Final

Total Maximum Daily Load for <u>E</u>. <u>coli</u> 22 Stream Segments within the Beaver Creek Watershed Floyd and Knott Counties, Kentucky September, 2010

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Kentucky Department for Environmental Protection Division of Water

This report is approved for release

Sandra L. Gruzesky rector

Division of Water

9/10/10 Date



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Glossary of Acronyms

ADD	Area Development District
AFO	Animal Feeding Operation
AWQA	Agriculture Water Quality Act
BMP	Best Management Practices
CAFO	Confined Animal Feeding Operation
CFR	Code of Federal Regulations
CPP	Continuing Planning Process
CSO	Combined Sewer Overflow
DMR	Discharge Monitoring Report
GNIS	Geographic Names Information System
HUC	Hydrologic Unit Code
KAR	Kentucky Administrative Regulations
KDOW	Kentucky Division of Water
KGS	Kentucky Geological Survey
KRS	Kentucky Revised Statutes
KIA	Kentucky Infrastructure Authority
KNDOP	Kentucky No Discharge Operating Permit
KPDES	Kentucky Pollution Discharge Elimination System
LA	Load Allocations
LTCP	Long Term Control Plan
MAF	Mean Annual Flow
MGD	Million Gallons per Day
MOS	Margin of Safety
MS4	Municipal Separate Storm Sewer Systems
NASS	National Agricultural Statistics Service
NLCD	National Land Cover Database
NRCS	Natural Resources Conservation Service
OSTDS	On Site Sewage Treatment and Disposal System
PCR	Primary Contact Recreation
POTW	Publicly Owned Treatment Works
RM	River Mile
SCR	Secondary Contact Recreation
SOP	Standard Operating Procedures
STP	Sewage Treatment Plant
TMDL	Total Maximum Daily Load
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WBID	Waterbody Identification Number
WLA	Waste Load Allocation
WQC	Water Quality Criteria
WQS	Water Quality Standard
WWTP	Wastewater Treatment Plant

Total Maximum Daily Load Synopsis

State: Kentucky
Major River Basin: Big Sandy
USGS HUC8: 05070203
Counties: Floyd and Knott
Impaired Use(s): Primary and Secondary Contact Recreation
Pollutants of Concern: Fecal Coliform, <u>E. coli</u>

The Beaver Creek Watershed is located in the Big Sandy River Basin in Floyd and Knott Counties and encompasses the cities of Wheelwright and Pippa Passes in its headwaters, Wayland in its midst, and Martin and Allen near its confluence with Levisa Fork. A map depicting the location of the Beaver Creek Watershed is in Figure S.1.



Figure S.1 Location of Beaver Creek Watershed in Floyd and Knott Counties of Eastern KY

The Kentucky Division of Water (KDOW) contracted with Eastern Kentucky University (EKU) to monitor for <u>Escherichia coli</u> (a pathogen indicator) in the Beaver Creek watershed, including the Right Fork and Left Fork of Beaver Creek and their major tributaries. This sampling was performed by the students and staff of the Eastern Kentucky Environmental Research Institute at EKU under the direction of Dr. Alice Jones and Environmental Specialist Reagan Butcher. This

document contains the monitoring results and describes TMDL development for pathogen indicators in the Beaver Creek watershed as required under Section 303(d) of the Clean Water Act. Table S.1 indicates the pathogen indicator impaired segments for which TMDLs are developed in this document.

Waterbody	Total			Assessment			
& Segment	Size	Waterbody ID	County	Category	Use	Impairment	Suspected Source(s)
							On-Site Treatment
Arkansas							Systems (Septic
Creek 0.0 to	3.6					Escherichia	Systems and Similar
3.6	miles	KY486027_01	Floyd	5-NS	PCR	<u>coli</u>	Decentralized Systems)
							Municipal (Urbanized
							High Density Area),
							On-Site Treatment
							Systems (Septic
							Systems and Similar
							Decentralized
							Systems), Package
							Plant or Other
							Permitted Small Flows
Beaver							Discharges,
Creek 0.0 to	7.1					Escherichia	Unspecified Domestic
7.1	miles	KY486610_01	Floyd	5-NS	PCR	<u>coli</u>	Waste
							On-Site Treatment
							Systems (Septic
Buck Branch	2.8					Escherichia	Systems and Similar
0.0 to 2.8	miles	KY488192_01	Floyd	5-NS	PCR	<u>coli</u>	Decentralized Systems)
							On-Site Treatment
							Systems (Septic
Caleb Fork	1.2					Escherichia	Systems and Similar
0.0 to 1.2	miles	KY488598_01	Floyd	5-NS	PCR	<u>coli</u>	Decentralized Systems)
							Package Plant or Other
Caney Fork	7.5					Escherichia	Permitted Small Flows
0.0 to 7.5	miles	KY488862_01	Knott	5-NS	PCR	<u>coli</u>	Discharges
							On-Site Treatment
							Systems (Septic
Clear Creek	4.9					<u>Escherichia</u>	Systems and Similar
0.0 to 4.9	miles	KY489611_01	Floyd	5-NS	PCR	<u>coli</u>	Decentralized Systems)
							On-Site Treatment
							Systems (Septic
							Systems and Similar
							Decentralized
_							Systems), Package
Frasure	5.0					_	Plant or Other
Creek 0.0 to	5.2			5) 10	DOD	Escherichia	Permitted Small Flows
5.2	miles	<u>KY492468_01</u>	Floyd	5-NS	PCR	<u>coli</u>	Discharges
							On-Site Treatment
~ .							Systems (Septic
Jacks Creek	4.4				DOT	Escherichia	Systems and Similar
0.0 to 4.4	miles	KY495089_01	Floyd	5-NS	PCR	<u>coli</u>	Decentralized Systems)

Table S.1 Impaired Waterbodies Ad	dressed in this TMDL Document
-----------------------------------	-------------------------------

Waterbody	Total			Assessment			
& Segment	Size	Waterbody ID	County	Category	Use	Impairment	Suspected Source(s)
				85			On-Site Treatment
							Systems (Septic
Iones Fork	99					Escherichia	Systems and Similar
0.0 to 9.9	miles	KY495499 01	Knott	5-NS	PCR	coli	Decentralized Systems)
							On-Site Treatment
							Systems (Septic
							Systems and Similar
							Decentralized
Left Fork							Systems). Package
Beaver							Plant or Other
Creek 0.0 to	11.4					Escherichia	Permitted Small Flows
11.4	miles	KY496194 01	Floyd	5-NS	PCR	coli	Discharges
					_		On-Site Treatment
							Systems (Septic
							Systems and Similar
							Decentralized
Left Fork							Systems). Package
Beaver							Plant or Other
Creek 11.4	2.15					Escherichia	Permitted Small Flows
to 13.55	miles	KY496194 02	Flovd	5-NS	PCR	coli	Discharges
Left Fork					_		On-Site Treatment
Beaver							Systems (Septic
Creek 18.7	5.3					Escherichia	Systems and Similar
to 28.6	miles	KY496194 04	Floyd	5-NS	PCR	coli	Decentralized Systems)
		—					Package Plant or Other
Otter Creek	0.5					Escherichia	Permitted Small Flows
0.0 to 0.5	miles	KY500021_01	Floyd	5-NS	PCR	coli	Discharges
Right Fork							
Beaver						Escherichia	
Creek 0.0 to	17.4				PCR,	<u>coli</u> , Fecal	Inappropriate Waste
17.4	miles	KY501863_01	Floyd	5-NS, 5-NS	SCR	coliform	Disposal
							On-Site Treatment
							Systems (Septic
							Systems and Similar
							Decentralized
Right Fork							Systems), Package
Beaver							Plant or Other
Creek 17.4	5.9					Escherichia	Permitted Small Flows
to 23.3	miles	KY501863_02	Floyd	5-NS	PCR	<u>coli</u>	Discharges
							On-Site Treatment
							Systems (Septic
							Systems and Similar
							Decentralized
Right Fork							Systems), Package
Beaver							Plant or Other
Creek 30.3	2.9					Escherichia	Permitted Small Flows
to 33.4	miles	KY501863_04	Knott	5-NS	PCR	coli	Discharges
							On-Site Treatment
Salt Lick							Systems (Septic
Creek 0.0 to	6.8					Escherichia	Systems and Similar
68	miles	KY502845_01	Flovd	5-NS	PCR	coli	Decentralized Systems)

Waterbody	Total			Assessment			
& Segment	Size	Waterbody ID	County	Category	Use	Impairment	Suspected Source(s)
							On-Site Treatment
Simpson							Systems (Septic
Branch 0.0	1.8					Escherichia	Systems and Similar
to 1.8	miles	KY503532_01	Floyd	5-NS	PCR	<u>coli</u>	Decentralized Systems)
							On-Site Treatment
Sizemore							Systems (Septic
Branch 0.0	2					Escherichia	Systems and Similar
to 2.0	miles	KY503590_01	Floyd	5-NS	PCR	coli	Decentralized Systems)
Spewing							On-Site Treatment
Camp							Systems (Septic
Branch 0.0	3.1					Escherichia	Systems and Similar
to 3.1	miles	KY504061_01	Floyd	5-PS	PCR	coli	Decentralized Systems)
							On-Site Treatment
Spurlock							Systems (Septic
Creek 0.0 to	0.6					Escherichia	Systems and Similar
0.6	miles	KY504191_01	Floyd	5-NS	PCR	coli	Decentralized Systems)
							On-Site Treatment
Turkey							Systems (Septic
Creek 0.0 to	5.9					Escherichia	Systems and Similar
5.9	miles	KY505598_01	Floyd	5-NS	PCR	coli	Decentralized Systems)

Kentucky Water Quality Criteria (WQC):

According to 401 KAR 10:031,

"The following criteria shall apply to waters designated as primary contact recreation use during the primary contact recreation season of May 1 through October 31: Fecal coliform content or <u>Escherichia coli</u> content shall not exceed 200 colonies per 100 ml or 130 colonies per 100 ml respectively as a geometric mean based on not less than five (5) samples taken during a thirty (30) day period. Content also shall not exceed 400 colonies per 100 ml in twenty (20) percent or more of all samples taken during a thirty (30) day period for fecal coliform or 240 colonies per 100 ml for <u>Escherichia coli</u>."

Additionally,

"The following criteria shall apply to waters designated for secondary contact recreation use during the entire year: Fecal coliform content shall not exceed 1000 colonies per 100 ml as a thirty (30) day geometric mean based on not less than five (5) samples; nor exceed 2000 colonies per 100 ml in twenty (20) percent or more of all samples taken during a thirty (30) day period."

TMDL Components and Target:

A TMDL calculation is performed as follows:

$$TMDL = WLA + LA + MOS$$

Where:

TMDL = the Water Quality Criterion. This is defined as an instantaneous <u>E</u>. <u>coli</u> concentration of 240 colonies/100 ml.

WLA = the Waste Load Allocation. For this TMDL document, there are two types of WLAs: WLAs for KPDES-permitted sources and a Future Growth WLA. The KPDES-permitted WLAs are allowable loadings of pollutants into the stream from KPDES-permitted sources such as sewage treatment plants, package plants, and home units. The Future Growth WLA is a portion of the loading reserved for expanding and new KPDES-permitted sources.

LA = the Load Allocation, which is the allowable loading of pollutants into the stream from sources not permitted by KPDES and from natural background.

MOS = the Margin of Safety, which can be an implicit or explicit additional reduction applied to sources of pollutants that accounts for uncertainties in the data or TMDL calculations. For this TMDL an explicit MOS of 10% was applied and an implicit MOS was incorporated by calculating WLAs for KPDES-sources at their maximum design capacity.

TMDL Target = the TMDL minus the MOS (or 240 colonies/100 ml - 10% = 216 colonies/100 ml).

Seasonality

In Kentucky regulations, the PCR use is defined to apply to the period beginning May 1 and ending October 31. For this TMDL, seasonality is considered because samples were collected twice a month to provide data over the entire PCR season.

Critical Condition

The critical condition for nonpoint source \underline{E} . <u>coli</u> (or fecal coliform) loadings is typically an extended dry period followed by a rainfall runoff event. Conversely, the critical condition for point source loading typically occurs during periods of low stream flow when dilution is minimized. Sampling was performed during both types of conditions (during or following rain events and during extended dry periods). The Beaver Creek watershed contains both types of sources; therefore the critical condition for each impaired segment is defined by the sample showing the greatest concentration, which was generally collected during rainfall events.

TMDL Methodology:

<u>Mean Annual Flows (MAFs)</u>: MAFs were used to convert concentrations of <u>E</u>. <u>coli</u> into loads of <u>E</u>. <u>coli</u>. The MAF for each site was adjusted by either adding or subtracting flow based on any KPDES-permitted dischargers of pathogen indicators or KDOW permitted stream water withdrawals in the watershed upstream of a sample site (yielding the Adjusted MAF for that site).

<u>Existing Loads</u>: For each sample site, the sample with the greatest concentration of \underline{E} . <u>coli</u> was used as the existing concentration for the site. Existing loads were calculated as:

Greatest		Adjusted		Conversion Factor		
Concentration	×	MAF	×		=	Existing Load (billion
(colonies/100ml)		(cfs)		.0244657584		colonics/day)

where the conversion factor converts cfs to ml/day and colonies to billion colonies.

<u>Total TMDL</u>: Total TMDLs were calculated for each site using the <u>E</u>. <u>coli</u> criterion of 240 colonies/100 ml:

240		Adjusted		Conversion Faster		
240	×	MAF	×	Conversion Factor	=	Total TMDL (billion
(colonies/100ml)	~	1017 11	~	.0244657584		colonies/day)
` '		(cfs)				

<u>MOS</u>: A 10% explicit MOS (i.e., 10% of the WQC, or 24 colonies/100ml,) was set. Additionally, an implicit MOS was incorporated in loading calculations for KPDES-permitted sources by setting their flow at the maximum design capacity. The explicit MOS load for each site was calculated as:

24		Adjusted		Gamma Easter		
24	×	MAF	×	Conversion Factor	=	MOS (billion
(colonies/100ml)		(cfs)		.0244657584		colonies/day)

<u>Target Load</u>: The Target Load was calculated for each site by subtracting the explicit MOS from the Total TMDL (Target Load = Total TMDL – MOS).

<u>Percent Reduction</u>: Percent Reduction (%) = [(Existing Load – Target Load) / Existing Load] * 100

<u>Calculation of WLAs for Each KPDES-permitted Source</u>: The WLAs are calculated based on the permitted concentration limits expressed in terms of <u>E</u>. <u>coli</u> limits and facility design flow (in units of cfs) using the following equation:

240	v	Des1gn Flow	×	Conversion Factor	_	KPDES WLA (billion
(colonies/100ml)	~	(cfs)	~	.0244657584	_	colonies/day)

- .

The design capacity in MGD was converted to cfs by multiplying by 1.54723 to convert days to seconds and million gallons to cubic feet.

<u>Calculation of Remainder</u>: The Remainder is not part of the TMDL; however, it is used in the TMDL calculations. It is determined as the Target Load minus the sum of all WLAs for KPDES-permitted sources.

