

**Open-File Report 96-247** 

Water-Quality Characteristics and Suspended Sediment of the Clinch and Powell Rivers in Northeastern Tennessee, 1989-94



Prepared by the U.S. GEOLOGICAL SURVEY

in cooperation with the TENNESSEE STATE PLANNING OFFICE



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Cover illustration. See figure 2, page 4.

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## by LAWRENCE M. BREDE and BRIAN L. BENHAM

U.S. Geological Survey

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## U.S. DEPARTMENT OF THE INTERIOR BRUCE BABBITT, Secretary

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### **CONVERSION FACTORS**

Multiply	Ву	To obtain
inch (in.)	25.4	millimeter
foot (ft)	0.30483	meter
mile (mi)	1.609	meter
square mile (mi <sup>2</sup> )	2.590	square kilometer
cubic feet (ft <sup>3</sup> )	0.0283	cubic meter
gallon (gal)	3.785	liter
pound (lb)	0.4536	kilogram
ton	0.9072	metric ton
tons per square mile per year [(tons/mi <sup>2</sup> )/yr]	0.3502	ton per square kilometer per year
nicrosiemens per centimeter (µS/cm) at 25° Celsius	1	micromhos per centimeter at 25° Celsius

Temperature in degrees Fahrenheit (°F) can be converted to degrees Celsius (°C) as follows:

 $^{o}C = (^{o}F - 32)/1.8$ 

Water-quality abbreviations

mg/L milligrams per liter

cols./100 mL colonies per 100 milliliter

## Water-Quality Characteristics and Suspended Sediment of the Clinch and Powell Rivers in Northeastern Tennessee, 1989-94

## By Lawrence M. Brede and Brian L. Benham

## Abstract

The U.S. Geological Survey, in cooperation with the Tennessee State Planning Office, conducted a 4 1/2-year water-quality study in the Clinch and Powell River drainage basins in northeastern Tennessee. An intermittent sampling program was conducted from June 1989 through January 1994. Water-quality samples were collected and analyzed for an upstream site and a downstream site on each river. The upstream sites were near the Tennessee-Virginia State line, and the downstream sites were located on the rivers upstream of Norris Lake.

At the upstream sites, fecal coliform bacteria exceeded the water-quality criteria for recreational use in 14 of 40 samples. At the downstream sites, counts exceeded the criteria limits in 2 out of 22 samples. Concentrations of nitrogen and phosphorus compounds were within the range expected for natural surface water. Nutrient discharge did not correlate well to streamflow, rainfall, and seasonal effects. Suspended-sediment discharge at the four study sites was related to streamflow, a rainfall factor, and seasonal effects. Average annual sediment yields among sites were estimated at 97 tons per square mile per year on the Clinch River and 184 tons per square mile per year on the Powell River. Concentrations of calcium, magnesium, sodium, potassium, sulfate, chloride, silica, and fluoride were all measured within the range expected for a natural carbonate system.

Instantaneous total-iron concentrations exceeded the U.S. Environmental Protection Agency criteria for fish and aquatic life at the upstream sites in 23 of 28 samples on the Clinch River, and in 38 of 44 samples on the Powell River. At the downstream sites, total iron exceeded the same criteria in 2 of 5 samples on the Clinch River, and in 1 of 4 samples on the Powell River.

## INTRODUCTION

The Clinch and Powell River drainage basins contain valuable natural resources. Agricultural, grazing, and mining activities in these basins pose potential problems that may jeopardize the water quality of the basins. Data on water quality are needed to identify and quantify potentially harmful constituent levels, as well as their sources.

From June 1989 through January 1994, the U.S. Geological Survey (USGS), in cooperation with the Tennessee State Planning Office, conducted an investigation of water quality in the Clinch and Powell River basins. The purposes of the study were to characterize water quality, to identify potential water-quality problems, and to estimate annual loads of selected constituents in the Clinch and Powell Rivers.

This report presents summary statistics of the water-quality data and estimates of annual loads for suspended sediment from two sites located in each basin. Water samples were analyzed for physical properties, bacteria, nutrients, suspended sediment, major ions, and selected trace constituents. Sampling intensity varied during the study period due to differing annual study requirements. Storm flow, defined as flow during the rise, peak, and recession of a storm event, and base flow, defined as flow more than 72 hours after a precipitation event, were sampled. The annual suspended-sediment loads were estimated by extrapolating the measured suspended-sediment concentration and continuous data such as discharge and

rainfall to produce a synthetic record of daily sediment loads and an estimated annual load.

#### **Description of the Study Area**

The Clinch River and Powell River drainage basins (referred to as Clinch and Powell River basins) are located in northeastern Tennessee and southwestern Virginia (fig. 1). The study includes the Clinch and Powell River basins situated upstream of the backwater of Norris Lake. The basins are adjacent, with the Clinch River basin to the east and the Powell River basin to the west. The rivers flow from northeast to southwest.

The Clinch and Powell River drainage basins occur in the Appalachian Plateaus and the Valley and Ridge Physiographic Provinces (fig. 2) (Fenneman, 1938). The Valley and Ridge Physiographic Province is characterized by parallel southwest to northeast trending valleys and ridges, with valleys having an average width of 45 miles. The valleys within the basin have slopes ranging between 0.0001 foot per foot (ft/ft) and 0.0025 ft/ft, and altitudes varying from 1,200 to 1,600 feet. The ridges bounding these valleys have altitudes of nearly 2,200 feet. The northwestern part of the Powell River basin contains a part of the Cumberland Mountain section of the Appalachian Plateaus Physiographic Province (fig. 2). It is marked by a prominent escarpment of cliffs 1,000 feet higher than the floor of the Valley and Ridge Physiographic Province.

The Clinch River drains  $1,154 \text{ mi}^2$  in southwestern Virginia upstream of the Looney's Gap site (site 1 near the Tennessee-Virginia State line), and 320 mi<sup>2</sup> in northwestern Tennessee at site 2, near the backwater of Norris Lake, for a total contributing study area of  $1,474 \text{ mi}^2$  (fig. 1, table 1). The Powell River drains  $510 \text{ mi}^2$  in southwestern Virginia upstream of site 3 near Alanthus Hill, Tennessee, and  $175 \text{ mi}^2$  in northeastern Tennessee above Arthur, Tennessee, at site 4 also near the backwater of Norris Lake, for a total contributing study area of 685 mi<sup>2</sup> (table 1). The four sampling sites used in this investigation are located in Tennessee.

The surface geology of the two river basins is similar. Both basins are primarily underlain by extensively faulted and folded limestone, dolomite, and shale of Mississippian to Cambrian age. The valleys are underlain by soft or less resistant rocks, and the ridges are underlain by hard, more resistant rocks (Floyd, 1965). The Powell River basin, however, contains a much larger area underlain by formations of Pennsylvanian age consisting of sandstones and shale with bituminous coal beds.

The study area has a mean annual temperature of 58 °F. The coldest months are December and January with an average daily minimum temperature of 30 °F, and the hottest months are July and August with an average daily maximum temperature of about 87 °F (National Oceanic and Atmospheric Administration, 1974).

Average annual precipitation is 49 inches with approximately 23 inches occurring during April through September. Average annual snowfall varies from 8 inches in the southwestern part of the watershed to 12 inches on the highland area of the Cumberland Plateau. The highest volume precipitation occurs from December through March, caused by frontal activity, and from July through August, caused by lateday convective storms (Hufschmidt and others, 1981).

Well over half of each basin is forested (table 1). The majority of forest land in the Clinch and Powell River basins is of the oak-hickory type. The Clinch River basin also contains loblolly-shortleaf pine, maple-beech-birch, oak-pine, and elm-ash-cottonwood forest types, which occupy less than 10 percent of the forested area. The Powell River basin contains small areas of eastern red cedar and maple-beechbirch forest types (U.S. Department of Agriculture, 1992a; 1992b).

Agriculture (cropland and pasture) accounts for about 19 to 37 percent of the land use (table 1). The primary crops in this region include tobacco, corn, and small grains in addition to hay. Beef cattle, horses, and sheep are the predominant livestock in both basins, followed by dairy cattle, hogs, and poultry (U.S. Department of Agriculture, 1992b).

Bituminous coal occurs in both river basins and is extracted by both deep and strip mining methods. Mining accounts for about 1 percent of the land use in the Clinch River basin and about 2 percent in the Powell River basin (table 1), but most of the mining occurs in Virginia (U.S. Department of Agriculture, 1992a).

# Streamflow Characteristics of the Clinch and Powell Rivers

When compared with flood-frequency values, peak discharges recorded during sampling demonstrate the relative magnitude and range of flows

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4 Water-Quality Characteristics and Suspended Sediment of the Clinch and Powell Rivers in Northeastern Tennessee, 1989-94

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Table 1. V

[from U.S. Department of Agriculture, 1992a and 1992b; and Donald L. Dotson, U.S. Department of Agriculture, Soil Conservation Service, written commun., 1993]

						Land use	Land use as percentage of total land area	ge of total la	and area	
Station number	Subbasin location	Drainage, in square miles	Latitude	Longitude	Forest	Cropland Pasture	Pasture	Mined	Mine associated land	Other <sup>1</sup>
03527220	Clinch River near Loonev's Gan (site 1)	1 154	76° 34' 77"	80° 5K' JN"	5 Y S	13.6	124	=	20	
			11 10 00	70 70 70	C.0C	0.01	4.07	1.1	<b>C</b> .0	4.4
;	Looney's Gap to Tazewell <sup>2</sup>	320	ł	I	78.8	5.7	13.7	0.6	0.3	0.9
03528000	above Tazewell (site 2)	1,474	36° 25′ 30″	83° 23′ 54″	61.3	11.9	21.3	1.0	0.5	4.0
	Powell River									
03531680	at Alanthus Hill (site 3)	510	36° 33' 23"	82° 22′ 47″	61.3	15.9	13.6	2.3	0.3	6.6
ł	Alanthus Hill to Arthur <sup>2</sup>	175	I	ł	62.0	16.2	18.7	2.0	0.3	0.8
03532000	03532000 above Arthur (site 4)	685	36° 33′ 30″	83° 37′ 49″	61.5	16.0	14.9	2.2	0.3	5.1

Outer category includes restortial, industrial, water boules, orchard, and Christmas tree acreage. <sup>2</sup> Represents subbasin drainage to the river between sampling sites.

Introduction 5

covered by the sampling (table 2). Flood probability values, or flood-frequency curves, were defined by Weaver and Gamble (1993). The flood-frequency curves for the Clinch River near Looney's Gap, Tennessee (fig. 3a), and the Powell River at Alanthus Hill, Tennessee (fig. 3c), were calculated using Method B for ungaged sites in rural basins of Tennessee (Weaver and Gamble, 1993). The flood-frequency curves for the Clinch River above Tazewell, Tennessee (fig. 3b), and the Powell River above Arthur, Tennessee (fig. 3d), were developed using discharge data collected at those gaged sites (Weaver and Gamble, 1993).

The storms sampled during this investigation typically had a recurrence interval of less than 2 years. A flood with a 2-year recurrence interval, or average return period, is expected to be exceeded on the average of once in 2 years. Two storms had 2-year recurrence intervals: February 10-12, 1990, at Clinch River near Looney's Gap and June 15-19, 1989, at Powell River above Arthur. The storm of December 1-6, 1991, resulted in a peak discharge with a 4-year recurrence interval on the Powell River near Alanthus Hill (table 2).

#### **Data Collection**

Hydrographs for sampled storm-flow events were taken from continuous recording stations, if available, or estimated from actual observations of stream discharge made during the storm event. The accuracy of hydrograph delineation for each stormflow event varied greatly and, therefore, a linear approximation between samples was used to estimate all hydrographs.

Rainfall data were obtained from the Tennessee Valley Authority Engineering Services (Wayne Hamburger, written commun., 1994) and from the National Oceanic and Atmospheric Administration (1988 to 1994) monthly data reports for Tennessee. These data were used in a Thiessen weighted calculation to determine a basin rainfall factor for calculating suspendedsediment loads.

Water samples were taken with a depth integrating sampler. The samples were collected manually during individual storms to characterize water quality during the rise, peak, and recession of the storm event (table 2). Comparison of peak discharges from sampled events (table 2) with flood recurrence intervals from the respective stations show that all sampled storms were of low to moderate size. Additionally, samples were collected during base-flow conditions, defined by the absence of significant rainfall in the basin during the 72 hours (or more) prior to sampling.

Properties and constituents measured in the field include pH, specific conductance, dissolved oxygen, fecal coliform and fecal streptococcal bacteria, discharge, and water temperature. Analyses for other chemical constituents and sediment particle-size determinations were made in the laboratory.

Water-quality data for the sampling sites are described using statistical measures (minimum, maximum, median, mean, 75th and 25th percentile) that summarize sample distribution. These sample distribution statistics are presented in table 3 (in back of report).

## WATER-QUALITY CHARACTERISTICS OF THE CLINCH AND POWELL RIVERS

Water-quality samples were collected at four sites on the Clinch and Powell Rivers to evaluate water-quality conditions and differences between the two basins. The samples were analyzed for physical properties, bacteria, nutrients, suspended sediment, major ions, and selected trace constituents.

Physical properties of the Clinch and Powell Rivers were measured during each sampling event. The pH of the waters ranged from 7.2 to 8.8 at all sites. At each site, the pH decreased during storm flow (table 4). Median values of pH during stormflow were typically less than the median values observed during periods of base flow. All values were within the range expected for streams draining watersheds containing carbonate rocks. The median value of pH for all water samples from the Clinch River is 8.2, and the median from the Powell River is 8.1 (table 3, in back of report). The median value of pH for all water samples from the Powell River is less than the median value from the comparably sized Clinch River sites.

Acidity was tested at three of the four sampling sites (table 3) and ranged from 5 to 25 milligrams per liter (mg/L) as calcium carbonate (CaCO<sub>3</sub>). The larger values occurred in winter months at higher discharges. Runoff rates during these months increased due to increased rainfall and decreased infiltration rates. Most of the carbonate in the system existed as bicarbonate at the observed pH range during the study. Alkalinity at the four sampling sites ranged from 62 to 157 mg/L as CaCO<sub>3</sub>. However, the median at all sites varied only

## Table 2. Description of storm-flow sampling for each of the study sites

.

