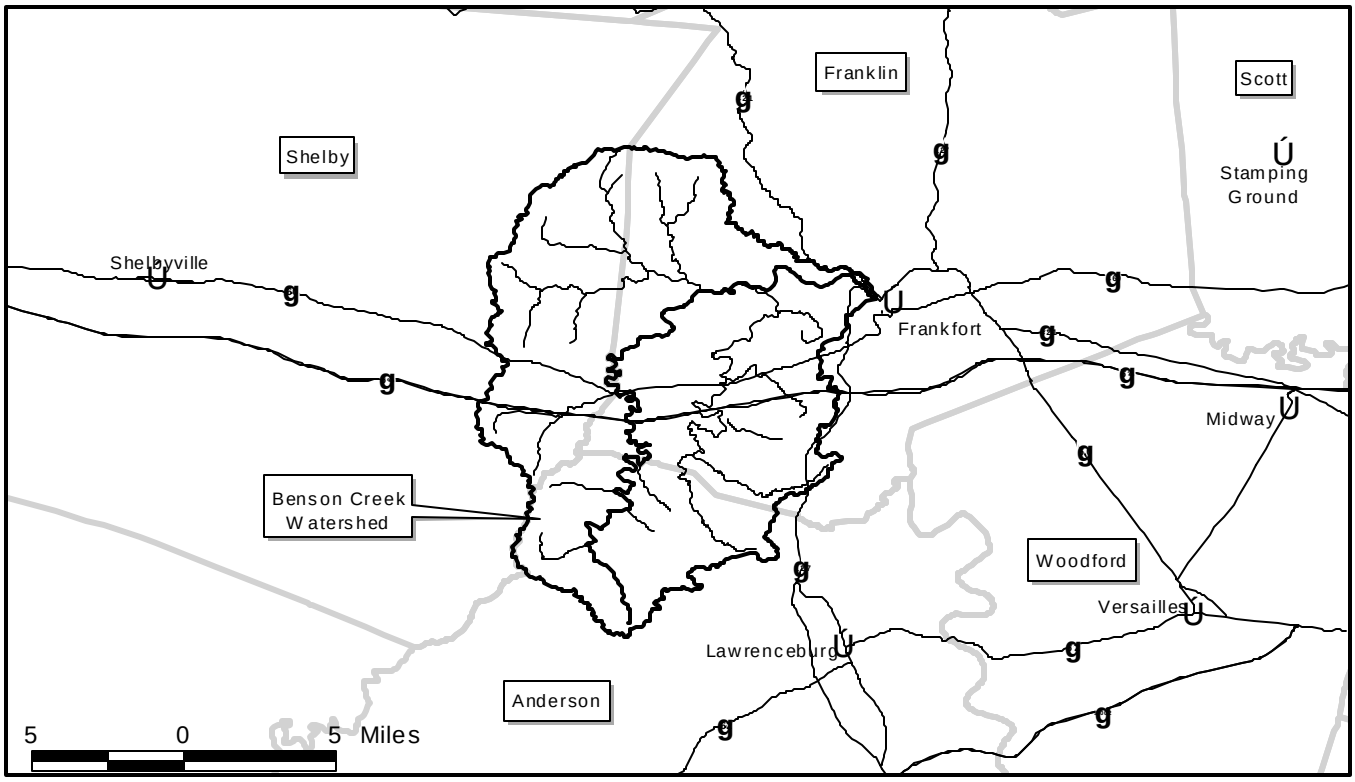
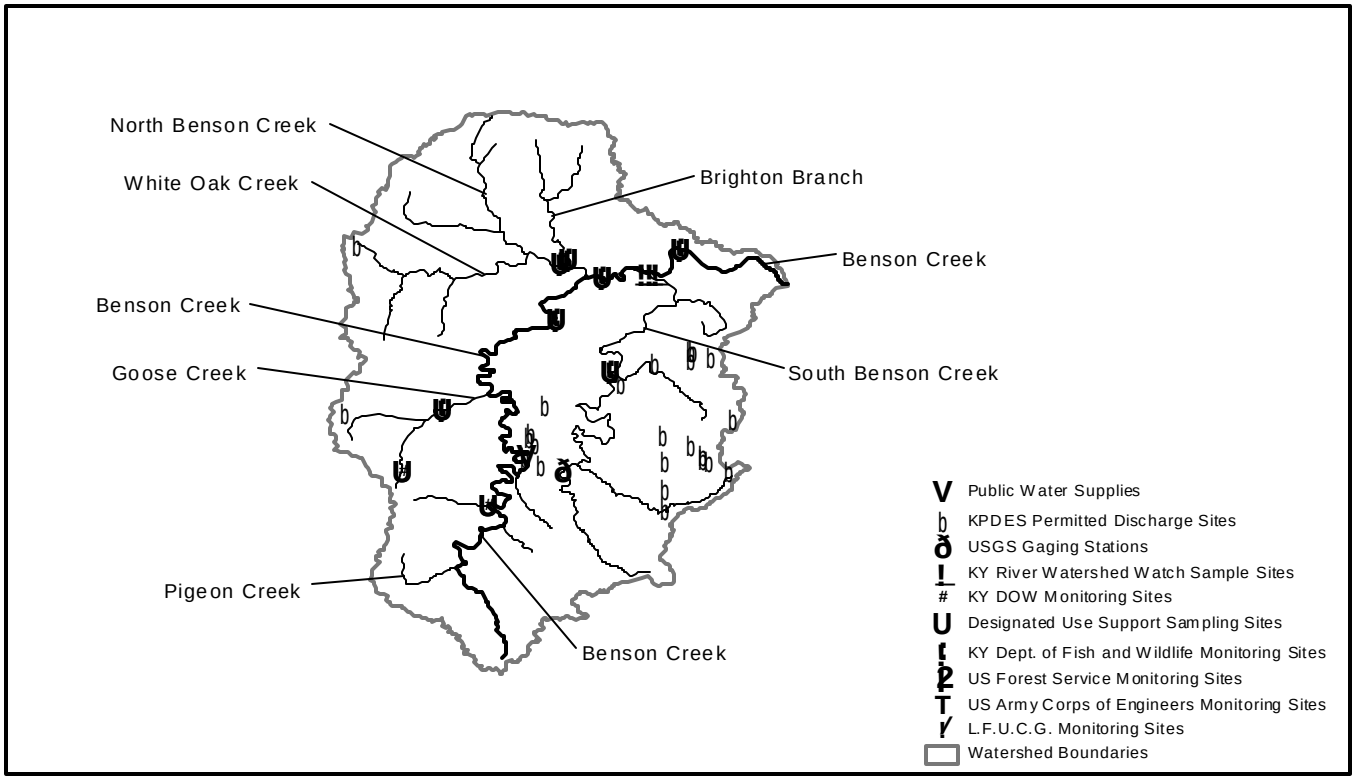
Benson Creek Watershed
Watershed Number: 05100205260

