONS	WEATHER CONDUCT	PRECIP	COMMENTS
3RM	NEW RIVER @ PRINCE	07/07/93	01:38	30.0	18	34.0	8.3	NORM	N,SW,MI 4.2NTU	22:02	7.20	100ML:18/150ML:7	SCT	159.0.00"	F/C VALUE IS EST - 150ML SAMPLE HAD BROWN AND YELLOW GROWT
3RM	NEW RIVER @ PRINCE	07/19/93	10:37	27.0	9	25.0	7.9	NORM	N,SW,MI 4.6NTU	24:39	6.90	75ML:8/100ML:9	OVC,L,F	179.0.00"	F/C VALUE IS EST
3RM	NEW RIVER @ PRINCE	08/03/93	1:30	27.0	63	29.0	8.3	LOW	L,N,MR 3.2NTU	24:00	7.80	100ML:63/125ML:74	CLR	175.0.00"	F/C VALUE IS EST
3RM	NEW RIVER @ PRINCE	08/17/93	01:55	27.0	24	31.0	8.2	NORM	N,SW,MI 4.3NTU	24:00	5.40	50ML:11/100ML:24	OVC	185.0.04"	F/C VALUE IS 24/100ML
3RM	NEW RIVER @ PRINCE	08/30/93	09:55	27.0	127	28.0	8.1	NORM	N,N,MI 4.7NTU	24:00	7.20	100ML:127/125ML:143	OVC	190.0.44"	F/C VALUE IS EST
3RM	NEW RIVER @ PRINCE	09/13/93	09:50	32.0	5	19.0	8.2	NORM	N,N,CLR 3.7NTU	24:00	8.00	75ML:4/100ML:3	OVC	170.0.00"	F/C VALUE IS EST AT 5.33/100ML
3RM	NEW RIVER @ PRINCE	10/04/93	09:35	17.0	6	9.0	8.2	LOW	L,N,CLR 2.2NTU	24:30	99.99	100ML:--/125ML:8	SCT	147.0.05"	F/C VALUE IS EST AT 6.4/100ML
9PT	PINEY CREEK @ McCREERY	05/11/93	10:34	18.0	99	20.0	8.2	93.6	N,SW,MI 3.8NTU	22:30	5.50	35ML:32/50ML:54	SCT,N	230.0.05"	F/C VALUE IS 99.7/100ML
9PT	PINEY CREEK @ McCREERY	05/25/93	11:40	15.0	26	18.0	7.6	81.80	N,SW,MI 2.4NTU	23:10	9.80	15ML:4/25ML:1	OVC	205.0.00"	F/C VALUE IS EST 26.7/100ML
9PT	PINEY CREEK @ McCREERY	06/10/93	7:57	19.0	198	17.0	7.8	87.00	N,SW,MI 4.7NTU	23:00	8.60	15ML:43/25ML:24	OVC,F	205.0.01"	
9PT	PINEY CREEK @ McCREERY	06/21/93	10:51	21.0	40	21.0	7.9	38.0	N,S,CLR 3.1NTU	23:00	9.80	15ML:6/25ML:10	OVC	275.0.14"	F/C VALUE IS EST
9PT	PINEY CREEK @ McCREERY	07/07/93	01:11	24.0	512	32.0	8.1	38.0	N,SW,MI 6.0NTU	22:02	8.20	25ML:128/50ML:75	SCT	300.0.00"	F/C VALUE IS EST
9PT	PINEY CREEK @ McCREERY	07/19/93	10:25	22.0	206	22.0	7.8	25.00	N,SW,MI 6.0NTU	24:39	8.20	5ML:10/15ML:31	OVC,L,F	370.0.00"	F/C VALUE IS 206.7/100ML
9PT	PINEY CREEK @ McCREERY	08/03/93	1:05	22.0	1200	22.0	7.9	40.80	N,SW,MI 7.7NTU	24:00	8.00	5.ML:TNTC/15ML:TNTC	CLR	290.0.00"	F/C VALUE IS >1200/100ML
9PT	PINEY CREEK @ McCREERY	08/17/93	01:30	22.0	466	25.0	8.0	28.00	N,SW,MR 3.9NTU	24:00	8.10	1.ML:2/3.ML:14	SCT	330.0.04"	F/C VALUE IS EST
9PT	PINEY CREEK @ McCREERY	08/30/93	09:35	22.0	80	23.0	8.0	16.50	L,N,CLR 2.2NTU	24:00	8.60	5ML:4/7ML:3	OVC	404.0.44"	F/C VALUE IS EST
9PT	PINEY CREEK @ McCREERY	09/13/93	09:30	16.0	40	14.0	7.9	14.90	L,N,CLR 1.6NTU	24:00	9.60	10ML:3/15ML:6	OVC	360.0.00"	F/C VALUE IS EST
9PT	PINEY CREEK @ McCREERY	10/04/93	09:15	17.0	144	7.0	7.9	19.20	L,N,CLR 1.1NTU	24:30	99.99	25ML:36/75ML:78	SCT	300.0.05"	
11T	DUNLOUP CREEK	05/20/93	09:45	12.0	300	12.0	6.5	132.6	N,SW,MR 11NTU	22:00	10.90	15ML:45/25ML:92	BKN	210.01.10"	
11T	DUNLOUP CREEK	06/02/93	01:30	15.0	370	25.0	8.5	NORM	N,SW,MI 4.8NTU	22:00	10.40	5ML:15/10ML:37	SCT	405.0.39"	
11T	DUNLOUP CREEK	06/16/93	09:40	16.0	255	22.0	8.4	43.00	N,SW,MI 4.4NTU	22:30	11.20	20ML:51/30ML:91	CLR	422.0.00"	
11T	DUNLOUP CREEK	06/29/93	12:35	18.0	380	24.0	8.4	29.50	N,SW,MI 4.2NTU	23:35	9.40	15ML:57/25ML:89	OVC,R-	510.0.08"	COLONIES APPEAR PALE BULE AND SOME BROWN GROWTH AS WELL
11T	DUNLOUP CREEK	07/12/93	10:15	19.0	600	21.0	8.3	36.50	N,SW,TB 148.0NTU	24:00	9.00	10ML:TNTC/20ML:TNTC	CLR	430.0.55"	F/C VALUE IS >600/100ML - SITE 11,13 TB DUE TO HEAVY LOCAL
11T	DUNLOUP CREEK	07/28/93	11:00	20.0	195	26.0	8.5	16.75	L,N,MI 3.6NTU	23:00	9.10	5ML:6/20ML:39	SCT	550.0.04"	
11T	DUNLOUP CREEK	08/11/93	11:35	17.0	307	20.0	8.6	14.00	L,N,MI 4.8NTU	23:45	9.60	5ML:21/20ML:39	SCT	525.0.00"	F/C VALUE IS 307.5/100ML
11T	DUNLOUP CREEK	08/25/93	12:30	20.0	1200	27.0	8.6	15.00	L,N,MI 2.5NTU	23:00	8.80	5ML:TNTC/20ML:TNTC	CLR,N-	600.0.00"	F/C VALUE IS EST 1200/100ML
11T	DUNLOUP CREEK	09/07/93	09:05	18.0	130	19.0	8.4	LOW	L,SW,CLR 3.3NTU	22:02	9.60	5ML:5/20ML:26	OVC	550.0.00"	
11T	DUNLOUP CREEK	09/21/93	08:55	18.0	370	12.0	8.3	267.0	L,SW,MI 6.9NTU	23:00	9.40	30ML:83/20ML:74	SCT	500.0.04"	F/C VALUE IS EST 370/100ML
2RM	NEW RIVER @ THURMOND	05/20/93	10:15	16.0	72	15.0	6.9	12850	N,N,MR 12NTU	22:00	10.00	25ML:18/50ML:36	BKN	100.01.10"	
2RM	NEW RIVER @ THURMOND	06/02/93	12:45	20.0	42	23.0	8.4	2,860	N,SL,MI 4.1NTU	22:00	9.60	25ML:6/50ML:21	CLR	133.0.39"	
2RM	NEW RIVER @ THURMOND	06/16/93	11:00	23.0	54	24.0	7.9	7,150	N,N,TB 13NTU	22:30	8.80	25ML:10/50ML:27	CLR	188.0.00"	
2RM	NEW RIVER @ THURMOND	06/29/93	12:00	23.0	14	26.0	8.1	2,890	N,N,MI 3.0NTU	22:35	7.80	50ML:7/75ML:4	OVC	160.0.08"	F/C VALUE IS EST
2RM	NEW RIVER @ THURMOND	07/12/93	11:15	29.0	780	27.0	8.0	2,440	N,SL,CLR 2.6NTU	24:00	7.20	75ML:TNTC/125ML:TNTC	SCT	160.0.55"	F/C VALUE IS >780/100ML
2RM	NEW RIVER @ THURMOND	07/28/93	11:20	28.5	46	28.0	8.0	2,800	L,SL,CLR 3.3NTU	23:00	6.80	25ML:12/30ML:14	SCT	178.0.04"	F/C VALUE IS EST 46.7/100ML
2RM	NEW RIVER @ THURMOND	08/09/93	11:15	25.0	7	20.0	8.2	2,270	L,SL,CLR 2.4NTU	23:45	8.10	50ML:6/100ML:7	SCT	170.0.00"	F/C VALUE IS EST - BOTH SAMPLES OVERGROWN WITH YELLOWISH M
2RM	NEW RIVER @ THURMOND	08/25/93	12:00	28.0	10	27.0	8.5	2,360	L,N,CLR 2.1NTU	23:00	8.20	100ML:11/150ML:16	SCT,N-	182.0.00"	F/C VALUE IS EST 10.7/100ML
2RM	NEW RIVER @ THURMOND	09/07/93	10:00	25.0	2	20.0	8.2	900	L,SL,CLR 1.6NTU	22:02	8.00	1000ML:2/125ML:3	OVC	170.0.00"	F/C VALUE IS EST 2.4/100ML
2RM	NEW RIVER @ THURMOND	09/21/93	09:30	23.0	50	19.0	7.7	4,340	N,SL,MI 3.9NTU	23:00	7.40	125ML:63/150ML:75	OVC	165.0.04"	F/C VALUE IS EST 50.4/100ML
5T	ARBUCKLE CREEK	05/29/93	11:50	11.0	1020	13.0	7.0	HIGH	N,SW,MR 15.2NTU	22:00	11.00	15ML:153/25ML:TNTC	BKN	235.01.10"	F/C VALUE IS EST
5T	ARBUCKLE CREEK	06/02/93	12:15	13.0	1030	19.0	8.4	13.00	N,N,MI 11NTU	22:00	10.20	10ML:103/15ML:127	CLR	370.0.39"	F/C VALUE IS EST
5T	ARBUCKLE CREEK	06/16/93	10:25	15.0	96	22.0	8.4	14.00	N,N,MI 8.5NTU	22:30	11.30	15ML:19/25ML:24	CLR	370.0.00"	
5T	ARBUCKLE CREEK	06/29/93	11:30	17.5	73	20.0	8.3	6.000	L,N,MI 6.8NTU	23:35	9.20	5ML:5/15ML:11	OVC	480.0.08"	F/C VALUE IS EST