Final Beaver Creek Watershed E. coli TMDL

<u>Calculation of Future Growth WLA:</u> Future growth is represented by a portion of the TMDL Target that is set aside (i.e., is not part of the LA nor is it part of the WLA for current/known sources). The Future Growth WLA was calculated as the Remainder multiplied by the appropriate percentage from Table S.2 (Future Growth WLA = Remainder * Future Growth WLA percentage).

Percent Developed Area	% of Remainder Set Aside for Future Growth WLA
≥25%	5%
$\geq 20\% - <25\%$	4%
$\geq 15\% - <20\%$	3%
$\geq 10\% - <15\%$	2%
$\geq 5\% - < 10\%$	1%
<5%	0.5%

Table S.2 Future Growth WLA Formula

<u>Calculation of LA:</u> Load Allocations are calculated as LA= Remainder – Future Growth WLA. The available sampling data were insufficient to apportion the existing loading among the various LA sources; therefore, it is lumped to all LA sources.

TMDLs for Impaired Segments:

TMDLs and loading allocations are summarized for each segment in Table S.3. All loads are expressed in units of billion <u>E</u>. <u>coli</u> colonies per day while percent reduction is expressed as a percentage.

Translation of WLAs into Permit Limits:

All WLAs will be translated into KPDES permit limits as an <u>E</u>. <u>coli</u> effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average or as a Fecal coliform effluent gross limit of 200 colonies/100 ml as a monthly average and 400 colonies/100 ml as a maximum weekly average.

September, 2010

Table S.3 TMDLs for Impaired Segments

Leade and			ea begin												D:-1-4									
Loads are in units of billion <u>E</u> . <u>colii</u> <u>colonies</u> /	Percent Reduction is expressed as		Caleb Fork RM	Clear Creek RM 0.0 to	Jacks Creek RM	Otter Creek RM	Left Fork Beaver Creek RM	Frasure Creek RM	Simpson Branch RM 0.0 to	Spurlock Creek RM	Sizemore Branch RM 0.0 to	Spewing Camp Branch RM 0.0 to	Left Fork Beaver Creek RM 11.4 to	Left Fork Beaver Creek RM	Fork Beaver Creek RM 30.3 to	Caney Fork RM	Jones Fork RM	Right Fork Beaver Creek RM	Salt Lick Creek RM	Turkey Creek RM	Right Fork Beaver Creek RM	Arkansas Creek RM	Buck Branch RM 0.0 to	Beaver Creek 0.0 to
day	a percentage	Existing	0.0 to 1.2	4.9	0.0 to 4.4	0.0 to 0.5	18.7 to 28.6	0.0 to 5.2	1.8	0.0 to 0.6	2.0	3.1	13.55	0.0 to 11.4	33.4	0.0 to 7.5	0.0 to 9.9	17.4 to 23.3	0.0 to 6.8	0.0 to 5.9	0.0 to 17.4	0.0 to 3.6	2.8	/.1
		Load Total	5284.6038	13901.0933	1783.7241	9686.2876	69257.5721	27154.7145	3436.0145	6117.7027	3704.6737	4327.5145	90650.1145	126755.5507	1994.2419	549.4722	3243.4191	10391.2139	27133.8788	10107.7083	65184.6057	8035.3679	5798.3369	147268.9800
		TMDL	15.8538	41.7033	47.5660	29.0589	207.7727	91.7906	15.2712	29.9643	12.3489	19.9731	315.3047	573.9874	251.9042	191.1208	181.0280	608.2662	98.6687	41.1161	1203.4081	24.1061	21.7438	1860.2397
		TMDL	1.3034	4.1703	4.7300	2.9039	20.7773	9.1791	1.5271	2.9904	1,2349	1.9973	51.5505	51.5901	23.1904	19.1121	10.1020	00.8200	9.0009	4,1110	120.3400	2.4100	2,1/44	100.0240
		Target percent	14.2684	37.5330	42.8094	26.1530	186.9954	82.6115	13.7441	26.9678	11.1140	17.9758	283.7743	516.5887	226.7138	172.0087	162.9252	547.4396	88.8018	37.0045	1083.0673	21.6955	19.5694	1674.2158
AI #	KPDES #	reduction	99.73	99.73	97.60	99.73	99.73	99.70	99.60	99.56	99.70	99.58	99.69	99.59	88.63	68.70	94.98	94.73	99.67	99.63	98.34	99.73	99.66	98.86
1133	KYG400642	WLA																			0.0045			0.0045
1134	KY0085791	KPDES WLA												0.1817										0.1817
1143	KYG400479	KPDES WLA												0.0045										0.0045
1150	KVC 400797	KPDES																					0.0045	0.0045
1158	KYG400787	WLA KPDES																					0.0045	0.0045
1161	KYG400692	WLA KPDES								0.0045				0.0045										0.0045
1162	KYG400678	WLA								0.0045				0.0045										0.0045
1168	KYG400854	WLA									0.0045			0.0045										0.0045
1168	KYG401516	KPDES WLA									0.0045			0.0045										0.0045
1173	KYG400790	KPDES WLA		0.0045									0.0045	0.0045										0.0045
1120	KNC 400520	KPDES																					0.0045	0.0045
1180	KYG400520	KPDES																					0.0045	0.0045
1182	KYG400614	WLA KPDES						0.0045						0.0045										0.0045
1196	KYG400590	WLA KPDES																			0.0045			0.0045
1199	KYG400603	WLA																	0.0045		0.0045			0.0045
1202	KYG400969	KPDES WLA						0.0045						0.0045										0.0045
1218	KYG400567	KPDES WLA									0.0045			0.0045										0.0045
1222	KVC 400720	KPDES WLA																			0.0045			0.0045
1222	K10400750	KPDES																			0.0045			0.0045
1232	KYG400806	WLA KPDES																					0.0045	0.0045
1237	KYG400753	WLA KPDFS		0.0045									0.0045	0.0045										0.0045
1243	KYG400915	WLA		·		·		·			· · · · · · · · · · · · · · · · · · ·							0.0045			0.0045	· · · · · · · · · · · · · · · · · · ·		0.0045
1248	KYG400593	KPDES WLA																				0.0045		0.0045
1255	KY0096342	KPDES WLA												0.1635										0.1635
1262	KY0026021	KPDES WL A																						1 0002
1202	K10020921	KPDES												0.00.0										1.0902
1263	KY0103136	WLA KPDES												0.0045										0.0045
1265	KYG400612	WLA KPDFS																						0.0045
1266	KYG400970	WLA		0.0045									0.0045	0.0045										0.0045
1269	KYG400478	WLA						0.0045						0.0045										0.0045

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Loads are in units of	Democrat						L of E od		C'		C :	Spewing	Left Fork	Left Feels	Right Fork			Disht Eads			Disht East		Duch	
billion <u>E</u> . coli	Reduction is		Caleb	Clear Creek	Jacks	Otter	Beaver	Frasure	Branch	Spurlock	Branch	Branch	Creek RM	Beaver	Creek RM	Caney	Jones	Beaver	Salt Lick	Turkey	Beaver	Arkansas	Buck Branch	Beaver
colonies/ dav	expressed as a percentage		Fork RM 0.0 to 1.2	RM 0.0 to 4.9	Creek RM 0.0 to 4.4	Creek RM 0.0 to 0.5	Creek RM 18.7 to 28.6	Creek RM 0.0 to 5.2	RM 0.0 to 1.8	Creek RM 0.0 to 0.6	RM 0.0 to 2.0	RM 0.0 to 3.1	11.4 to 13.55	Creek RM 0.0 to 11.4	30.3 to 33.4	Fork RM 0.0 to 7.5	Fork RM 0.0 to 9.9	Creek RM 17.4 to 23.3	Creek RM 0.0 to 6.8	Creek RM 0.0 to 5.9	Creek RM 0.0 to 17.4	Creek RM 0.0 to 3.6	RM 0.0 to 2.8	Creek 0.0 to 7.1
1270	KNC 400ccc	KPDES																			0.0045			0.0045
1270	KYG400666	WLA KPDES WLA											0.0045	0.0045							0.0045			0.0045
1076	KNC 400075	KPDES WL A																		0.0045	0.0045			0.0045
1276	KYG400975	WLA KPDES WLA																0.0045		0.0045	0.0045			0.0045
1204	KVC400220	KPDES WL A																				0.0045		0.0045
1304	KY0103233	KPDES WLA												0.0899								0.0045		0.0045
1314	KYG400844	KPDES WLA	· · · · · · · · · · · · · · · · · · ·									· · · · · · · · · · · · · · · · · · ·	·			·			0.0045		0.0045			0.0045
1315	KYG400677	KPDES WLA								0.0045				0.0045										0.0045
1327	KYG400601	KPDES WLA						0.0045						0.0045										0.0045
1328	KYG400936	KPDES WLA																				0.0045		0.0045
1343	KYG400778	KPDES WLA																			0.0045			0.0045
1352	KY0072974	KPDES WLA			· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	·	·	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·					·	·			·		0.2271	·		0.2271
1367	KYG400579	KPDES WLA												0.0045										0.0045
1369	KYG400724	KPDES WLA									0.0045			0.0045										0.0045
2514	KY0094510	KPDES WLA															0.0273				0.0273			0.0273
2517	KY0083089	KPDES WLA															0.0908				0.0908			0.0908
2527	KY0042854	KPDES WLA													·	0.9085		0.9085			0.9085			0.9085
4250	KYG400659	KPDES WLA												0.0045										0.0045
4327	KYG401073	KPDES WLA																			0.0045			0.0045
4331	KYG401143	KPDES WLA																				0.0045		0.0045
4332	KYG401142	KPDES WLA												0.0045										0.0045
4333	KYG401140	KPDES WLA					·						0.0045	0.0045								·		0.0045
4336	KYG401125	KPDES WLA																0.0045			0.0045			0.0045
4342	KYG401126	KPDES WLA																				0.0045		0.0045
4344	KYG401121	KPDES WLA																		0.0045	0.0045			0.0045
4349	KYG401133	KPDES WLA			0.0045		0.0045						0.0045	0.0045										0.0045
4350	KYG401113	KPDES WLA																	0.0045		0.0045			0.0045
4356	KYG401040	KPDES WLA						0.0045						0.0045										0.0045
4405	KYG401197	KPDES WLA										0.0045	0.0045	0.0045										0.0045
12253	KYG401218	KPDES WLA																			0.0045			0.0045
15635	KYG401271	KPDES WLA												0.0045										0.0045

September, 2010

Loads are															Right									
in units of												Spewing	Left Fork		Fork									
billion <u>E</u> .	Percent Reduction is		Caleb	Clear Creek	Jacks	Otter	Left Fork Beaver	Fragura	Simpson	Spurlock	Sizemore	Camp Branch	Beaver Creek PM	Left Fork	Beaver Creek PM	Capey	Iones	Right Fork	Salt Lick	Turkey	Right Fork	Arkansas	Buck	Baavar
colonies/	expressed as		Fork RM	RM 0.0 to	Creek RM	Creek RM	Creek RM	Creek RM	RM 0.0 to	Creek RM	RM 0.0 to	RM 0.0 to	11.4 to	Creek RM	30.3 to	Fork RM	Fork RM	Creek RM	Creek RM	Creek RM	Creek RM	Creek RM	RM 0.0 to	Creek 0.0 to
day	a percentage		0.0 to 1.2	4.9	0.0 to 4.4	0.0 to 0.5	18.7 to 28.6	0.0 to 5.2	1.8	0.0 to 0.6	2.0	3.1	13.55	0.0 to 11.4	33.4	0.0 to 7.5	0.0 to 9.9	17.4 to 23.3	0.0 to 6.8	0.0 to 5.9	0.0 to 17.4	0.0 to 3.6	2.8	7.1
15655	KYG401296	KPDES WLA																			0.0045			0.0045
15807	KVG401352	KPDES WL A																			0.0045			0.0045
15007	K10401352	KPDES																			0.0045			0.0045
33378	KYG401353	WLA KPDES																			0.0045			0.0045
33945	KY0077542	WLA KPDFS													0.0636			0.0636						0.0636
35251	KY0089435	WLA					0.0618						0.0618	0.0618										0.0618
35252	KY0079421	WLA						0.1363						0.1363										0.1363
35254	KY0079430	KPDES WLA																			0.0999			0.0999
35258	KY0093017	KPDES WLA																			0.0727			0.0727
35260	KV0003012	KPDES WL A					0 1363						0 1363	0 1363										0.1363
25260	K10073712	KPDES					0.1505						0.1303	0.1303							0.0051			0.1303
35260	KY0107051	WLA KPDES																			0.2271			0.2271
35359	KY0087076	WLA KPDES															0.0545				0.0545			0.0545
35761	KY0105228	WLA KPDES																0.9085			0.9085			0.9085
35887	KYG401533	WLA						0.0045						0.0045										0.0045
35892	KYG401529	WLA																						0.0045
36057	KYG401541	KPDES WLA																						0.0045
40534	KY0028789	KPDES WLA				2.0441	2.0441						2.0441	2.0441										2.0441
43120	KYG401540	KPDES WLA																			0.0045			0.0045
43224	KYG401548	KPDES WLA																			0.0045			0.0045
44695	KYG401580	KPDES WLA				0 0045	0 0045						0 0045	0 0045										0 0045
45070	KYC 401500	KPDES				0.0042	0.0042						0.0042	0.0045										0.0045
43070	K10401390	KPDES												0.0045										0.0045
45073	KYG401582	WLA KPDES												0.0045										0.0045
45396	KYG401587	WLA KPDES												0.0045										0.0045
46144	KYG401601	WLA KPDES								0.0045				0.0045										0.0045
46147	KYG401603	WLA KPDES															0.0045				0.0045			0.0045
47022	KYG401638	WLA																			0.0045			0.0045
48864	KYG401645	WLA												0.0045										0.0045
48897	KYG401646	KPDES WLA					0.0045						0.0045	0.0045										0.0045
49354	KYG401654	KPDES WLA										0.0045	0.0045	0.0045										0.0045
50021	KYG401692	KPDES WLA						0.0045						0.0045										0.0045
50138	KYG401699	KPDES WLA																						0.0045
50150	M10+01077	KPDES																						0.00-13
50627	KYG401721	WLA																		0.0045	0.0045			0.0045