Location Map



Watershed Features



Geography. The Benson Creek watershed covers southwest Franklin County, eastern Shelby County, and northern Anderson County. The land lies mainly in the hills of the bluegrass subregion of the bluegrass physiographic region, characterized by hilly terrain, very rapid rates of surface runoff, and slow rates of groundwater drainage. The eastern section of the watershed is in the inner bluegrass subregion, with moderate rates of both surface and groundwater drainage. Much of the watershed lies above interbedded limestones and shales (>20% limestone, allowing groundwater flow where the clay content is low enough). Other parts of the watershed lie above thick layers of easily dissolved limestone that form carbonate aquifers: groundwater flows through channels in the limestone, so caves and springs are common in regions with this geology.

Waterways. Benson Creek empties into the Kentucky River at Frankfort. Among the creeks that feed it are North and South Benson Creek, White Oak Creek, Goose Creek and Pigeon Creek.

Land and water use. Land in the watershed is 57% agricultural, 35% wooded, and 6% residential. Twenty-one businesses and organizations hold permits for discharges into the creeks. See tables for details.

Agency data assessment. The assessed creek segments in this watershed include one segment of Benson Creek that does not support its designated uses, based on biological and/or water-quality data. Five creek segments only partially support their uses, and two are categorized as threatened. Agricultural activities, construction, road runoff, failing septic systems, and runoff through storm sewers may contribute to the impairment of these streams. See tables for details.

Watershed rankings. The ranking formula provides a preliminary ranking by synthesizing a broad spectrum of watershed characteristics, current conditions, and threats. This watershed ranks in the group with a moderate need for protection and/or restoration. This rating is for the watershed on average: particular sites and particular waters within the watershed may vary widely. See tables for details.

Volunteer data. One of the three volunteer sites sampled in 1999 had high levels of iron and thallium and relatively high lead and selenium levels. Phosphorus concentrations at both sites on Benson Creek were elevated enough to cause potential nutrient enrichment problems (> 0.1 mg/L). See tables for details.

Watershed Name: Benson Creek *11-Digit Watershed Identity Number:* 05100205260

This report was prepared by the Kentucky Water Research Institute as a product of the statewide Kentucky Watershed Management process. Information presented in this report was collected from many sources. Reasonable attempts were made to ensure that information and figures are as accurate as possible, but no representation or guarantee is made as to either the correctness or suitability of information for particular purposes. All critical information should be independently verified. Please address questions or corrections to Basin Coordinator, KWRI, Rm. 233 Mining and Minerals Resources Building, University of Kentucky, Lexington, Kentucky 40506-0107.

Summary of Basin Characteristics and Facilities

General Land-use Characteristics:

Total Land Area (Acres):	68,542	*Acres*	*% of Total*	
Residential Area:	4,099		6.0	
Commercial Area:	989		1.4	
Industrial Area:	139		0.2	
Agricultural Area:	39,369		57.4	
Rural and Wooded Area:	23,937		34.9	
Other Land-use Area:	17		0.0	

Number of Mine Permits:	0
Total Permitted Mining Area (Acres):	0
Number of Identified Wetland Areas:	1
Total Wetland Area (Acres):	0

Withdrawal and Discharge Sites:

Number of Public Water Supplies and Water Withdrawal Sites:	1	*Number of KPDES Discharge Permits:*	24
Surface Water Withdrawals:	1		
Groundwater Withdrawals:	0		
No. of Potable Water Treatment Facilities:	0		

Sampling Site Statistics:

Number of USGS Gaging Stations:	0
Number of Kentucky Division of Water Sampling Sites:	2
Number of Kentucky Dept. of Fish and Wildlife Sampling Sites:	7
Number of US Forest Service Sampling Sites:	0
Number of US Army Corps of Engineers Sampling Sites:	0
Number of Kentucky River Watershed Watch Sampling Sites:	3
Number of Lexington-Fayette Urban Co. Gov. Sampling Sites:	0

Watershed Name: Benson Creek *11-Digit Watershed Identity Number:* 05100205260

Watershed Indicators and Ranking Categories:

Overall Watershed Ranking: Medium

Protection Ranking	Observed Impacts	Potential Impacts	Restoration Ranking
Low	Medium	High	Medium

Protection Categories:

Indicator	*Value*	*Units*	*Range of All Watersheds*	*Mean of All Watersheds*
Wetland Areas	0	Acres	0 - 106	12
Surface Drinking Water Sources	1	No. of sources	0 - 14	2
Ground Drinking Water Sources	0	No. of sources	0 - 17	1
Groundwater Sensitivity	2.83	Score	2 - 5	3.21
KY Dept. of Fish and Wildlife Management Areas	0	Acres	0 - 2951	93
U.S. Forest Service Management Areas	0	Acres	0 - 155253	12,600
Kentucky State Park Areas	0	Acres	0 - 1928	42
Nature Preserves Commission Areas	0	Acres	0 - 1430	32
Nature Conservancy Areas	0	Acres	0 - 2473	28
Reference Reach Watersheds	0.00	Score	0 - 100	3.08
Outstanding Resource Watersheds	0.00	Score	0 - 0	0.00
Recognized Stream Resources	0	No. of resources	0 - 8	1
Kentucky Rivers Assessment Scores	0.34	Score	0 - 11	1.80