[<, less than]

Date	Hydrograph period, In hours	Total number of samples	Samples on rising limb	Samples on falling limb	Samples at peak discharge	Peak discharge, in cubic feet per second	Recurrence interval
		Clinch Ri	ver near Loon	ey's Gap, Tenno	essee		
September 16-18, 1989	40	3	0	3	0	13,040	< 2 yr
February 10-12 1990	56	4	1	2	1	19,400	2 yr
December 19-20, 1990	28	5	2	2	1	3,350	< 2 yr
February 14-15, 1991	50	2	0	2	0	7,589	< 2 yr
March 29-April 2, 1991	93	9	4	4	1	13,300	< 2 yr
May 19-21, 1993	43	14	5	7	2	5,080	< 2 yr
		Clinch River	above Tazew	ell, Tennessee			
June 17-19, 1989	66	25	8	10	7	17,100	< 2 yr
September 18-19, 1989	84	2	0	2	0	13,460	< 2 yr
February 10-13, 1990	73	19	5	13	1	16,600	< 2 yr
May 5-7, 1990	46	24	9	12	3	13,100	< 2 yr
		Powell River	at Alanthus H	Iill, Tennessee			
September 16-18, 1989	41	3	1	2	0	5,235	< 2 yr
February 10-13, 1990	72	5	2	2	1	11,200	< 2 yr
May 5-7, 1990	43	4	2	1	1	7,460	< 2 yr
January 7-9, 1991	53	7	3	3	1	5,910	< 2 yr
February 18-22, 1991	91	9	4	3	2	11,400	< 2 yr
November 22-24, 1991	52	17	5	11	1	6,480	< 2 yr
December 1-6, 1991	110	21	11	8	2	18,300	4 yr
January 7-10, 1994	72	5	2	2	1	5,160	< 2 yr
		Powell Riv	er above Arthu	ar, Tennessee			
June 7-8, 1989	15	15	4	6	5	4,670	< 2 yr
June 15-19, 1989	102	31	6	22	3	15,600	2 yr
September 17-19, 1989	57	2	0	2	0	4,965	< 2 yr
November 16-18, 1989	46	24	11	9	4	6,140	< 2 yr
February 10-13, 1990	78	26	12	10	4	11,600	< 2 yr
May 5-7, 1990	48	17	9	6	2	8,410	< 2 yr



Figure 3. Flood-frequency curves for the sampling sites in the Clinch and Powell River basins.



Figure 3. Flood-frequency curves for the sampling sites in the Clinch and Powell River basins—Continued.

	P	H, in standard un	its
Site	Range	Base-flow median	Storm flow median
Clinch River			
near Looney's Gap	7.2-8.6	8.2	8.1
above Tazewell	8.0-8.8	8.3	8.2
Powell River			
at Alanthus Hill	7.7-8.3	8.2	7.9
above Arthur	7.8-8.4	8.0	8.0

Table 4. Comparison of pH during low flow and storm flow at the sampling sites

between 83 and 119 mg/L (table 3). Specific conductance at the sites ranged from 99 to 445 microsiemens per centimeter ( $\mu$ S/cm), with median values ranging from 234 to 302  $\mu$ S/cm (table 3). Turbidity at all sampling sites ranged from 0.6 to 140. Dissolved-oxygen concentration varied slightly among the four sites and was never below the water-quality criterion of 5 mg/L established by the Tennessee Department of Environment and Conservation for the protection of fish and aquatic life (Tennessee Department of Environment and Conservation, 1991) (table 3).

Measurement of fecal bacteria (streptococcus and coliform) was taken under varying streamflow conditions. No correlation existed between streamflow and fecal bacteria count. Fecal streptococcus ranged from 3 to 20,000 cols./100 mL (table 3). The upstream sites on both rivers showed wider ranges and higher median values than the downstream sites. Fecal coliform colonies ranged from 5 to 7,300 cols./100 mL (table 3). The upstream sites showed greater ranges and higher median values than the downstream sites. The State of Tennessee water-quality criterion for a single sample for recreational use (1,000 cols./100 mL) was exceeded for 6 of 19 samples at the upstream Clinch River site and for 8 of 21 samples at the upstream Powell River site. Additionally, the criterion for fish and aquatic life (5,000 cols./100 mL) was exceeded for 5 of 19 samples at the upstream Clinch River site and for 3 of 21 samples at the upstream Powell River site. The values for the downstream sites were, for the most part, within the criterion limits. Only 2 of 13 samples exceeded the criterion for recreation and 1 of 13 samples exceeded the fish and aquatic life criterion at the downstream Clinch River site. No values were measured in exceedance of recreation or fish and aquatic life criteria at the Powell River downstream site.

Natural sources of nitrogen include precipitation, runoff, and erosion of fertile land. Biological nitrogen fixation by microorganisms, such as blue-green algae, also contributes nitrogen to surface water. Man-made sources of nitrogen include agricultural, domestic (septic), and industrial wastewater discharge. Samples from the Clinch and Powell River sites were analyzed for nitrite, nitrate, dissolved ammonia, and total ammonia. Concentrations were typically below 1 mg/L. The concentration ranges showed little difference between river basins or upstream and downstream sites. The detected levels of total ammonia (NH<sub>4</sub>) nitrogen did exceed the U.S. EPA criterion for fish and aquatic life (0.02 mg/L) in 44 of 124 samples collected (table 3). However, un-ionized ammonia toxicity is a function of water temperature and pH. Decreases in either of these two variables results in decreased toxicity for a given concentration of total ammonia.

Total phosphorus values ranged from <0.01 to 0.41 mg/L. These values were consistent with land use of the basins and did not exceed values expected for these uses (table 3). The median values for total phosphorus were less than 0.1 mg/L at all four sites.

Concentrations of suspended sediment in samples from the four sites ranged from 1 to 1,040 mg/L (table 3). The downstream sites on the two rivers had greater median concentrations than the upstream sites. The median percentage of suspended sediment finer than 0.062 millimeter in diameter, the break point between sand and silt, varied between 83 and 89 percent. These percentages indicate that the majority of the sediment transported by both rivers consists of silts and clays. No correlation existed between streamflow and percentage finer than 0.062 millimeter. Each river appears to have a similar content of sand versus silt between sites, with a slightly larger ratio of silt-clay to sand in the Clinch River than the Powell River (table 3).

Samples were analyzed for total dissolved solids and major constituents to determine the general water quality. Dissolved solids consist of inorganic salts, some organic matter, and dissolved constituents. The concentrations at all sampling sites were well below the water-quality criterion limit of 500 mg/L for domestic water supply (table 3). The major ions determined in the study act as "fingerprints" for the type of water which is being sampled. These ions include calcium, magnesium, sodium, potassium, sulfate, chloride, silica, and fluoride, as well as total hardness, which is expressed in milligrams per liter as calcium carbonate (table 3). Concentrations of these constituents were within the range expected for a natural carbonate system.

Total and dissolved analysis for 20 trace constituents were made on selected base-flow and storm-flow samples (table 3). Concentrations were compared on an individual basis with the most appropriate waterquality criteria (Tennessee Department of Environment and Conservation, 1991; U.S. Environmental Protection Agency, 1976). Total-iron concentrations exceeded the U.S. Environmental Protection Agency criterion for fish and aquatic life in 23 of 28 samples at the upstream Clinch River site, in 38 of 44 samples at the upstream Powell River site, in 2 of 5 samples at the downstream Powell River site. No other dissolved trace-constituent concentrations exceeded established water-quality criteria for the study basins.

#### SUSPENDED SEDIMENT

To estimate annual loads of any water-quality constituent, the water-quality data must be used with a surrogate variable and an extrapolation technique, such as regression, to estimate concentration data for unsampled times. Regression defines a relation between a dependent variable, such as water-quality concentration, and the surrogate variable, such as streamflow, for which continuous data are available. Other independent variables, such as season and rainfall characteristics, may also be included in the regression. The coefficient of determination  $(r^2)$  and the standard error of the estimate (SE) measure the fit of the regression. The  $r^2$  value represents how well the variation of the dependent variable is explained by the independent variables. The SE is a measure of how well estimated values agree with observed values of the dependent variable.

Concentration data for suspended sediments were regressed against streamflow, season at time of sampling, and a rainfall factor. To separate the data seasonally, each calendar year was divided into radians and the discharge was related to the sine and cosine of the radian date. The rainfall factor (R) was determined by the product of total rainfall in inches (*Precip<sub>total</sub>*) and the maximum 6-hour storm intensity ( $I_{6-hour}$ ), which were published by the National Oceanic and Atmospheric Administration (1974). Rainfall factor is determined by the following equation:

$$R = (Precip_{total}) \cdot (I_{6-hour})$$

The rainfall factor (*R*) was then weighted according to the Thiessen diagram results for a basinwide rainfall factor (table 5). The final regression factor values for instantaneous discharge were computed from either actual measurements or unit-value discharge based on stage data taken during the sampling event. Calibration coefficients and error statistics for the regression at each of the four sampling sites are listed in table 6. The regression for Powell River above Arthur appears weaker ( $r^2$ =0.611 and *SE*=0.269) than those for the other sites because of a single storm that caused extremely large sediment loads.

A synthetic record of daily sediment loading was produced for each site by applying the regression relation to streamflow and rainfall data. Annual load was computed by summing the synthetic record and dividing by the number of years of record (table 7). Percentage of error is based on the regression error of the concentration estimate. The estimated annual load for the Clinch River both near Looney's Gap (upstream) and above Tazewell (downstream) was 143,000 tons. Results suggest that the Clinch River between Looney's Gap and Tazewell does not contribute to the sediment load; however, there are no impoundments to trap sediment and the contribution may be obscured in the error. The estimated annual load for the Powell River increased from 110,000 tons at Alanthus Hill (upstream) to 126,000 tons above Arthur (downstream); however, the estimated annual load for Powell River above Arthur has a percentage error of 91 due to the weak regression caused by a single storm with extremely large sediment loads. The estimated annual suspended-sediment yield from June 1989 through January 1994 was 97 and 184 (tons/mi<sup>2</sup>)

#### Table 5. Rain gage locations with Thiessen weight annotated

Station name	Latitude	Longitude	Data type	Thiessen weight
Wise, Va.	36°58'00"	82°23'00"	Hourly	6.25
Rogersville, Tenn.	36°25'00"	82°59'00"	Hourly	0.78
Arthur, Tenn.	36°32'32"	83°37'49"	2-hour	4.69
Speedwell, Tenn.	36°27'27"	83°53'04"	6-hour	4.69
Fitt's Gap, Tenn.	36°35'20''	83°13'40"	6-hour	4.69
Church Hill, Tenn.	36°31'16"	82°44'15"	6-hour	0.78
Duffield, Va.	36°42'44"	82°47'47"	6-hour	12.5
Pennington Gap, Va.	36°44'48"	83°02'20"	6-hour	12.5
Appalachia, Va.	36°53'54"	82°47'18"	6-hour	12.5
Tazewell, Va.	37°07'33"	81°33'29"	6-hour	6.25
Coeburn, Va.	36°55'44"	82°28'53"	6-hour	6.25
Lebanon, Va.	36°54'33"	83°03'39"	6-hour	9.37
Richlands, Va.	37°05'46"	81°50'09"	6-hour	9.37
Hilton, Va.	36°38'44"	82°29'15"	6-hour	9.37

[Data source: Wayne Hamburger, Tennessee Valley Authority Engineering Services, written commun., 1994]

 
 Table 6. Regression equations for estimating suspended-sediment concentration based on season, rainfall, and instantaneous discharge at the sampling sites

[ss, instantaneous concentration of suspended sediment in milligrams per liter;  $\theta$ , the radian year with January 1 as  $\theta=0$ ; Q, the instantaneous streamflow in cubic feet per second; R, rainfall factor defined by the weighted product of the total precipitation and 6-hour intensity;  $r^2$ , coefficient of determination; SE, standard error of the regression estimate; N, number of samples used in the regression analysis; C, B, D, E, and F are regression coefficients; --, variable is not used in the model; equation form is:  $log[ss] = C + B*sin\theta + D*cos\theta + E*logQ + F*R]$ 

Site	С	В	D	E	F	r <sup>2</sup>	SE	N
Clinch River						<u> </u>		
Looney's Gap	-4.013	-0.1496		1.8428	-0.0095	0.885	0.192	42
Tazewell	-0.5797	1.4391		0.3478	0.0071	0.879	0.154	78
Powell River								
Alanthus Hill	-4.8273		-0.2813	1.50608	0.0137	0.934	0.093	72
Arthur	-0.08105			0.7124	0.0062	0.611	0.269	120

[(tons/mi<sup>2</sup>)/year, tons per square mile per year]

Site	Total annual load (tons)	Annual load per basin area [(tons/mi <sup>2</sup> )/year]	Percentage of error
Clinch River			
near Looney's Gap	143,000	124	50
above Tazewell	143,000	97	42
Powell River			
at Alanthus Hill	110,000	216	25
above Arthur	126,000	184	91

on the downstream sites of the Clinch and Powell Rivers, respectively. The estimated annual suspended-sediment yields at the upstream sites were also lower for the Clinch River (124 tons/mi<sup>2</sup>) than for the Powell River (216 tons/mi<sup>2</sup>).

### SUMMARY

From June 1989 through January 1994, the USGS, in cooperation with the Tennessee State Planning Office, conducted an investigation of water quality in the Clinch and Powell River basins in northeastern Tennessee. Agriculture, grazing, and mining activities in these basins pose potential problems that may jeopardize the water quality. This report summarizes the water quality at an upstream and downstream site on both the Clinch and Powell Rivers. Water samples were analyzed for physical properties, bacteria, nutrients, suspended sediment, major ions, and selected trace constituents.

The Clinch and Powell River basins are located in northeastern Tennessee and southwestern Virginia in the Appalachian Plateau and the Valley and Ridge Physiographic Provinces. The study area is underlain by rock formations mostly of Pennsylvanian, Cambrian, and Ordovician ages.

The part of the Clinch and Powell River basins used in the study are upstream of the backwater of Norris Lake. The basins are adjacent. The Clinch River basin in the study area is 1,474 mi<sup>2</sup>, and the Powell River basin in the study area is 685 mi<sup>2</sup>. Flowduration curves are characteristic of highly variable streamflow with most flow occurring during or immediately after storms. The pH of the waters ranged from 7.2 to 8.8 at all sites. At each site, the pH decreased during storm flow. The median value of pH for all water samples from the Clinch River is 8.2, and the median from the Powell River is 8.1.

Acidity tested at three of the four sampling sites ranged from 5 to 25 milligrams per liter as calcium carbonate. Alkalinity at the four sampling sites ranged from 62 to 157 milligrams per liter as calcium carbonate. Values of specific conductance at the sites ranged from 99 to 445 microsiemens per centimeter.