SITE NO	SITE NAME	DATE	TIME	WaterTEMP	FC/100ml	AIRTEMP	pH	STRMLVL	H2OCONDITION/NTU	INCUB	DO	DILUTIONS	WEATHER	CONDUCT	PRECIP	COMMENTS
13T	ARBUCKLE CREEK		07/12/93	10:51	19.5	240	23.0	8.4	10.50	H,SW,TB	138.0NTU	24:00	8.50	10ML:21/20ML:54	CLR		485.0.55"	STRONG SMELL OF SEWAGE TODAY
13T	ARBUCKLE CREEK		07/28/93	10:15	19.5	97	22.0	8.4	1.000	L,SL,MI	7.6NTU	23:00	8.40	25ML:26/30ML:27	SCT		540.0.04"	
13T	ARBUCKLE CREEK		08/09/93	10:30	17.0	355	18.0	8.5	1.000	L,SL,MI	8.0NTU	23:45	9.20	20ML:71/27ML:129	SCT		500.0.00"	F/C VALUE IS EST - 20ML SAMPLE OVERGROWN WITH BACT.
13T	ARBUCKLE CREEK		08/25/93	11:30	21.0	80	22.0	7.8	LOW	L,M,MR	23.0NTU	23:00	8.50	5ML:8/20ML:16	SCT,H-		525.0.00"	F/C VALUE IS EST 80/100ML LOCAL T-STORM CAME IN AREA
13T	ARBUCLKE CREEK		09/07/93	11:00	19.0	2190	19.0	8.3	LOW	L,SW,MI	13.0NTU	22:02	8.60	10ML:219/25ML:323	OVC		480.0.00"	F/C VALUE IS EST 2190/100ML
13T	ARBUCKLE CREEK		09/21/93	10:20	19.0	540	18.0	7.6	20.00	L,SW,MI	>100.0NTU	23:00	8.60	5ML:27/10ML:TNTC	SCT		200.0.04"	EXTREMELY TURBID WATER
14M	NEW RIVER @ CUNARD		05/20/93	02:10	15.4	81	18.5	6.6	HIGH	H,M,MR	14.5NTU	22:00	9.80	25ML:21/50ML:39	OVC		95.01.10"	
14M	NEW RIVER @ CUNARD		06/02/93	10:05	20.0	50	20.0	8.1	HIGH	H,SL,MI	3.7NTU	22:00	8.20	25ML:9/50ML:25	CLR		132.0.39"	
14M	NEW RIVER @ CUNARD		06/18/93	10:45	25.0	152	27.0	7.9	HIGH	H,SL,MR	5.1NTU	23:00	8.70	50ML:76/100ML:	CLR,H+		142.0.00"	100ML DILUTION WAS OVER TAKEN BY ANOTHER BACTERIA (BROWN/YE
14M	NEW RIVER @ CUNARD		07/01/93	09:50	26.0	330	22.0	8.0	NORM	H,SL,MR	6.0NTU	22:00	7.50	30ML:99/60ML:120	OVC,H-		162.0.52"	
14M	NEW RIVER @ CUNARD		07/13/93	02:35	29.0	100	25.0	8.3	NORM	H,SL,MI	3.1NTU	22:00	7.40	15ML:21/25ML:25	SCT		169.0.00"	F/C VALUE IS EST
14M	NEW RIVER @ CUNARD		07/28/93	01:10	29.0	20	31.0	8.2	LOW	L,SL,CLR	2.8NTU	23:00	7.20	20ML:5/30ML:6	SCT		180.0.04"	F/C VALUE IS EST
14M	NEW RIVER @ CUNARD		08/11/93	01:35	25.0	60	24.0	8.0	LOW	L,SL,MI	2.1NTU	23:00	7.70	15ML:4/25ML:15	SCT		184.0.54"	F/C VALUE IS EST - OVERGROWN WITH OTHER BACTERIAL GROWTH
14M	NEW RIVER @ CUNARD		08/24/93	09:50	27.0	6	24.0	8.2	LOW	L,M,CLR	2.2NTU	22:00	7.30	100ML:6/125ML:3	BKN,H-		183.0.00"	F/C VALUE IS EST 6/100ML
14M	NEW RIVER @ CUNARD		09/07/93	12:30	26.0	5	29.0	8.1	LOW	L,SL,CLR	2.2NTU	22:02	7.60	125ML:7/175ML:10	SCT		180.0.00"	F/C VALUE IS 5.7/100ML
14M	NEW RIVER @ CUNARD		09/21/93	12:00	24.0	28	22.0	7.6	NORM	H,SL,CLR	7.1NTU	23:00	8.00	125ML:42/175ML:42	SCT		170.0.04"	F/C VALUE IS EST 28.8/100ML
15T	COAL RUN		05/20/93	02:30	11.0	400	19.0	6.1	HIGH	H,SW,MR	13NTU	22:00	11.40	15ML:60/25ML:98	OVC		200.01.10"	
15T	COAL RUN		06/18/93	11:00	16.0	******	19.0	8.1	NORM	H,SW,MR	8.5NTU	23:00	10.40	15ML:--/25ML:--	CLR,H+		330.0.00"	NO F/C COLONIES WERE COUNTED DUE TO ANOTHER BACTERIAL GROWN
15T	COAL RUN		06/20/93	09:50	12.0	400	15.0	8.2	NORM	H,SW,MI	7.3NTU	22:00	11.20	15ML:60/25ML:90	CLR		300.0.39"	
15T	COAL RUN		07/01/93	09:30	18.0	******	22.0	7.9	NORM	H,SW,TB	23.0NTU	22:00	9.40	5ML:--/10ML:--	OVC,H-		323.0.52"	OTHER BACTERIAL GROWTH, CANNOT DIFFERENTIATE BETWEEN F/C AN
15T	COAL RUN		07/13/93	02:05	21.0	4333	24.0	8.0	NORM	H,M,MR	18NTU	22:00	6.60	0.5ML:16/3.0ML:130	CLR		310.0.00"	F/C VALUE IS EST
15T	COAL RUN		07/28/93	12:55	20.0	33	30.0	8.4	LOW	L,M,MI	5.7NTU	23:00	8.50	0.5ML:0/3.0ML:1	SCT		413.0.04"	F/C VALUE IS EST 33.3/100ML
15T	COAL RUN		08/11/93	01:15	18.0	666	20.0	8.0	LOW	L,SL,MR	32.5NTU	23:00	8.90	0.3ML:2/1.0ML:--	SCT		379.0.54"	F/C VALUE IS EST AT 666.7/100ML
15T	COAL RUN		08/24/93	10:10	19.0	46	23.0	7.9	LOW	L,M,MI	7.2NTU	22:00	9.20	5ML:2/15ML:7	BKN,H-		422.0.00"	F/C VALUE IS EST 46.7/100ML CREEK BED LAYERED WITH FINE SED
15T	COAL RUN		09/07/93	01:00	19.0	240	20.0	8.0	LOW	L,SW,CLR	6.9NTU	22:02	8.60	10ML:23/20ML:50	SCT		410.0.00"	
15T	COAL RUN		09/21/93	12:30	18.0	1200	19.0	7.6	LOW	L,SW,MI	42.0NTU	23:00	9.40	5ML:TNTC/10ML:TNTC	SCT		365.0.04"	F/C VALUE IS EST >1200/100ML
16T	KEENEY CREEK		05/19/93	01:45	13.0	786	15.0	7.4	HIGH	H,SW,MR	16NTU	22:05	9.10	15ML:118/25ML:189	OVC		63.0.54"	F/C VALUE IS EST AT 786.7ML/100ML
16T	KEENEY CREEK		06/01/93	12:30	14.0	300	18.0	7.5	NORM	H,SW,MI	6.5NTU	22:00	9.60	20ML:TNTC/30ML:TNTC	SCT		90.0.58"	F/C VALUE IS >300/100ML
16T	KEENEY CREEK		06/18/93	01:30	17.0	400	28.0	7.4	LOW	L,M,CLR	2.7NTU	23:00	9.70	15ML:TNTC/25ML:TNTC	BKN,H+		110.0.00"	F/C VALUE IS >400/100ML
16T	KEENEY CREEK		07/01/93	01:00	18.0	3400	28.0	7.4	LOW	L,M,MI	5.0NTU	22:00	8.80	5ML:170/10ML:TNTC	BKN		145.0.53"	
16T	KEENEY CREEK		07/13/93	09:42	19.5	10200	21.0	7.7	NORM	H,M,CLR	2.8NTU	22:00	8.20	0.5ML:51/3.0ML:TNTC	SCT		180.0.00"	F/C VALUE IS EST
16T	KEENEY CREEK		07/27/93	11:25	21.0	7500	28.0	7.2	LOW	L,SL,CLR	1.3NTU	22:00	6.80	0.1ML:6/0.2ML:15	SCT		221.0.00"	F/C VALUE IS EST
16T	KEENEY CREEK		08/11/93	10:10	18.0	36000	17.0	7.8	LOW	L,SL,TB	36.2NTU	23:00	7.90	0.1ML:36/0.5ML:140	R		200.0.54"	
16T	KEENEY CREEK		08/24/93	12:45	20.0	2400	27.0	7.4	LOW	L,SL,CLR	1.9NTU	22:00	7.20	.5ML:12/3ML:66	CLR		230.0.00"	F/C VALUE IS EST 2400/100ML
16T	KEENEY CREEK		09/08/93	10:05	18.0	7375	18.0	7.5	LOW	L,SL,CLR	1.7NTU	23:00	8.00	.8ML:59/2.ML:96	OVC		240.0.00"	F/C VALUE IS EST 7375/100ML
17M	NEW RIVER @ FAYETTE STATION		05/19/93	02:50	17.0	300	17.0	7.5	7,100	H,M,MR	17NTU	22:05	9.80	20ML:TNTC/30ML:TNTC	OVC		140.0.54"	F/C VALUE IS >300/100ML - WOLF CR. IS INFLUENCING THIS SIT
17M	NEW RIVER @ FAYETTE STATION		06/01/93	02:00	19.0	274	20.0	8.1	4,400	H,M,MR	4.4NTU	22:00	9.20	35ML:96/50ML:115	SCT		168.0.58"	F/C VALUE IS EST AT 274.3/100ML - WOLF CR.IS INFLUENCING TH
17M	NEW RIVER @ FAYETTE STATION		06/18/93	12:25	25.0	101	28.0	8.0	3,350	H,SL,MI	9.0NTU	23:00	9.00	30ML:29/50ML:53	SCT,H+		170.0.00"	
17M	NEW RIVER @ FAYETTE STATION		07/01/93	02:24	26.0	403	24.0	8.1	3,600	H,SL,MR	5.1NTU	22:00	8.20	30ML:121/40ML:148	BKN		172.0.53"	COLIFORM BACTERIA GROWTH NOT FECAL COLIFORM
17M	NEW RIVER @ FAYETTE STATION		07/13/93	12:05	29.0	75	29.0	8.2	3,600	H,M,MI	4.6NTU	22:00	5.60	10ML:4/20ML:15	SCT		171.0.00"	F/C VALUE IS EST
17M	NEW RIVER @ FAYETTE STATION		07/27/93	12:25	29.0	117	31.0	8.2	2,600	L,SL,MI	5.6NTU	22:00	7.80	40ML:47/100ML:96	SCT		253.0.00"	
17M	NEW RIVER @ FAYETTE STATION		08/11/93	12:20	25.0	12	20.0	8.1	2,600	L,SL,MI	1.7NTU	23:00	7.60	15ML:1/25ML:3	OVC		182.0.54"	F/C VALUE IS EST POSSIBLE T-STORM CAME IN AREA