Observed Impact Categories:

Human Health Impact Categories:

Indicator	*Value*	*Units*	*Range of All Watersheds*	*Mean of All Watersheds*
Flood Declarations	3	Number since 1970	0 - 10	4
Water Supply Inadequacy	0.00	Score	0 - 2	0.22
Observed Impacts to Surface Drinking Water	1.00	Score	1 - 1	1.00
Observed Impacts to Fish Consumption	1.00	Score	1 - 1	1.00
Observed Impacts to Primary Water Contact	1.00	Score	1 - 3	1.33
Contamination Sites Impacting Human Health	12	Number of sites	0 - 71	4

Ecological Health Impact Categories:

Indicator	*Value*	*Units*		
Observed Impacts to Aquatic Life	2.10	Score	1 - 3	1.31
Contamination Sites Impacting Ecological Health	12	Number of sites	0 - 71	4

Potential Impact Categories:

Indicator	*Value*	*Units*	*Range of All Watersheds*	*Mean of All Watersheds*
Potential Contamination Sites	23	Number of sites	1 - 121	12
Potential Pesticide Loading	25	Est. sales in tons	0 - 45	10
Potential Fertilizer Loading	1,220	Est. tons applied	0 - 2747	394
Agricultural Erosion Potential	3.40	Est. tons erosion / acre	0 - 9	3.20
Livestock Operations Potential Impact	15,415	Animal units	55 - 43826	7,021
KPDES Discharge Violations	380	Number of violations	0 - 541	39
KY Division of Water Citizen Complaints	37	Number of complaints	0 - 53	9
Toxic Release Inventory	21,876	Score	0 - 11547626	231,638
Population Change Projection	344	Number of persons	-149 - 11030	448
Population Not on Public Sewer Systems	1,926	Number of persons	12 - 4511	1,114
Mining Area	0	Acres	0 - 6305	355
Surface Water Runoff Potential	75.44	SCS Curve Number	60 - 79	68
KPDES Permitted Discharges	24	Number of sites	0 - 56	6

Watershed Name: Benson Creek *11-Digit Watershed Identity Number:* 05100205260

Stream and Waterbody Use Support Summary

Total Stream Miles: 97.1	*Number of Segments*	*Stream Miles Assessed*	*Miles * Fully Supporting*	*Miles * Partially Supporting*	*Miles * Not Supporting*	*Miles * Threatened*
Segments Assessed:	9	30.2	4.6	9.6	6.7	9.3
Designated Uses						
Aquatic Life:	9	30.2	4.6	9.6	6.7	9.3
Primary Contact:						
Fish Consumption:						
Drinking Water:						

** Blank values indicate no assessed segments for this category.*

Assessed Stream Segments and Waterbodies

*Stream or Waterbody Name **	*Starting Milepoint*	*Ending Milepoint*	*Segment Length (miles)*	*Designated Uses **	*Overall Level of Support*
Benson Creek	21.6	25.5	3.9	AL	Threatened
Benson Creek	6.7	13.4	6.7	AL	Not Supporting
Benson Creek	4.6	6.7	2.1	AL	Partially Supporting
Benson Creek	0	4.6	4.6	AL	Fully Supporting
Goose Creek	1.9	4.2	2.3	AL	Partially Supporting
Goose Creek	0	1.8	1.8	AL	Partially Supporting
North Benson Creek	0.8	2	1.2	AL	Partially Supporting
North Fork North Benson Creek	0	2.2	2.2	AL	Partially Supporting
South Benson Creek	0	5.4	5.4	AL	Threatened

**Abbreviations: AL - Aquatic Life Support, PC - Primary Contact Recreation, SC - Secondary Contact Recreation, FC - Fish Consumption, DW - Drinking Water Supply, UT - Unnamed Tributary*