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September, 2010

Loads are															Right									
in units of												Spewing	Left Fork		Fork									
billion F	Percent						Left Fork		Simpson		Sizemore	Camp	Beaver	Left Fork	Beaver			Right Fork			Right Fork		Buck	
oniion <u>L</u> .	Paduation is		Calab	Clear Creek	Inaka	Ottor	Paguar	Fragura	Bronch	Spurloak	Branch	Branch	Crook PM	Poovor	Crook PM	Conor	Ionos	Paquar	Salt Liek	Turkov	Poovor	Arkoncoc	Duck	Doguar
	Reduction is		Caleb	Стеаг Стеек	Jacks	Oller	Deaver	Frasure	Branch	Spuriock	Dranch	Dranch		Deaver		Calley	Jones	Deaver			Deaver	Arkansas	Dranch	Deaver
colonies/	expressed as		Fork RM	RM 0.0 to	Creek RM	Creek RM	Creek RM	Creek RM	RM 0.0 to	Creek RM	RM 0.0 to	RM 0.0 to	11.4 to	Creek RM	30.3 to	Fork RM	Fork RM	Creek RM	Creek RM	Creek RM	Creek RM	Creek RM	RM 0.0 to	Creek 0.0 to
day	a percentage		0.0 to 1.2	4.9	0.0 to 4.4	0.0 to 0.5	18.7 to 28.6	0.0 to 5.2	1.8	0.0 to 0.6	2.0	3.1	13.55	0.0 to 11.4	33.4	0.0 to 7.5	0.0 to 9.9	17.4 to 23.3	0.0 to 6.8	0.0 to 5.9	0.0 to 17.4	0.0 to 3.6	2.8	7.1
		KPDES																						
50950	KYG401730	WLA																	0.0045		0.0045			0.0045
		KPDES																						
53921	KYG401764	WLA																				0.0045		0.0045
		KPDFS																				010010		010010
54970	KVC 401772																				0.0045			0.0045
34879	K10401/72	WLA																			0.0045			0.0045
51.10.5		KPDES																						0.004
71436	KYG401809	WLA						0.0045						0.0045										0.0045
		KPDES																						
74022	KYG401406	WLA							0.0045					0.0045										0.0045
		KPDES																						
74025	KYG401409	WLA												0.0045										0.0045
		KPDES																						
74062	KYG401442	WLA						· · · · · · · · · · · · · · · · · · ·				· · · · · · · · · · · · · · · · · · ·	0 0045	0 0045										0.0045
71002	RIGIOTIL	KPDFS											0.0042	0.0042										0.0045
74101	WWC 401 470	KIDES WLA					0.0045						0.0045	0.0045										0.0045
/4181	KYG401470	WLA					0.0045						0.0045	0.0045										0.0045
		KPDES																						
74185	KYG401475	WLA																	0.0045		0.0045			0.0045
		KPDES																						
74243	KYG401821	WLA						0.0045						0.0045										0.0045
		KPDES																						
75141	KYG401851	WLA												0.0045										0.0045
		KPDES																						
75556	KYG401857	WLA						· · · · · · · · · · · · · · · · · · ·				· · · · · · · · · · · · · · · · · · ·									0.0045			0.0045
10000	1110.01007	KPDFS																			010012			010012
75746	VVC 101969																						0.0045	0.0045
/3/40	K10401808	WLA																					0.0045	0.0045
		KPDES																						0.004
76078	KYG401876	WLA																			0.0045			0.0045
		KPDES																						
76185	KYG401883	WLA																				0.0045		0.0045
		KPDES																						
79525	KYG401931	WLA						0.0045						0.0045										0.0045
		KPDES																						
79842	KYG401936	WLA																						0.0045
		KPDES																						010010
81103	KVG401970	WIA						0 0045						0 0045										0.0045
01175	K10401770	VDDES						0.0045						0.0045										0.0045
91570	VVC 401081	WI A																			0.0045			0.0045
81370	K10401981	WLA																			0.0045			0.0045
		KPDES																						
82092	KY0106755	WLA																			0.0545			0.0545
		KPDES																						
82471	KYG402002	WLA												0.0045										0.0045
		KPDES																						
84292	KYG402025	WLA																			0.0045			0.0045
		KPDES																						
97291	KYG402063	WLA																			0.0045			0.0045
		KPDES																						
103052	KYG402117	WLA						0.0045						0.0045										0.0045
		KPDES																						
1207	KY0027413	WI A																						0.0000
1297	111002/413	Tet-1																						0.0000
		TOTAL VDDEC																						
		KPDES	0.000	0.0105	0.0045	0.0407	2.2502	0 1002	0.0045	0.010	0.010	0.000	2.00/2	2.0207	0.0/0/	0.0005	0.1551	1.00.44	0.0225	0.0125	3.910.4	0.0215	0.010	-
		WLA	0.000	0.0135	0.0045	2.0486	2.2602	0.1903	0.0045	0.018	0.018	0.009	2.2962	3.0206	0.0636	0.9085	0.1771	1.8941	0.0225	0.0135	2.8104	0.0315	0.018	7.060855
		remainder	14.2684	37.5193	42.8048	24.1043	184.7351	82.4207	13.7395	26.9497	11.0959	17.9667	281.4776	513.5661	226.6502	171.1002	162.7481	545.5453	88.7791	36.9909	1080.2555	21.6637	19.5512	1667.1549
		Future																						
		Growth																						
		WLA ⁽¹⁾	0.0713	0.3752	0.4280	0.2410	1.8474	0.8242	0.0687	0.2695	0.1110	0.0898	2.8148	5.1357	2.2665	0.8555	0.8137	5.4555	0.8878	0.1850	10.8026	0.2166	0.1955	16.6715
		Total																						
		WLA	0.07134	0.3887	0.4325	2.2896	4.1076	1.0145	0.0732	0.2875	0.129	0.0988	5.111	8.1563	2.3301	1.764	0.9908	7.3496	0.9103	0.1985	13.613	0.2481	0.2135	23.7324
		LA	14.1971	37.1441	42.3768	23.8633	182.8877	81.5965	13.6708	26.6802	10.9849	17.8769	278.6628	508.4304	224.3837	170.2447	161.9343	540.0899	87.8913	36.8059	1069.4529	21.4471	19.3557	1650.4834

Note: ⁽¹⁾ Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.

1.0 Introduction

<u>1.1 Section 303(d) Requirements</u>

Section 303(d) of the Clean Water Act (1972) requires states to identify waters within their boundaries that have been assessed and are not currently meeting their designated uses (per 401 KAR 10:026 and 10:031) and that require a Total Maximum Daily Load (TMDL). States must establish a priority ranking for such waters, taking into account their intended uses and the severity of the pollutant. Section 303(d) also requires that states provide a list of this information called the 303(d) list. This list is submitted to the Environmental Protection Agency (EPA) during even numbers years and each submittal replaces the previous list. The 2008-303(d) information for Kentucky can be found in the 2008 Integrated Report to Congress on the Condition of Water Resources in Kentucky Volume II. 303(d) List of Surface Waters (Kentucky Division of Water [KDOW], 2008a) and can be obtained at: http://water.ky.gov.

States are required to develop TMDLs for the listed pollutants that cause a waterbody to fail to meet its designated uses. The TMDL process establishes the allowable amount (i.e. "load") of pollutant a waterbody can naturally assimilate while continuing to meet the water quality criteria (WQC) for each designated use. The pollutant load must be established at a level necessary to implement the applicable WQC with seasonal variations and a margin of safety (MOS) which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality. This total load is then divided among different sources of the pollutant in a watershed. Information from EPA on TMDLs can be found at: http://www.epa.gov/owow/tmdl.

1.2 TMDL Definitions

A Total Maximum Daily Load (TMDL) = Waste Load Allocation (WLA) + Load Allocation (LA) + Margin of Safety (MOS), where:

TMDL = the maximum amount of a pollutant that a waterbody can receive over a one day period and not be impaired for its designated use(s). This amount must be determined as a load (mass/day or colonies/day).

WLA = the part of the TMDL that is portioned among sources that are regulated under the Kentucky Pollutant Discharge Elimination System (KPDES) program in KY. These sources are often referred to as point sources because they frequently, but not always, discharge through a pipe directly to a waterbody. These sources require a KPDES permit that places limits on the amount of pollutant that can be legally discharged to a waterbody. For this document, the WLA has two components, the KPDES-permitted WLA (for sources mentioned above) and a Future Growth WLA (a portion of the loading reserved for expanding and new KPDES-permitted sources).

LA = the part of the TMDL that is portioned among sources that do not require a KPDES-permit. These sources are often referred to as nonpoint sources because they tend to discharge to a

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waterbody following periods of rain or snow melt that wash the pollutant into the waterbody. Natural background levels of a pollutant are also included in this category.

MOS = an implicit (using conservative assumptions) or explicit (a reserved portion) additional reduction applied to the WLA, LA or both types of sources that accounts for uncertainties in the data or TMDL calculations.

<u>1.3 Beaver Creek Watershed</u>

Beaver Creek and Right Fork Beaver Creek were 303(d) listed on the 2008 Integrated Report for the Primary Contact Recreation (PCR) use due to fecal coliform (a pathogen indicator) (KDOW, 2008a). The Beaver Creek Watershed is located in the Big Sandy River Basin in Floyd and Knott Counties and encompasses the cities of Wheelwright and Pippa Passes in its headwaters, Wayland in its midst, and Martin and Allen near its confluence with Levisa Fork. A map depicting the location of the Beaver Creek Watershed is shown in Figure 1.1.



Figure 1.1 Location of Beaver Creek Watershed in Floyd and Knott Counties of Eastern KY

Final Beaver Creek Watershed E. coli TMDL

KDOW contracted with Eastern Kentucky University (EKU) to monitor for <u>Escherichia coli</u> (<u>E</u>. <u>coli</u>, another pathogen indicator) in the Beaver Creek watershed, including the Right Fork and Left Fork of Beaver Creek and their major tributaries. This sampling was performed by the students and staff of the Eastern Kentucky Environmental Research Institute at EKU under the direction of Dr. Alice Jones and Environmental Specialist Reagan Butcher. This document contains the monitoring results and describes TMDL development for pathogen indicators in the Beaver Creek watershed as required under Section 303(d) of the Clean Water Act.

2.0 Problem Definition

The Clean Water Act requires states to designate uses for surface waters within their jurisdiction. The designated uses assigned to waterbodies in Kentucky can be found in 401 KAR 10:026 and includes primary contact recreation (PCR) and secondary contact recreation (SCR). 401 KAR 10:001 defines PCR waters as those "waters suitable for full body contact recreation during the recreation season of May 1 through October 31" and SCR waters as "waters suitable for partial body contact recreation, with minimal threat to public health due to water quality." 401 KAR 10:031 establishes standards that are "minimum requirements that apply to all surface waters in the Commonwealth of Kentucky in order to maintain and protect them for designated uses." The pathogen-related Water Quality Criteria (WQC) in 401 KAR 10:031 are based upon those proposed by EPA in 1986 (EPA, 1986) and, at the levels established, would cause an estimated occurrence of illness in 8 out of 1000 swimmers in fresh waters.

The term pathogen refers to bacteria, viruses, or other biological agents (like parasites) that can cause disease. Because it is currently resource intensive, difficult, and a potential health hazard to detect most pathogens in water, other organisms are used to indicate whether the presence of pathogens is likely in waters. Like EPA's proposed criteria, Kentucky uses fecal coliform bacteria and Escherichia coli (E. coli) bacteria as indicator organisms of pathogens. Fecal coliform and <u>E. coli</u> are found in the fecal waste of humans and warm-blooded animals (birds and mammals). The presence of these bacteria in a waterbody indicates that contamination from human or animal wastes has occurred and that pathogens may be present. Per 401 KAR 10:031:

"The following criteria shall apply to waters designated as primary contact recreation use during the primary contact recreation season of May 1 through October 31: Fecal coliform content or <u>Escherichia coli</u> content shall not exceed 200 colonies per 100 ml or 130 colonies per 100 ml respectively as a geometric mean based on not less than five (5) samples taken during a thirty (30) day period. Content also shall not exceed 400 colonies per 100 ml in twenty (20) percent or more of all samples taken during a thirty (30) day period for fecal coliform or 240 colonies per 100 ml for <u>Escherichia coli</u>."

Additionally,

"The following criteria shall apply to waters designated for secondary contact recreation use during the entire year: Fecal coliform content shall not exceed 1000 colonies per 100 ml as a thirty (30) day geometric mean based on not less than five (5) samples; nor exceed 2000 colonies per 100 ml in twenty (20) percent or more of all samples taken during a thirty (30) day period."

EPA and the Council of State Territorial Epidemiologist maintain a Waterbourne Disease and Outbreak Surveillance System to report water-related disease outbreaks. Their reports can be obtained at <u>http://www.cdc.gov/mmwr/preview/mmwrhtml/ss5709a1.htm</u>. The latest report from 2008 provides information on waterborne disease outbreaks across the United States during 2005 and 2006. During this period, 13 outbreaks of gastroenteritis from swimming in lakes or rivers were reported, along with five fatal cases of Primary Amebic Meningoencephalitis (caused by an ameba; <u>Naegleria fowleri</u>), two outbreaks of Leptospirosis (affecting 46 people), and two outbreaks of cercarial dermatitis (caused by avian schistosomes) (Yoder, et. al. 2008). The

number of unreported cases of waterborne diseases contacted by people recreating in and around natural freshwaters is unknown.

Beaver Creek from river miles (RM) 0.0 to 7.1 was first listed as impaired for pathogens on the 2004-303(d) list (KDOW, 2005a). This initial listing was carried forward to the 2006 303(d) list when the Right Fork of Beaver Creek from RM 0.0 to 17.4 was also listed as impaired for pathogens (KDOW, 2007). During the 2008 listing cycle, these pathogen listings were more correctly identified with the indicator organism used; in this case fecal coliform (KDOW, 2008a). KDOW contracted with Eastern Kentucky University to collect <u>Escherichia coli</u> data in the Beaver Creek Watershed during the 2007 and 2008 PCR seasons. The assessment results from this monitoring effort indicated that many additional stream segments within the watershed were impaired for the PCR use. On the draft 2010 list, these additional segments are proposed for listing for <u>E</u>. <u>coli</u>, which will result in the 22 listings shown in Table 2.1 (KDOW, 2010a). KDOW designates a waterbody as partial support for PCR if 20 to 33% of samples collected exceed these criteria. In addition to the segments found to be impaired, four segments were found to be fully supporting for the pathogen PCR use as shown in Table 2.2.