Fecal coliform colonies ranged from 5 to 7,300 colonies per 100 milliliters. The State of Tennessee water-quality criterion for a single sample for recreational use (1,000 colonies per 100 milliliters) was exceeded for 6 of 19 samples at the upstream Clinch River site and for 8 of 21 samples at the upstream Powell River site. The criterion for fish and aquatic life (5,000 colonies per 100 milliliters) was exceeded for 5 of 19 samples at the upstream Clinch River site and for 3 of 21 samples at the upstream Powell River site. Only 2 of 13 samples exceeded the criterion for recreation and 1 of 13 samples exceeded the fish and aquatic life criterion at the downstream Clinch River site. No values were measured in exceedance of recreation or fish and aquatic life criteria at the Powell River downstream site.

Detected levels of total ammonia nitrogen did exceed the U.S. Environmental Protection Agency criterion for fish and aquatic life in 44 of 124 samples. Total phosphorus values ranged from < 0.01 to 0.41 milligrams per liter, were consistent with land use of the basins, and did not exceed values expected for these uses. Concentrations of suspended sediment in samples from the four sites ranged from 1 to 1,040 milligrams per liter. Sand-silt separation of samples indicated that the majority of the sediment transported by both rivers consists of silts and clays.

Major ions sampled included calcium, magnesium, sodium, potassium, sulfate, chloride, silica, and fluoride, as well as total hardness. Concentrations of these constituents were within the range expected for a natural carbonate system. Of 20 trace constituents sampled, only total-iron concentrations frequently exceeded U.S. Environmental Protection Agency criterion for fish and aquatic life. Total-iron concentration exceedances occurred in 23 of 28 samples at the upstream Clinch River site, in 38 of 44 samples at the downstream Clinch River site, and in 1 of 4 samples at the downstream Powell River site.

Estimates of suspended-sediment loads were made using suspended-sediment concentration data, continuous streamflow data, and rainfall data. Coefficients of determination for the estimators indicate that loads can be reasonably estimated at all sites except Powell River at Arthur, Tennessee. The low confidence at Arthur is apparently due to one large storm event that created extremely large sediment loads. The estimated average annual suspended-sediment yield from June 1989 through January 1994 was 97 and 184 tons per square mile on the Clinch and Powell Rivers, respectively.

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[P75, the value of the 75<sup>th</sup> percentile sample; Public number and detected, the number of samples with measured values lower than detectable levels; mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mL, milligrer; <, less than; >, greater than; mm, millimeter; NTU, nephelometric turbidity unit; µg/l, micrograms/liter; n/a, no applicable criteria; n/a, not applicable; --, no data] I ļ

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Parameter	Units	Listed criteria	Number of exceedances	Number of samples	Maximum	Minimum	Mean	Median	P75	P25	Number not detected
			Station Numl	Station Number 03527220 Clinch River near Looney's Gap, Tennessee	ch River near Loc	ney's Gap, Tenn	lessee				
Hd	Standard	6.5-8.5 <sup>1</sup>	1	41	8.6	7.2	ł	8.2	8.2	8.1	0
		6.4-9.0 <sup>2.3</sup>	0								
Acidity	me/L	none	n/a	80	6.6	در	5.6	5	S	5	0
Alkalinity	mg/L	<204	0	18	151	76	103	101	011	16	11
Specific conductance	Jo 26 @ 110/1011	none	n/a	40	445	220	281	272	309	240	0
Dissolved oxvgen	mg/L	>\$ 0 <sup>1</sup>	0	38	14.1	7.6	10.1	10.4	11.0	8.9	0
Fecal coliform	colonies/100 mL	s nm <sup>1</sup>	Ś	19	6,700	5	1,755	490	3,200	87	0
		$1.000^{2}$	9								
Fecal streptococcus	colonies/100 mL	none	n/a	18	20,000	22	3,600	1,350	5,600	02	0
Nitrogen:											
NO,	mg/L	none	п/а	4	0:04	≤0.01	0.02	0.02	0.02	<0.01	36
NO.	mg/L	none	n/a	4	96:0	0.68	0.81	١	i	ł	0
NO.+NO.	me/L	none	n/a	4	1.1	<0.05	0.69	0.70	0.82	0.6	I
Constant Physics	- S	none	n/a	40	0.05	<0.01	0.02	.02	0.03	0.01	5
		0.004	14	35	0.05	<0.01	0.02	.02	0.04	0.01	3
(101) 57751		70.0		30	15	0.15	0.59	0.52	0.67	0.36	0
Total organic nitrogen	mg/L	none	IVA	ŝ	]	61.0					
Phosphorus:								;			ç
Dissolved	mg/L	none	n/a	40	0.03	<0.01	0.01	10.	0.02	<0.01	۲.
Total	mg/L	none	n/a	40	0.23	<0.01	0.07	.07	0.1	0.03	7
Ortho-phosphorus	mg/L	none	n/a	40	0.03	10:0>	0.01	0.01	<0.01	<0.01	26
Total organic carbon	mg/L	none	n/a	38	10	1	4.7	4.2	6.2	2.8	0
<sup>1</sup> State of Tenne	<sup>1</sup> State of Tennessee water-quality criteria for fish and aquatic	niteria for fish and a	quatic life.								
	•										

<sup>2</sup> State of Tennessee water-quality criteria for recreational use.

<sup>3</sup> State of Tennessee water-quality criteria for irrigation and livestock watering and wildlife.

<sup>4</sup> Federal water-quality criteria for fish and aquatic life.

Station Number 03527220 Cline         Station Number 03527220 Cline           none $n/a$ 42           none $n/a$ 42           none $n/a$ 11           none $n/a$ 23 $360^3$ 0         11 $100^4$ 0         11           none $n/a$ 11			Median	P/5	P25	detected
mgl.         none         n/a         42         43           percent         none         n/a         42         43           NTU         none         n/a         41         42           mgl.         500 <sup>2</sup> n/a         11         23           mgl.         none         n/a         11         24           mgl.         none         n/a         21         23           µgl.         none	ear Looney's Gap, <sup>1</sup>	lennessee				
n         mg/L         none $1/3$ $-42$ $43$ $42$ $43$ $42$ $43$ $42$ $43$ $42$ $43$ $42$ $43$ $11$ $10$ $100$ $11$ $12$ <t< td=""><td></td><td></td><td></td><td></td><td></td><td>,</td></t<>						,
n         percent         none $n/n$ $-42$ $-6$ NTU         none $n/n$ $n/n$ $-42$ $-42$ $mg/L$ none $n/n$ $-11$ $-23$ $-11$ $-23$ $mg/L$ none $n/n$ $-11$ $-12$ $-23$ $-12$ $mg/L$ none $n/n$ $-11$ $-12$ $-12$ $-23$ $mg/L$ none $n/n$ $-11$ $-12$ $-11$ $-23$ $\mug/L$ none $n/n$ $-11$ $-11$ $-11$ $-11$ $\mug/L$ none $n/n$ $-11$ $-11$ $-11$ $-11$ $\mug/L$ $-100$ $-11$ $-11$	2.0	110.5	95.5	126.2	60.2	0
NTU       none $n/a$ 11 $e$ mg/L       s00 <sup>2</sup> u/a       11       23         mg/L       none       n/a       11       23         ug/L       none       n/a       21       23         ug/L       none       n/a       21       23         ug/L       none       n/a       23	0.69	89.1	89.0	95.2	83.7	0
$ [s^{1}] mg/L 500^{2} u/a $ $ [mg/L none n/a 1] 1 23 \\ mg/L none n/a 1] 1 23 \\ mg/L none n/a 1] 1 1 \\ mg/L none n/a 1] 1 1 1 \\ mg/L none n/a 1] 1 1 2 \\ mg/L none n/a 1] 1 1 2 \\ mg/L none n/a 1] 1 1 1 \\ mg/L none n/a 1] 1 1 1 \\ mg/L none n/a 2] 1 1 1 1 \\ mg/L none n/a 2] 1 1 1 1 \\ \mug/L none n/a 2] 1 1 1 1 \\ \mug/L none n/a 2] 1 1 1 1 \\ \mug/L none n/a 2] 1 1 1 1 \\ \mug/L none n/a 2] 1 1 1 1 \\ \mug/L none n/a 2] 1 1 1 1 \\ \mug/L none n/a 1] 1 1 1 \\ \mug/L none n/a 2] 1 1 1 1 \\ \mug/L none n/a 1] 1 1 1 \\ \mug/L none n/a 2] 1 1 1 1 \\ \mug/L none n/a 2] 1 1 1 1 \\ \mug/L none n/a 2] 1 1 1 1 1 \\ \mug/L none n/a 2] 1 1 1 1 \\ \mug/L none n/a 2] 1 1 1 1 \\ \mug/L none n/a 2] 1 1 1 1 \\ \mug/L none n/a 2] 1 1 1 1 1 \\ \mug/L none n/a 2] 1 1 1 1 1 \\ \mug/L none n/a 2] 1 1 1 1 1 \\ \mug/L none n/a 2] 1 1 1 1 1 \\ \mug/L none n/a 2] 1 1 1 1 1 1 \\ \mug/L none n/a 2] 1 1 1 1 1 1 \\ \mug/L none n/a 2] 1 1 1 1 1 1 \\ \mug/L none n/a 2] 1 1 1 1 1 1 \\ \mug/L none n/a 2] 1 1 1 1 1 1 1 \\ \mug/L none n/a 2] 1 1 1 1 1 1 1 1 1 \\ \mug/L none n/a 2] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 $	0.7	28	26	42	9	0
mg/L         none         n/a         11           ug/L         none         n/a         28           µg/L         none         n/a         28           µg/L         none         n/a         28           µg/L         none         n/a         28           µg/L         none         n/	127	160	153	167	139	0
mgL         none $u'a$ 11         4           mgL         none $u'a$ 11         1           mgL         none $u'a$ 11         1           mgL         none $u'a$ 11         2           mgL         none $u'a$ 21         1           mgL         none $u'a$ 23         3.33           mgL         none $u'a$ 2         3.33           mgL         none </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>						
m         mg/L         none $1/a$ 11           ug/L         none $1/a$ 23           ug/L         none $1/a$ 23           ug/L         none $1/a$ 23           ug/L $100^a$ 0         11           ug/a $1/a$ $10^a$ $11^a$ <td>25</td> <td>34</td> <td>33</td> <td>37</td> <td>31</td> <td>0</td>	25	34	33	37	31	0
mg/L         none $u/a$ 11         2           mg/L         none $u/a$ 11         2           mg/L         none $u/a$ 11         1           mg/L         none $u/a$ 11           mg/L         none $u/a$ 23           ug/L         none $u/a$ 23           ug/L         none $u/a$ 23           ug/L         none $u/a$ 23           ug/L $u/a$ $0$ 11           ug/d $u/a$ $0$ $u/a$ ug/d $u/a$ $u/a$ $u/a$ ug/d $u/a$ $u/a$ </td <td>7.9</td> <td>9.7</td> <td>8.9</td> <td>12.0</td> <td>8.3</td> <td>0</td>	7.9	9.7	8.9	12.0	8.3	0
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	4.8	7.9	7.0	8.3	5.7	0
a mg/L none $n/a$ [1] mg/L none $n/a$ 2] mg/L none $n/a$ 3] mg/L none $n/a$ 3	3.6	4.3	4.0	5.1	3.8	0
mg/L         none $n/a$ 11         5           mg/L         none $n/a$ 11         11           mg/L         none $n/a$ 21         23           ug/L         none $n/a$ 23         3.34           d $\mug/L$ none $n/a$ 28         3.33           d $\mug/L$ none $n/a$ 28         3.34 $\mug/L$ none $n/a$ 0         11 $n/a$ 11 $\mug/L$ none $n/a$ 0         11 $n/a$ $n/a$ $n/a$	1.4	1.7	1.6	1.7	1.5	0
mg/L         none $n/a$ 11           mg/L         none $n/a$ 21           µg/L         none $n/a$ 21           µg/L         none $n/a$ 23           µg/L         none $n/a$ 28         3.3(1)           µg/L         none $n/a$ 28         3.3(1)           µg/L         none $n/a$ 28         3.3(1)           µg/L         none $n/a$ 0         11 $n/a$ µg/L         none $n/a$ 0         11 $n/a$	23	32.3	31	33	26	0
mg/L     none $n/a$ 11       mg/L     none $n/a$ 11       i $\mu g/L$ none $n/a$ 21       i $\mu g/L$ none $n/a$ 23       d $\mu g/L$ none $n/a$ 23       i $\mu g/L$ none $n/a$ 28     3.3(1)       d $\mu g/L$ none $n/a$ 28     3.3(1)       i $\mu g/L$ none $n/a$ 0     11       i $\mu g/L$ none $n/a$ 0     11       i $\mu g/L$ none $n/a$ 1     1	≪0.1	0.1	0.1	0.1	0.1	1
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0.9	4.4	4.7	6.1	2.6	0
i     μg/L     none     n/a     21       μg/L     none     n/a     28     3.3       d     μg/L     none     n/a     4       μg/L     100 <sup>4</sup> 0     11       d     μg/L     none     n/a     11       d     μg/L     none     n/a     11       d     μg/L     none     n/a     11	95	125	120	140	110	0
1     μg/L     none     n/a     21       μg/L     none     n/a     28     3.3       d     μg/L     none     n/a     4       μg/L     100 <sup>4</sup> 0     11       d     μg/L     none     n/a       100 <sup>4</sup> 0     11       d     μg/L     none     n/a						
μg/L     none     n/a     28     3.3       ved     μg/L     none     n/a     4     4       μg/L     360 <sup>3</sup> 0     11     1       ved     μg/L     100 <sup>4</sup> 0     11       ved     μg/L     none     n/a     11	<10	24.3	20	30	20	-
ved μg/L none n/a 4 μg/L 360 <sup>3</sup> 0 11 100 <sup>4</sup> 0 11 ved μg/L none n/a 11	50	1,350	1,250	2,000	702	0
ved         μg/L         none         n/a         4           μg/L         360 <sup>3</sup> 0         11           100 <sup>4</sup> 0         11         10           ved         μg/L         none         n/a         11						
μg/L 360 <sup>3</sup> 0 11 100 <sup>4</sup> 0 11 ved μg/L none n/a 11	1	1	ł	ŧ	1	4
100 <sup>4</sup> <sup>0</sup> ved μg/L none n/a 11	;	I	ł	ł	;	11
ved µg/L none n/a 11						
μg/L none n/a 11			:	:		¢
:	29	35.5	35	41	99	0
Total $\mu g/L$ none $n/a$ 11 <100	ł	ł	1	ł	:	П
<sup>1</sup> Residue on evaporation at 180 °C.						
<sup>2</sup> State of Tennessee water-quality criteria for domestic water supply.						
<sup>3</sup> State of Tennessee water-quality criteria for fish and aquatic life.						