Causes for Nonsupport or Impairment of Designated Uses

*Stream or Waterbody Name **	*Starting Milepoint*	*Ending Milepoint*	*Segment Length (miles)*	*Impaired or Threatened Designated Use*	*Level of Support*
Benson Creek	4.6	6.7	2.1	Aquatic Life Support	Partially Supporting
Possible Causes of Impairment: Nutrients				*Possible Sources For Impairment:* Highway/Road/Bridge Runoff, Land Disposal, Onsite Wastewater Systems (Septic Tanks), Urban Runoff/Storm Sewers	
Benson Creek	6.7	13.4	6.7	Aquatic Life Support	Not Supporting
Possible Causes of Impairment: Siltation, Other habitat alterations				*Possible Sources For Impairment:* Agriculture, Habitat Modification (other than Hydromodification), Highway/Road/Bridge Runoff, Urban Runoff/Storm Sewers	
Goose Creek	0	1.8	1.8	Aquatic Life Support	Partially Supporting

Watershed Name: Benson Creek *11-Digit Watershed Identity Number:* 05100205260

Possible Causes of Impairment: Cause Unknown, Other habitat alterations, Siltation			*Possible Sources For Impairment:* Agriculture, Habitat Modification (other than Hydromodification), Highway/Road/Bridge Runoff, Urban Runoff/Storm Sewers		
Goose Creek	1.9	4.2	2.3	Aquatic Life Support	Partially Supporting
Possible Causes of Impairment: Other habitat alterations			*Possible Sources For Impairment:* Agriculture, Grazing related Sources, Pasture grazing - Riparian and/or Upland		
North Benson Creek	0.8	2	1.2	Aquatic Life Support	Partially Supporting
Possible Causes of Impairment: Siltation, Organic enrichment/Low DO, Other habitat alterations			*Possible Sources For Impairment:* Agriculture, Construction, Highway/Road/Bridge Runoff, Urban Runoff/Storm Sewers		
North Fork North Benson Creek	0	2.2	2.2	Aquatic Life Support	Partially Supporting
Possible Causes of Impairment: Organic enrichment/Low DO, Other habitat alterations, Siltation			*Possible Sources For Impairment:* Agriculture, Construction, Habitat Modification (other than Hydromodification), Land Development, Removal of Riparian Vegetation		

**Abbreviations: UT - Unnamed Tributary*

Watershed Name: Benson Creek *11-Digit Watershed Identity Number:* 05100205260

Withdrawal Sites and Discharge Facilities:

Public Water Supplies and Water Withdrawal

Facility	*Origin of Source*	*Type of Facility*	*Permit ID Number*
B.F.I. WASTE SYSTEMS/BENSON VALLEY	Surface Water	Water Withdrawal Site	WW1378

KPDES Permitted Discharge Facilities

Facility	*Type of Facility*	*KPDES Site ID Number*
BFI WASTE SYSTEMS OF N AMERICA	REFUSE SYSTEMS	KY0087581
BRIDGEPORT ELEM SCHOOL	ELEMENTARY & SECONDARY SCHOOLS	KY0075001
COOLBROOK SUBD	LAND SUBDIVIDERS & DEV, EX CEM	KY0044351
EDGEWOOD SUBD	LAND SUBDIVIDERS & DEV, EX CEM	KY0074977
EVERGREEN MHP #1	OPER OF RES MOBILE HOME SITES	KY0086312
EVERGREEN SEWAGE DISPOSAL SYST	OPERATORS OF APART BUILDINGS	KY0078298
FARMDALE SUBD	LAND SUBDIVIDERS & DEV, EX CEM	KY0054780
FARMGATE SUBD	LAND SUBDIVIDERS & DEV, EX CEM	KY0074969
FLYING J TRUCK PLAZA	GASOLINE SERVICE STATIONS	KY0101486
FOX RUN SUBD DOWNSTREAM INC	LAND SUBDIVIDERS & DEV, EX CEM	KY0086967
H & M MHP	OPER OF RES MOBILE HOME SITES	KY0080632
HAWKEEGAN CENTER	OPER OF NONRESIDENTIAL BLDGS	KY0088111
HUNTINGTON WOODS	LAND SUBDIVIDERS & DEV, EX CEM	KY0088650
KY F & W RES OFFICE BLDG	OPER OF NONRESIDENTIAL BLDGS	KY0081710
MEADOWBROOK SUBD	LAND SUBDIVIDERS & DEV, EX CEM	KY0074951
SHADY ACRES MHP	OPER OF RES MOBILE HOME SITES	KY0078263
STEWART HOME SCHOOL	INTERMEDIATE CARE FACILITIES	KY0078191
SUBURBAN MHP	OPER OF RES MOBILE HOME SITES	KY0074454
WADDY TRAVEL CENTERS LLC	GASOLINE SERVICE STATIONS	KY0086657
WAINSCOTT CHEVRON	GASOLINE SERVICE STATIONS	KY0073431
WILLOWCREST SUBD	LAND SUBDIVIDERS & DEV, EX CEM	KY0042552