Waterbody &	Country	Support	Line	Dellatent	Summer ted Source(c)
Segment	County	Status	Use	Pollutant	Suspected Source(s)
Arkansas				Ecohorichio	On Site Tagetment Systems (Sentic Systems and
	F 11	N	DCD	Escherichia	On-Site Treatment Systems (Septic Systems and
3.0	Floyd	Nonsupport	PCK	<u>COI1</u>	Similar Decentralized Systems)
					Municipal (Urbanized High Density Area), On-
					Sine Treatment Systems (Septic Systems and Similar Decentrolized Systems), Deckage Dignt or
Baavar Craak				Escherichia	Other Permitted Small Flows Discharges
0.0 to 7.1	Floyd	Nonsupport	PCR	coli	Unspecified Domestic Waste
Buck Branch	Pittyu	Nonsupport	ICK	Escherichia	On Site Treatment Systems (Sentic Systems and
0.0 to 2.8	Floyd	Nonsupport	PCR	coli	Similar Decentralized Systems)
Caleb Fork	Tioyu	ronsupport	TCK	Escherichia	On-Site Treatment Systems (Sentic Systems and
0.0 to 1.2	Floyd	Nonsupport	PCR	coli	Similar Decentralized Systems)
Concer Fords	110yu	ronsupport	TCK	<u>con</u> Eacharichia	Package Plant on Other Parmitted Small Flame
Caney Fork	Vaatt	Nonormant	DCD	Escherichia	Package Plant of Other Permitted Small Flows
0.0 to 7.5	Knou	Nonsupport	PCK	<u>con</u>	Discharges
Clear Creek				Escherichia	On-Site Treatment Systems (Septic Systems and
0.0 to 4.9	Floyd	Nonsupport	PCR	<u>coli</u>	Similar Decentralized Systems)
					On-Site Treatment Systems (Septic Systems and
Frasure Creek				Escherichia	Similar Decentralized Systems), Package Plant or
0.0 to 5.2	Floyd	Nonsupport	PCR	<u>coli</u>	Other Permitted Small Flows Discharges
Jacks Creek				Escherichia	On-Site Treatment Systems (Septic Systems and
0.0 to 4.4	Floyd	Nonsupport	PCR	coli	Similar Decentralized Systems)
Iones Fork				Escherichia	On-Site Treatment Systems (Sentic Systems and
0.0 to 9.9	Knott	Nonsupport	PCR	coli	Similar Decentralized Systems)
Left Fork					On-Site Treatment Systems (Septic Systems and
Beaver Creek				Escherichia	Similar Decentralized Systems), Package Plant or
0.0 to 11.4	Floyd	Nonsupport	PCR	coli	Other Permitted Small Flows Discharges

Table 2.1 Proposed 2010 303(d) Listings for Pathogen Indicators in the Beaver Creek Watershed

Waterbody &	County	Support	Usa	Dollutant	Supported Source(s)
Segment	County	Status	Use	Pollutant	
Left Fork Beaver Creek				Escherichia	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems), Package Plant or
11.4 to 13.55	Floyd	Nonsupport	PCR	coli	Other Permitted Small Flows Discharges
Left Fork	110yu	ronsupport	TCK	<u>con</u>	other remnited sman riows Discharges
Beaver Creek				Escherichia	On-Site Treatment Systems (Septic Systems and
18.7 to 28.6	Floyd	Nonsupport	PCR	coli	Similar Decentralized Systems)
Otter Creek				Escherichia	Package Plant or Other Permitted Small Flows
0.0 to 0.5	Floyd	Nonsupport	PCR	coli	Discharges
Right Fork				Escherichia	
Beaver Creek			PCR.	coli. Fecal	
0.0 to 17.4	Floyd	Nonsupport	SCR	coliform	Inappropriate Waste Disposal
Right Fork					On-Site Treatment Systems (Septic Systems and
Beaver Creek				Escherichia	Similar Decentralized Systems), Package Plant or
17.4 to 23.3	Floyd	Nonsupport	PCR	coli	Other Permitted Small Flows Discharges
Right Fork					On-Site Treatment Systems (Septic Systems and
Beaver Creek				Escherichia	Similar Decentralized Systems), Package Plant or
30.3 to 33.4	Knott	Nonsupport	PCR	<u>coli</u>	Other Permitted Small Flows Discharges
Salt Lick					
Creek 0.0 to				Escherichia	On-Site Treatment Systems (Septic Systems and
6.8	Floyd	Nonsupport	PCR	<u>coli</u>	Similar Decentralized Systems)
Simpson					
Branch 0.0 to				Escherichia	On-Site Treatment Systems (Septic Systems and
1.8	Floyd	Nonsupport	PCR	<u>coli</u>	Similar Decentralized Systems)
Sizemore				F 1 · 1 ·	
Branch 0.0 to	F 11	N	DCD	Escherichia	On-Site Treatment Systems (Septic Systems and
2.0	Floyd	Nonsupport	PCR	<u>coli</u>	Similar Decentralized Systems)
Spewing Comp Bronch		Dortiol		Ecohoriohio	On Site Treatment Systems (Sentia Systems and
0.0 to 3.1	Floyd	Support	PCR	coli	Similar Decentralized Systems)
Spurlock	Tityu	Support	ICK	<u>con</u>	Similar Decentralized Systems)
Creek 0.0 to				Escherichia	On-Site Treatment Systems (Sentic Systems and
0.6	Floyd	Nonsupport	PCR	coli	Similar Decentralized Systems)
Turkey Creek				Escherichia	On-Site Treatment Systems (Septic Systems and
0.0 to 5.9	Floyd	Nonsupport	PCR	coli	Similar Decentralized Systems)

Table 2.2 Proposed PCR-Use Fully Supporting	Segments in the Beaver Creek Watershed
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Waterbody & Segment	County	Support Status	Use
Spurlock 0.6 to 4.0	Floyd	Full Support	PCR
Left Fork Beaver Creek 13.55 to 18.7	Floyd	Full Support	PCR
Rock Fork 0.0 to 7.0	Floyd	Full Support	PCR
Right Fork Beaver Creek 23.3 to 30.3	Knott	Full Support	PCR

3.0 Physical Setting

3.1 Location

Beaver Creek is located Floyd (population 42,441) and Knott (population 17,649) Counties, west of Pikeville and US 23, and encompasses the cities of Wheelwright (population 1,042) and Pippa Passes (population 297) in its headwaters, Wayland (population 298) in its midst, and Martin (population 633) and Allen (population 150) near its confluence with Levisa Fork (U.S. Census Bureau 2007). Figure 1.1 showed the location of the Beaver Creek Watershed. The Beaver Creek watershed is in the Big Sandy River Basin, United States Geological Survey (USGS) 6-digit hydrologic unit code (HUC) # 050702. The system of HUCs was developed by the USGS to identify specific watersheds (all the land area that drains to a particular stream) (USGS, 2004). The larger the HUC number, the smaller the watershed and the more specific the identification of a watershed to one particular stream.

The Beaver Creek Watershed is in the Eastern Kentucky physiographic region, in the Level III Ecoregion of the Central Appalachians (Figure 3.1). Information from Woods, et. al. (2002) indicates that this Ecoregion is dominated by forested hills with narrow ridges and narrow valleys. Streams in this area have moderate to high gradients with cobble or boulder substrates. Surface and underground bituminous coal mines, logging, and oil and gas production are common in this Ecoregion, while agriculture is limited due to the rugged terrain and nutrient poor soils. The Beaver Creek watershed is approximately 240 square miles in area.



Figure 3.1 Level III Ecoregions in Kentucky after Woods et. al., 2002

Because of its size, the Beaver Creek Watershed was divided into six smaller subwatersheds to display information. These six subwatersheds are Mainstem Beaver Creek, Lower Left Fork Beaver Creek, Upper Left Fork Beaver Creek, Lower Right Fork Beaver Creek, Middle Right Fork Beaver Creek, and Upper Right Fork Beaver Creek. The HUC14s that are in each of these six subwatersheds and the areas of each are in Tables 3.1 through 3.6.

HUC14	NAME	SQUARE MILES	ACRES
05070203065050	Beaver Creek	3.95	2526.85
05070203065030	Beaver Creek	1.69	1081.64
05070203065020	Buck Branch	2.97	1899.04
05070203065040	Arkansas Creek	3.11	1992.52
05070203065010	Beaver Creek	0.46	296.17
Total		12.18	7796.22

Table 3.1 HUC14s in the Mainstem Beaver Creek Subwatershed

Table 3.2 HUC14s in the Lower Left Fork Beaver Creek Subwatershed

HUC14	NAME	SQUARE MILES	ACRES
05070203050370	Left Fork Beaver Creek	3.73	2385.93
05070203050350	Left Fork Beaver Creek	8.09	5176.96
05070203050360	Spurlock Creek	3.88	2485.90
05070203050340	Simpson Branch	1.94	1243.35
05070203050330	Left Fork Beaver Creek	0.55	351.97
05070203050320	Sizemore Branch	1.77	1132.22
05070203050280	Frasure Creek	1.4	894.80
05070203050310	Left Fork Beaver Creek	0.86	548.95
05070203050290	Left Fork Beaver Creek	0.39	250.81
05070203050270	Hall Fork	1.82	1161.87
05070203050300	Doty Branch	1.65	1055.67
05070203050190	Left Fork Beaver Creek	1.3	830.93
05070203050260	Frasure Creek	1.09	698.42
05070203050250	Hoods Fork	1.52	975.22
05070203050180	Spewing Camp Creek	2.49	1594.18
05070203050170	Left Fork Beaver Creek	4.84	3099.27
05070203050240	Frasure Creek	0.39	250.73
05070203050230	Ned Fork	1.78	1138.58
05070203050220	Frasure Creek	0.75	481.91
05070203050210	Biglick Branch	0.62	394.79
05070203050200	Frasure Creek	2.16	1381.14
Total		43.02	27533.60

HUC14	NAME	SQUARE MILES	ACRES
05070203050160	Clear Creek	5.26	3369.02
05070203050150	Left Fork Beaver Creek	3.02	1929.34
05070203050110	Left Fork Beaver Creek	2.20	1407.71
05070203050140	Jacks Creek	4.10	2626.35
05070203050060	Abner Fork	1.80	1196.98
05070203050070	Left Fork Beaver Creek	0.88	562.46
05070203050100	Otter Creek	0.24	156.22
05070203050050	Left Fork Beaver Creek	0.20	128.34
05070203050040	Henpen Branch	1.39	887.79
05070203050090	Left Fork of Otter Creek	1	637.38
05070203050080	Right Fork of Otter Creek	2.08	1329.80
05070203050030	Left Fork Beaver Creek	1.34	860.44
05070203050010	Left Fork Beaver Creek	3.38	2163.29
05070203050020	Caleb Fork	1.91	1222.77
05070203050130	Frozen Fork	0.97	618.04
05070203050120	Jacks Creek	0.76	485.74
Total		30.6	19581.67

Table 3.4 HUC14s in the Lower Right Fork Beaver Creek Subwatershed

HUC14	NAME	SQUARE MILES	ACRES
05070203060760	Stephens Branch	2.70	1730.00
05070203060770	Right Fork Beaver Creek	0.90	577.52
05070203060720	Wilson Creek	3.14	2011.34
05070203060750	Right Fork Beaver Creek	4.36	2792.32
05070203060680	Brush Creek	5.81	3715.94
05070203060690	Right Fork Beaver Creek	1.85	1184.05
05070203060730	Right Fork Beaver Creek	0.36	229.68
05070203060740	Turkey Creek	5.3	3390.29
05070203060710	Right Fork Beaver Creek	1.59	1019.72
05070203060660	Saltlick Creek	7.06	4517.03
05070203060670	Right Fork Beaver Creek	1.11	707.14
05070203060630	Right Fork Beaver Creek	1.72	1101.69
05070203060700	Goose Creek	2.76	1767.51
05070203060650	Lick Fork	1.55	990.10
05070203060620	Rock Fork	8.33	5330.81
05070203060600	Stonecoal Branch	1.82	1164.70
05070203060640	Saltlick Creek	3.99	2551.79
05070203060610	Right Fork Beaver Creek	0.09	57.72
05070203060590	Right Fork Beaver Creek	0.41	261.51
Total		54.84	35100.86

Table 3.5 HUC14s in	the Middle Right Fo	ork Beaver Creek Subwa	tershed
10010 010 110 01 10 11	the first set of the group of the		

	0		
HUC14	NAME	SQUARE MILES	ACRES
05070203060430	Right Fork Beaver Creek	3.10	1986.23
05070203060580	Jones Fork	3.9	2493.63
05070203060420	Steele Creek	3.42	2185.61
05070203060560	Jones Fork	0.78	495.76
05070203060550	Fourmile Branch	1.89	1206.82
05070203060410	Right Fork Beaver Creek	0.16	99.36
05070203060400	Mill Creek	1.57	1006.39
05070203060570	Big Springs Branch	1.54	982.63
05070203060390	Right Fork Beaver Creek	1.99	1273.71
05070203060540	Jones Fork	0.54	343.52
05070203060500	Bruce Branch	0.87	553.74
05070203060520	Jones Fork	0.42	267.15
05070203060510	Ball Branch	0.25	160.01
05070203060530	Bear Branch	2.31	1477.09
05070203060490	Ball Branch	1.96	1251.11
05070203060380	Caney Fork	1.14	726.38
05070203060480	Jones Fork	1.94	1243.08
05070203060360	Caney Fork	7.96	5096.21
05070203060470	Turtle Branch	0.87	556.30
05070203060370	Big Branch	1.03	656.37
05070203060460	Jones Fork	1.36	871.83
05070203060440	Long Fork	3.13	2003.84
05070203060450	Terry Fork	1.19	762.85
05070203060340	Caney Fork	1.07	681.90
05070203060350	Hempatch Branch	1.09	699.28
05070203060300	Caney Fork	2.55	1632.60
05070203060330	Hollybush Creek	0.64	407.52
05070203060320	Left Fork of Hollybush Creek	2.61	1669.22
05070203060310	Hollybush Creek	3.27	2091.19
05070203060280	Short Fork	2.20	1409.01
05070203060290	Trace Fork	1.00	641.70
Total		57.71	36932.04
HUC14	NAME	SQUARE MILES	ACRES
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05070203060270	Right Fork Beaver Creek	2.52	1609.37
05070203060250	Right Fork Beaver Creek	1.94	1242.39
05070203060260	Salisbury Branch	1.68	1072.99
05070203060240	Patten Branch	1.36	867.02
05070203060230	Right Fork Beaver Creek	3.45	2207.83
05070203060170	Right Fork Beaver Creek	1.34	859.45
05070203060190	Right Fork Beaver Creek	0.19	122.00
05070203060220	Dry Creek	1.12	718.88
05070203060180	Potato Branch	0.9	575.17
05070203060160	Hall Branch	1.53	981.89
05070203060150	Right Fork Beaver Creek	0.93	596.14
05070203060210	Left Fork of Dry Creek	1.4	895.36
05070203060200	Dry Creek	2.59	1657.76
05070203060130	Right Fork Beaver Creek	0.1	636.50
05070203060140	Mullins Branch	1.50	959.76
05070203060120	Bates Branch	1.60	1025.76
05070203060100	Righthand Fork	3.77	2412.53
05070203060110	Right Fork Beaver Creek	0.03	15.93
05070203060090	Right Fork Beaver Creek	0.27	175.48
05070203060070	Right Fork Beaver Creek	0.24	151.37
05070203060050	Right Fork Beaver Creek	1.28	819.03
05070203060080	Joe King Branch	0.90	575.91
05070203060060	Puncheon Branch	4.25	2720.28
05070203060040	Arnold Fork	3.51	2243.54
05070203060030	Isaac Fork	1.03	660.24
05070203060020	West Fork of Isaac Fork	0.7	445.56
05070203060010	Isaac Fork	1.45	924.53
Total		42.46	27172.67

Table 2 6 IIIIC1 do in the	I Immon I	Diaht Doult	Dooron	Craale	Cubrustanshad
Table 5.0 $\Pi UU148$ in the	UDDer r	КІУПІ ГОГК	Deaver	геек .	Subwatersned
	• p p •				

3.2 Hydrology

The Beaver Creek Watershed headwater tributaries begin in Knott and Floyd counties at their southern boundary with Letcher and Pike counties and flow northward to their confluence with Levisa Fork in Floyd County. The Left Fork and Right Fork of Beaver Creek merge to form the mainstem of Beaver Creek just south of the city of Martin. KDOW follows the Strahler (1952) method for stream order determination where small upstream segments with no tributaries are first order. When two first order streams merge, they form a second order stream segment; two second order segments merge to form a third order segment and so on. In this method, a first order segment merging with a second order segment results in a continuation of the second order

Final Beaver Creek Watershed E. coli TMDL

segment, order only increases when segments with the same order merge or if a tributary to a main segment has a larger order. First order streams tend to be small and carry little flow except during wet weather events while larger stream orders indicate larger systems with greater flow. At its confluence with Levisa Fork, Beaver Creek is a fifth order stream, while the Left Fork and Right Fork are both fourth order at their confluence.