	Units	Listed criteria	Number of exceedances	Number of samples	Maximum	Minimum	Mean	Median	P75	P25	Number not detected
Bordlinn.			Station Nu	mber 03527220	Station Number 03527220 Clinch River near Looney's Gap, Tennessee	r Looney's Gap	, Tennessee				
ayındır.											
Dissolved	μg/L	none	n/a	4	<0.5	:	1	ł	ł	۱	4
Total	μg/L	1.3 <sup>2</sup>	unknown	11	<10	:	;	;	1	1	11
		$1,100^{3}$ $100^{4}$	00								
Cadmium:											
Dissolved	J/gµ	1 <sub>6</sub>	0	4	⊽	1	1	ł	;	1	4
Total	J/gµ	12 <sup>3</sup>	0	Ш	~	I	1	;	;	ł	. =
Chromium:											1
Dissolved	µg/L	none	n/a	4	ľ	V	1	;	:	;	"
Total	μg/L	16 <sup>1</sup> 670.0002	00	11	£	$\overline{\nabla}$	2.2	2	2	2	<i>. .</i>
Cobalt:		0005010									
Dissolved	us/L	none	n/a	E	7						:
Total	us/L	none	n/a	: =	) •	i 7	7 -	¦ -	(	:	- '
Copper:	0		8	:	r	7	1.0	-	7	0.0	'n
Dissolved	μg/L	34 <sup>1</sup>	0	4	⊽	ł	;	;	1	1	4
Total	дgД	none	n/a	10	11	¢.	59	<i>C L</i>	5 S	77	· .
Iron:	1				1	ì		1	2		>
Dissolved	µg/L	none	n/a	28	8	<10	20	18	75	01	V
Total	µg/Г	$1,000^{3}$	23	28	5,000	170	2,240	2,200	3,250	1.220	. 0
Lead:											ı
Dissolved	μg/L	198 <sup>1</sup>	0	4	6	⊽	3.7	;	;	1	-
Total	µg/L	none	n/a	11	10	2	4.6	4	v		
Lithium:							•		0	'n	þ
Dissolved	μg/L	none	n/a	11	17	42	9.2	8.0	13.0	<b>c4</b>	۲
Total	μg/L	none	n/a	11	30	<10	15.8	20	20	<10	
<sup>1</sup> State of Tenn <sup>2</sup> state of Tenn	essee water-qua	<sup>1</sup> State of Tennessee water-quality criteria for fish and aquatic life. <sup>2</sup> come of Tennessee water-quality criteria for fish and aquatic life.	and aquatic life.							5	\$
ы ты ты тып <sup>3</sup> Federal water	cssee water-yuz .mality criteria	oute or remessee water-quanty criteria for fecreanonal use. <sup>3</sup> Federal water-muality criteria for fich and acmain life.	ational use. 1:fa								

se: ved µg/L ved µg/L num: ved µg/L ved µg/L ved µg/L	Station Nurr N/a N/a 0 0 0	Station Number 03527220 Clinch River near Looney's Gap, Tennessee	<b>Clinch River neg</b>						detected
лан 1 10 <sup>21</sup> Лан 1 10 <sup>21</sup> 1	Йа 17а 000 Ц			r Looney's Gap,	Tennessee				
ed µg/L ed µg/L n µg/L ed µg/L red µg/L	и/а 17/а 0000								
red µg/L n µg/L wum: hg/L hg/L hg/L hg/L hg/L hg/L	и/а 0 0	28	11	7	2.6	<10	<10	7	18
ed µg/L n µg/L wum: hg/L µg/L hg/L hg/L	л/а 0 0	28	350	20	178	190	237	92	0
ved µg/L in µg/L num: ved µg/L ived µg/L	11/a 0 0								
in µg/L num: ved µg/L lved µg/L	000	4	0.2	<0.1	1	1	I	ł	2
лит: ved µg/L lved µg/L		11	0.1	<0.1	:	:	ł	I	6
ved µg/L µg/L ved µg/L									
нg/L Ned нg/L	n/a	11	<10	1	;	ł	I	:	11
ved µg/L	n/a	11	1	⊽	:	1	:	ı	10
ved µg/L									
E :	0	11	-	⊽	I	1	1	v	5
Total µg/L 4,600 <sup>4</sup>	0	11	7	2	3.3	æ	4	2	0
Selenium:									
Dissolved µg/L none	n/a	11	7	1	1	;	ł	1	11
Total µg/L 20 <sup>1</sup>	0	11	7	ł	:	ł	ł	;	11
Silver:									
Dissolved µg/L 13 <sup>1</sup>	0	11	7	1	1	I	ł	1	=
Total µg/L none	n/a	11	⊽	ł	ł	I	1	ł	П
Strontium:									
Dissolved µg/L none	n/a	11	300	84	121	100	120	66	0
Total µg/L none	п/а	11	290	50	109	100	120	60	0
Vanadium:									
Dissolved µg/L none	n/a	11	<b>%</b>	ł	1	ł	I	1	П
Zinc:									
Dissolved µg/L 210 <sup>1</sup>	0	4	35	7	21	1	;	ł	2
Total µg/L none	n/a	11	150	<10	30	20	30	10	3
<sup>1</sup> State of Tennessee water-quality criteria for fish and aquatic	h and aquatic life.								

Parameter	Units	Listed criteria	Number of exceedances	Number of samples	Maximum	Minimum	Mean	Median	P75	P25	detected
			Station	Number 0352800	Clinch River ab	Station Number 0352800 Clinch River above Tazewell, Tennessee	Inessee				
РН	Standard	6.5-8.5 <sup>1</sup>	1 0	16	80 90	8.0	:	8.2	8.3	8.1	0
٨٠٠٠٠	μ <del>οια</del>	0.4-9.0	6/U	C	ı	;	;	:	;	I	0
Allaliaior	- Tugun	1000		, w	130	8	111	1	ł	1	0
Kalluty	Шġ/Г	>207	<b>D</b>	n i		2 2		ω,	015	(LC	c
Specific conductance	µS/cm @ 25°C	none	n/a	28	417	66	301	302	0 <del>4</del> 5	717	5
Dissolved oxygen	mg/L	>5.0 <sup>1</sup>	0	16	13.2	7.5	9.8	9.6	11.2	8.5	0
Fecal coliform	colonies/100 ml	5,000 <sup>1</sup> 1,000 <sup>2</sup>	1	13	6,000	61	1,010	380	770	68	0
Fecal streptococcus	colonies/100 ml	none	n/a	11	3,300	11	873	470	1,100	135	0
Nitrogen:											
NO2	mg/L	none	n/a	14	0.03	<0.01	:	ı	I	:	12
NO3	mg/L	none	n/a	2	0.93	0.83	ı	ł	Ļ	1	0
NO <sub>2</sub> +NO <sub>3</sub>	mg/L	none	n/a	14	1	0.49	0.77	0.79	0.95	0.60	0
NH4 (dis)	mg/L	none	n/a	14	0.04	<0.01	0.02	0.01	.03	<0.01	2
NH4 (tot)	mg/L	0.024	ŝ	16	0.07	<0.01	0.02	0.02	<u>.03</u>	10.0	2
Total organic nitrogen	mg/L	попе	n/a	11	1.6	0.15	0.42	0.29	0.39	0.27	0
Phosphorus:											
Dissolved	mg/L	none	n/a	15	0.04	<0.01	0.2	0.01	0.02	€0.01	Ś
Total	mg/L	none	п/а	16	0.13	0.01	0.46	0.03	0.07	0.02	0
Ortho-phosphorus	mg/L	попе	п/а	14	0.04	<0.01	0.01	0.01	0.02	€0.01	٢
Total organic carbon	mg/L	попе	п/а	12	6.8	1.1	3.4	3.3	4.4	1.8	0
<sup>1</sup> State of Te	<sup>1</sup> State of Tennessee water-quality criteria for fish and aquatic life.	lity criteria for fisl	n and aquatic life.								
<sup>2</sup> State of Te	<sup>2</sup> State of Tennessee water-quality criteria for recreational use.	lity criteria for rec	reational use.								

<sup>4</sup> Federal water-quality criteria for fish and aquatic life.

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Table 3. Stat
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Station Number (1525000 Cline). Rise of Lineaset           Station Number (1525000 Cline). Rise of Lineaset           Station Number (1525000 Cline). Rise of Lineaset           Concentration         mg/L         none         nin         71         3         256         300         423         66         0           Concentration         mg/L         none         nin         7         3         256         300         423         66         0           Concentration         mg/L         none         nin         3         3         266         300         423         66         0           Total state         mg/L         none         nin         3         326         4         3         36         5	diment: diment: an mg/L none na bercent none na NTU none na s: mg/L none na mg/L none na mg/L none na mg/L none na mg/L none na mg/L none na ua mg/L none na ua pg/L none na ua	r 03528000 Clinch River abs 8 717 8 717 8 99 3 32 3 175 3 175 3 7,4 4 3 3 7,4 1.8 5 36 5 0,1 3 7,4	ve Tazewell, Tenness 45 45 11 141 7.8 3.5 3.5 3.5 3.5 2.2 2.2	E [ 92.5	6 -		
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	nm:         mg/L         none         n/a           percent         none         n/a           NTU         none         n/a           NTU         none         n/a           NTU         none         n/a           NTU         none         n/a           mg/L         500 <sup>2</sup> n/a           mg/L         none         n/a           pg/L         none         n/a           pg/L         none         n/a           pg/L         none         n/a           pg/L         none         n/a		من من عد م	6 58 58 7	0 – 4		
mgl         nore         nh         71         3         236         300         423         66           NTU         nore         nh         7         9         5         86         77         9         61           NTU         nore         nh         7         9         5         7         9         5         5           ngl         nore         nh         3         14         16         13         5	mg/L none n/a percent none n/a NTU none n/a mg/L 500 <sup>2</sup> n/a mg/L none n/a mg/L none n/a mg/L none n/a mg/L none n/a mg/L none n/a mg/L none n/a ug/L none n/a ug/L none n/a ug/L none n/a		وورين علا ست	5 5 5 5 7 9	Q:		
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	percent     none     n/a       NTU     none     n/a       mg/L     500 <sup>2</sup> n/a       mg/L     none     n/a       µg/L     none     n/a		86 Vî 44 –	9 56 58	6 –	~	
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	NTU none n/a mg/L 500 <sup>2</sup> n/a mg/L none n/a ng/L none n/a ng/L none n/a ng/L none n/a		∞c ∧' 4. –' .	5 % 9 1	21 33 9,9 4		000
$ \begin{array}{lcccccccccccccccccccccccccccccccccccc$	mg/L 500 <sup>2</sup> n <sup>1</sup> a mg/L none n <sup>1</sup> a ng/L none n <sup>1</sup> a ng/L none n <sup>1</sup> a ng/L none n <sup>1</sup> a		∞ vî 44 —i 4	56 9 26	73 38 9.9 4		• •
mgL         none $nh$ 3         42         34         38         5         10         10	mg/L none M'a mg/L none M'a µg/L none M'a µg/L none M'a	4 - 61	34 7.8 3.5 3.3 22 4 1.4 20.1		38 9.9 7.1		0
$ \begin{array}{ ccccccccccccccccccccccccccccccccccc$	mg/L         none         n/a           mg/L         воле         n/a           mg/L         воле         n/a           mg/L         попе         n/a           l         µg/L         попе         n/a           l         µg/L         попе         n/a           l         µg/L         попе         n/a	4 - 61	34 7.8 3.5 3.5 22 4.1 20.1		38 9.9 7.1 4		0
$ \begin{array}{ ccccccccccccccccccccccccccccccccccc$	mg/L         попе         n/a           mg/L         none         n/a           l         µg/L         none         n/a           l         µg/L         none         n/a           l         µg/L         none         n/a	_ 0	7.8 3.5 3.5 1.4 22 40.1		9.9 7.1 4		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	mg/L none n/a mg/L none n/a mg/L none n/a mg/L none n/a mg/L none n/a mg/L none n/a mg/L none n/a 1 µg/L none n/a	(1)	3.5 3 22 40.1 2 2 2 2		7.1 4		0
$ \begin{array}{lcccccccccccccccccccccccccccccccccccc$	n mg/L none n/a mg/L none n/a mg/L none n/a mg/L none n/a mg/L none n/a mg/L none n/a 1 µg/L none n/a 1 µg/L none n/a	0)	3 1.4 22 40.1		4		0
$ \begin{array}{lcccccccccccccccccccccccccccccccccccc$	n mg/L none n/a mg/L none n/a mg/L none n/a mg/L none n/a mg/L none n/a hg/L none n/a hg/L none n/a	()	1.4 22 60.1				0
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	mg/L none n/a mg/L none n/a mg/L none n/a mg/L none n/a jug/L none n/a jug/L none n/a		22 <0.1		1.5		0
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	mg/L none n/a mg/L none n/a mg/L none n/a j µg/L none n/a j µg/L none n/a		<0.1				0
$ \begin{array}{lcccccccccccccccccccccccccccccccccccc$	mg/L none n/a mg/L none n/a 1 µg/L none n/a 1 µg/L none n/a		Ţ		0.1	_	1
$ \begin{array}{l c c c c c c c c c c c c c c c c c c c$	mg/L none n/a l µg/L none n/a µg/L none n/a		7.4		7.2		0
$ \begin{array}{[cccccccccccccccccccccccccccccccccccc$	i μg/L none n/a μg/L none n/a i μg/L none n/a	-			40		0
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	ved μg/L none π/a μg/L none π/a ved μg/L none π/a						
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	μg/L none n/a ved μg/L none n/a		10		20		0
ved     μg/L     nome     n/a     3     <0.01 </td <td>ved µg/L none n/a</td> <td></td> <td></td> <td></td> <td>50</td> <td></td> <td>0</td>	ved µg/L none n/a				50		0
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	µg/L none n/a						
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			I	1	1		ũ
ved μg/L none n/a 3 38 34 35.3 34	360 <sup>3</sup> 0 d		ł		:		£
ved μg/L none π/a 3 38 34 35.3 34							
μg/L none n/a 3 38 34 35.3 34							
$\frac{\mu g/L}{1 \operatorname{Residue on evaporation at 180 °C.}} = 3 < 100$	none n/a		34		34		0
<sup>1</sup> Residue on evaporation at 180 °C. <sup>2</sup> come of the content content of the domastic uniter curvely	none n/a		;		;		£
	Residue on evaporation at 180 °C.						