Gaging Stations and Sampling Sites:

US Geological Survey and US Army Corps of Engineers Stream Gaging Stations

Stream Location	*Agency*	*Station ID Number*	*Sampling Parameter*
South Benson Creek	USGS	USGS03287534	Flow

KY Division of Water Sampling Sites

Stream Name	*Type of Sampling*
Goose Creek	Physical/Chemical Monitoring
Benson Creek	Physical/Chemical Monitoring

KY Dept of Fish and Wildlife Sampling / Assessment Sites

Stream Segment	*Upstream Description*	*Downstream Description*	*Total Length of Segment*	*Upstream Mile Point*	*Downstream Mile Point*
Goose Creek	I-64	Mouth	4.2	1.8	0
Benson Creek	Goose Creek	North Benson Creek	28.8	13.4	6.7
Benson Creek	North Benson Creek	South Fork Benson Creek	28.8	6.7	4.6

Watershed Name: Benson Creek *11-Digit Watershed Identity Number:* 05100205260

Benson Creek	South Fork Benson Creek	Mouth	28.8	4.6	0
North Benson Creek	White Oak Creek	North Fork North Benson Creek	6.1	2	0.8
North Fork North Benson Creek	Quire Brance & Sudduth Branch	Mouth	2.2	2.2	0
South Benson Creek	US 60	Upstream of Benson Creek	18.3	5.8	1.2

KY River Watershed Watch Sampling Sites

Stream Name	*KRWW Sample ID No.*	*Site Description*
Benson Creek	K51	At Red Bridge Falls
Benson Creek	K50	Downstream of Red Bridge
South Fork Benson Creek	K52	At Riffle Above Red Bridge

Watershed Name: Benson Creek *11-Digit Watershed Identity Number:* 05100205260

Results from 1999 KY River Watershed Watch Sampling:

Conventional Parameters:

Sample ID Number: K50 *Stream:* Benson Creek

Physical Data (May):

pH	0	*Alkalinity*	156
Temperature	0	*Total Hardness*	192
Dissolved Oxygen	2	*Chlorides*	26.8
		Conductivity	457
		Total Organic Carbon	13.6
		Total Suspended Solids	16

Fecal Data (July / August):

	Coliform Count	*Strep Count*	*Coliform/Strep Ratio*
July			
August			

Sample ID Number: K51 *Stream:* Benson Creek

Physical Data (May):

pH	0	*Alkalinity*	129
Temperature	0	*Total Hardness*	154
Dissolved Oxygen	2	*Chlorides*	9.2
		Conductivity	320
		Total Organic Carbon	7.4
		Total Suspended Solids	13

Fecal Data (July / August):

	Coliform Count	*Strep Count*	*Coliform/Strep Ratio*
July			
August			

Sample ID Number: K52 *Stream:* South Fork Benson Creek

Physical Data (May):

pH	0	*Alkalinity*	
Temperature	0	*Total Hardness*	
Dissolved Oxygen	0	*Chlorides*	
		Conductivity	
		Total Organic Carbon	
		Total Suspended Solids	

Fecal Data (July / August):

	Coliform Count	*Strep Count*	*Coliform/Strep Ratio*
July			
August			

Note: Most indicators are in milligrams per liter (mg/L) which is equivalent to parts per million (ppm). Temperature is in Celsius degrees. Alkalinity and hardness are as mg/L of calcium carbonate. Bacterial counts are in colonies per 100 milliliters. Conductivity units are micro-mhos per centimeter.