Stream slopes were determined using a 30M Digital Elevation Model. Elevation at the upstream end of blue line streams on a 1:24 scale was determined and the highest elevations for the Left Fork and Right Fork were selected to determine stream slope. The lowest elevation for the Right and Left Fork was assumed to be at their confluence and the lowest elevation for Beaver mainstem was assumed to be at its mouth. Figure 3.2 shows the elevation points used to determine slopes in the watershed. The highest elevation in the Left Fork of Beaver Creek is along Stonecoal Fork at 1800 ft above mean sea level (msl). The lowest elevation in the Left Fork is at its confluence with the Right Fork at 639 ft msl. The stream length along this path is 27.5 miles providing a slope in the Left Fork of 42.2 ft/mile. The highest elevation in the Right Fork is along the Left Fork of Holly Bush at 1556 ft msl. The lowest elevation is its confluence with the Left Fork at 639 msl. The stream length along this path is 35.4 miles, providing a slope in the Right Fork of 25.9 ft/mile. The mouth of Beaver Creek is at an elevation of 624 ft msl and the length from its highest point on Stonecoal Fork (1800 ft msl) to its mouth is 34.6 miles, providing a slope for Beaver Creek of 34 ft/mile. Table 3.7 summarizes the elevation and slope information.



Figure 3.2 Stream Elevation Points Used to Determine Stream Slopes

				Length from	
	Highest		Difference in	Highest to	
Stream	Elevation	Lowest Elevation	Elevation	Lowest	Slope
		639 ft			
Left Fork	1800 ft	Confluence of Left			
Beaver	Stonecoal Fork	and Right Fork	1161 ft	27.5 miles	42.2 ft/mile
	1556 ft	639 ft			
Right Fork	Left Fork	Confluence of Left			
Beaver	Holly Bush	and Right Fork	917 ft	35.4 miles	25.9 ft/mile
	1800 ft	624 ft			
	1800 11	024 11			
Beaver Creek	Stonecoal Fork	Mouth of Beaver	1176 ft	34.6 miles	34 ft/mile

Table 3.7 Beaver Creek Watershed Elevation and Slope

Karst development is not expected in the Beaver Creek Watershed. Groundwater in this area is predominantly fracture flow through sandstone and some minor fracture-flow springs may occur. There is no reason to suspect groundwater flow that would deviate from the topographic hydrologic divides (KDOW, 2010b).

There are no active discharge gaging stations in the Beaver Creek watershed; however, a realtime precipitation gage, Price Precipitation Site # 372418082444201, is in operation on the Left Fork of Beaver Creek. Figure 3.3 shows the location of this precipitation gage in the watershed.



Figure 3.3 Location of Price Precipitation Gage on Left Fork Beaver Creek

Final Beaver Creek Watershed E. coli TMDL

There are nine water withdrawals permitted by KDOW in the Beaver Creek Watershed. Three of these are groundwater withdrawals, one is from a surface impoundment, and five are from streams. Table 3.8 displays KDOW water withdrawal permit information while Figure 3.4 shows the location and type of withdrawal. Information was obtained from the KDOW water withdrawal permits.

Introduction Database Computation (MGD) (cfs) Descrip Wheelwright Utility Wheelwright Utility Groundw from Wheelwr Groundw from Wheelwr 1359 Commission 37.32165 -82.73251 <=0.350 <=0.54153 Mine ICG Knott Co LLC ICG Knott Co A0.6 of R
Wheelwright Groundw Utility 37.32165 -82.73251 <=0.350
Wheelwright Utilityfrom Wheelwr1359Commission37.32165-82.73251<=0.350
Utility Wheelwith 1359 Commission 37.32165 -82.73251 <=0.350
1359 Commission 37.32165 -82.73251 <=0.350 <=0.54153 Mine ICG Knott Co ICG Knott Co 40.6 of R Fork Bea Fork Bea
ICG Knott CoRiver nLLCFork Bea
ICG Knott Co 40.6 of F LLC Fork Bes
LLC Fork Bea
2528 (860-8012) 37.32166 -82.80366 <=0.265 <=0.4100156 Creel
River m
Deane Mining 31.0 of R
LLC Fork Bea
2525 (860-5318) 37.41038 -82.78096 <=0.010 <=0.01547229 Creel
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CONSOL of impound
100130 Kentucky Inc 37.43167 -82.89833 <=0.384 <=0.5941358 off Jones
Field of s
groundw
Knott Co wells ale
44215 Water District 37.35042 -82.86385 <=0.144 <=0.2228009 Caney C
Jan. & Feb.
<=0.062;
Mar <=0 .064;
Apr. & May <=
0.067; Jun.
<=0.07;
Jul., Aug. &
Sept. <=0.073; Groundw
Oct <=0.07; <=0.09592818 from a
Francis Water Nov <=0.066; to abando
1191 Co 37.47522 -82.81634 Dec <= 0.063 <=0.1129477 mine
River n
15.36 of
Elk Horn Coal Fork Be
1299 CoLLC 37.40129 -82.74175 <=0.06 <=0.09283372 Creel
River mil
ICG Knott Co of Can
3502 LLC 37.3884 -82.82856 <=0.65 <=1.005699 Creel
Black River mil
Diamond of Left F
78571 Mining 37.53192 -82.74364 <=0.432 <=0.6684028 Beaver C

Table 3.8 Information for KDOW Permitted Water Withdrawals



Figure 3.4 Location of KDOW Permitted Water Withdrawals in the Beaver Creek Watershed

3.3 Geology

The Beaver Creek watershed is underlain by Pennsylvanian rock, which developed 325 to 290 million years ago (KGS, 2010). These rocks consist of interbedded shale, sandstone, conglomerates, and coal (KGS, 2010). The major members of the Pennsylvanian rock in Eastern Kentucky are the Pennington and Lee formations and the overlying Breathitt, Conemaugh, and Monongahela formations (McDowell, 1986).

<u>3.4 Soils</u>

Information on soils was obtained from the U.S. Department of Agriculture Web Soil Survey. The major soil associations found in the watershed are the Hazleton-Fedscreek-Marrowbone complex, the Dekalb-Gilpin-Marrowbone complex, the Hazleton-Fedscreek-Kimper complex, the Sharondale-Hazleton-Kimper complex, the Fedscreek-Shelocta-Handshoe complex, and the Cloverlick-Shelocta-Kimper complex. Tables 3.9 through 3.14 show the soil formations found in each of the six subwatersheds. Only soils that comprise at least 1% of the subwatershed total are shown; many lesser soils have been deleted. It should be noted that the above mentioned major soil formations tend to be on the hillsides while the loams mentioned in the tables tend to be along the streams or in the floodplains.

		Sauceo	Percent of	Santia Tank	Samaga
	A cros in	Square Miles in	son Type	Absorption	Lagoons
Soil Type	Watershed	Watershed	Watershed	Fields Rating	Rating
Hazleton-Fedscreek-	watershed	watershed	watershed	Tields Rating	Rating
Marrowbone complex 30 to					
80 percent slopes, very					
stony	2231	3.5	28.20	Very limited	Very limited
Dekalb-Gilpin-Marrowbone					
complex, 20 to 80 percent					
slopes, very stony	2184.8	3.4	27.60	Very limited	Very limited
Hazleton-Fedscreek-Kimper					
complex, 30 to 80 percent					
slopes, very stony	993.8	1.6	12.60	Very limited	Very limited
Sharondale-Hazleton-					
Kimper complex, 30 to 80					
percent slopes, extremely					
stony	800.2	1.3	10.10	Very limited	Very limited
Myra very channery fine					
sandy loam, 30 to 70					
percent slopes, stony	374.6	0.6	4.70	Very limited	Very limited
Udorthents-Urban land					
complex, 0 to 15 percent	2151	o r	4.00		
slopes	315.1	0.5	4.00	Not rated	Not rated
Grigsby fine sandy loam,	205.0	0.0	2 - 60	** 1 1 1	X X 1 1 1
occasionally flooded	205.9	0.3	2.60	Very limited	Very limited
Potomac-Shelocta-Grigsby					
complex, 2 to 15 percent					
slopes	197.3	0.3	2.50	Very limited	Very limited
Allegheny loam, 2 to 6					
percent slopes, occasionally					
flooded	166	0.3	2.10	Very limited	Very limited
Shelocta-Grigsby-Stokly				~ .	
complex, 2 to 15 percent				Somewhat	
slopes	147.9	0.2	1.90	limited	Very limited
Fairpoint-Bethesda					
complex, 30 to 70 percent					
slopes, stony	112.1	0.2	1.40	Very limited	Very limited
Allegheny loam, 6 to 15					
percent slopes, occasionally			4.00	** 4	
tlooded	76.5	0.1	1.00	Verv limited	Verv limited

			Percent of		
		Square	Soil Type	Septic Tank	Sewage
	Acres in	Miles in	in	Absorption	Lagoons
Soil Name	Watershed	Watershed	Watershed	Fields Rating	Rating
Sharondale-Hazleton-Kimper					
complex, 30 to 80 percent					
slopes, extremely stony	7986.4	12.5	30.51	Very limited	Very limited
Hazleton-Fedscreek-					
Marrowbone complex, 30 to					
80 percent slopes, very stony	7613	11.9	29.09	Very limited	Very limited
Dekalb-Gilpin-Marrowbone					
complex, 20 to 80 percent					
slopes, very stony	7087.4	11.1	27.08	Very limited	Very limited
Grigsby fine sandy loam,					
occasionally flooded	1076.8	1.7	4.11	Very limited	Very limited
Myra very channery fine					
sandy loam, 30 to 70 percent				Somewhat	
slopes, stony	600.9	0.9	2.30	limited	Very limited
Udorthents-Urban land					
complex, 0 to 15 percent					
slopes	494.5	0.8	1.89	Very limited	Very limited
Potomac-Shelocta-Grigsby					
complex, 2 to 15 percent					
slopes	395.1	0.6	1.51	Very limited	Very limited

Table 3.10 Lower Left Fork Beaver Creek Subwatershed Soils

Table 3.11 Upper Left Fork Beaver Creek Subwatershed Soils

		Sauceo	Percent of	Sontio Tonla	Samaga
	Acresin	Square Miles in	son Type	A beamtion	Sewage
Soil Nome	Watershad	Watershed	III Watarshad	Eiclds Dating	Dagoons
Soli Nalle	water sheu	watersheu	watersheu	Fields Katilig	Kaung
Sharondale-Hazieton-					
Kimper complex, 30 to 80					
percent slopes, extremely					Very
stony	6707	10.5	34.76	Very limited	limited
Dekalb-Gilpin-Marrowbone					
complex, 20 to 80 percent					Very
slopes, very stony	5792.4	9.1	30.02	Very limited	limited
Hazleton-Fedscreek-					
Marrowbone complex, 30					
to 80 percent slopes, very					Very
stony	5116	8.0	26.51	Very limited	limited
Potomac-Shelocta-Grigsby					
complex, 2 to 15 percent					Very
slopes	878.3	1.4	4.55	Very limited	limited
Udorthents-Urban land					
complex, 0 to 15 percent					
slopes	298.6	0.5	1.55	Not rated	Not rated

Tuble 5.12 Lower Right For				С. (° Т. 1	
		G	Percent of	Septic Tank	a
		Square	Soil Type	Absorption	Sewage
	Acres in	Miles in	in	Fields	Lagoons
Soil Name	Watershed	Watershed	Watershed	Rating	Rating
Dekalb-Gilpin-					
Marrowbone complex, 20					
to 80 percent slopes, very					Very
stony	9080.1	14.2	26.42	Very limited	limited
Hazleton-Fedscreek-					
Marrowbone complex, 30					
to 80 percent slopes, very					Very
stony	8611.2	13.5	25.05	Very limited	limited
Hazleton-Fedscreek-					
Kimper complex, 30 to					
80 percent slopes, very					Verv
stony	4536.5	7.1	13.20	Verv limited	limited
Sharondale-Hazleton-					
Kimper complex, 30 to					
80 percent slopes.					Verv
extremely stony	2834.7	4.4	8.25	Very limited	limited
	200 117		0.20	, ery mintea	mintou
Cloverlick-Shelocta-					
Kimper complex, 20 to					Very
70 percent slopes, stony	2341.8	3.7	6.81	Very limited	limited
Fedscreek-Shelocta-					
Handshoe complex, 30 to					
80 percent slopes, very					Very
stony	1994.9	3.1	5.80	Very limited	limited
Grigsby fine sandy loam.					Verv
occasionally flooded	1098.1	1.7	3.19	Verv limited	limited
Shelocta-Grigsby-Stokly					
complex 2 to 15 percent				Somewhat	Verv
slopes	984.8	1.5	2.87	limited	limited
Udorthents-Urban land	20110	1.0	2.07	lililited	mintou
complex 0 to 15 percent					
slopes	657 3	1.0	1 91	Not rated	Not rated
Fedscreek-Shelocta	037.5	1.0	1.71	110110100	11011000
complex 20 to 50					Verv
percent slopes	460	0.7	1 3/	Very limited	limited
		0.7	1.34	very mineu	minted
Udorthents-Urban land					
complex, steep	401	0.6	1.17	Not rated	Not rated
Potomac-Shelocta-					
Grigsby complex, 2 to 15					Very
percent slopes	379.3	0.6	1.10	Verv limited	limited

Table 3.12 Lower Right Fork Beaver Creek Subwatershed Soils

			Percent of	Septic Tank	
		Square	Soil Type	Absorption	Sewage
	Acres in	Miles in	in	Fields	Lagoons
Soil Name	Watershed	Watershed	Watershed	Rating	Rating
Fedscreek-Shelocta-					
Handshoe complex, 30 to					
80 percent slopes, very					Very
stony	10278.7	16.1	27.91	Very limited	limited
Cloverlick-Shelocta-					
Kimper complex, 20 to					Very
70 percent slopes, stony	10107.1	15.8	27.44	Very limited	limited
Dekalb-Gilpin-					
Marrowbone complex, 20					
to 80 percent slopes, very					Very
stony	9273.1	14.5	25.18	Very limited	limited
Hazleton-Fedscreek-					
Marrowbone complex, 30					
to 80 percent slopes, very					Very
stony	2151.9	3.4	5.84	Very limited	limited
Sharondale-Hazleton-					
Kimper complex, 30 to					
80 percent slopes,					Very
extremely stony	2025	3.2	5.50	Very limited	limited
Urban land-Udorthents-					
Grigsby complex, 0 to 6					
percent slopes, rarely					
flooded	568.6	0.9	1.54	Not rated	Not rated
Kaymine, Fairpoint, and					
Fiveblock soils, benched,					
2 to 70 percent slopes,					Very
very stony	547.6	0.9	1.49	Very limited	limited
Grigsby sandy loam,					Very
occasionally flooded	493.2	0.8	1.34	Very limited	limited

Table 3.13 Middle Right Fork Beaver Creek Subwatershed Soils

			Percent of		
		Square	Soil Type	Septic Tank	Sewage
	Acres in	Miles in	in	Absorption	Lagoons
Soil Name	Watershed	Watershed	Watershed	Fields Rating	Rating
Fedscreek-Shelocta-					
Handshoe complex, 30 to					
80 percent slopes, very					Very
stony	10567.5	16.5	37.30	Very limited	limited
Cloverlick-Shelocta-					
Kimper complex, 20 to 70					Very
percent slopes, stony	8161.9	12.8	28.81	Very limited	limited
Dekalb-Gilpin-Marrowbone					
complex, 20 to 80 percent					Very
slopes, very stony	7185.5	11.2	25.36	Very limited	limited
Rowdy-Grigsby complex, 0					
to 4 percent slopes,					Very
occasionally flooded	728.9	1.1	2.57	Very limited	limited
Kaymine, Fairpoint, and					
Fiveblock soils, benched, 2					
to 70 percent slopes, very					Very
stony	722.2	1.1	2.55	Very limited	limited
Grigsby-Urban land					
complex, 0 to 6 percent					Very
slopes, occasionally flooded	426.7	0.7	1.51	Very limited	limited
Urban land-Udorthents-					
Grigsby complex, 0 to 6					
percent slopes, rarely					
flooded	294.2	0.5	1.04	Not rated	Not rated

Table 3.14 Upper Right Fork Beaver Creek Subwatershed Soils

3.5 Land Cover Distribution

The 2001 National Land Cover Dataset (USGS 2003) was used to determine the land cover within the Beaver Creek watershed. The 2001 NLCD Land Cover Class Definitions are in Appendix A. Tables 3.15 through 3.20 describe the land cover by class within the subwatershed areas. For the land cover tables, all forms of developed area (i.e., high-, medium- and low-intensity developed area, as well as developed open space), were aggregated, as were all forms of forest. This was done to simplify the source analysis. Land cover is also shown graphically in Figures 3.5 through 3.10 for each of the six subwatersheds.