Parameter	Units	Listed criteria	Number of exceedances	Number of samples	Maximum	Minimum	Mean	Median	P75	P25	Number not detected
			Station A	lumber 0352800	Station Number 03528000 Clinch River above Tazewell, Tennessee	bove Tazewell,	lennessee				
perymum:											
Dissolved	μg/L	none	n/a	Э	<0.5	I	ł	ł	1	;	3
Total	J/8H	1.3 <sup>2</sup> 1,100 <sup>3</sup> 100 <sup>4</sup>	unknown 0 0	Ś	<10	1	:	:	:	ł	Ś
Cadmium:											
Dissolved	μg/L	9 <sup>1</sup>	0	3	⊽	:	ł	1	:	:	e
Total	μg/L	12 <sup>3</sup>	0	s	1	~	I	:	:	:	2
Chromium:											
Dissolved	цg/L	none	n/a	60	7	ł	;	I	1	1	£
Total	μg/L	16 <sup>1</sup> 670,000 <sup>2</sup>	00	6	⊽	:	ł	;	ł	ł	ŝ
Cobalt:											
Dissolved	μg/L	none	n/a		Ø	;	ł	;	;	;	ę
Total	μg/L	none	n/a	3	2	7	ł	;	:	1	7
Copper:											
Dissolved	J/gu	34 <sup>1</sup>	0	3	7	2	3.7	2	ł	:	0
Total	J/Brl	none	n/a	S	10	<10	9.3	1	1	:	6
Iron:											
Dissolved	1∕3ri	none	n/a		23	7	13.7	11	:	ł	0
Total	J∕βri	1,000 <sup>3</sup>	7	5	2,700	061	1,232	490	2,300	480	0
Lead:											
Dissolved	J/8H	198 <sup>1</sup>	0	3	2	⊽	I	ł	ł	ł	2
Total	'∏∕8rf	none	n/a	5	90	⊽	9	1	:	1	1
Lithium:											
Dissolved	1∕8п	none	n/a	ю	15	7	10.3	6	:	:	0
Total	J/gui	none	n/a	3	20	<10	15	ł	1	:	1
<sup>1</sup> State of Teni <sup>2</sup> State of Tenr <sup>3</sup> r	lessee water-qua essee water-qua	<sup>1</sup> State of Tennessee water-quality criteria for fish and aquatic life. <sup>2</sup> State of Tennessee water-quality criteria for recreational use.	and aquatic life. ational use.								

Sutian Number Of Standing Tanding Tanging Tanding Tanging T	Statical Number (TSS2000 Clasch River allow (Tanesta). Transmess           Statical Number (TSS2000 Clasch River allow (Tanesta).           Ref         Hg/L         none         n/h         3         3         3         2         4         2         1           Ref         Hg/L         none         n/h         3         1         0         27         101         140         139         3           Ref         Hg/L         none         n/h         3         0.1         <0.1	Parameter	Units	Listed criteria	Number of exceedances	Number of samples	Maximum	Minimum	Mean	Median	P75	P25	Number not detected
met         met <td>and the field of the field of</td> <td></td> <td></td> <td></td> <td>Station N</td> <td>lumber 0352800</td> <td>0 Clinch River a</td> <td>bove Tazewell, T</td> <td>ennessee</td> <td></td> <td></td> <td></td> <td></td>	and the field of				Station N	lumber 0352800	0 Clinch River a	bove Tazewell, T	ennessee				
		Manganese:											
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Dissolved	μg/L	none	n/a	ß	80	2	4	2	;	;	0
the field of the transformation of transformation o	$ \begin{array}{l l l l l l l l l l l l l l l l l l l $	Total	µg/L	none	п/а	5	160	27	101	140	150	30	0
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Mercury:											
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Dissolved	μg/L	none	n/a	3	0.1	⊲0.1	:	ł	;	;	2
and def light none na 3 <10 $-2$ $-2$ $-2$ $-2$ $-2$ $-2$ $-2$ $-2$	and def $\mu \mu L$ none $\mu h$ $3 < 0 = 2$ $\mu \mu L$ none $\mu h$ $3 < 0 = 2$ $\mu \mu L$ none $\mu h$ $3 = -1$ $-1$ $-1$ $-1$ $-1$ $-1$ $-1$ $-1$	Total	μg/L	2.40 <sup>1</sup> 0.15 <sup>2</sup> 0.05 <sup>3</sup>	900	m	0.1	€.1 1	1	ł	ł	I	2
	ved       µg/L       none       nd       3       <10 $r$	Molybdenum:											
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Dissolved	μg/L	none	n/a	3	<10	ı	ı	:	;	1	ę
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	we have the formation of the formation	Total	hg/L	none	n/a	3	7	;	1	ł	ł	ł	ę
olved       legL $2,349$ 0       3       1       <1       <1       <1 $=$	olved $\mu g/L$ 2.59 <sup>1</sup> 0 3 1 4 4 3. 2.59 <sup>1</sup> 0 3 1 4 4	ckel:											
1 $\mu g/L$ $4,600^2$ 0       5       6       <1       3.3       3       -	1 $µgL$ $460c^2$ 056<13.33 $\cdot$ m:m:m: $1$ $µgL$ none $nh$ 3 $<1$ $\cdot$ $\cdot$ $\cdot$ $\cdot$ olved $µgL$ $uonenh3<1\cdot$	Dissolved	µg∕L	2,549 <sup>1</sup>	0	3	-	7	I	ł	:	1	1
mi $1$	mimimimiolvedµg/Lnonen/a3<1	Fotal	μg/L	4,600 <sup>2</sup>	0	5	9	⊽	3.3	3	:	ł	2
olved       lg/L       none       n'a       3       <1 <th< td=""><td>olved         <math>µgL</math>         none         <math>na</math>         3         &lt;1 <math>r</math> <math>r</math></td><td>enum:</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>	olved $µgL$ none $na$ 3         <1 $r$	enum:											
1 $\mu g/L$ $20^1$ $0$ $5$ $<1$ $-1$	1Lg/L $20^1$ $0$ 5<1 $        -$ olved $\mu g/L$ $13^1$ $n/a$ 3 $   -$ <td>Dissolved</td> <td>μg/L</td> <td>none</td> <td>n/a</td> <td>3</td> <td>⊽</td> <td>1</td> <td>:</td> <td>ł</td> <td>;</td> <td>ł</td> <td>3</td>	Dissolved	μg/L	none	n/a	3	⊽	1	:	ł	;	ł	3
olved $\mu g/L$ $\mu J^{1}$ $\mu g/L$ $\mu J^{1}$ $\mu h^{2}$ $3$ $<1$ $         -$	olved $\mu g/L$ $13^{1}$ $n/a$ $3$ $-1$ $-1$ $-1$ $-1$ $-1$ $-1$ $-1$ $-1$	<b>Fotal</b>	μg/L	20 <sup>1</sup>	0	5	⊽	ſ	:	:	ł	I	5
olved $\mu \mu L$ 13 <sup>1</sup> $\pi a$ 3 <1 $\alpha$ 5 $\alpha$ 13 <sup>1</sup> $\alpha$ 13 <sup>1</sup> $\mu a$ 13 <sup>1</sup> $\alpha$ 13	olvedµg/L $13^1$ $n/a$ $3$ $<1$ $       -$ 1µg/Lnone05 $<1$ $   -$ <t< td=""><td>ver:</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	ver:											
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	1µg/Lnone05<1 <td>Dissolved</td> <td>μg/L</td> <td>13<sup>1</sup></td> <td>n/a</td> <td>3</td> <td>⊽</td> <td>ł</td> <td>ł</td> <td>I</td> <td>:</td> <td>ł</td> <td>3</td>	Dissolved	μg/L	13 <sup>1</sup>	n/a	3	⊽	ł	ł	I	:	ł	3
un: olved $\mu g/L$ none $n/a$ 3 120 82 101 100 $   -$ 1 $\mu g/L$ none $n/a$ 3 100 80 90 90 $   -$ un: olved $\mu g/L$ none $n/a$ 3 $- 66$ $         -$	um: olved $\mu g/L$ none $n'a$ 3 120 82 101 100 $   -$ 1 $\mu g/L$ none $n'a$ 3 100 80 90 90 $   -$ um: olved $\mu g/L$ none $n'a$ 3 $- < <          -$	[ota]	μg/L	none	0	5	⊽	ſ	:	ł	ł	ł	5
olved $\mu g/L$ note $n'a$ 3 120 82 101 100 $ \cdot$ - 1 $         -$	olved $\mu g/L$ none $n'a$ 3 120 82 101 100 $         -$	ontium:											
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Dissolved	J∕gμ	none	n/a	e	120	82	101	100	•	;	0
um: olved $\mu g/L$ none $n/a$ 3 <6	um:       um: <thu< td=""><td>Fotal</td><td>μg/L</td><td>none</td><td>n/a</td><td>e</td><td>100</td><td>80</td><td>8</td><td>6</td><td>;</td><td>1</td><td>0</td></thu<>	Fotal	μg/L	none	n/a	e	100	80	8	6	;	1	0
olved $\mu g/L$ none $n/a$ 3 <6	olved $\mu g/L$ none $n'a$ 3<6olved $\mu g/L$ $210^1$ 03140451.3101 $\mu g/L$ none $n'a$ 550<10	nadium:											
$\frac{1}{10} \qquad \mu g/L \qquad 210^{1} \qquad 0 \qquad 3 \qquad 140 \qquad 4 \qquad 51.3 \qquad 10 \qquad \qquad \\ \frac{1}{1 \text{ State of Tennessee water-quality criteria for fish and aquatic life.}$	olved $\mu g/L$ $210^1$ 031404 $51.3$ 101 $\mu g/L$ none $n/a$ 550<10	Dissolved	J∕gµ	none	n/a	æ	\$	ſ	ł	I	1	ł	Э
$\frac{1}{1} \log L = \frac{1}{210^{1}} = 0 = 3 = 140 = 4 = 51.3 = 10 = -5 = -5 = -5 = -5 = -5 = -5 = -5 = -$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	JC:											
μg/L     none     n/a     5     50     <10     35         1     State of Tennessee water-quality criteria for fish and aquatic life.     2     State of Tennessee water-quality criteria for recreational use.	μg/L     none     n/a     5     50     <10     35 <sup>1</sup> State of Tennessee water-quality criteria for fish and aquatic life. <sup>2</sup> State of Tennessee water-quality criteria for fish and aquatic life.	Dissolved	Π/gμ	210 <sup>1</sup>	0	£	140	4	51.3	10	ł	ł	0
<sup>1</sup> State of Tennessee water-quality criteria for fish and aquatic life. <sup>2</sup> State of Tennessee water-mality criteria for recreational use.	<sup>1</sup> State of Tennessee water-quality criteria for fish and aquatic life. <sup>2</sup> State of Tennessee water-quality criteria for recreational use. <sup>3</sup> Federal water-multiv criteria for fish and aquatic life.	Total	µg/L	none	n/a	5	50	<10	35	:	;	;	°
	State of refinesses water-quarry criteria for fish and aniatic life.	<sup>1</sup> State of Teni <sup>2</sup> State of Teni	tessee water-gu	uality criteria for fish	n and aquatic life.								