SITE NO	SITE NAME	DATE	TIME	WaterTEMP	FC/100ml	AIRTEMP	pH	STRMLVL	H2OCONDITION/NTU	INCUB	DO	DILUTIONS	WEATHER	CONDUCT	PRECIP	COMMENTS
17M	NEW RIVER @ FAYETTE STATION	08/24/93	01:35	19.0	7	28.0	8.4	2,400 L,SL,CLR	1.8NTU	22:00	8.20	100ML:7/127ML:9	SCT,H-	195.0.00"		F/C VALUE IS EST 7.2/100ML
17M	NEW RIVER @ FAYETTE STATION	09/08/93	11:07	25.0	6	22.0	8.3	1,700 L,N,CLR	1.7NTU	23:00	8.50	125ML:4/150ML:9	OVC	180.0.00"		F/C VALUE IS EST 6/100ML
18T	WOLF CREEK	05/19/93	02:45	15.0	300	11.0	7.5	130.1 H,SW,TB	27NTU	22:05	10.40	20ML:TNTC/30ML:TNTC	OVC	152.0.54"		F/C VALUE IS >300/100ML
18T	WOLF CREEK	06/01/93	01:40	14.5	423	18.0	7.7	29.65 H,SW,MR	8.9NTU	22:00	10.20	5ML:28/15ML:43	SCT	383.0.58"		F/C VALUE IS 423.3/100ML
18T	WOLF CREEK	06/18/93	12:15	17.0	205	27.0	8.5	5.330 N,M,CLR	2.1NTU	23:00	10.60	20ML:41/30ML:69	SCT,H+	385.0.00"		
18T	WOLF CREEK	07/01/93	02:10	18.0	400	24.0	8.2	5.330 N,SW,MR	12NTU	22:00	9.70	15ML:TNTC/20ML:TNTC	BKN	370.0.53"		F/C VALUE IS >400/100ML
18T	WOLF CREEK	07/13/93	11:00	20.5	33	25.0	8.3	4.209 N,M,CLR	2.7NTU	22:00	8.60	0.5ML:2/3.0ML:5	SCT	450.0.00"		F/C VALUE IS EST 33.3/100ML
18T	WOLF CREEK	07/27/93	12:45	20.0	12	31.0	8.6	2.450 L,M,CLR	1.8NTU	22:00	9.60	25ML:3/50ML:1	SCT	510.0.00"		F/C VALUE IS EST
18T	WOLF CREEK	08/11/93	12:05	17.0	280	20.0	8.6	2.782 L,SL,MR	4.4NTU	23:00	9.00	5ML:14/15ML:42	OVC	465.0.54"		
18T	WOLF CREEK	08/24/93	01:20	27.0	20	28.0	8.5	1.602 L,M,CLR	1.6NTU	22:00	9.60	25ML:5/35ML:4	SCT,H-	550.0.00"		F/C VALUE IS EST 20/100ML
18T	WOLF CREEK	09/08/93	10:55	18.0	20	21.0	8.6	2.322 L,M,CLR	1.4NTU	23:00	9.40	50ML:7/75ML:15	OVC	550.0.00"		F/C VALUE IS EST 20/100ML
19T	MARR BRANCH	05/19/93	03:10	13.0	360	16.0	7.2	18.20 H,SW,TB	26NTU	22:05	9.90	10ML:36/15ML:70	OVC	80.0.54"		
19T	MARR BRANCH	06/01/93	01:15	15.0	990	18.0	7.5	1.250 N,M,MI	8.3NTU	22:00	6.60	20ML:198/30ML:TNTC	SCT	221.0.58"		F/C VALUE IS EST
19T	MARR BRANCH	06/18/93	12:00	18.0	600	25.0	7.6	.750 L,SL,MR	8.4NTU	23:00	3.70	10ML:TNTC/15ML:TNTC	CLR,H+	460.0.00"		F/C VALUE IS >600/100ML
19T	MARR BRANCH	07/01/93	01:45	20.0	10800	25.0	7.1	.7800 N,M,MR	16NTU	22:00	4.80	1.0ML:108/3.0ML:235	BKN	208.0.53"		CHIRONOMIDAE ARE PRESENT THROUGH OUT THE STREAM
19T	MARR BRANCH	07/13/93	10:30	20.0	65500	22.0	7.8	.3600 N,M,MR	10NTU	22:00	1.20	0.2ML:131/0.5ML:TNTC	OVC	800.0.00"		F/C VALUE IS EST
19T	MARR BRANCH	07/27/93	11:50	22.0	60000	29.0	7.9	.2000 L,SL,MR	14.0NTU	22:00	0.70	0.1ML:TNTC/0.2ML:TNTC	SCT	550.0.00"		F/C VALUE IS >60,000/100ML - VERY STRONG ORDOR TODAY
19T	MARR BRANCH	08/11/93	11:25	19.0	60000	19.0	7.4	5.270 L,SL,TB	28.0NTU	23:00	4.80	.1ML:TNTC/.1ML:TNTC	R	700.0.54"		F/C VALUE IS >60,000/100ML - VERY STRONG ORDOR TODAY
19T	MARR BRANCH	08/24/93	01:55	22.0	38000	28.0	7.7	.500 L,SL,MR	12.0NTU	22:00	2.60	.1ML:34/.1ML:42	SCT,H-	850.0.00"		VERY STRONG ORDOR TODAY
19T	MARR BRANCH	09/08/93	11:49	19.0	60000	22.0	7.8	LOW L,M,MR	25.0NTU	23:00	1.40	.1ML:TNTC/.1ML:TNTC	OVC	1000.0.00"		BAD ODOR SAMPLE DARK GRAY IN COLOR F/C VALUE IS >60000/100M