The land cover figures and tables indicate that the majority of the Beaver Creek watershed is forested with little agriculture or development. The land cover figures also show that much of the developed area occurs along the streams and floodplains as opposed to the forested hillsides. The barren class includes active surface mines while reclaimed mine sites are in the grassland/herbaceous class.



Figure 3.5 Land Cover in the Beaver Creek Mainstem Subwatershed

Land C	over	Square Miles	% of Total Area
Forest		8.91	73.15
Develop	oed	1.24	10.19
Grasslar	nd/ Herbaceous	1.16	9.49
Agricult	ure (total)	0.79	6.49
	Pasture/ Hay	0.70	5.75
	Cultivated Crops	0.09	0.74
Barren		0.05	0.44
Shrubla	nd	0.03	0.26
Wetland	ls	0.00	0.03
Open W	ater	0.00	0.01
	Total	12.18	

Table 3.15 Bea	ver Creek Mainste	m Subwatershed	Land Cover
1 4010 0110 004		in bao materbilea	



Figure 3.6 Land Cover in the Lower Left Fork Beaver Creek Subwatershed

Land C	over	Square Miles	% of Total Area
Forest		34.32	79.77
Develop	oed	2.96	6.87
Grasslar	nd/ Herbaceous	3.48	8.10
Agriculture (total)		1.67	3.9
	Pasture/ Hay	1.56	3.64
	Cultivated Crops	0.11	0.25
Barren		0.49	1.14
Shrubla	nd	0.08	0.18
Wetlands		0.01	0.02
Open W	ater	0.02	0.05
	Total	43.02	

Table	3 16	Lower	I eft F	Fork	Reaver	Creek	Subwa	tershed	Land	Cover
I able	5.10	LUWEI	LULI	MIO	Deaver	CIEER	Subwa	ucisneu	Lanu	COVEL



Figure 3.7 Land Cover in the Upper Left Fork Beaver Creek Subwatershed

Land C	over	Square Miles	% of Total Area
Forest		26.27	85.87
Develop	bed	2.08	6.80
Grasslar	nd/ Herbaceous	1.62	5.30
Agriculture (total)		0.32	1.05
	Pasture/ Hay	0.28	0.93
	Cultivated Crops	0.04	0.12
Barren		0.27	0.89
Shrublar	nd	0.03	0.09
Wetlands		0.00	0.00
Open W	'ater	0.00	0.00
	Total	30.60	



Figure 3.8 Land Cover in the Lower Right Fork Beaver Creek Subwatershed

Land C	over	Square Miles	% of Total Area
Forest		41.13	74.99
Develop	ed	4.24	7.73
Grassland/ Herbaceous		5.88	10.73
Agriculture (total)		3.07	5.59
	Pasture/ Hay	2.88	5.24
	Cultivated Crops	0.19	0.34
Barren		0.38	0.69
Shrublar	nd	0.13	0.24
Wetlands		0.01	0.03
Open W	ater	0.00	0.01
	Total	54.85	

Table 3.18 Lower Right Fork Beaver Creek Subwatershed Land Cov	Fork Beaver Creek Subwatershed Land Cover
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Figure 3.9 Land Cover in the Middle Right Fork Beaver Creek Subwatershed

Land C	over	Square Miles	% of Total Area
Forest		45.17	78.27
Develop	oed	2.80	4.85
Grassland/ Herbaceous		7.33	12.71
Agriculture (total)		1.20	2.08
	Pasture/ Hay	1.15	1.99
	Cultivated Crops	0.05	0.08
Barren		0.99	1.72
Shrubla	nd	0.11	0.20
Wetlands		0.01	0.01
Open W	ater	0.10	0.17
	Total	57.71	

Table	3 1 9	Middle	Right	Fork	Beaver	Creek	Subwater	shed I	Land (Cover
raute	5.17	muuic	man	I UIK	Deaver	CIUUK	Subwater	Shou I	Juna	



Figure 3.10 Land Cover in the Upper Right Fork Beaver Creek Subwatershed

Land C	over	Square Miles	% of Total Area
Forest		35.23	82.97
Develop	ed	2.24	5.29
Grassland/ Herbaceous		3.68	8.68
Agriculture (total)		0.71	1.66
	Pasture/ Hay	0.68	1.61
	Cultivated Crops	0.02	0.05
Barren		0.52	1.23
Shrublar	nd	0.06	0.13
Wetlands		0.00	0.00
Open W	ater	0.02	0.04
	Total	42.46	

Table	3 20	Unner	Right	Fork	Beaver	Creek	Subwater	shed I	and (Cover
raute	5.20	Opper	ngm	TOLK	Deaver	CIUCK	Subwater	shou i	Janu	

4.0 Pathogen Indicator Monitoring Data

In 1997, Kentucky adopted a Watershed Management Framework under which monitoring is targeted in a specific basin unit during a specified year. Monitoring began with the Kentucky River Basin during 1998, then the Salt/Licking Basin in 1999, the Cumberland/ Mississippi/Ohio/Tennessee in 2000, the Green/Tradewater in 2001, and the Big Sandy/Little Sandy/Tygarts in 2002. This first cycle of monitoring focused on obtaining a snapshot of conditions of Kentucky's waters, especially wadeable streams. The second cycle of the Watershed Framework schedule again began with the Kentucky Basin in 2004 and ended with the Sandy/Little/Sandy/Tygarts in 2007. This second cycle of monitoring focused on impaired watersheds; however, monitoring for other purposes was also conducted. KDOW has several monitoring programs to monitor biological and water quality indicators, which are highlighted in Table 4.1. Details about the programs can be found in the 2008 Integrated Report to Congress on Water Quality in Kentucky Volume 1, 305(b) Report (KDOW, 2008b).

	Long- term Surface Water (a)	Rotating Surface Water (a)	Targeted Biological Monitoring (b, c)	Reference Reach (b)	Probabilistic Biosurvey (d)	Lake monitoring (e)	Ground- water & Springs Monitoring (a)
Streams (1st-5th order)		X	X	X	X		
Large Rivers	Х	Х	Х				
Lakes/Reservoirs						Х	
Groundwater							X

Table 4-1	KDOW	Monitoring	Programs
1 auto 4 .1	KDO W	Monitoring	riograms

(a) Indicators: physicochemical and pathogen indicator

(b) Indicators: macroinvertebrates, fish, algae, physicochemical, habitat

(c) Includes some 6^{th} order streams where wadeable and associated with ambient water quality stations

(d) Indicators: macroinvertebrates, physicochemical, habitat

(e) Indicators: physicochemical, fish kills, macrophytes, algae

The PCR use for pathogens can initially be monitored and assessed under three different programs, Long-term Surface Water, Rotating Surface Water, or Groundwater and Springs Monitoring. Under the Kentucky Watershed Management Framework, Long-term stations are fixed, permanent sampling sites located in the downstream and mid-unit reaches of USGS 8-digit HUCs, upstream of major reservoirs and in the downstream reaches of major tributaries. The long-term stations of a watershed management unit are sampled monthly during the year the unit is in the monitoring phase of the watershed cycle. During the other four years of the watershed cycle, sampling frequency is reduced to bimonthly. The Beaver Creek watershed has one Longterm station (PRI095) located at RM 1.3 of Beaver Creek. Rotating watershed stations are selected for intensive monthly sampling for one year during the monitoring portion of the fiveyear watershed cycle. These are usually located at the downstream reaches of USGS 11-digit HUC watersheds, and many were coupled with biological sampling and with USGS gauging stations. Groundwater and Springs Monitoring is performed as needed. Once a segment is identified as impaired, monitoring for TMDL development may be performed. TMDL monitoring sites are typically located in the initial impaired segment(s) and areas upstream of and major tributaries to these segments. KDOW follows water quality sample collection and

preservation procedures found in its water quality monitoring standard operating procedures (KDOW, 2005b).

4.1 Historical Monitoring

Beaver Creek RM 0.0 to 7.1 was initially listed as nonsupport of the PCR use due to pathogens on the 2004 303(d) list. This listing was due in part to discharge monitoring reports (DMRs) from the Martin Sewage Treatment Plant. The Right Fork of Beaver Creek was not listed during 2004 but was indicated to be threatened for the PCR use. The 2004 listing for Beaver Creek was carried forward to the 2006 303(d) list when the Right Fork of Beaver Creek from RM 0.0 to 17.4 was also listed as nonsupport for pathogens. During the 2008 listing cycle, these pathogen listings were more correctly identified with the indicator organism used; in this case fecal coliform.

4.2 TMDL Monitoring

To obtain information for TMDL development, KDOW contracted with Eastern Kentucky University (EKU) to collect <u>E</u>. <u>coli</u> data at 33 sites in the Beaver Creek watershed during the 2007 and 2008 PCR season (Figure 4.1). This sampling was performed by the students and staff of the Eastern Kentucky Environmental Research Institute at EKU under the direction of Dr. Alice Jones and Environmental Specialist Reagan Butcher. The assessment results from this monitoring effort indicated that many additional stream segments within the watershed were impaired for the PCR use due to the pathogen indicator <u>E</u>. <u>coli</u>. On the draft 2010 list, these additional segments were listed for <u>E</u>. <u>coli</u> and the previously mentioned segments were carried forward, resulting in the 22 proposed listings shown in Table 4.2. To show greater detail, Figures 4.2 through 4.7 display the sample sites by subwatershed. The <u>E</u>. <u>coli</u> data submitted by Eastern Kentucky University, along with data from the Long-term site PRI095 is shown in Appendix B.



Figure 4.1 E. coli Sample Sites in the Beaver Creek Watershed

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 2 is under site 3, site 30a is to the immediate left of site 50, Site 27 is under site 35, site 20 is under site 31, site 32 is under site 33, site 37 is under site 45 and site 40 is under site 47.

Waterbody &		Support			
Segment	County	Status	Use	Pollutant	Suspected Source(s)
Arkansas					
Creek 0.0 to				Escherichia	On-Site Treatment Systems (Septic Systems and
3.6	Floyd	Nonsupport	PCR	coli	Similar Decentralized Systems)
					Municipal (Urbanized High Density Area), On-
					Site Treatment Systems (Septic Systems and
					Similar Decentralized Systems), Package Plant or
Beaver Creek				Escherichia	Other Permitted Small Flows Discharges,
0.0 to 7.1	Floyd	Nonsupport	PCR	coli	Unspecified Domestic Waste
Buck Branch				Escherichia	On-Site Treatment Systems (Septic Systems and
0.0 to 2.8	Floyd	Nonsupport	PCR	coli	Similar Decentralized Systems)
Caleb Fork				Escherichia	On-Site Treatment Systems (Septic Systems and
0.0 to 1.2	Floyd	Nonsupport	PCR	<u>coli</u>	Similar Decentralized Systems)

Table 4.2 Proposed Pathogen	Indicator Im	paired Segments	in Beaver	Creek Watershed
ruble 1.2 rioposed rudlogen	marcator mi	pulled beginein.	m Douver	Creek waterblied

Final Beaver Creek Watershed <u>E</u>. <u>coli</u> TMDL

Waterbody & Segment	County	Support Status	Use	Pollutant	Suspected Source(s)
Caney Fork 0.0 to 7.5	Knott	Nonsupport	PCR	Escherichia coli	Package Plant or Other Permitted Small Flows Discharges
Clear Creek 0.0 to 4.9	Floyd	Nonsupport	PCR	Escherichia coli	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Frasure Creek 0.0 to 5.2	Floyd	Nonsupport	PCR	Escherichia coli	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems), Package Plant or Other Permitted Small Flows Discharges
Jacks Creek 0.0 to 4.4	Floyd	Nonsupport	PCR	<u>Escherichia</u> coli	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Jones Fork 0.0 to 9.9	Knott	Nonsupport	PCR	Escherichia coli	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Left Fork Beaver Creek 0.0 to 11.4	Floyd	Nonsupport	PCR	Escherichia coli	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems), Package Plant or Other Permitted Small Flows Discharges
Left Fork Beaver Creek 11.4 to 13.55	Floyd	Nonsupport	PCR	Escherichia coli	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems), Package Plant or Other Permitted Small Flows Discharges
Left Fork Beaver Creek 18.7 to 28.6	Floyd	Nonsupport	PCR	Escherichia coli	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Otter Creek 0.0 to 0.5	Floyd	Nonsupport	PCR	Escherichia coli	Package Plant or Other Permitted Small Flows Discharges
Right Fork Beaver Creek 0.0 to 17.4	Floyd	Nonsupport	PCR, SCR	Escherichia <u>coli</u> , Fecal coliform	Inappropriate Waste Disposal
Right Fork Beaver Creek 17.4 to 23.3	Floyd	Nonsupport	PCR	Escherichia coli	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems), Package Plant or Other Permitted Small Flows Discharges
Right Fork Beaver Creek 30.3 to 33.4	Knott	Nonsupport	PCR	Escherichia coli	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems), Package Plant or Other Permitted Small Flows Discharges
Salt Lick Creek 0.0 to 6.8	Floyd	Nonsupport	PCR	Escherichia coli	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Simpson Branch 0.0 to 1.8	Floyd	Nonsupport	PCR	Escherichia coli	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Sizemore Branch 0.0 to 2.0	Floyd	Nonsupport	PCR	Escherichia coli	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Spewing Camp Branch 0.0 to 3.1	Floyd	Partial Support	PCR	Escherichia coli	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Spurlock Creek 0.0 to 0.6	Floyd	Nonsupport	PCR	Escherichia coli	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Turkey Creek 0.0 to 5.9	Floyd	Nonsupport	PCR	Escherichia coli	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)



Figure 4.2 Assessed Segments and <u>E</u>. <u>coli</u> Sample Sites in the Beaver Creek Mainstem Subwatershed

Final Beaver Creek Watershed E. coli TMDL



Figure 4.3 Assessed Segments and <u>E</u>. <u>coli</u> Sample Sites in the Lower Left Fork Beaver Creek Subwatershed.