Parameter	Units	Listed criteria	Number of exceedances	Number of samples	Maximum	Minimum	Mean	Median	P75	P25	Number not detected
			Station N	Station Number 03531680 Powell River at Alanthus Hill, Tennessee	Powell River at	Alanthus Hill, T	ennessee				
Hq	Standard	6.5-8.5 <sup>1</sup> 6.4-9.0 <sup>2.3</sup>	00	59	8.3	7.7	I	8.0	8.1	6.7	0
Acidity	mg/L	none	n/a	33	25	5	9.3	9.9	6.6	5	0
Alkalinity	mg/L	>204	0	28	157	62	8.68	83	98.2	71	0
Specific conductance	μS/cm @ 25°C	none	n/a	63	402	165	245.6	234	270	202	0
Dissolved oxygen	mg/L	>5.0 <sup>1</sup>	0	46	13.8	6.6	10.3	10.4	11.4	9.3	0
Fecal coliform	colonies/100 ml	5,000 <sup>1</sup> 1,000 <sup>2</sup>	w w	21	7,300	14	1,850	096	- 3,150	150	0
Fecal steptococcus	colonies/100 ml	none	n/a	21	15,000	3	3,335	2,000	5,500	185	0
Nitrogen:											
NO <sub>2</sub>	mg/L	none	n/a	61	0.01	<0.01	0.01	ł	ł	ł	56
NO <sub>3</sub>	mg/L	none	n/a	5	0.93	0.51	0.78	0.83	ł	;	0
NO <sub>2</sub> +NO <sub>3</sub>	mg/L	none	n/a	61	1.1	0.23	0.77	0.79	0.85	0.70	0
NH4 (dis)	mg/L	none	n/a	61	0.04	<0.01	0.014	0.01	0.02	<0.01	26
NH4 (tot)	mg/L	0.024	22	56	0.07	<0.01	0.02	0.02	0.03	0.01	8
Total organic nitrogen	mg/L	none	n/a	53	1.4	0.17	0.56	0.46	0.76	0.29	0
Phosphorus:											
Dissolved	mg∕L	none	n/a	61	0.04	<0.01	0.02	0.01	0.02	0.01	12
Total	mg/L	none	n/a	61	0.41	0.02	0.10	0.08	0.14	0.04	0
Ortho-phosphorus	mg/L	none	n/a	61	0.03	<0.01	0.01	<0.01	0.01	<0.01	27
Total organic carbon	mg/L	none	n/a	49	19	1.1	6.2	4.9	8.8	3.1	0
<sup>1</sup> State of Ten	nessee water-qua	State of Tennessee water-quality criteria for fish and aquatic life.	and aquatic life.								
<sup>2</sup> State of Ten	nessee water-qua	<sup>2</sup> State of Tennessee water-quality criteria for recreational use.	reational use.								
<sup>3</sup> State of Teni	nessee water-qua	<sup>3</sup> State of Tennessee water-quality criteria for irrigation and livestock watering and wildlife.	gation and livesto	ck watering and	wildlife.						
<sup>4</sup> Federal wate	sr-quality criteria	<sup>4</sup> Federal water-quality criteria for fish and aquatic	ic life.								
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National Number of Anatoria Biti, TananceStation Number of Station Number of Station Number of	Station Number of S351060 Powell River at Alaudius HIII, Thnesses           station Number 05351060 Powell River at Alaudius HIII, Thnesses           station Number 05351060 Powell River at Alaudius HIII, Thnesses           mg/L         none         nh         79         1,040         2         2467         319         314           NTU         none         nh         79         1,040         0         6         56.7         53         56.7         31         347           NTU         none         nh         28         140         0.6         56.7         53         56.7         31         347           mg/L         none         nh         28         19         4.7         7.4         6.7         8.0           mg/L         none         nh         28         19         4.7         7.4         6.7         8.0           mg/L         none         nh         28         7.4         11         2.8         3.6           mg/L         none         nh         28         7.4         10         13         17         2.1           mg/L         none         nh         28         7.4         16         17         2.6	Matical Number of S351660 Proveit River at Aluatius HIII, Thenasses           mg/L         none         n/h         7         256         192         314           mg/L         none         n/h         79         1040         2         2567         192         314           percent         none         n/h         79         1040         0.6         567         53         567         314           mg/L         none         n/h         28         140         0.6         567         53         567         314         147         141         <	Parameter	Units	Listed criteria	Number of exceedances	Number of samples	Maximum	Minimum	Mean	Median	P75	P25	Number not detected
mgl         none         na	mgl.         noe $nh$ 79         1040         2         256.7         192         314           proteer         noe $nh$ 79         96         13         78         867         31           NTU         noe $nh$ 28         140         0.6         56.7         53         58.7           NTU         noe $nh$ 28         140         0.6         56.7         53         58.7           mgl.         noe $nh$ 28         140         0.6         56.7         53         58.7           mgl.         noe $nh$ 28         140         28         47         21         31.2         31.3         34.7           mgl.         noe $nh$ 28         94         1         31         28.3         35           mgl.         noe $nh$ 28         94         1         31         23         35           mgl.         noe $nh$ 28         74         67         31         34.7           mgl.         noe $nh$ 28         74         10         23 </td <td>mgl         none         n/a         79         1040         2         226.7         192         314           precent         none         n/a         79         66         13         78         86         314           NTU         none         n/a         79         66         13         78         86         314           NTU         none         n/a         29         140         0.6         56.7         53         86.7           mgl         none         n/a         28         140         0.6         56.7         53         86.7           mgl         none         n/a         28         140         26         141.4         140         154           mgl         none         n/a         28         94         1         21         24         21           mgl         none         n/a         28         94         1         31         23         35           mgl         none         n/a         28         74         10         31         24           mgl         none         n/a         28         74         67         31         24           mgl<!--</td--><td></td><td></td><td></td><td>Station N</td><td>umber 03531680</td><td>Powell River at</td><td>Alanthus Hill, J</td><td>ennessee</td><td>-</td><td></td><td></td><td></td></td>	mgl         none         n/a         79         1040         2         226.7         192         314           precent         none         n/a         79         66         13         78         86         314           NTU         none         n/a         79         66         13         78         86         314           NTU         none         n/a         29         140         0.6         56.7         53         86.7           mgl         none         n/a         28         140         0.6         56.7         53         86.7           mgl         none         n/a         28         140         26         141.4         140         154           mgl         none         n/a         28         94         1         21         24         21           mgl         none         n/a         28         94         1         31         23         35           mgl         none         n/a         28         74         10         31         24           mgl         none         n/a         28         74         67         31         24           mgl </td <td></td> <td></td> <td></td> <td>Station N</td> <td>umber 03531680</td> <td>Powell River at</td> <td>Alanthus Hill, J</td> <td>ennessee</td> <td>-</td> <td></td> <td></td> <td></td>				Station N	umber 03531680	Powell River at	Alanthus Hill, J	ennessee	-			
mpl.         none         nin         79         1,040         2         2.257         192         314         81           NTU         none         nin         29         96         141         140         154         1117           NTU         none         nin         29         96         141         140         154         1117           mpl.         none         nin         28         141         29         54         252           mpl.         none         nin         28         267         96         141         140         154         117           mpl.         none         nin         28         267         96         141         140         154         153           mpl.         none         nin         28         94         1         21         23         23         23           mpl.         none         nin         28         31         23         23         23         23         23           mpl.         none         nin         28         32         31         23         32         33         33         33         33         33         33 <th< td=""><td>mg/L         note         nin         79         1040         2         226.7         192         314           NTU         none         nin         79         96         13         78         88         88           NTU         none         nin         28         100         06         56.7         33         84           mg/L         none         nin         28         19         4.7         7.4         6.7         80           mg/L         none         nin         28         19         4.7         7.4         6.7         80           mg/L         none         nin         28         19         4.7         7.4         6.7         31         347           mg/L         none         nin         28         9.4         1         31         28         75           mg/L         none         nin         28         6.5         0.03         52         54         57           mg/L         none         nin         28         6.5         0.03         52         54         57           mg/L         none         nin         28         6.5         0.65         52</td><td>mg/L         note         nin         79         1040         2         2.26.7         192         314           NTU         none         nin         79         96         13         78         88         88           NTU         none         nin         28         190         06         56.7         59         514           ng/L         none         nin         28         19         47         714         67         88           ng/L         none         nin         28         19         47         714         67         80           ng/L         none         nin         28         94         1         31         23         75           ng/L         none         nin         28         94         1         31         28         35           ng/L         none         nin         28         36         11         18         17         21         21           ng/L         none         nin         28         36         36         36         36         36         36           ng/L         none         nin         28         36         37         31</td><td>uspended sediment:</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>;</td><td></td></th<>	mg/L         note         nin         79         1040         2         226.7         192         314           NTU         none         nin         79         96         13         78         88         88           NTU         none         nin         28         100         06         56.7         33         84           mg/L         none         nin         28         19         4.7         7.4         6.7         80           mg/L         none         nin         28         19         4.7         7.4         6.7         80           mg/L         none         nin         28         19         4.7         7.4         6.7         31         347           mg/L         none         nin         28         9.4         1         31         28         75           mg/L         none         nin         28         6.5         0.03         52         54         57           mg/L         none         nin         28         6.5         0.03         52         54         57           mg/L         none         nin         28         6.5         0.65         52	mg/L         note         nin         79         1040         2         2.26.7         192         314           NTU         none         nin         79         96         13         78         88         88           NTU         none         nin         28         190         06         56.7         59         514           ng/L         none         nin         28         19         47         714         67         88           ng/L         none         nin         28         19         47         714         67         80           ng/L         none         nin         28         94         1         31         23         75           ng/L         none         nin         28         94         1         31         28         35           ng/L         none         nin         28         36         11         18         17         21         21           ng/L         none         nin         28         36         36         36         36         36         36           ng/L         none         nin         28         36         37         31	uspended sediment:										;	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Concentration	mg/L	none	n/a	79	1,040	2	226.7	192	314	81	0
NTU         nee         na         28         140         0.6         56.7         53         66.7         197           mgL         node         nd         28         297         96         141.4         140         154         1117           mgL         none         nd         28         49         27         31         347         252           mgL         none         nd         28         19         4.7         7.4         6.7         80.7         32           mgL         none         nd         28         94         1         31         23         73         32           mgL         none         nd         28         94         1         31         23         35         34         35           mgL         none         nd         28         94         1         1         28         35         35         35         35         35         35           mgL         none         nd         28         74         10         13         21         37         35           mgL         none         nd         28         74         10         13         21 <td>NTU         note         na         28         140         0.6         56.7         53         86.7           mg/L         note         n/1         note         n/1         28         27         96         141.4         140         154         1           mg/L         note         n/1         note         n/1         28         29         27         96         141.4         140         154         1           mg/L         note         n/1         note         n/1         28         39         47         7.4         67         86.7           mg/L         note         n/1         28         9.4         1         31         2.3         36.7           mg/L         note         n/1         28         9.4         1         31         2.8         36.7           mg/L         note         n/1         28         0.2         40.0         0.3         31.7         31.7           mg/L         note         n/1         28         0.2         40.0         57         31.7           mg/L         note         n/1         28         0.2         0.3         0.3         31.7         31.7</td> <td>NTU         none         na         28         140         0.6         56.7         53         86.7           mg/L         none         na         28         27         96         141.4         140         154         1           mg/L         none         na         28         29         27         96         141.4         140         154         1           mg/L         none         na         na         28         39         31         34.7         86.7           mg/L         none         na         1         100         1         21         31         23         35         36.7           mg/L         none         na         28         34         1         1         31         2.8         35           mg/L         none         na         28         36         36         36         36           mg/L         none         na         28         74         16         33         37         37           mg/L         none         na         28         36         36         36         36         36         36           mg/L         none         na</td> <td>%&lt; 0.062mm</td> <td>percent</td> <td>none</td> <td>n/a</td> <td>79</td> <td>96</td> <td>13</td> <td>78</td> <td>83</td> <td>88</td> <td>78</td> <td>0</td>	NTU         note         na         28         140         0.6         56.7         53         86.7           mg/L         note         n/1         note         n/1         28         27         96         141.4         140         154         1           mg/L         note         n/1         note         n/1         28         29         27         96         141.4         140         154         1           mg/L         note         n/1         note         n/1         28         39         47         7.4         67         86.7           mg/L         note         n/1         28         9.4         1         31         2.3         36.7           mg/L         note         n/1         28         9.4         1         31         2.8         36.7           mg/L         note         n/1         28         0.2         40.0         0.3         31.7         31.7           mg/L         note         n/1         28         0.2         40.0         57         31.7           mg/L         note         n/1         28         0.2         0.3         0.3         31.7         31.7	NTU         none         na         28         140         0.6         56.7         53         86.7           mg/L         none         na         28         27         96         141.4         140         154         1           mg/L         none         na         28         29         27         96         141.4         140         154         1           mg/L         none         na         na         28         39         31         34.7         86.7           mg/L         none         na         1         100         1         21         31         23         35         36.7           mg/L         none         na         28         34         1         1         31         2.8         35           mg/L         none         na         28         36         36         36         36           mg/L         none         na         28         74         16         33         37         37           mg/L         none         na         28         36         36         36         36         36         36           mg/L         none         na	%< 0.062mm	percent	none	n/a	79	96	13	78	83	88	78	0
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	mg/L         50 <sup>2</sup> $n^4$ 267         96         141.4         140         154         1           mg/L         none $n^4$ 28         29         27         31.2         31.3         347           mg/L         none $n^4$ 28         19         4.7         7.4         6.7         80           mg/L         none $n^4$ 28         9.4         1         31         2.3         7.5           mg/L         none $n^4$ 28         9.4         1         31         2.8         36           mg/L         none $n^4$ 28         7.4         16         2.3         34           mg/L         none $n^4$ 28         7.4         16         2.7         34           mg/L         none $n^4$ 28         7.4         16         2.7         34           mg/L         none $n^4$ 28         7.4         16         2.7         34           mg/L         none $n^4$ 28         0.62         5.2         5.4         5.7           mg/L         none	$ \begin{array}{llllllllllllllllllllllllllllllllllll$	urbidity	UTN	none	n/a	28	140	0.6	56.7	53	86.7	19.7	0
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	mg/L         none         na         28         49         22         312         31         347           mg/L         none         na         28         19         47         74         67         80           mg/L         none         na         28         19         47         74         67         80           mg/L         none         na         28         94         1         31         28         36           mg/L         none         na         28         74         16         27         34         21         21         28         36           mg/L         none         na         28         74         16         29         27         34           mg/L         none         na         28         65         0.62         57         34         57           mg/L         none         na         28         66         0.62         57         34         57           mg/L         none         na         28         0.62         57         34         57           mg/L         none         na         28         0.62         52         54         50	mg/L       none       u/a       28       49       22       312       31       347         mg/L       none       n/a       28       19       47       74       67       80         mg/L       none       n/a       28       94       1       311       23       37         mg/L       none       n/a       28       94       1       311       23       35         mg/L       none       n/a       28       94       1       311       28       36         mg/L       none       n/a       28       74       16       29       27       34         mg/L       none       n/a       28       74       16       29       27       34         mg/L       none       n/a       28       74       16       29       27       34         mg/L       none       n/a       28       74       16       29       27       34         mg/L       none       n/a       28       0.02       6.01       0.08       27       34         mg/L       none       n/a       24       70       10       10       26       <	issolved solids <sup>1</sup>	mg/L	500 <sup>2</sup>	n/a	28	267	96	141.4	140	154	111.7	0
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	ommon ions:											
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Calcium	mg/L	none	n/a	28	49	22	31.2	31	34.7	25.2	0
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Magnesium	mg/L	none	n/a	28	19	4.7	7.4	6.7	8.0	5.5	0
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Sodium	mg/L	none	n/a	28	18	2.2	6.1	5.3	7.5	3.2	0
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Chloride	mg/L	none	n/a	28	9.4	1	3.1	2.8	3.6	2.4	0
		mgL         none         na         28         74         16         29         27         34           mgL         none         n'a         28         0.2 $(0.01)$ 0.08 $(0.01)$ $(0$	Potassium	me/L	попе	п/а	28	æ	1.1	1.8	1.7	2.1	1.5	0
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	mgL       none       n/a       28       0.2       <010       0.08       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01       <0.01	Sulfate	mg/L	none	n/a	28	74	16	29	27	34	21	0
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		Fluoride	mg/L	none	n/a	28	0.2	<0.01	0.08	<0.01	<0.01	<0.01	12
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Silica	mg/L	none	n/a	28	6.5	0.62	5.2	5.4	5.7	4.9	0
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Hardness	mg/L	none	n/a	28	200	74	108.3	100	120	87.2	0
ved         µg/L         none         na         44         70         10         35.2         30         50         22.5           ved         µg/L         none         na         44         8,400         50         2.655         2,100         4,400         962           ved         µg/L         none         na         3         <0.01	ved         µg/L         none         n/a         44         70         10         35.2         30         50	vel $\mu g/L$ none       n/a       44       70       10       35.2       30       50       50         vel $\mu g/L$ none       n/a       44       8,400       50       2,655       2,100       4,400       5         vel $\mu g/L$ none       n/a       3       <0.01	luminum:											
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{\mu g L}{\nu cd} \qquad \mu g L \qquad \text{ none} \qquad n'a \qquad 44 \qquad 8,400 \qquad 50 \qquad 2.655 \qquad 2,100 \qquad 4.400 \qquad $	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Dissolved	µg/L	none	n/a	4	70	10	35.2	30	50	22.5	0
vcd $\mu g/L$ none $n/a$ 3 $< 001$ $=$ <	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	ved $\mu g/L$ none $n/a$ 3 $(001)$ $      \mu g/L$ $360^3$ 0282<1	Total	μg/L	none	n/a	4	8,400	50	2,655	2,100	4,400	962	0
ved $\mu g/L$ none         n/a         3         < d0.01	ved $\mu gL$ none $n'a$ 3 $<0.01$ $$	ved $\mu g/L$ none $n'a$ 3         <001	rsenic:											
$\frac{\mu g/L}{100^4} = \frac{360^3}{100^4} = \frac{0}{0} = \frac{28}{2} = \frac{2}{-1} = \frac{0.56}{-1} = \frac{-1}{-1} = \frac{-1}{-1}$ ved $\frac{\mu g/L}{\mu g/L} = \frac{1}{1006} = \frac{1}{1/3} = \frac{28}{28} = \frac{49}{-20} = \frac{22}{-34.2} = \frac{34}{-34.2} = \frac{34}{-34.2} = \frac{34}{-34.2} = \frac{34}{-100} = \frac{34}{-100}$ $\frac{1}{1}$ Residue on evaporation at 180 °C. $\frac{1}{2}$ State of Tennessee water-quality criteria for domestic water supply.	$\frac{\mu g L}{100^4}$ $\frac{\mu g L}{100^6}$ $\frac{1}{1 \text{ Residue on evaporation at 180 °C.}$ $\frac{1}{2 \text{ State of Tennessee water-quality criteria for domestic water supply.}$ $\frac{1}{2 \text{ State of Tennessee water-quality criteria for domestic water supply.}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Dissolved	hg/L	none	n/a	£	<0.01	1	I	ł	ł	ł	m
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Total	hg/L	360 <sup>3</sup>	0	28	2	⊽	0.56	⊽	7	7	22
$\frac{\text{ved}}{\mu g/L} \frac{\mu g/L}{\text{none}} \frac{n/a}{n/a} 28 49 22 34.2 34 38.7 27 29 \mu g/L \text{ none} n/a 28 100 <100 100 <100 <100 <100 <100 100 <100 100 $	$\frac{ved}{\mu g/L} \frac{\mu g/L}{none} \frac{n/a}{n'a} \frac{28}{28} \frac{49}{100} \frac{22}{100} \frac{34.2}{100} \frac{34}{100} \frac{38.7}{100} \frac{34.2}{100} \frac{34.2}{10$	$\frac{\text{ved}}{\mu g/L} \frac{\mu g/L}{\text{none}} \frac{n/a}{n/a} 28 49 22 34.2 34 38.7 \\ \frac{\mu g/L}{\mu g/L} \text{none} \frac{n/a}{n/a} 28 100 < 100 100 < 100 < 100 \\ \frac{1}{\text{Residue on evaporation at 180 °C.}}$			1004	0								
$\frac{\mu g/L}{\mu g/L}  \text{none}  n/a  28  49  22  34.2  34.  38.7  27$ $\frac{\mu g/L}{\text{rome}}  \text{none}  n/a  28  100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100 $	$\frac{\mu g L}{\mu g L}  none \qquad n'a \qquad 28 \qquad 49 \qquad 22 \qquad 34.2 \qquad 38.7$ $\frac{\mu g L}{\mu g L}  none \qquad n'a \qquad 28 \qquad 100 \qquad <100 \qquad <10$	$\frac{\mu g L}{\mu g L}  \text{none}  u^{\text{a}}  28  49  22  34  38.7$ $\frac{\mu g L}{\mu g L}  \text{none}  n^{\text{a}}  28  100  <100  100  <100  <100$ kesidue on evaporation at 180 °C.	Barium:											i
$\frac{\mu g/L}{1 \text{ Residue on evaporation at 180 °C.}} = \frac{n/a}{28} = 28 = 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < 100 < $	$\frac{\mu g/L}{l} \text{ none } n/a  28  100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <100  <10$	$\frac{\mu g/L}{1 \text{ Residue on evaporation at 180 °C.}} \qquad none \qquad n/a \qquad 28 \qquad 100 \qquad <100 \qquad <1000 \qquad <100 \qquad $	Dissolved	µg/L	none	n/a	28	49	22	34.2	34	38.7	27	0
<sup>1</sup> Residue on evaporation at 180 °C. <sup>2</sup> State of Tennessee water-quality criteria for domestic water supply.	<sup>1</sup> Residue on evaporation at 180 °C. <sup>2</sup> State of Tennessee water-quality criteria for domestic water supply.	<sup>1</sup> Residue on evaporation at 180 °C. <sup>2</sup> State of Tennessee water-quality criteria for domestic water supply.	Total	μg/L	none	n/a	28	100	<100	100	<100	√00	<100	24
<sup>2</sup> State of Tennessee water-quality criteria for domestic water supply.	<sup>2</sup> State of Tennessee water-quality criteria for domestic water supply.	<sup>2</sup> State of Tennessee water-quality criteria for domestic water supply.	<sup>1</sup> Residue on e	svaporation at	180 °C.									
			<sup>2</sup> State of Tenr	nessee water-c	juality criteria for do	mestic water supp	dy.							