APPENDIX 5. RAW DATA FOR 1993 FECAL COLIFORM BACTERIA
BLUESTONE NATIONAL SCENIC RIVER

SITE NO	SITE NAME	DATE	TIME	WaterTEMP	FC/100ml	AIRTEMP	pH	STRMLVL	H2OCONDITION/NTU	INCUB	DO	DILUTIONS	WEATHER	CONDUCT	PRECIP	COMMENTS
1M	BLUESTONE RIVER @ ST. PARK	05/14/93	10:15	16.0	94	16.0	8.2	HIGH	N,SW,TB	19.0NT	23:30	10.00 35ML:33/50ML:--	CLR	150.0	.35"	50ML PRODUCED INCONCLUSIVE RESULTS
1M	BLUESTONE RIVER @ ST. PARK	05/27/93	10:34	18.0	8	20.0	8.4	NORM	N,M,CLR	2.7NT	22:00	10.00 50ML:4/35ML:3	CLR	200.0	.21"	F/C VALUE IS EST
1M	BLUESTONE RIVER @ ST. PARK	06/11/93	12:30	25.0	14	25.0	8.5	NORM	N,M,MI	4.4NT	22:15	9.00 100ML:5/125ML:18	SCT	258.0	.22"	F/C VALUE IS EST AT 14.4/100ML
1M	BLUESTONE RIVER @ ST. PARK	06/24/93	11:30	24.5	22	25.0	8.6	NORM	N,SW,MI	5.8NT	22:30	8.40 100ML:17/125ML:28	CLR	315.0	.00"	
1M	BLUESTONE RIVER @ ST. PARK	07/06/93	11:20	28.0	97	28.0	8.8	LOW	L,M,MI	6.5NT	22:00	9.40 100ML:97/125ML:--	CLR	322.0	.74"	125ML WAS COVERED BY BACTERIA OTHER THAN FECAL COLIFORM
1M	BLUESTONE RIVER @ ST. PARK	07/23/93	10:05	24.0	22	19.0	8.4	LOW	L,M,MI	4.4NT	22:00	7.70 100ML:22/150ML:19	OVC	290.0	.00"	
1M	BLUESTONE RIVER @ ST. PARK	08/05/93	10:50	23.0	14	23.0	8.6	LOW	L,M,MI	4.4NT	23:00	8.50 50ML:10/100ML:14	SCT	350.0	.09"	F/C VALUE IS EST
1M	BLUESTONE RIVER @ ST. PARK	08/19/93	10:25	24.0	25	21.0	8.4	LOW	L,M,MI	6.0NT	24:00	8.20 100ML:24/125ML:34	BKN,M-	290.0	.30"	F/C VALUE IS EST AT 25.6/100ML
1M	BLUESTONE RIVER @ ST. PARK	09/02/93	10:25	24.0	8	28.0	8.6	LOW	L,M,CLR	2.5NT	23:00	8.10 100ML:8/125ML:7	SCT	310.0	.00"	F/C VALUE IS EST
1M	BLUESTONE RIVER @ ST. PARK	09/16/93	10:00	23.0	70	21.0	8.2	LOW	L,M,CLR	2.3NT	23:00	8.20 100ML:70/125ML:81	OVC	340.0	.01"	F/C VALUE IS EST
2T	LITTLE BLUESTONE RIVER	05/14/93	11:26	13.0	18	16.0	7.2	NORM	N,M,CLR	1.7NT	23:30	10.40 50ML:9/100ML:--	CLR	58.0	.35"	F/C VALUE IS EST - 100ML PRODUCED INCONCLUSIVE RESULTS
2T	LITTLE BLUESTONE RIVER	05/27/93	11:38	14.4	24	19.0	7.8	NORM	N,M,CLR	2.2NT	22:00	10.00 50ML:12/100ML:9	CLR	70.0	.21"	F/C VALUE IS EST
2T	LITTLE BLUESTONE RIVER	06/11/93	01:45	21.0	67	28.0	7.8	NORM	N,M,CLR	2.7NT	22:15	8.20 100ML:67/125ML:101	SCT	80.0	.22"	F/C VALUE IS EST
2T	LITTLE BLUESTONE RIVER	06/24/93	11:55	20.0	46	28.0	7.9	NORM	N,SL,CLR	1.9NT	22:30	8.60 75ML:30/100ML:52	CLR	108.0	.00"	
2T	LITTLE BLUESTONE RIVER	07/06/93	01:30	22.5	120	30.0	7.8	LOW	L,M,MR	9.0NT	22:00	8.10 50ML:TNTC/100ML:TNTC	SCT	121.0	.74"	F/C VALUE IS >120/100ML
2T	LITTLE BLUESTONE RIVER	07/23/93	11:10	21.0	28	23.0	7.6	LOW	L,SL,CLR	1.4NT	22:00	7.10 25ML:6/50ML:14	SCT	130.0	.00"	F/C VALUE IS EST
2T	LITTLE BLUESTONE RIVER	08/05/93	12:00	19.0	6	26.0	7.5	LOW	L,SL,CLR	2.9NT	23:00	5.80 50ML:0/100ML:6	SCT	153.0	.09"	F/C VALUE IS EST
2T	LITTLE BLUESTONE RIVER	08/19/93	11:40	22.0	21	24.0	7.2	LOW	L,SL,CLR	2.0NT	24:00	7.60 100ML:12/125ML:27	SCT,M-	142.0	.30"	F/C VALUE IS EST AT 21.6/100ML
2T	LITTLE BLUESTONE RIVER	09/02/93	11:50	22.0	49	25.0	7.5	LOW	L,SL,CLR	1.9NT	23:00	7.00 100ML:29/125ML:55	OVC	175.0	.00"	F/C VALUE IS 49.5/100ML
2T	LITTLE BLUESTONE RIVER	09/16/93	11:00	20.0	60	21.0	8.0	LOW	L,SL,CLR	2.5NT	23:00	8.60 100ML:TNTC/125ML:TNTC	OVC	170.0	.01"	F/C VALUE IS >60/100ML
5M	BLUESTONE RIVER @ CONFLUENCE	05/14/93	11:44	16.5	70	18.0	8.1	NORM	N,SL,TB	14.5NT	23:30	10.40 35ML:--/50ML:35	CLR	158.0	.35"	35ML PRODUCED INCONCLUSIVE RESULTS
5M	BLUESTONE RIVER @ CONFLUENCE	05/27/93	12:05	17.5	6	22.0	8.2	NORM	N,SL,MI	3.4NT	22:00	9.40 35ML:3/50ML:2	CLR	210.0	.21"	F/C VALUE IS EST
5M	BLUESTONE RIVER @ CONFLUENCE	06/11/93	01:55	24.5	3	28.0	8.2	NORM	N,SL,MI	5.0NT	22:15	8.60 35ML:1/50ML:3	SCT	278.0	.22"	F/C VALUE IS EST
5M	BLUESTONE RIVER @ CONFLUENCE	06/24/93	11:14	24.0	28	25.0	8.2	NORM	N,SL,MI	2.9NT	22:30	6.80 100:14/125ML:35	CLR	312.0	.00"	
5M	BLUESTONE RIVER @ CONFLUENCE	07/06/93	01:45	27.0	20	30.0	8.3	LOW	L,SL,MR	7.0NT	22:00	6.00 30ML:7/50ML:10	SCT	348.0	.74"	F/C VALUE IS EST - LOW DILUTIONS DUE TO VERY MURKY WATER
5M	BLUESTONE RIVER @ CONFLUENCE	07/23/93	11:30	24.0	56	23.0	8.0	LOW	L,SL,MR	5.3NT	22:00	6.00 100ML:56/150ML:61	SCT	312.0	.00"	
5M	BLUESTONE RIVER @ CONFLUENCE	08/05/93	12:10	23.0	12	26.0	8.6	LOW	L,SL,MR	9.6NT	23:00	6.80 100ML:14/125ML:16	SCT	350.0	.09"	F/C VALUE IS EST AT 12.8/100ML
5M	BLUESTONE RIVER @ CONFLUENCE	08/19/93	12:00	25.0	41	25.0	8.2	LOW	L,SL,MI	4.8NT	24:00	6.40 100ML:41/125ML:27	SCT,M-	300.0	.30"	
5M	BLUESTONE RIVER @ CONFLUENCE	09/02/93	12:15	25.0	20	27.0	8.4	LOW	L,SL,MI	5.1NT	23:00	5.50 100ML:15/125ML:25	OVC	330.0	.00"	
5M	BLUESTONE RIVER @ CONFLUENCE	09/16/93	11:10	22.0	2	21.0	8.3	LOW	L,SL,MI	3.6NT	23:00	6.00 110ML:24/125ML:18	OVC	320.0	.01"	F/C VALUE IS 2.1/100ML
6M	BLUESTONE RIVER @ PIPESTEM	05/14/93	01:20	17.0	47	19.0	8.4	542	N,M,TB	32.0NT	23:30	10.00 35ML:--/50ML:47	CLR	150.0	.35"	35ML PRODUCED INCONCLUSIVE RESULTS
6M	BLUESTONE RIVER @ PIPESTEM	05/27/93	99999	99.9	******	99.9	99.9	186	99999999999999999999	99999	99.99	99999999999999999999	999	9999.99999		UNABLE TO UNLOCK GATE TO ENTER PIPESTEM - NO DATA
6M	BLUESTONE RIVER @ PIPESTEM	06/11/93	03:10	26.0	10	26.0	9.0	140	N,SW,CLR	2.5NT	22:15	9.70 35ML:2/50ML:5	SCT	280.0	.22"	F/C VALUE IS EST
6M	BLUESTONE RIVER @ PIPESTEM	06/24/93	01:28	25.5	10	26.0	8.8	81	N,M,MI	3.2NT	22:30	9.00 100ML:10/125ML:6	CLR	378.0	.00"	F/C VALUE IS EST - SURFACE OF WATER WATER SCUMMY WHERE SAMP
6M	BLUESTONE RIVER @ PIPESTEM	07/06/93	01:55	29.0	7	30.0	9.1	63	L,SW,MI	3.2NT	22:00	8.50 100ML:7/125ML:9	SCT	370.0	.74"	F/C VALUE IS EST
6M	BLUESTONE RIVER @ PIPESTEM	07/23/93	12:45	25.0	18	25.0	8.6	70	L,M,CLR	1.9NT	22:00	8.50 100ML:11/150ML:28	SCT	298.0	.00"	F/C VALUE IS 18.7/100ML
6M	BLUESTONE RIVER @ PIPESTEM	08/05/93	01:00	24.0	26	28.0	9.1	35	L,M,CLR	2.2NT	23:00	9.30 100ML:24/150ML:42	BKN	370.0	.09"	
6M	BLUESTONE RIVER @ PIPESTEM	08/19/93	01:15	26.0	13	27.0	8.9	59	L,SW,CLR	3.6NT	24:00	9.70 100ML:17/150ML:20	SCT	315.0	.30"	F/C VALUE IS 13.3/100ML
6M	BLUESTONE RIVER @ PIPESTEM	09/02/93	02:15	26.0	8	25.0	9.8	37	L,SW,CLR	2.0NT	23:00	9.80 100ML:11/150ML:12	SCT	350.0	.00"	F/C VALUE IS EST