Nutrient Parameters:

Sample ID Number: K50 *Stream:* Benson Creek

Ammonia		*Orthophosphate as Phosphate*	0.191	*Sulfate*	43.6
Ammonia Nitrogen					
Total Kjeldahl Nitrogen as NH3	0.63	*Orthophosphate as Phosphorus*	0.062		
Total Kjeldahl Nitrogen as N	0.52	*Total Recoverable Phosphorus*	0.23		
Nitrate					
Nitrate Nitrogen					

Note: All indicators are in milligrams per liter (mg/L) which is equivalent to parts per million (ppm).

Sample ID Number: K51 *Stream:* Benson Creek

Ammonia		*Orthophosphate as Phosphate*		*Sulfate*	27.7
Ammonia Nitrogen					
Total Kjeldahl Nitrogen as NH3	0.44	*Orthophosphate as Phosphorus*			
Total Kjeldahl Nitrogen as N	0.36	*Total Recoverable Phosphorus*	0.17		
Nitrate					
Nitrate Nitrogen					

Note: All indicators are in milligrams per liter (mg/L) which is equivalent to parts per million (ppm).

Watershed Name: Benson Creek *11-Digit Watershed Identity Number:* 05100205260

Sample ID Number: K52 *Stream:* South Fork Benson Creek

Ammonia		*Orthophosphate as Phosphate*		*Sulfate*	
Ammonia Nitrogen		*Orthophosphate as Phosphorus*			
Total Kjeldahl Nitrogen as NH3					
Total Kjeldahl Nitrogen as N		*Total Recoverable Phosphorus*			
Nitrate					
Nitrate Nitrogen					

Note: All indicators are in milligrams per liter (mg/L) which is equivalent to parts per million (ppm).

Metals and Mineral Parameters:

Sample ID Number: K50 *Stream:* Benson Creek

Aluminum	13.86	*Calcium*	102.44	*Lead*	0.01	*Selenium*	0.02	*Thallium*	0.23
Antimony		*Chromium*		*Lithium*	0.02	*Silicon*	21.91	*Vanadium*	
Barium	0.22	*Cobalt*	0.01	*Magnesium*	20.86	*Sodium*	19.78	*Zinc*	0.03
Beryllium		*Copper*		*Manganese*	4.68	*Strontium*	0.29		
Boron	0.16	*Iron*	10.28	*Potassium*	15.33	*Sulfur*	11.83		

Note: All indicators are in milligrams per liter (mg/L) which is equivalent to parts per million (ppm).

Sample ID Number: K51 *Stream:* Benson Creek

Aluminum	2.54	*Calcium*	43.56	*Lead*		*Selenium*	0.01	*Thallium*	
Antimony		*Chromium*		*Lithium*		*Silicon*	3.59	*Vanadium*	
Barium	0.06	*Cobalt*	0.003	*Magnesium*	10.95	*Sodium*	6.77	*Zinc*	0.006
Beryllium		*Copper*		*Manganese*	0.10	*Strontium*	0.17		
Boron	0.16	*Iron*	1.09	*Potassium*	5.77	*Sulfur*	8.77		

Note: All indicators are in milligrams per liter (mg/L) which is equivalent to parts per million (ppm).

Sample ID Number: K52 *Stream:* South Fork Benson Creek

Aluminum		*Calcium*		*Lead*		*Selenium*		*Thallium*	
Antimony		*Chromium*		*Lithium*		*Silicon*		*Vanadium*	
Barium		*Cobalt*		*Magnesium*		*Sodium*		*Zinc*	
Beryllium		*Copper*		*Manganese*		*Strontium*			
Boron		*Iron*		*Potassium*		*Sulfur*			

Note: All indicators are in milligrams per liter (mg/L) which is equivalent to parts per million (ppm).

Pesticide/Herbicide Parameters:

Sample ID No.	*Stream*	*2,4-D*	*Chlorpyrifos*	*Triazines*
K50	Benson Creek			0.14
K51	Benson Creek			0.07
K52	South Fork Benson Creek			0.23

Note: All indicators are in micrograms per liter which is equivalent to parts per billion (ppb).