<sup>4</sup> Federal water-quality criteria for irrigation.

Beryllium: Dissolved m	Units	Listed criteria	Number of exceedances	Number of samples	Maximum	Minimum	Mean	Median	P75	P25	Number not detected
q			Station N	umber 0353168	Station Number 03531680 Powell River at Alanthus Hill, Tennessee	: Alanthus Hill, 7	lennessee				
	mg/L	none	n/a	3	<0.5	1	ł	ł	ł	ł	3
	mg/L	$1.3^{2}$ $1,100^{3}$ $100^{4}$	unknown 0 0	28	<10	ł	ī	:	ł	:	28
Cadmium:											
Dissolved	mg/L	1 <sub>0</sub>	0	3	~	I	ł	:	1	:	£
Total m	mg∕L	12 <sup>3</sup>	0	28	2	⊽	I	ł	1	1	26
Chromium:											
Dissolved	mg/L	none	n/a	3	2	7	;	:	ı	ł	2
Total m	mg/L	16 <sup>1</sup> 670,000 <sup>2</sup>	00	28	16	⊽	4.4	ę	٢	1	ŝ
Cobalt:											
Dissolved	mg/L	none	n/a	28	Ø	:	;	:	:	ł	28
Total	mg/L	none	n/a	28	10	7	4.2	e	ø	-	s
Copper:											
Dissolved	mg/L	34 <sup>1</sup>	0	3	2	1	1.3	ł	:	:	0
Total m	mg/L	none	n/a	25	6	⊽	4.3	4	9	2	ę
Iron:											
Dissolved m	mg/L	none	п/а	4	810	s	55.2	37	56	21.5	0
Total m	mg/L	1,000 <sup>3</sup>	38	4	16,000	140	4,985	1,000	8,700	1,425	0
Lead:											
Dissolved m	mg/L	198 <sup>1</sup>	0	ŝ	1	⊽	2	ł	ł	ł	1
Total m	mg/L	none	n/a	28	80	2	17.6	12	26.7	6.2	0
Lithium:											
Dissolved mg	mg/L	none	n/a	28	26	4	2.3	4	4	4	22
Total m	mg/L	none	n/a	28	20	<10	7.7	<10	<10	<10	22
<sup>1</sup> State of Tennessee water-quality criteria for fish and aquatic <sup>2</sup> State of Tennessee water-quality criteria for recreational use.	vater-qual vater-qual	ity criteria for fish : ity criteria for recre	and aquatic life. eational use.								

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Mation.Number of Marchine MII, Transso           Mation.Number of Marchine MII, Transso         c c c c c c c c c c c c c c c c c c c		Units	Listed criteria	Number of exceedances	Number of samples	Maximum	Minimum	Mean	Median	P75	P25	detected
				Station N	umber 03531680	Powell River a	t Alanthus Hill, 1	ennessee				
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	lganese:				Ţ	12	01/	53	۴	ę	<10	16
	hissolved	µg/L	none	B/1	<b>‡</b>	<u>נ</u>	212			, <u>1</u>	137	-
	otal	µg∕L	none	n/a	4	068	0	301	067	4/0	701	5
of $\mu_0 L$ note $\mu_0$ $3$ $\Delta M$ $3$ $3$ $\Delta M$ $3$ $3$ $\Delta M$ $3$ $\Delta M$ $3$ $\Delta M$ $3$ $3$ $\Delta M$ $3$ $3$ $3$ $3$ $3$ $3$ $3$ $3$ $3$ $3$ $3$ $3$	rcury.					:						
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Vissolved	µg/L	none	n/a	ю	40.1	:	ł	:	ł	I	n i
	lotal	цgЛ	2.40 <sup>1</sup> 0.15 <sup>2</sup> 0.05 <sup>3</sup>	007	28	0.2	40.1	:	ł	÷	i	R
ved         µg/L         none         µÅ         28         <10 $=$ <td>lybdenum:</td> <td></td> <td>ę</td>	lybdenum:											ę
$\mu g/L$ nose $\mu a$ 25         2         <1	Dissolved	μg/L	none	n/a	28	<10	:	1	1	ł	ł	93
ved $\mu gL$ $2.549^1$ 0 $28$ 2         <1         08         <1         1         <1           in $\mu gL$ $4.600^2$ 0 $28$ 2         1 $88$ 6 $14.7$ $3.2$ in $\mu gL$ $\mu gL$ $200^2$ 0 $28$ $<1$ $18$ 6 $14.7$ $3.2$ ived $\mu gL$ $20^1$ $0^2$ $28$ $<1$ $=2$	lotal	J/grt	none	n/a	25	2	4	1	:	1	;	74
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	skel:								•	•	7	0
$\mu g/L$ $4,600^2$ 0       28       23       1       8.8       6       14.7       3.2         ed $\mu g/L$ none $\nu a$ 28       <1	Dissolved	μg/L	2,549 <sup>1</sup>	0	28	7	⊽	0.8	V	-	7	g '
$ \begin{array}{lcccccccccccccccccccccccccccccccccccc$	Total	μg/L	4,600 <sup>2</sup>	0	28	23	Ι	8. 9	9	14.7	3.2	Ð
Ived $\mu g/L$ none $\nu a$ 28         <1         -	lenium:											96
Hg/L $20^1$ $0$ $28$ <1	Dissolved	μg/L	none	n/a	28	7	I	:	1	:	1	07 07
Wed $\mu g L$ 13 <sup>1</sup> $\nu f a$ 28         <1 $   -$ <t< td=""><td>Total</td><td>μg/L</td><td>20<sup>1</sup></td><td>0</td><td>28</td><td>V</td><td>1</td><td>I</td><td>1</td><td>1</td><td>:</td><td>07</td></t<>	Total	μg/L	20 <sup>1</sup>	0	28	V	1	I	1	1	:	07
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	ver:											ac
$ \begin{array}{lcccccccccccccccccccccccccccccccccccc$	Dissolved	hg/L	13 <sup>1</sup>	n/a	28	7	;	ı	ł	:	:	9
$ \begin{array}{lcccccccccccccccccccccccccccccccccccc$	Total	µg/L	none	0	28	⊽	;	ı	I	:	:	87
olved $\mu g/L$ none $n/a$ 28     210     78     133.1     130     100.2     20.3       1 $\mu g/L$ none $n/a$ 28     180     70     120.3     110     147.5     92.5       un: $\mu g/L$ none $n/a$ 28     180     70     120.3     110     147.5     92.5       olved $\mu g/L$ none $n/a$ 28     <6	rontium:					;	ć	t	130	5 7 51	95.5	c
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Dissolved	hg/L	none	n/a	28	210	18	1.001	061		2 <b>2</b>	
un:       un:       un:       un	Total	μg/L	none	n/a	28	180	6	120.3	110	C. / 4]	C776	>
olved $\mu g L$ none $n/a$ 28 <0 - $-$ - $-$ - $-$ - $-$ - $-$ - $-$ - $-$ - $-$ - $-$ - $-$ - $-$ - $-$ olved $\mu g L$ 210 <sup>1</sup> 0 3 3 12 <3 - 7 - 7 - 7 - 7 - 7 - 1 - 1 - 1 - 1 - 1	madium:				;					:	:	28
olved μg/L 210 <sup>1</sup> 0 3 12 <3 7 <sup></sup>	Dissolved	Π/βη	none	n/a	28	Ş	ł	:	1	ł		2
μg/L 210 <sup>1</sup> 0 3 12 <3 " <sup>1</sup> 20 μg/L none π/a 22 140 <10 56.7 40 80 20	nc:					ļ	ç		٢	1	:	-
μg/L none n/a 22 140 <10 56.7 40 60 20 20	Dissolved	µg/L	210 <sup>1</sup>	0	<b>m</b>	17	0	: }	- 9	08	ç	
	Total	hg/L	none	n/a	22	140	01≻	26.7	<del>]4</del>	00	3	r

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	Units	Listed criteria	Number of exceedances	samples	Maximum	Minimum	Mean	Median	P75	P25	Number not detected
			Station	Number 0353200	00 Powell River a	Station Number 03532000 Powell River above Arthur, Tennessee	inessee				
Hd	Standard	6.5-8.5 <sup>1</sup> 6.4-9.0 <sup>2.3</sup>	00	20	8.4	7.8	;	8.1	8.3	3.0	0
Acidity	mg/L	none	n/a	2	5	S	;	ı	ł	ł	0
Alkalinity	mg/L	>20 <sup>4</sup>	0	2	129	109	I	ł	ł	ł	0
Specific conductance	µS/cm @ 25°C	none	n/a	15	410	190	283.6	285	320	230	0
Dissolved oxygen	mg/L	>5.0 <sup>1</sup>	0	17	13.0	7.5	9.8	9.8	10.4	8.8	0
Fecal coliform	colonies/100 ml	5,000 <sup>1</sup> 1,000 <sup>2</sup>	0 0	6	730	20	275	160	520	65	0
Fecal steptococcus	colonies/100 ml	none	n/a	6	2,100	34	520	160	906	49	0
Nitrogen: NO <sub>2</sub>	mg/L	none	n/a	17	0.02	10.05	1	ļ	;	:	<u>y</u>
NO <sub>3</sub>	mg/L	none	n/a	2	0.92	0.73	0.82	;	;	;	0
N02+NO3	mg/L	none	n/a	17	1.2	0.54	0.78	0.73	0.89	0.68	0
NH4 (dis)	mg/L	none	n/a	17	0.04	<0.01	0.02	0.02	0.03	0.01	4
NH4 (tot)	mg/L	0.024	£	17	0.13	<0.01	0.02	0.02	0.02	0.01	4
Total organic nitrogen	J/gm	none	n/a	13	2.3	0.28	0.70	0.42	1.03	0.28	0
Phosphorus:											
Dissolved	mg/L	none	n/a	18	0.7	<0.01	0.01	<0.01	0.02	<0.01	13
Total	mg/L	none	n/a	19	0.18	0.01	0.05	0.04	0.07	0.02	0
Ortho-phosphorus	mg/L	none	n/a	17	0.05	<0.01	0.01	<0.01	0.02	<0.01	10
Total organic carbon	mg/L	none	n/a	13	17	1	4.6	3.1	6.1	1.3	0
<sup>1</sup> State of Tenr <sup>2</sup> State of Tenr	ressee water-quali ressee water-qualit	<sup>1</sup> State of Tennessee water-quality criteria for fish and aquatic life. <sup>2</sup> State of Tennessee water-quality criteria for recreational use.	and aquatic life. eational use.								
<sup>3</sup> State of Tenr	iessee water-quali	<sup>3</sup> State of Tennessee water-quality criteria for irrigation and livestock watering and wildlife.	ation and livestoc	k watering and	wildlife.						