SITE NO	SITE NAME	DATE	TIME	WaterTEMP	FC/100ml	AIRTEMP	pH	STRMLVL	H2OCONDITION/NTU	INCUB	DO	DILUTIONS	WEATHER	CONDUCT	PRECIP	COMMENTS
04M	BLUESTONE RIVER @ PIPESTEM	09/16/93	12:20	22.0	29	21.0	8.9	43	L,SL,CLR	2.3NT	23:00	12.60 150ML:44/175ML:53	OVC	325.0.01"		F/C VALUE IS 29.3/100ML
05T	MT. CREEK	05/14/93	01:01	14.5	8	19.0	7.6	NORM	N,SW,CLR	1.5NT	23:30	9.70 50ML:1/100ML:8	CLR	130.0.35"		F/C VALUE IS EST
05T	MT. CREEK	05/27/93	01:05	15.6	1	25.0	7.7	NORM	N,M,CLR	1.6NT	22:00	9.40 50ML:0/100ML:0	CLR	140.0.21"		F/C VALUE IS <1/100ML
05T	MT. CREEK	06/11/93	02:50	21.0	8	26.0	7.6	LOW	L,M,CLR	3.2NT	22:15	9.00 100ML:8/125ML:11	SCT	160.0.22"		F/C VALUE IS EST AT 8.8/100ML
05T	MT. CREEK	06/24/93	01:13	20.0	6	24.0	7.9	NORM	N,M,MI	2.6NT	22:30	8.60 125ML:7/150ML:9	CLR	172.0.00"		F/C VALUE IS EST
05T	MT. CREEK	07/23/93	12:30	20.0	31	25.0	7.8	LOW	L,SL,CLR	0.7NT	22:00	8.40 125ML:45/175ML:46	SCT	278.0.00"		F/C VALUE IS 31.1/100ML
05T	MT. CREEK	08/05/93	99999	99.9	******	999.9	99.9	99999	99999999999999999999	99999	99.99	99999999999999999999	999	9999.99999		NO SURFACE WATER FOUND AT THE SAMPLE SITE VERY DRY
05T	MT. CREEK	08/19/93	01:00	21.0	43	26.0	7.2	LOW	L,SL,CLR	0.8NT	24:00	7.40 100ML:45/125ML:53	SCT	355.0.30"		F/C VALUE IS 43.7/100ML
05T	MT. CREEK	09/02/93	01:45	21.0	11	24.0	7.4	LOW	L,SL,MR	7.1NT	23:00	6.70 100ML:11/125ML:7	OVC	310.0.00"		F/C VALUE IS EST

APPENDIX 5. RAW DATA FOR 1993 FECAL COLIFORM BACTERIA
GAULEY RIVER NATIONAL RECREATION AREA

SITE NO	SITE NAME	DATE	TIME	WaterTEMP	FC/100ml	AIRTEMP	pH	STRMLVL	H2OCONDITION/NTU	INCUB	DO	DILUTIONS	WEATHER	CONDUCT	PRECIP	COMMENTS
01M	SUMMERSVILLE DAM	08/12/92	01:15	15.0	1	27.0	7.2	203 N,SW,CLR	1.4NTU	22:00	9.80	150ML:0/200ML:2	SCT		50.0.10"	F/C VALUE IS EST
01M	SUMMERSVILLE DAM	05/07/93	11:40	8.0	1	25.0	7.2	640 N,SW,MI	5.7NTU	23:40	6.80	100ML:1/125ML:2	CLR		38.0.14"	F/C VALUE IS EST 1.6/100ML
01M	SUMMERSVILLE DAM	05/18/93	11:25	8.5	1	12.0	7.4	650 N,SW,MI	8.0NTU	22:00	99.99	100ML:1/125ML:1	OVC		40.0.43"	F/C VALUE IS EST - DO METER IS NOT WORKING
01M	SUMMERSVILLE DAM	06/03/93	10:25	10.0	2	15.0	7.3	343 N,SW,CLR	3.8NTU	22:00	11.60	100ML:3/150ML:4	OVC		45.0.01"	F/C VALUE IS EST AT 2.7/100ML
01M	SUMMERSVILLE DAM	06/14/93	10:32	11.5	3	21.0	7.5	660 N,SW,CLR	2.4NTU	22:00	12.10	150ML:4/200ML:6	CLR		43.0.88"	F/C VALUE IS EST
01M	SUMMERSVILLE DAM	06/30/93	10:40	12.5	1	22.0	7.7	1,754 N,SW,CLR	.92NTU	22:20	10.90	200ML:2/250ML:3	BKN		49.0.32"	F/C VALUE IS EST AT 1.5/100ML
01M	SUMMERSVILLE DAM	07/14/93	10:10	13.0	1	23.0	7.4	186 L,SW,CLR	1.2NTU	22:42	10.40	150ML:0/250ML:0	SCT		45.0.02"	CLEAR COLONIES PRESENT BUT NOT BLUE le F/C - F/C VALUE IS <1/
01M	SUMMERSVILLE DAM	07/29/93	10:00	14.0	1	33.0	7.2	196 L,SW,CLR	1.6NTU	23:15	1.04	100ML:0/125ML:2	SCT		43.0.01"	F/C VALUE IS EST AT 1.6/100ML
01M	SUMMERSVILLE DAM	08/26/93	09:45	14.0	0	23.0	7.3	484 N,SW,CLR	1.8NTU	23:00	10.40	150ML:1/200ML:1	OVC		54.0.00"	F/C VALUE IS EST AT .67/100ML
01M	SUMMERSVILLE DAM	09/09/93	10:36	15.0	1	21.0	7.2	41 L,M,CLR	1.4NTU	23:00	10.20	200ML:1/225ML:2	CLR		56.0.00"	F/C VALUE IS EST AT .9/100ML
01M	SUMMERSVILLE DAM	09/30/93	11:30	15.0	0	8.0	7.4	110 L,M,MI	5.3NTU	23:00	99.99	100ML:0/150ML:1	OVC		71.0.00"	F/C VALUE IS EST AT 0.67/100ML - DO METER NOT WORKING
01M	SUMMERSVILLE DAM	10/04/93	11:35	15.0	2	11.0	7.5	2,350 H,SW,MI	4.9NTU	23:35	99.99	100ML:1/150ML:3	SCT		130.0.20"	F/C VALUE IS EST - DO METER NOT WORKING
01M	SUMMERSVILLE DAM	10/14/93	11:30	17.0	1	12.0	7.3	182 N,M,CLR	2.1NTU	22:40	99.99	150ML:1/200ML:1	OVC		60.0.48"	F/C VALUE IS 0.7/100ML - DO METER NOT WORKING
02M	MID GAULEY	05/07/93	12:30	15.0	3	23.0	7.3	NORM N,SL,MI	3.7NTU	23:40	8.40	100ML:3/125ML:2	CLR		55.0.14"	F/C VALUE IS EST
02M	MID GAULEY	05/17/93	12:24	14.0	22	19.0	7.4	HIGH H,M,MI	4.4NTU	22:00	99.99	100ML:22/125ML:19	OVC,R		50.0.43"	DO METER IS NOT WORKING
02M	MID GAULEY	06/03/93	11:08	16.0	10	19.0	7.4	NORM N,SL,CLR	2.5NTU	22:00	10.20	100ML:10/150ML:16	OVC		72.0.01"	F/C VALUE IS EST AT 10.7/100ML
02M	MID GAULEY	06/14/93	11:13	16.5	161	22.0	7.2	HIGH H,M,MR	6.0NTU	22:00	10.40	75ML:121/100ML:133	CLR		49.0.88"	F/C VALUE IS EST
02M	MID GAULEY	06/30/93	11:30	22.0	2	25.0	7.4	NORM N,SL,CLR	1.4NTU	22:20	8.50	75ML:2/100ML:2	BKN		80.0.32"	F/C VALUE IS EST AT 2.6/100ML
02M	MID GAULEY	07/14/93	11:15	22.0	3	24.0	7.4	LOW L,SL,CLR	1.8NTU	22:42	8.40	150ML:5/200ML:4	SCT		53.0.02"	F/C VALUE IS EST AT 3.3/100ML
02M	MID GAULEY	07/29/93	01:40	23.0	1	33.0	7.4	LOW L,SL,CLR	1.5NTU	23:15	8.70	150ML:0/200ML:2	SCT		62.0.01"	F/C VALUE IS EST
02M	MID GAULEY	08/12/93	01:45	22.0	2	27.0	7.4	LOW L,SL,CLR	1.7NTU	22:00	99.99	150ML:2/200ML:5	SCT		71.0.10"	F/C VALUE IS EST - DO METER IS NOT WORKING
02M	MID GAULEY	08/26/93	11:00	20.0	20	25.0	7.2	LOW L,SL,MI	4.6NTU	23:00	9.10	100ML:21/125ML:26	OVC		60.0.00"	
02M	MID GAULEY	09/09/93	11:36	18.0	3	25.0	6.6	LOW L,M,CLR	1.1NTU	23:00	10.00	150ML:5/175ML:0	CLR		65.0.00"	F/C VALUE IS EST AT 3.3/100ML
02M	MID GAULEY	09/30/93	12:25	14.0	44	8.0	7.2	LOW L,SL,MR	6.7NTU	23:00	99.99	100ML:45/125ML:56	OVC		100.0.00"	F/C VALUE IS 44.9/100ML - DO METER NOT WORKING
02M	MID GAULEY	10/04/93	12:40	13.0	46	14.0	7.2	HIGH H,M,MI	3.9NTU	23:35	99.99	50ML:22/100ML:46	SCT		110.0.20"	DO METER NOT WORKING
02M	MID GAULEY	10/14/93	12:35	14.5	34	14.0	7.1	NORM N,SL,MI	2.8NTU	22:40	99.99	100ML:41/125ML:36	OVC,R-		72.0.48"	F/C VALUE IS 34.9/100ML - DO METER NOT WORKING
03T	PETER'S CREEK	05/07/93	12:45	1.7	91	23.0	8.2	NORM N,SL,MI	2.5NTU	23:40	6.20	30ML:28/50ML:45	CLR		270.0.14:	F/C VALUE IS 91.7/100ML
03T	PETER'S CREEK	05/17/93	12:53	15.0	260	16.0	8.0	HIGH H,SW,TB	19.0NTU	22:00	99.99	10ML:19/20ML:52	OVC,R		225.0.43"	DO METER IS NOT WORKING
03T	PETER'S CREEK	06/03/93	11:22	16.0	65	19.0	8.2	NORM N,SW,CLR	2.7NTU	22:00	9.90	10ML:4/20ML:13	BKN		325.0.01"	F/C VALUE IS EST
03T	PETER'S CREEK	06/14/93	11:25	18.0	298	21.0	8.0	NORM N,SW,MI	3.0NTU	22:00	9.80	10ML:35/20ML:49	CLR		255.0.88"	
03T	PETER'S CREEK	06/30/93	11:43	21.5	207	24.0	8.3	NORM N,M,MI	5.5NTU	22:20	8.40	5ML:15/15ML:31	BKN		428.0.32"	
03T	PETER'S CREEK	07/14/93	11:35	25.0	60	27.0	8.3	LOW L,M,MI	3.3NTU	22:42	7.80	5ML:6/15ML:9	SCT		471.0.02"	F/C VALUE IS EST
03T	PETER'S CREEK	07/29/93	01:55	27.0	14	30.0	8.4	LOW L,SL,MI	3.2NTU	23:15	7.70	35ML:6/50ML:7	SCT		535.0.01"	F/C VALUE IS EST
03T	PETER'S CREEK	08/12/93	02:00	23.0	48	27.0	8.1	LOW L,SL,MI	3.1NTU	22:00	99.99	35ML:16/50ML:24	SCT		510.0.10"	
03T	PETER'S CREEK	08/26/93	11:25	25.0	180	26.0	8.2	NORM N,SL,MR	5.7NTU	23:00	7.70	35ML:63/50ML:121	OVC		500.0.00"	F/C VALUE IS EST
03T	PETER'S CREEK	09/09/93	11:53	22.0	46	25.0	8.1	LOW L,SL,MI	3.2NTU	23:00	8.60	30ML:19/45ML:21	CLR		482.0.00"	F/C VALUE IS EST AT 46.7/100ML
03T	PETER'S CREEK	09/30/93	12:40	12.0	136	8.0	8.1	LOW L,SL,MR	5.5NTU	23:00	99.99	30ML:41/50ML:63	OVC		262.0.00"	F/C VALUE IS 136.7/100ML - DO METER NOT WORKING
03T	PETER'S CREEK	10/04/93	01:00	11.0	142	14.0	7.9	NORM N,SL,MI	3.2NTU	23:35	99.99	25ML:46/50ML:53	SCT		390.0.20"	DO METER NOT WORKING
03T	PETER'S CREEK	10/14/93	12:50	13.0	117	14.0	8.2	NORM N,M,MR	5.6NTU	22:40	99.99	30ML:41/50ML:49	OVC,R-		355.0.48"	F/C VALUE IS 117.3 - DO METER NOT WORKING