Note: Spurlock Creek 0.0 to 0.6 is between sites 51 and 52. Due to map resolution, some sites are masked by symbols for other sites. Site 47 is under site 40.

Final Beaver Creek Watershed <u>E</u>. <u>coli</u> TMDL



Figure 4.4 Assessed Segments and \underline{E} . <u>coli</u> Sample Sites in the Upper Left Fork Beaver Creek Subwatershed

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 37 is under site 45.



Figure 4.5 Assessed Segments and \underline{E} . <u>coli</u> Sample Sites in the Lower Right Fork Beaver Creek Subwatershed



Figure 4.6 Assessed Segments and <u>E</u>. <u>coli</u> Sample Sites in the Middle Right Fork Beaver Creek Subwatershed

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 20 is under site 31.



Figure 4.7 Assessed Segments and \underline{E} . <u>coli</u> Sample Sites in the Upper Right Fork Beaver Creek Subwatershed

5.0 Source Analysis

For regulatory purposes, the sources of <u>E</u>. <u>coli</u> in a watershed can be placed into two broad categories: KPDES-permitted and non KPDES-permitted sources. A KPDES-permitted source requires a Kentucky Pollutant Discharge Elimination System (KPDES) discharge permit, a Storm Water permit, or a Municipal Separate Storm Sewer System (MS4) permit from the KDOW. KPDES discharge permits include wastewater treatment facilities that discharge directly to a stream, facilities discharging storm water, and some agricultural operations. The KPDES is not the only permitting program that may affect water quality or quantity within a watershed; other permitting examples include water withdrawal permits, permits to build structures within a floodplain, permits to construct an on-site sewage treatment disposal system (OSTDS), and permits to land apply waste from sewage treatment plants. However, within the framework of the TMDL process a KPDES-permitted source is defined as one regulated under the KPDES program.

A non KPDES-permitted source does not include surface or ground water dischargers regulated by the KPDES program but does include nonpoint sources of pollution. Nonpoint sources of pollution are caused by runoff from precipitation over and/or through the ground and are correlated to land use.

5.1 KPDES-Permitted Sources (assigned a WLA)

Permitted sources include all sources regulated by the KPDES permitting program. In 401 KAR 10:001, KDOW adopted the definition of a point source per 33 U.S.C. 1362(14) as "any discernable, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, or concentrated animal feeding operation or vessel or other floating craft, from which pollutants are or may be discharged." However, 401 KAR 10:001 exempts "agricultural storm water run-off or return flows from irrigated agriculture" from the definition of a point source. A Waste Load Allocation (WLA) is assigned to KPDES-permitted sources.

5.1.1 Sanitary Wastewater Dischargers

The KPDES program issues discharge permits to facilities that treat sanitary wastewater, among other types. These facilities can be large publicly owned treatment works (POTWs) that service thousands of households and businesses, small, privately operated package facilities that service one business or one residential development, or a home unit that services an individual residence.

KPDES-permitted sanitary wastewater discharges are located within the Beaver Creek watershed (Table 5.1. and Figure 5.1). There are certainly other KPDES-permitted facilities in the impaired watersheds; however, those identified in this report treat sanitary wastewater and contribute an \underline{E} . <u>coli</u> (or fecal coliform) load to an impaired segment. Facilities in Table 5.1 receive WLAs. The location of sources by subwatershed are shown in Figures 5.2 through 5.7.

Table 5.1 KPDES-permitted Sources of <u>E</u>. <u>coli</u> (or Fecal Coliform) in Beaver Creek Watershed. AI # indicates Agency Interest number, an internal identification number.

KPDES #	Name	Туре	AI #	Latitude	Longitude
	CONSOL OF KY	BITUMINOUS COAL			
KY0094510	INC JONES FORK	& LIG, SURFACE	2514	37.432222	-82.874722
	MCDOWELL	,			
	DOLLAR	DEPARTMENT			
KY0103136	GENERAL STORE	STORE	1263	37.458333	-82.749166
	ALLEN CENTRAL				
KY0079430	HIGH SCHOOL	SCHOOL	35254	37.518055	-82.808333
	BEAVER CREEK				
KY0077542	ELEM SCHOOL	SCHOOL	33945	37.351111	-82.812222
	JAMES A DUFF				
KY0093017	ELEM SCHOOL	SCHOOL	35258	37.508333	-82.815555
	JONES FORK				
KY0087076	ELEM SCHOOL	SCHOOL	35359	37.417500	-82.879166
	MCDOWELL ELEM				
KY0079421	SCHOOL	SCHOOL	35252	37.453888	-82.736111
	OSBORNE ELEM				
KY0089435	SCHOOL	SCHOOL	35251	37 363611	-82,730277
11100007100	SOUTH FLOYD		00201	27.202011	02.750277
KV0003012	HIGH SCHOOL	SCHOOL	35260	37 385208	82 735564
K10093912	MAYVALLEV		33200	57.585298	-82.735304
KV0106755	FI FM SCHOOL	SCHOOL	82002	37 3560174	00 770070
K10100733	COLDEN VEADS	INTEDMEDIATE	02092	37.3309174	-02.110012
KV0083080	DOLDEN TEAKS	CARE FACILITY	2517	37 463611	82 833611
K10003009		DWELLING OTHER	2317	37.403011	-82.833011
KVC400642	ALLEN	THAN ADADTMENT	1122	37 552500	82 784444
K10400042	DADTI EV	DWELLING OTHER	1155	37.332300	-02.704444
KVG401107	DANILLI DESIDENCE	THAN ADADTMENT	4405	37 430555	<i>דרררר</i> נא
K10401197	RESIDENCE DENTI EV	DWELLING OTHER	4403	37.430333	-02.121111
KVC401026	DENILEI DESIDENCE	TUAN ADADTMENT	70842	27 57700	82 725277
K10401930	DINCHAM	DWELLING OTHER	19042	51.511222	-02.123211
KVG400753	DINORAWI	THAN ADARTMENT	1237	37 387777	82 706388
K10400733		DWELLING OTHER	1237	57.507777	-82.700388
KVG400479	DEACKDORN	THAN ADARTMENT	11/3	37 185277	82 740555
K10400479	RESIDENCE BLANKENCUID	DWELLING OTHER	1143	57.405277	-82.740333
KVG401602	DEANKENSTIF	THAN ADADTMENT	50021	37 / 10///	82 688888
K10401092			30021	37.417444	-02.000000
KYG400787	RESIDENCE	THAN APARTMENT	1158	37 576388	-82 776388
K10400787	RESIDENCE	DWELLING OTHER	1130	37.370388	-02.770300
KYG400602	CASE RESIDENCE	ΤΗΔΝ ΔΡΔΡΤΜΕΝΤ	1161	37 505833	-82 711044
KI 0400072	CASTI F	DWELLING OTHED	1101	57.505055	-02./11744
KYG400678	RESIDENCE	ΤΗΔΝ ΔΡΔΡΤΜΕΝΤ	1162	37 518611	-82 721666
KIU 400070		DWELLING OTHED	1102	57.510011	-02.721000
KYG401113	RESIDENCE	THAN ADARTMENT	4350	37 407222	-82 851666
110401113		DWELLING OTHED	+330	51.771222	-02.031000
KYG401580	RESIDENCE	THAN APARTMENT	44695	37 332777	-82 716388

Final Beaver Creek Watershed <u>E</u>. <u>coli</u> TMDL

KPDES #	Name	Type	AI#	Latitude	Longitude
	CHILDERS	DWELLING OTHER		Lutitude	Longitude
KYG401603	RESIDENCE	THAN APARTMENT	46147	37.411666	-82.851111
	COCHRAN	DWELLING OTHER			
KYG401646	RESIDENCE	THAN APARTMENT	48897	37.375833	-82.733611
	COLLINS	DWELLING OTHER			
KYG400854	RESIDENCE	THAN APARTMENT	1168	37.452222	-82.778611
	COLLINS	DWELLING OTHER			
KYG401516	RESIDENCE	THAN APARTMENT	1168	37.452500	-82.778333
	COMBS	DWELLING OTHER			
KYG401821	RESIDENCE	THAN APARTMENT	74243	37.457222	-82.737500
		DWELLING OTHER			
KYG400790	COOK RESIDENCE	THAN APARTMENT	1173	37.377777	-82.688611
		DWELLING OTHER			
KYG402025	COOK RESIDENCE	THAN APARTMENT	84292	37.526666	-82.775277
	COOLEY	DWELLING OTHER			
KYG401143	RESIDENCE	THAN APARTMENT	4331	37.576111	-82.730555
		DWELLING OTHER			
KYG401125	CRUM RESIDENCE	THAN APARTMENT	4336	37.441111	-82.794722
	CURRENT	DWELLING OTHER			
KYG400659	RESIDENCE	THAN APARTMENT	4250	37.535833	-82.748611
	DEROSSETT	DWELLING OTHER			
KYG400520	RESIDENCE	THAN APARTMENT	1180	37.577777	-82.784722
	DINGUS	DWELLING OTHER			
KYG401582	RESIDENCE	THAN APARTMENT	45073	37.563055	-82.738611
		DWELLING OTHER			
KYG400614	DYE RESIDENCE	THAN APARTMENT	1182	37.445277	-82.724722
		DWELLING OTHER			
KYG401140	DYE RESIDENCE	THAN APARTMENT	4333	37.401388	-82.740000
	EVERIDGE	DWELLING OTHER			
KYG401352	RESIDENCE	THAN APARTMENT	15807	37.532222	-82.829444
	FRASURE	DWELLING OTHER			
KYG401121	RESIDENCE	THAN APARTMENT	4344	37.527777	-82.790000
	GEARHEART	DWELLING OTHER	1700 5		
KYG401587	RESIDENCE	THAN APARTMENT	45396	37.471944	-82.763888
	GOBLE	DWELLING OTHER	1101		
KYG400590	RESIDENCE	THAN APARTMENT	1196	37.531944	-82.870000
WWG 400 602	GREEN	DWELLING OTHER	1100	27 405277	00.055555
KYG400603	RESIDENCE	THAN APARTMENT	1199	37.495277	-82.855555
WWG 4000 CO	UALL DEGIDENCE	DWELLING OTHER	1000	27 451200	00 700077
KYG400969	HALL RESIDENCE	THAN APARTMENT	1202	37.451388	-82.700277
XXC 401 475	LIALL DEGIDENCE	DWELLING OTHER	74105	27 492222	00,000,000
KYG4014/5	HALL KESIDENCE	THAN APARTMENT	/4185	37.483333	-82.898333
WVC 401 500	HALL DECIDENCE	DWELLING OTHER	45070	27 426111	92 759000
KIG401590	HALL KESIDENCE	THAN APAKIMENT	45070	37.436111	-82./38888
KVC 401021	HAKVEL DESIDENCE	DWELLING UTHER	70525	27 152000	87 605822
KI 0401931	RESIDENCE		19323	37.433888	-02.093833
KYG400567	HICKS RESIDENCE	THAN ADARTMENT	1218	37 455000	_82 773611
N 1 040030/	I HICKS KESIDENCE		1210	57.433000	-02.//3011

Final Beaver Creek Watershed <u>E</u>. <u>coli</u> TMDL

KPDES #	Name	Туре	AI#	Latitude	Longitude
	HOOVER	DWELLING OTHER			
KYG400730	RESIDENCE	THAN APARTMENT	1222	37.533333	-82.867777
	HOPKINS	DWELLING OTHER			
KYG402002	RESIDENCE	THAN APARTMENT	82471	37.472500	-82.761388
	HOWELL	DWELLING OTHER			
KYG401040	RESIDENCE	THAN APARTMENT	4356	37.451944	-82.695000
	JACOBS	DWELLING OTHER			
KYG400806	RESIDENCE	THAN APARTMENT	1232	37.582222	-82.793333
		DWELLING OTHER			
KYG401133	JONES RESIDENCE	THAN APARTMENT	4349	37.353611	-82.735555
	JUSTICE	DWELLING OTHER			
KYG401699	RESIDENCE	THAN APARTMENT	50138	37.608333	-82.736111
	KEATHLEY	DWELLING OTHER			
KYG401529	RESIDENCE	THAN APARTMENT	35892	37.590555	-82.723888
	KESTER	DWELLING OTHER			
KYG400915	RESIDENCE	THAN APARTMENT	1243	37.454444	-82.814166
		DWELLING OTHER			
KYG401730	KIDD RESIDENCE	THAN APARTMENT	50950	37.494722	-82.880000
	LAFERTY	DWELLING OTHER			
KYG401638	RESIDENCE	THAN APARTMENT	47022	37.558333	-82.758888
	LAWSON	DWELLING OTHER			
KYG400593	RESIDENCE	THAN APARTMENT	1248	37.549444	-82.720000
	LAWSON	DWELLING OTHER			
KYG401271	RESIDENCE	THAN APARTMENT	15635	37.453055	-82.746944
	LITTLE	DWELLING OTHER			
KYG401851	RESIDENCE	THAN APARTMENT	75141	37.533611	-82.752777
1/1/0 400117	LITTLE	DWELLING OTHER	102052	07 450000	00 700777
KYG402117	RESIDENCE	THAN APARTMENT	103052	37.453333	-82.132111
WWC 401654	VODK DEGIDENCE	DWELLING OTHER	40254	27 410200	00 707 417
KYG401654	YORK RESIDENCE	THAN APAKIMENT	49354	37.419389	-82.727417
KNC 401070	MAKTIN	DWELLING UTHER	01102	27 450277	92 722611
K1G401970	RESIDENCE	THAN APAKIMENT	81195	37.430277	-82.723011
KVC401072	MAN DESIDENCE	TUAN ADADTMENT	1207	27 521666	82 700166
K10401073	MCKINNEY	DWELLING OTHER	4327	37.331000	-82.799100
KVG400612	RESIDENCE	THAN ADARTMENT	1265	37 560166	82 748611
K10400012	MCKINNEV	DWELLING OTHER	1203	37.309100	-02.740011
KYG401541	RESIDENCE	THAN APARTMENT	36057	37 600833	-82 724166
K10401541	MEADE	DWELLING OTHER	30037	37.000833	-82.724100
KYG400970	RESIDENCE	THAN APARTMENT	1266	37 372777	-82 675555
K10400770	MCKINNEY	DWELLING OTHER	1200	51.512111	-02.075555
KYG401764	RESIDENCE	THAN APARTMENT	53921	37 571194	-82 732083
1110-01/04	MITCHELL	DWELLING OTHER	55721	57.571174	02.152005
KYG400478	RESIDENCE	THAN APARTMENT	1269	37 448611	-82,703055
110100470	MITCHELL	DWELLING OTHER	1207	57.110011	02.100000
KYG400666	RESIDENCE	THAN APARTMENT	1270	37.527222	-82,828055
110100000	MOORE	DWELLING OTHER	12.0	<u> </u>	02.020000
KYG401533	RESIDENCE	THAN APARTMENT	35887	37.430000	-82.710555