Station Number 0533000 Provel Riser Above Arbuir, Transcee           Station Number 0533000 Provel Riser Above Arbuir, Transcee           Concentration         mg/L         tools         u/l         120         87         131         444         2097         0           Concentration         mg/L         tools         u/l         120         98         10         1335         333         444         2097         0           Concentration         mg/L         tools         u/l         120         98         90         93 <th></th> <th>Units</th> <th>Listed criteria</th> <th>exceedances</th> <th>samples</th> <th>Maximum</th> <th>Minimum</th> <th>Mean</th> <th>Median</th> <th>P75</th> <th>P25</th> <th>Number not detected</th>		Units	Listed criteria	exceedances	samples	Maximum	Minimum	Mean	Median	P75	P25	Number not detected
mg/l         nose         nd         120         871         1         3357         333         444,7         2007           percent         nose         nd         120         98         70         833         333         444,7         2007           NTU         nose         nds         120         98         100         64         335         333         444,7         2007           mg/l         nose         nds         2002         nds         20         98         89         20         88         20         88         20         20           mg/l         nose         nds         2         13         14         162         1125         2 <th2< th=""> <th2< th="">         2         &lt;</th2<></th2<>				Station	Number 0353200	0 Powell River a	bove Arthur, Ter	Inessee				
	Suspended sediment:											
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	Concentration	mg/L	none	n/a	120	871	1	335.7	333	444.7	209.7	0
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	%< 0.062mm	percent	none	n/a	120	98	50	84.8	86	68	82	0
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	Turbidity	UTN	none	n/a	7	81	0.6	40.8	I	1	:	0
	isolved solids <sup>1</sup>	mg/L	500 <sup>2</sup>	n/a	2	184	162	112.5	I	ł	ł	0
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Common ions:											
sim mg/L nore n'a 2 12 8.6 103	Calcium	mg/L	none	n/a	2	40	39	39.5	:	ļ	ı	0
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Magnesium	mg/L	none	n/a	7	12	8.6	10.3	I	ł	1	0
let         mg/L         none         u/a         2         2         2         2         2         2         2         2         2         1 <th1< th="">         1         <th1< th=""> <th1< td=""><td>Sodium</td><td>mg/L</td><td>none</td><td>n/a</td><td>3</td><td>9.2</td><td>7.8</td><td>8.5</td><td>I</td><td>1</td><td>ł</td><td>0</td></th1<></th1<></th1<>	Sodium	mg/L	none	n/a	3	9.2	7.8	8.5	I	1	ł	0
	Chloride	mg/L	none	n/a	7	2.9	2.7	2.8	ł	;	;	0
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	Potassium	mg/L	none	n/a	2	1.5	1.4	1.45	:	ł	:	0
Le mg/L noue n'a 2 0.1 c	Sulfate	mg/L	none	n/a	2	39	30	34.5	ł	;	:	0
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Fluoride	mg/L	none	п/а	2	0.1	<0.1	ł	ł	;	ł	0
es mg/L note n'a 2 150 130 140 - $140$ - $12$ - $120$ 150 130 140 - $120$ -	Silica	mg/L	none	п/а	2	6.5	S.	5.7	ł	;	ł	0
m:ved $\mu g/L$ none $n/a$ 2301020ved $\mu g/L$ none $n/a$ 2 $3400$ 50900 $325$ 76050ved $\mu g/L$ none $n/a$ 2<1	Hardness	mg/L	none	n/a	2	150	130	140	ł	;	1	0
ved $\mu g/L$ none $n/a$ 2 30 10 20	Aluminum:							ł	;	;	ł	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Dissolved	hg/L	none	n/a	2	30	10	20	:	;	ł	0
ved $\mu g/L$ none $n/a$ 2 <1	Total	hg/L	none	п/а	4	3,400	50	006	525	760	50	0
	Arsenic:											
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Dissolved	µg/L	none	п/а	2	7	ł	ł	1	1	ł	2
ved μg/L none n/a 2 39 37 38	Total	μg/L	360 <sup>3</sup> 100 <sup>4</sup>	00	6	1	₽	ł	1	1	I	1
$\frac{\mu g/L}{\mu g/L}  none \qquad n/a \qquad 2 \qquad 39 \qquad 37 \qquad 38 \qquad \qquad \qquad \qquad \qquad \qquad \qquad$	Barium:											
μg/L     none     n/a     2     <100 <sup>1</sup> Residue on evaporation at 180 °C. <sup>2</sup> State of Tennessee water-quality criteria for domestic water supply.	Dissolved	µg/L	none	n/a	2	39	37	38	;	;	:	0
<sup>1</sup> Residue on evaporation at 180 °C. <sup>2</sup> State of Tennessee water-quality criteria for domestic water supply.	Total	hg/L	none	n/a	2	<100	ł	ı	;	I	1	2
<sup>2</sup> State of Tennessee water-quality criteria for domestic water supply.	<sup>1</sup> Residue on ev	aporation at 18	30 °C.									
	<sup>2</sup> State of Tenn	essee water-qui	ality criteria for don	lestic water suppl	y.							

Sution Number Obtany, Francises           Both interpret intere interpret interpret interpret interpret interpret	и и и и и и и и и и и и и и	none 1.3 <sup>2</sup> 1,100 <sup>3</sup> 100 <sup>4</sup> 9 <sup>1</sup> 9 <sup>1</sup> 12 <sup>3</sup> 12 <sup>3</sup> none none folo <sup>2</sup>	Station N Ja unknown 0 0 0 0 1/a	lumber 0353200 2 4	0 Powell River	above Arthur, T					
Let $\mu \mu L$ be $\mu \mu L$ and $\mu \mu L$ be $\mu \mu L$ and $\mu \mu L$ and $\mu \mu L$ be $\mu \mu L$ and $\mu L$	п: ved µg/L ved µg/L ved µg/L ved µg/L ved µg/L	none 1.3 <sup>2</sup> 1,100 <sup>3</sup> 100 <sup>4</sup> 100 <sup>4</sup> 12 <sup>3</sup> 12 <sup>3</sup> 10 <sup>1</sup> 16 <sup>1</sup> 16 <sup>1</sup> 16 <sup>1</sup>	л/а ипknown 0 0 0 0 0 0 0	04			ènnessee				
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ed $\mu g/L$ $g_1$ $g_1$ $g_1$ $g_1$ $g_1$ $g_2$ $G$ </td <td>ved µug/L m: ved µug/L ved µug/L ved µug/L</td> <td>9<sup>1</sup> 12<sup>3</sup> none 16<sup>1</sup> 670,000<sup>2</sup></td> <td>0 0 1 제 0</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	ved µug/L m: ved µug/L ved µug/L ved µug/L	9 <sup>1</sup> 12 <sup>3</sup> none 16 <sup>1</sup> 670,000 <sup>2</sup>	0 0 1 제 0								
Index       Index <t< td=""><td>щ: ved µg/L ved µg/L ved µg/L</td><td>12<sup>3</sup> none 16<sup>1</sup> 670,000<sup>2</sup></td><td>0 17/a</td><td>2</td><td>7</td><td>:</td><td>ł</td><td>١</td><td>ł</td><td>I</td><td>2</td></t<>	щ: ved µg/L ved µg/L ved µg/L	12 <sup>3</sup> none 16 <sup>1</sup> 670,000 <sup>2</sup>	0 17/a	2	7	:	ł	١	ł	I	2
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ed $\mu g/L$ note $n'a$ 2-3-1-1-2-3ed $\mu g/L$ note $n'a$ 2-5-111.5-1-1ed $\mu g/L$ note $n'a$ 2-211.5-1-1-1ued $\mu g/L$ note $n'a$ 2220613-1-1-1ued $\mu g/L$ note $n'a$ 220613-1-1-1ued $\mu g/L$ $1$ 0222061301500130 $\mu g/L$ $1$ $0$ 22200130130ued $\mu g/L$ note $n'a$ 2225-1-1-1ued $\mu g/L$ note $n'a$ 2221<1	л/дн рау		00	2	6	7	2	١	;	I	7
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ed $\mu g/L$ $34^1$ 0       2       2       1       1.5		none	n/a		5	4	:	1	ł	ł	
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$ \begin{array}{lcccccccccccccccccccccccccccccccccccc$		34 <sup>1</sup>	0	2	2	1	1.5	ł	ł	:	0
alved $\mu gL$ none $n/a$ 2 20 6 13		none	n/a	4	43	<10	21.3	١	ł	I	1
lived $\mu gL$ none $na$ 2 20 6 13				•							
$\frac{\mu g \Gamma}{1 \sin 2} = 1,000^3 = 1,000^3 = 1,000 $		none	n/a	, <b>2</b>	20	6	13	١	ł	:	0
lved $\mu g/L$ $\log^{1}$ $0$ $2$ $1$ $<1$ $<1$ $-1$ $-1$ $-1$ $-1$ $-1$ $-1$ $-1$ $-$		1,000 <sup>3</sup>	1	4	5,900	130	1,510	760	1,000	130	0
ed $\mu g/L$ $10gl$ 021<1<1< $\mu g/L$ none $n/a$ 41225342ved $\mu g/L$ none $n/a$ 255555 $\mu g/L$ none $n/a$ 2<10	d:										
$\frac{\mu g/L}{\nu cd} \qquad \mu g/L \qquad \text{none} \qquad n/a \qquad 4 \qquad 12 \qquad 2 \qquad 5 \qquad 3 \qquad 4 \qquad 2$ wed $\frac{\mu g/L}{\nu g/L} \qquad \text{none} \qquad n/a \qquad 2 \qquad 5 \qquad 5 \qquad - \qquad -$		198 <sup>1</sup>	0	2	1	4	:	١	ł	ł	1
ved μg/L none n/a 2 5 5 5		none	п/а	4	12	2	S	3	4	7	0
$\frac{1}{2} \frac{\mu g/L}{2 \text{ the of Tennessee water-quality criteria for fish and aquatic life.} = 2 5 5 5 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2$	ü <b>um:</b>										
$\label{eq:relation} \mu g/L \qquad \text{none} \qquad n/a \qquad 2 \qquad <10 \qquad \dots \qquad $		none	n/a	2	ŝ	Ŷ	S	ł	I	1	0
<sup>1</sup> State of Tennessee water-quality criteria for fish and aquatic life. <sup>2</sup> State of Tennessee water-quality criteria for recreational use.		none	n/a	7	<10	:	:	١	ı	1	2
<sup>2</sup> State of Tennessee water-quality criteria for recreational use.	<sup>1</sup> State of Tennessee water-quality cr	rtiteria for fish	and aquatic life.								
	<sup>2</sup> State of Tennessee water-quality cr	criteria for recr	eational use.								

at the campling sites June 1980 through January 1994—Continued lit. tot , j Tahle 3. Statistical s

Parameter	Units	Listed criteria	Number of exceedances	Number of samples	Maximum	Minimum	Mean	Median	P75	P25	Number not detected
			Station	Number 035320	00 Powell River	Station Number 03532000 Powell River above Arthur, Tennessee	nnessee				
Manganese:											
Dissolved	µg/L	none	n/a	2	7	1	4	ł	:	1	0
Total	Лgц	none	n/a	4	420	<10	153.5	92	140	<10	1
Mercury:											
Dissolved	µg/L	попе	n/a	1	0.1	ł	1	1	:	:	0
Total	Лдц	2.40 <sup>1</sup> 0.15 <sup>2</sup> 0.05 <sup>3</sup>	000	7	<b>0</b> .1	:	I	ł	ł	ł	2
Molybdenum:											
Dissolved	µg/L	none	n/a	2	<10	ł	ł	ł	ł	I	2
Total	J/gri	none	n/a	2	1	ī	ł	ł	ł	1	1
Nickel:											
Dissolved	J/grt	• 2,549 <sup>1</sup>	0	2	1	1	ł	1	1	;	0
Total	цg/L	4,600 <sup>2</sup>	0	4	6	1	3.2	1.5	2	1	0
Selenium:											
Dissolved	μg/L	none	n/a	2	⊽	ł	:	I	;	I	2
Total	μg/L	20 <sup>1</sup>	0	4	⊽	ł	1	1	1	:	4
Silver:											
Dissolved	Л/дц	13 <sup>1</sup>	n/a	2	7	ł	ł	I	I	ł	2
Total	µg/L	none	0	4	⊽	:	ł	I	;	ı	4
Strontium:											
Dissolved	μg/L	none	n/a	2	170	160	165	I	ł	:	0
Total	μg/L	none	n/a	2	150	100	125	1	1	:	0
Vanadium:											
Dissolved	μg/L	none	n/a	2	\$	:	1	ł	:	;	2
Zinc:											
Dissolved	hg/L	210 <sup>1</sup>	0	2	16	11	13.5	1	1	ł	0
Total	цg/L	none	n/a	4	40	10	25	25	<del>6</del>	10	0

<sup>2</sup> State of Tennessee water-quality criteria for recreational use. <sup>3</sup> Federal water-quality criteria for fish and aquatic life.

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