SITE NO	SITE NAME	DATE	TIME	WaterTEMP	FC/100ml	AIRTEMP	pH	STRMLVL	H2OCONDITION/NTU	INCUB	DO	DILUTIONS	WEATHER	CONDUCT	PRECIP	COMMENTS
04M	SOUTH SIDE SWISS	05/07/93	01:40	15.0	6	26.0	7.3	NORM	N,SL,MI	3.7NTU	23:40	8.20	100ML:4/125ML:8	CLR	60.0.14"	F/C VALUE IS EST 6.4/100ML
04M	SOUTH SIDE SWISS	05/17/93	01:35	15.0	22	17.0	7.5	HIGH	N,M,MI	5.3NTU	22:00	99.99	50ML:18/100ML:22	OVC	65.0.43"	DO METER IS NOT WORKING
04M	SOUTH SIDE SWISS	06/03/93	12:40	17.0	1	22.0	7.3	NORM	N,SL,CLR	2.5NTU	22:00	9.40	100ML:1/150ML:1	BKN	85.0.01"	F/C VALUE IS EST
04M	SOUTH SIDE SWISS	06/14/93	12:02	17.0	261	24.0	7.5	HIGH	N,M,MR	14.0NTU	22:00	10.10	75ML:196/100ML:TNTC	CLR	58.0.88"	F/C VALUE IS EST
04M	SOUTH SIDE SWISS	06/30/93	12:16	23.5	6	28.0	7.5	NORM	N,SL,CLR	1.3NTU	22:20	8.00	75ML:3/100ML:6	BKN	98.0.32"	F/C VALUE IS EST
04M	SOUTH SIDE SWISS	07/14/93	12:29	23.0	4	30.0	7.6	LOW	L,SL,CLR	1.8NTU	22:42	8.10	150:4/200ML:7	SCT	85.0.02"	F/C VALUE IS EST
04M	SOUTH SIDE SWISS	07/29/93	12:55	23.0	3	35.0	7.3	NORM	N,SL,CLR	1.5NTU	23:15	8.30	150ML:4/200ML:6	SCT	70.0.01"	F/C VALUE IS EST
04M	SOUTH SIDE SWISS	08/12/93	02:30	22.0	93	28.0	7.4	LOW	L,SL,MI	2.0NTU	22:00	99.99	100ML:2/125ML:5	SCT	93.0.10"	F/C VALUE IS EST
04M	SOUTH SIDE SWISS	08/26/93	12:35	23.0	9	30.0	7.4	NORM	N,SL,MI	2.2NTU	23:00	8.20	125ML:9/175ML:16	SCT	72.0.00"	F/C VALUE IS EST AT 9.14/100ML
04M	SOUTH SIDE SWISS	09/09/93	01:00	20.0	2	27.0	7.2	NORM	N,SL,CLR	1.6NTU	23:00	9.10	150ML:1/175ML:5	SCT	65.0.00"	F/C VALUE IS EST AT 2.8/100ML
04M	SOUTH SIDE SWISS	09/30/93	01:15	14.5	35	10.0	7.0	LOW	L,SL,MR	5.6NTU	23:00	99.99	100ML:35/125ML:81	OVC	133.0.00"	DO METER NOT WORKING
04M	SOUTH SIDE SWISS	10/04/93	01:35	14.0	65	18.0	7.0	HIGH	N,SL,MR	5.1NTU	23:35	99.99	50ML:29/100ML:73	CLR	162.0.20"	F/C VALUE IS EST AT 65.5/100ML - DO METER NOT WORKING
04M	SOUTH SIDE SWISS	10/14/93	01:40	16.0	30	18.0	7.2	NORM	N,SL,MI	2.2NTU	22:40	99.99	100ML:30/120ML:78	BKN	88.0.48"	DO METER NOT WORKING
05T	MEADOW RIVER	05/07/93	11:00	16.0	16	18.0	7.3	322	N,M,CLR	1.9NTU	23:40	8.50	100ML:11/125ML:21	SCT	95.0.14"	F/C VALUE IS 16.8/100ML
05T	MEADOW RIVER	05/17/93	10:49	16.0	29	16.0	7.5	320	N,M,MI	3.1NTU	22:00	8.60	50ML:17/75ML:22	OVC	75.0.43"	
05T	MEADOW RIVER	06/03/93	09:45	17.0	10	18.0	7.3	39	N,M,CLR	1.7NTU	22:00	9.10	50ML:6/75ML:8	OVC	110.0.01"	F/C VALUE IS EST AT 10.7/100ML
05T	MEADOW RIVER	06/14/93	10:05	15.5	120	21.0	7.5	1,020	N,M,MR	7.0NTU	22:00	10.00	50ML:60/75ML:123	CLR	62.0.88"	
05T	MEADOW RIVER	06/30/93	10:10	22.0	16	24.0	7.7	538	N,SL,CLR	1.4NTU	22:20	7.70	75ML:12/125ML:20	BKN	162.0.32"	
05T	MEADOW RIVER	07/14/93	09:35	24.0	43	24.0	7.5	36.7	L,SL,MI	2.3NTU	22:42	7.00	125ML:63/150ML:65	SCT	134.0.02"	F/C VALUE IS EST AT 43.3/100ML
05T	MEADOW RIVER	07/29/93	09:45	26.0	8	25.0	7.5	14	L,SL,CLR	1.6NTU	23:15	6.70	150ML:11/200ML:16	SCT	211.0.01"	F/C VALUE IS EST
05T	MEADOW RIVER	08/12/93	12:30	23.0	14	26.0	7.4	48	L,SL,CLR	1.5NTU	22:00	99.99	125ML:18/150ML:21	SCT	193.0.10"	
05T	MEADOW RIVER	08/26/93	09:00	25.0	6	23.0	7.4	51.4	N,SL,CLR	1.7NTU	23:00	6.80	125ML:5/150ML:10	OVC	240.0.00"	F/C VALUE IS EST AT 6.67/100ML
05T	MEADOW RIVER	09/09/93	10:00	22.0	10	24.0	7.1	37	L,SL,CLR	0.8NTU	23:00	7.60	150ML:15/175ML:12	CLR	184.0.00"	F/C VALUE IS EST
05T	MEADOW RIVER	09/30/93	09:45	14.0	57	8.0	7.3	NORM	N,SL,MR	6.3NTU	23:00	99.99	100ML:37/125ML:69	OVC	99.0.00"	DO METER NOT WORKING
05T	MEADOW RIVER	10/04/93	10:01	14.0	54	10.0	7.0	76	L,SL,MI	3.0NTU	23:35	99.99	50ML:25/100ML:59	BKN	86.0.20"	F/C VALUE IS EST AT 54.5/100ML - DO METER NOT WORKING
05T	MEADOW RIVER	10/14/93	09:45	14.0	59	11.0	7.2	101	N,SL,MI	3.1NTU	22:40	99.99	100ML:59/125ML:78	OVC,R-	100.0.48"	DO METER NOT WORKING

APPENDIX 6. RAW DATA FOR 1993 PHYSICAL/CHEMICAL TESTS

NEW RIVER GORGE NATIONAL RIVER
BLUESTONE NATIONAL SCENIC RIVER
GAULEY RIVER NATIONAL RECREATION AREA

SITE_NO	SITE_NAME	DATE	TIME	WATER_TEMP	AIR_TEMP	PH	STREAM_LVL	NTU_H2OCND_	DISS_OXYGN	WEATHER	CNDUCTIVTY	PRECIP_48H	ALKALINITY	ALUMINUM	MANGANESE	TOTAL_IRON	T_S_SOLIDS	NOT_AC
01M	BLUESTONE RIVER @ ST. PARK	06/24/93	11:03	24.5	25.0	8.6	NORM	5.8/M,SW,CLR	8.40	CLR	315.0	0.00	90.80	0.012	0.058	0.111	999.99	9999
01M	BLUESTONE RIVER @ ST. PARK	07/23/93	10:05	24.0	19.0	8.4	LOW	4.4/L,M,CLR	7.70	OVC	290.0	0.00	76.40	0.068	0.068	0.060	999.99	9999
01M	BLUESTONE RIVER @ ST. PARK	11/04/93	09:35	6.6	999.9	8.6	LOW	1.7/L,SW,CLR	99.99	OVC	210.0	0.00	93.00	0.017	0.026	0.069	999.99	9999
01M	NEW RIVER @ HINTON VC	06/23/93	12:20	26.0	25.0	8.1	3,500	7.3/M,SL,MI	8.00	SCT,H-	16.0	0.36	49.00	0.011	0.105	0.035	999.99	9999
01M	NEW RIVER @ HINTON VC	08/02/93	12:30	27.0	25.0	7.7	LOW	2.8/L,SL,CLR	6.90	OVC,R-	180.0	0.00	56.00	0.037	0.066	0.135	999.99	9999
01M	NEW RIVER @ HINTON VC	10/26/93	12:15	16.0	15.0	8.2	1,792	3.1/L,SL,MI	99.99	OVC	150.0	0.00	62.00	0.043	0.056	0.128	999.99	9999
01M	SUMMERSVILLE DAM	06/14/93	10:32	11.5	21.0	7.5	660	2.4/M,SW,MI	12.10	CLR	43.0	0.88	17.20	0.019	0.068	0.089	999.99	9999
01M	SUMMERSVILLE DAM	07/29/93	03:10	14.0	33.0	7.2	196.0	1.6/M,SW,CLR	10.40	SCT,HUM	43.0	0.01	10.40	0.046	0.132	0.022	999.99	9999
01M	SUMMERSVILLE DAM	11/08/93	10:10	10.0	5.0	7.3	4,130	5.7/M,SW,MI	99.99	SCT	70.0	0.18	12.00	0.075	0.173	0.159	999.99	9999
02M	MID GAULEY	06/14/93	11:13	16.5	22.0	7.2	HIGH	6.0/M,M,MR	10.40	CLR	49.0	0.88	10.40	0.011	0.068	0.063	999.99	9999
02M	MID GAULEY	07/29/93	01:40	23.0	33.0	7.4	LOW	1.5/L,SL,CLR	8.70	SCT,HUM	63.0	0.01	9.60	0.041	0.044	0.047	999.99	9999
02M	MID GAULEY	11/08/93	11:10	11.0	11.0	7.4	HIGH	5.7/M,SL,MI	99.99	CLR	60.0	0.18	10.00	0.052	0.064	0.157	999.99	9999
02T	LITTLE BLUESTONE RIVER	06/24/93	11:55	20.0	28.0	7.9	NORM	1.9/M,SL,CLR	8.60	CLR	108.0	0.00	48.00	0.004	0.021	0.043	999.99	9999
02T	LITTLE BLUESTONE RIVER	07/23/93	11:10	21.0	23.0	7.6	LOW	1.4/L,SL,CLR	7.10	SCT	130.0	0.00	48.00	0.058	0.043	0.034	999.99	9999
02T	LITTLE BLUESTONE RIVER	11/04/93	10:40	5.5	999.9	7.9	LOW	0.4/L,SL,CLR	99.99	OVC	95.0	0.00	46.00	0.001	0.014	0.065	999.99	9999
02T	MADAM CREEK	06/23/93	12:45	24.0	27.0	8.4	LOW	10.3/L,SL,MR	8.40	CLR,H-	210.0	0.36	84.00	0.023	0.056	0.059	999.99	9999
02T	MADAM CREEK	08/02/93	12:50	24.0	25.0	7.7	LOW	15./L,SL,MR	5.60	BKN,HUM	450.0	0.00	152.00	0.051	0.431	0.176	999.99	9999
02T	MADAM CREEK	10/26/93	11:50	11.0	14.0	8.1	LOW	1.7/L,SL,CLR	99.99	OVC	219.0	0.00	111.00	0.047	0.082	0.111	999.99	9999
03M	BLUESTONE RIVER @ CONFLUENCE	06/24/93	11:14	24.0	25.0	8.2	NORM	2.9/M,SL,MI	6.80	CLR	312.0	0.00	92.80	0.007	0.079	0.057	999.99	9999
03M	BLUESTONE RIVER @ CONFLUENCE	07/23/93	11:30	24.0	23.0	8.0	LOW	5.3/L,SL,MR	6.00	SCT	312.0	0.00	78.00	0.067	0.134	0.099	999.99	9999
03M	BLUESTONE RIVER @ CONFLUENCE	11/04/93	11:05	6.0	999.9	8.3	NORM	0.8/M,SL,CLR	99.99	BKN	238.0	0.00	94.00	0.003	0.025	0.256	999.99	9999
03M	NEW RIVER @ SANDSTONE FALLS	06/23/93	01:15	26.0	28.0	8.8	NORM	6.5/M,SW,MI	8.00	CLR,H-	152.0	0.36	51.00	0.013	0.075	0.047	999.99	9999
03M	NEW RIVER @ SANDSTONE FALLS	08/02/93	01:35	27.0	28.0	8.4	LOW	3.3/L,SW,CLR	7.50	BKN,HUM	173.0	0.00	59.00	0.050	0.066	1.232	999.99	9999
03M	NEW RIVER @ SANDSTONE FALLS	10/26/93	11:10	15.0	14.0	8.4	LOW	3.0/L,M,MI	99.99	OVC	151.0	0.00	69.00	0.030	0.045	0.130	999.99	9999
03T	PETERS CREEK	06/14/93	11:25	18.0	21.0	8.0	NORM	3.0/M,SW,MR	9.80	CLR	255.0	0.88	45.20	0.041	0.104	0.124	999.99	9999
03T	PETERS CREEK	07/29/93	01:55	27.0	30.0	8.4	LOW	3.2/L,SL,MR	7.70	SCT,HUM	535.0	0.01	95.20	0.075	0.064	0.028	999.99	9999
03T	PETERS CREEK	11/08/93	11:30	8.0	8.0	7.8	NORM	2.5/M,M,CLR	99.99	SCT	160.0	0.18	37.00	0.062	0.101	0.219	999.99	9999
04M	BLUESTONE RIVER @ PIPESTEM	06/24/93	01:28	25.5	26.0	8.8	81.0	3.2/M,M,MI	9.00	CLR	378.0	0.00	97.60	0.004	0.041	0.034	999.99	9999
04M	BLUESTONE RIVER @ PIPESTEM	07/23/93	12:45	25.0	25.0	8.6	70.0	1.9/L,SL,CLR	8.50	SCT	298.0	0.00	76.00	0.100	0.049	0.021	999.99	9999
04M	BLUESTONE RIVER @ PIPESTEM	11/04/93	12:15	6.7	999.9	8.9	4,560	1.7/L,SW,CLR	99.99	SCT	9999.9	0.00	92.00	0.001	0.023	0.127	999.99	9999
04M	NEW RIVER @ SANDSTONE	06/23/93	01:35	27.0	28.0	8.6	NORM	4.4/M,SL,MR	8.30	CLR,H-	153.0	0.36	48.00	0.015	0.074	0.037	999.99	9999
04M	NEW RIVER @ SANDSTONE	08/02/93	01:20	26.0	28.0	8.0	LOW	4.1/L,M,MI	7.20	BKN,HUM	172.0	0.00	56.00	0.046	0.078	0.325	999.99	9999
04M	NEW RIVER @ SANDSTONE	10/26/93	10:55	15.0	13.0	8.5	LOW	1.7/L,SW,CLR	99.99	OVC	150.0	0.00	66.00	0.024	0.037	0.126	999.99	9999
04M	SOUTH SIDE SWISS	06/14/93	12:02	17.0	24.0	7.5	HIGH	14./M,M,TR	10.10	CLR	58.0	0.88	10.80	0.014	0.068	0.020	999.99	9999
04M	SOUTH SIDE SWISS	07/29/93	12:55	23.0	35.0	7.3	NORM	1.5/M,SL,CLR	8.30	SCT,HUM	70.0	0.01	11.20	0.040	0.031	0.031	999.99	9999
04M	SOUTH SIDE SWISS	11/08/93	12:25	11.0	7.0	7.5	HIGH	5.2/M,M,MI	99.99	SCT	70.0	0.18	12.00	0.065	0.081	0.145	999.99	9999
[illegible]	LICK CREEK	06/23/93	02:30	24.0	28.0	8.1	LOW	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

APPENDIX 6. RAW DATA FOR 1993 PHYSICAL/CHEMICAL TESTS

SITE_NO	SITE_NAME	DATE	TIME	WATER_TEMP	AIR_TEMP	PH	STREAM_LVL	NTU_N2OCND_	OISS_OKYGN	WEATHER	CNDUCTIVTY	PRECIP_48H	ALKALINITY	ALUMINUM	MANGANESE	TOTAL_IRON	T_S_SOLIDS	NOT
05T	LICK CREEK	08/02/93	02:25	24.0	29.0	8.2	0.489	3.0/L,SL,CLR	9.10	BKN,HUM	400.0	0.00	51.00	0.036	0.069	0.080	999.99	9
05T	LICK CREEK	10/26/93	09:55	11.0	12.0	8.2	2.122	0.8/L,M,CLR	99.99	OVC	289.0	0.00	117.00	0.017	0.056	0.047	999.99	9
05T	MEADOW RIVER	06/14/93	10:05	15.5	21.0	7.5	1020	7.1/M,M,MR	10.00	CLR	62.0	0.88	12.40	0.010	0.081	0.051	999.99	9
05T	MEADOW RIVER	07/29/93	09:45	26.0	25.0	7.5	14.0	1.6/L,SL,CLR	6.70	SCT,HUM	211.0	0.01	36.40	0.030	0.075	0.028	999.99	9
05T	MEADOW RIVER	11/08/93	09:25	5.0	4.0	7.2	654	4.3/M,SL,MI	99.99	SCT	50.0	0.18	7.00	0.071	0.057	0.163	999.99	9
05T	MOUNTAIN CREEK	06/24/93	01:13	20.0	24.0	7.9	MORN	2.6/M,M,CLR	8.60	CLR	172.0	0.00	36.00	0.004	0.020	0.061	999.99	9
05T	MOUNTAIN CREEK	07/23/93	12:30	20.0	25.0	7.8	LOW	0.7/L,SL,CLR	8.40	SCT	278.0	0.00	45.20	0.042	0.022	0.036	999.99	9
05T	MOUNTAIN CREEK	11/04/93	12:30	5.9	999.9	7.8	LOW	0.4/L,SW,CLR	99.99	SCT	9999.9	0.00	28.00	0.001	0.017	0.120	999.99	9
06T	MEADOW CREEK	06/23/93	02:45	22.0	30.0	8.9	6.100	1.3/M,M,CLR	8.70	SCT,H-	152.0	0.36	36.80	0.015	0.017	0.049	999.99	9
06T	MEADOW CREEK	08/02/93	02:45	23.0	29.0	8.3	0.90	2.5/L,SL,CLR	8.90	SCT,HUM	240.0	0.00	101.00	0.042	0.045	0.155	999.99	9
06T	MEADOW CREEK	10/26/93	09:15	10.0	9.0	8.0	2.660	2.0/L,SW,CLR	99.99	OVC	139.0	0.00	68.00	0.053	0.041	0.088	999.99	9
07T	LAUREL CREEK @ QUINNIMONT	06/21/93	11:23	21.0	21.0	8.0	2.510	0.8/M,S,CLR	9.90	OVC	121.0	0.14	38.00	0.006	0.021	0.051	999.99	9
07T	LAUREL CREEK @ QUINNIMONT	08/03/93	02:00	21.0	22.0	7.9	8.061	/M,SW,MR	8.60	SCT	90.0	0.00	19.00	0.138	0.065	0.604	999.99	9
07T	LAUREL CREEK @ QUINNIMONT	10/25/93	10:10	9.0	5.0	7.9	1.706	0.7/L,SW,CLR	99.99	SCT	85.0	0.00	32.00	0.026	0.011	0.113	999.99	9
08M	NEW RIVER @ PRINCE	06/21/93	11:09	25.5	23.0	7.9	MORN	7.1/M,S,MI	8.30	OVC	145.0	0.14	49.20	0.005	0.071	0.035	999.99	9
08M	NEW RIVER @ PRINCE	08/03/93	01:30	27.0	29.0	8.3	LOW	/L,M,MR	7.80	CLR	175.0	0.00	49.00	0.052	0.055	0.132	999.99	9
08M	NEW RIVER @ PRINCE	10/25/93	09:40	13.0	6.0	8.4	LOW	1.8/L,M,CLR	99.99	SCT	149.0	0.00	64.00	0.081	0.170	0.114	999.99	9
09T	PINEY CREEK @ McCREERY	06/21/93	10:51	21.0	21.0	7.9	38	3.1/M,S,CLR	9.80	OVC	275.0	0.14	37.20	0.016	0.050	0.048	999.99	9
09T	PINEY CREEK @ McCREERY	08/03/93	01:05	22.0	22.0	7.9	40.8	/M,SW,MI	8.00	CLR	290.0	0.00	41.00	0.263	0.154	1.294	999.99	9
09T	PINEY CREEK @ McCREERY	10/25/93	09:20	9.0	8.0	8.0	30	1.2/L,M,CLR	99.99	SCT	275.0	0.00	43.00	0.015	0.036	0.115	999.99	9
11T	DUNLOUP CREEK	06/16/93	09:40	16.0	22.0	8.4	43	/M,SW,MI	11.20	CLR	422.0	0.00	100.80	0.039	0.101	0.065	999.99	9
11T	DUNLOUP CREEK	07/28/93	11:00	20.0	26.0	8.5	16.7	3.6/L,M,MI	9.10	SCT,HOT	550.0	0.00	153.60	0.057	0.051	0.177	999.99	9
11T	DUNLOUP CREEK	10/27/93	08:40	11.0	9.0	8.5	LOW	1.7/L,SW,CLR	99.99	SCT	435.0	0.00	148.00	0.024	0.046	0.126	999.99	9
12M	NEW RIVER @ THURMOND	06/16/93	11:00	23.0	24.0	7.9	7,150	/M,M,TB	8.80	CLR	188.0	0.00	49.60	0.011	0.110	0.081	999.99	9
12M	NEW RIVER @ THURMOND	07/28/93	11:20	28.5	28.0	8.0	2,800	3.3/L,SL,CLR	6.80	SCT,HOT	178.0	0.00	22.00	0.074	0.049	0.113	999.99	9
12M	NEW RIVER @ THURMOND	10/27/93	09:10	8.0	9.0	7.6	2,100	2.3/L,SL,CLR	99.99	SCT	157.0	0.00	73.00	0.040	0.153	0.210	999.99	9
13T	ARBUCKLE CREEK	06/16/93	10:25	15.0	22.0	8.4	14	/M,M,CLR	11.30	CLR	370.0	0.00	118.80	0.032	0.104	0.097	999.99	9
13T	ARBUCKLE CREEK	07/28/93	10:15	19.5	22.0	8.4	1.00	7.6/L,M,MI	8.40	SCT,HOT	540.0	0.00	41.00	0.108	0.075	0.115	999.99	9
13T	ARBUCKLE CREEK	10/27/93	10:00	11.0	11.0	8.4	1.22	3.5/L,SW,CLR	99.99	SCT	395.0	0.00	152.00	0.028	0.047	0.152	999.99	9
14M	NEW RIVER @ CUNARD	06/18/93	10:45	25.0	27.0	8.7	HIGH	5.1/M,SL,MR	8.70	CLR,H+	142.0	0.00	51.60	0.148	0.059	0.062	999.99	9
14M	NEW RIVER @ CUNARD	07/28/93	01:10	29.0	31.0	8.2	LOW	2.8/L,SL,CLR	7.20	SCT,HOT	180.0	0.00	18.00	0.059	0.046	0.109	999.99	9
14M	NEW RIVER @ CUNARD	10/28/93	10:00	13.6	8.0	8.1	LOW	1.8/L,SL,CLR	99.99	SCT	155.0	0.00	97.00	0.069	0.044	0.117	999.99	9
15T	COAL RUN	06/18/93	11:00	16.0	19.0	8.1	MORN	8.5/M,SW,MI	10.40	CLR,H+	330.0	0.00	72.00	0.182	0.069	0.080	999.99	9
15T	COAL RUN	07/28/93	12:55	20.0	30.0	8.4	LOW	5.7/L,M,MI	8.50	SCT,HOT	413.0	0.00	20.00	0.112	0.065	0.193	999.99	9
15T	COAL RUN	10/28/93	09:45	10.0	8.0	8.0	LOW	1.7/L,M,CLR	99.99	SCT	290.0	0.00	66.00	0.168	0.032	0.260	999.99	9
16T	KEENEY CREEK	06/18/93	01:30	17.0	28.0	7.4	LOW	2.7/L,M,CLR	9.70	BKN,H+	110.0	0.00	22.40	0.066	0.025	0.040	999.99	9
16T	KEENEY CREEK	07/27/93	11:25	21.0	28.0	7.2	LOW	1.2/L,SL,CLR	6.80	SCT,HOT	221.0	0.00	51.20	0.048	0.031	0.176	999.99	9

APPENDIX 6. RAW DATA FOR 1993 PHYSICAL/CHEMICAL TESTS

SITE_NO	SITE_NAME	DATE	TIME	WATER_TEMP	AIR_TEMP	PH	STREAM_LVL	NTU_H2OCND_	DISS_OXYGN	WEATHER	CNDUCTIVTY	PRECIP_48H	ALKALINITY	ALUMINUM	MANGANESE	TOTAL_IRON	T_S_SOLIDS	NOT_AC
16T	KEENEY CREEK	10/28/93	10:45	10.0	8.0	7.7	LOW	0.7/L,SL,CLR	99.99	SCT	140.0	0.00	40.00	0.176	0.025	0.180	999.99	9999
17M	NEW RIVER @ FAYETTE STATION	06/18/93	12:25	25.0	28.0	8.0	3,350	4.5/M,SL,MR	9.00	SCT,M+	170.0	0.00	52.00	0.160	0.052	0.041	999.99	9999
17M	NEW RIVER @ FAYETTE STATION	07/27/93	12:25	29.0	31.0	8.2	2,600	5.6/L,SL,CLR	7.80	SCT,HOT	253.0	0.00	12.00	0.055	0.080	0.116	999.99	9999
17M	NEW RIVER @ FAYETTE STATION	10/28/93	11:30	13.5	9.0	9.0	2,700	1.7/L,SL,CLR	99.99	SCT	153.0	0.00	65.00	0.140	0.029	0.216	999.99	9999
18T	WOLF CREEK	06/18/93	12:15	17.0	27.0	8.5	5.33	2.1/M,M,CLR	10.60	SCT,M+	385.0	0.00	129.20	0.138	0.044	0.049	999.99	9999
18T	WOLF CREEK	07/27/93	12:45	20.0	31.0	8.9	2.45	1.8/L,M,CLR	9.60	SCT,HOT	510.0	0.00	242.00	0.082	0.046	0.198	999.99	9999
18T	WOLF CREEK	10/28/93	11:45	10.0	9.0	8.4	3.99	1.5/L,M,CLR	99.99	SCT	300.0	0.00	127.00	0.142	0.019	0.126	999.99	9999
19T	MARR BRANCH	06/18/93	12:00	18.0	25.0	7.6	.750	8.4/L,SL,MI+	3.70	CLR,M+	460.0	0.00	184.00	0.082	0.541	0.082	999.99	9999
19T	MARR BRANCH	07/27/93	11:50	22.0	29.0	7.9	0.50	14./L,SL,MI	0.70	SCT,HOT	550.0	0.00	417.60	0.026	0.570	0.270	999.99	9999
19T	MARR BRANCH	10/28/93	11:55	10.0	9.0	7.7	0.70	5.1/L,SL,MI	99.99	SCT	450.0	0.00	227.00	0.124	0.408	0.338	999.99	9999