Final Beaver Creek Watershed <u>E</u>. <u>coli</u> TMDL

KPDFS #	Name	Type	ΔΤ #	Latitude	Longitude
		DWELLING OTHER		Latitude	Longitude
KYG401442	RESIDENCE	THAN APARTMENT	74062	37 392500	-82 739444
KIG 401442	MULTINS	DWFLLING OTHER	74002	37.372300	02.157444
KYG400714	RESIDENCE	THAN APARTMENT	1274	37 427777	-82 743888
K10 400714	MULTINS	DWFLLING OTHER	1274	57.427777	02.745000
KYG400975	RESIDENCE	THAN APARTMENT	1276	37 491666	-82 785277
110100775	NEWMAN	DWELLING OTHER	1270	37.191000	02.103211
KYG401809	RESIDENCE	THAN APARTMENT	71436	37.446944	-82.706111
		DWELLING OTHER	,1100		02000000
KYG401772	ISON RESIDENCE	THAN APARTMENT	54879	37.547778	-82.762500
	PERKINS	DWELLING OTHER			
KYG400836	RESIDENCE	THAN APARTMENT	1293	37.425555	-82.810000
	PRATER	DWELLING OTHER			
KYG401548	RESIDENCE	THAN APARTMENT	43224	37.517222	-82.847777
		DWELLING OTHER			
KYG401126	ROSE RESIDENCE	THAN APARTMENT	4342	37.561944	-82.724166
		DWELLING OTHER			
KYG400339	ROWE RESIDENCE	THAN APARTMENT	1304	37.566666	-82.732500
	PRATER	DWELLING OTHER			
KYG402063	RESIDENCE	THAN APARTMENT	97291	37.527494	-82.842581
	SCARBERRY	DWELLING OTHER			
KYG401981	RESIDENCE	THAN APARTMENT	81570	37.563611	-82.801944
	SCOTT	DWELLING OTHER			
KYG401721	RESIDENCE	THAN APARTMENT	50627	37.497777	-82.782777
	SHEPHERD	DWELLING OTHER			
KYG400844	RESIDENCE	THAN APARTMENT	1314	37.509166	-82.875555
	SHEPPARD	DWELLING OTHER			
KYG401218	RESIDENCE	THAN APARTMENT	12253	37.526944	-82.828055
	SHREWBERRY	DWELLING OTHER			
KYG400677	RESIDENCE	THAN APARTMENT	1315	37.504444	-82.716111
	STUMBO	DWELLING OTHER			
KYG400601	RESIDENCE	THAN APARTMENT	1327	37.449444	-82.714444
	STUMBO	DWELLING OTHER			
KYG401409	RESIDENCE	THAN APARTMENT	74025	37.438333	-82.756666
	STURGILL	DWELLING OTHER			
KYG400936	RESIDENCE	THAN APARTMENT	1328	37.560277	-82.726666
	TACKETT	DWELLING OTHER			
KYG401142	RESIDENCE	THAN APARTMENT	4332	37.475277	-82.755277
	TACKETT	DWELLING OTHER			
KYG401470	RESIDENCE	THAN APARTMENT	74181	37.319444	-82.698333
	TURNER	DWELLING OTHER			
KYG400778	RESIDENCE	THAN APARTMENT	1343	37.548611	-82.763333
	WALLACE	DWELLING OTHER			
KYG401540	RESIDENCE	THAN APARTMENT	43120	37.492500	-82.836944
		DWELLING OTHER			
KYG401296	WEBB RESIDENCE	THAN APARTMENT	15655	37.474444	-82.845000
	WILLIAMSON	DWELLING OTHER			
KYG401353	RESIDENCE	THAN APARTMENT	33378	37.540277	-82.816388

Final Beaver Creek Watershed <u>E</u>. <u>coli</u> TMDL

KPDES #	Name	Туре	AI #	Latitude	Longitude
	WILLIAMSON	DWELLING OTHER			
KYG401406	RESIDENCE	THAN APARTMENT	74022	37.476111	-82.744444
	WILLIAMSON	DWELLING OTHER			
KYG401601	RESIDENCE	THAN APARTMENT	46144	37.502777	-82.724166
	WRIGHT	DWELLING OTHER			
KYG400579	RESIDENCE	THAN APARTMENT	1367	37.543888	-82.751944
		DWELLING OTHER			
KYG401645	DUFF RESIDENCE	THAN APARTMENT	48864	37.456222	-82.750000
	YOUMANS	DWELLING OTHER			
KYG400724	RESIDENCE	THAN APARTMENT	1369	37.469444	-82.763888
		DWELLING OTHER			
KYG401868	ROWE RESIDENCE	THAN APARTMENT	75746	37.582494	-82.792359
	ALLEN	DWELLING OTHER			
KYG401883	RESIDENCE	THAN APARTMENT	76185	37.562778	-82.732476
	HOWARD	DWELLING OTHER			
KYG401857	RESIDENCE	THAN APARTMENT	75556	37.537221	-82.849438
	BILITER	DWELLING OTHER			
KYG401876	RESIDENCE	THAN APARTMENT	76078	37.543383	-82.864965
		MOBILE HOME			
KY0103233	S & V MHP	SITES	1305	37.473055	-82.752777
	LEFT BEAVER				
	CREEK	APARTMENT			
KY0096342	TOWNHOUSES	BUILDINGS	1255	37.466944	-82.755277
	WARCO HOUSING	APARTMENT			
KY0072974	PROJECT	BUILDINGS	1352	37.550277	-82.773888
	KNOTT CO WATER	SEWERAGE			
KY0042854	& SEWER DIST	SYSTEMS	2527	37.351388	-82.859166
		SEWERAGE			
KY0026921	MARTIN STP	SYSTEMS	1262	37.580555	-82.751944
		SEWERAGE			
KY0105228	WAYLAND STP	SYSTEMS	35761	37.448055	-82.816111
	WHEELWRIGHT	SEWERAGE			
KY0028789	STP	SYSTEMS	40534	37.348888	-82.717500
		SEWERAGE			
KY0107051	EASTERN STP	SYSTEMS	35260	37.517819	-82.809619
	MCDOWELL				
	APPALACHIAN				
KY0085791	REG HOSP	HOSPITAL	1134	37.458055	-82.748888

Final Beaver Creek Watershed <u>E</u>. <u>coli</u> TMDL



Figure 5.1 KPDES-permitted Sources of <u>E</u>. <u>coli</u> (or Fecal Coliform) in the Beaver Creek Watershed

Final Beaver Creek Watershed <u>E</u>. <u>coli</u> TMDL



Figure 5.2 KPDES-permitted Sources of <u>E</u>. <u>coli</u> (or Fecal Coliform) in the Mainstem Beaver Creek Subwatershed



Figure 5.3 KPDES-permitted Sources of \underline{E} . <u>coli</u> (or Fecal Coliform) in the Lower Left Fork Beaver Creek Subwatershed

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 47 is under site 40.

Final Beaver Creek Watershed <u>E. coli</u> TMDL



Figure 5.4 KPDES-permitted Sources of \underline{E} . <u>coli</u> (or Fecal Coliform) in the Upper Left Fork Beaver Creek Subwatershed

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 37 is under site 45.
Final Beaver Creek Watershed <u>E</u>. <u>coli</u> TMDL



Figure 5.5 KPDES-permitted Sources of <u>E</u>. <u>coli</u> (or Fecal Coliform) in the Lower Right Fork Beaver Creek Subwatershed

Final Beaver Creek Watershed E. coli TMDL



Figure 5.6 KPDES-permitted Sources of \underline{E} . <u>coli</u> (or Fecal Coliform) in the Middle Right Fork Beaver Creek Subwatershed

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 20 is under site 31.



Figure 5.7 KPDES-permitted Sources of <u>E</u>. <u>coli</u> (or Fecal Coliform) in the Upper Right Fork Beaver Creek Subwatershed

5.1.1.1 Sewerage Systems in Beaver Creek

Kentucky regulation 401 KAR 5:006 specifies wastewater-planning requirements for regional areas. Municipal wastewater treatment facilities are required to prepare 20-year regional planning documents under certain conditions as described in regulation. Section 2 of this regulation specifies that:

"(1) No new regional facility shall be constructed, no average daily design capacity of an existing regional facility shall be expanded by more than thirty (30) percent, or no existing regional sewage collection system shall expand its equivalent population served by more than thirty (30) percent of the existing population, without the regional planning agency submitting a regional facility plan and the cabinet approving the plan. All regional facility plans shall be prepared by a registered professional engineer."

And that:

- "(2) A regional planning agency shall submit a regional facility plan or regional facility plan update when the following occurs:
 - (a) A new regional facility is proposed to be constructed within the planning area;
 - (b) The average daily design capacity of an existing regional facility is proposed to be expanded by more than thirty (30) percent;
 - (c) The equivalent population served by an existing regional sewage collection system is proposed to be expanded by more than thirty (30) percent of the existing population served;
 - (d) A regional facility or other governmental agency applies for a grant from the U.S. EPA or applies for a loan from the federally assisted wastewater revolving fund pursuant to the requirements of 40 CFR Part 35 and 200 KAR Chapter 17. A plan of study shall be submitted to the cabinet for the project to be eligible to be placed on the project priority list and receive priority points;
 - (e) A regional planning agency considers the submission of the plan to be in the best interest of the public and the environment; or
 - (f) It has been twenty (20) years since the regional planning agency or its successor has submitted a regional facility plan."

Additionally, Section 4 of 401 KAR 5:005 requires that construction permits only be issued for wastewater treatment and conveyance facilities if the construction is compatible with the facilities plan.

"Section 4. Application; Preliminary Considerations. (1) A permit shall not be granted to a facility that is not compatible with a regional facility plan or with a water quality management plan approved by the cabinet or the U.S. EPA."

There are three wastewater-planning areas in the Beaver Creek watershed, South Floyd, Prestonsburg, and the Knott County Water & Sewer District (of which the Caney Creek Water District is in Beaver Creek watershed) as shown in Figure 5.8. The South Floyd Planning Area covers almost the entire Beaver Creek watershed that is in Floyd County. The Prestonsburg Planning Area covers a small fraction of Beaver Creek around the city of Allen as shown in Figure 5.9. The Caney Creek Waster District serves a small area in the headwaters of Caney Creek as shown in Figure 5.10.

Final Beaver Creek Watershed <u>E</u>. <u>coli</u> TMDL



Figure 5.8 Wastewater Planning Areas in the Beaver Creek Watershed

Final Beaver Creek Watershed <u>E</u>. <u>coli</u> TMDL



Figure 5.9 Detail of the Prestonsburg Planning Area and Sewer Lines

Final Beaver Creek Watershed E. coli TMDL



Figure 5.10 Detail of the Caney Creek Water District and Sewer Lines

Information about permitted sources was obtained from the application for permit submitted by the permitted entity and from the KPDES-permit. DMR information was obtained from The EPA Permit Compliance System database (US EPA, 2010) and the TEMPO database maintained by the Department for Environmental Protection.

Eastern Waste Water Treatment Plant (WWTP) KPDES permit # KY0107051 (effective 6/1/08-5/31/13)

The Eastern treatment plant is a 0.025 million gallons per day (MGD) plant owned and operated by the Southern Water and Sewer District. It is located in the Lower Right Fork Beaver Creek subwatershed and the effluent is discharged at river mile (RM) 8.4 of Right Fork Beaver Creek. It serves 42 residential units and came on-line during June 2008. The treatment process consists of influent screens, surge tanks for flow equalization, extended aeration, clarifiers, and chlorine disinfection. Waste sludge is placed in holding tanks and is disposed of by a sanitary service company at a publicly owned treatment works. KPDES permit limits for this discharge are: <u>E</u>. <u>coli</u> effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. A review of Discharge Monitoring Reports (DMRs, see Appendix C for DMR data from all major KPDES-permitted sources) from June 2008 through December 2009 indicate 5 months with exceedances of permit limits for <u>E</u>. <u>coli</u>.

Knott County Water and Sewer District Caney Creek WWTP KPDES permit # KY0042854 (effective 7/1/07-6/30/12)

The Knott County Caney Creek WWTP is a 0.10 MGD plant owned by the Knott County Water and Sewer District. It is located in the Middle Right Fork Beaver Creek subwatershed and the effluent is discharged at RM 7.8 of Caney Creek. It has about 130 sewer connections and serves about 612 people on Alice Lloyd College and about 390 residents in and around Pippa Passes. The treatment process consists of screening, grit removal, aeration, clarification, chlorine disinfection and dechlorination. Waste sludge is processed by drying beds and is disposed of in a landfill. KPDES permit limits for this discharge are: <u>E</u>. <u>coli</u> effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. A review of DMRs from August 2007 through November 2009 indicates 10 months with exceedances of permit limits for <u>E</u>. <u>coli</u>. Prior to August 07, this facility reported fecal coliform and one month exceeded permit limits from Jan 2007 through July 2007.

Martin Sewerage Treatment Plant KPDES permit # KY0026921 (effective 12/1/05-11/30/10)

The Martin Sewerage Treatment Plant (STP) is a 0.12 MGD plant owned by the city of Martin. It is located in the Mainstem Beaver Creek subwatershed and the effluent is discharged to RM 5.2 of Beaver Creek. It serves approximately 1,100 residents and is the regional facility for the area around Martin. The treatment process consists of a grinder and grit channel at the influent, an equalization basin with an oxidation ditch and clarifier combination with ultra-violet disinfection and post aeration. Sludge is pumped from a holding tank to drying beds. The dried sludge is composted or is hauled to a landfill. KPDES permit limits for this discharge are: Fecal coliform effluent gross limit of 200 colonies/100 ml as a monthly average and 400 colonies/100 ml as a maximum weekly average. A review of DMRs from August 2007 through November 2009 indicate 10 months with exceedances of permit limits for Fecal coliform; however, no exceedances have been reported since June 2008.

Wayland Sewerage Treatment Plant KPDES permit # KY0105228 (effective 12/1/2008-11/30/13)

The Wayland plant is a 0.1 MGD plant owned and operated by the Southern Water and Sewer District. It is located in the Middle Right Fork Beaver Creek subwatershed and the effluent is discharged at RM 19.8 of Right Fork Beaver Creek. It serves a population of 512 in and around Wayland. The wastewater treatment process for this facility consists of screening, extended aeration, activated sludge, settling, micro screening, chlorine disinfection and post aeration. Sludge is pumped from a holding tank to a belt filter press and is hauled to a landfill. KPDES permit limits for this discharge are: <u>E. coli</u> effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. A review of DMRs from December 2008 through July 2009 indicates 3 months with exceedances of permit limits for <u>E. coli</u>. Prior to December 2008, this facility reported fecal coliform and 2 months showed exceedances of permit limits from Jan 2007 through November 2008.

Wheelwright Sewerage Treatment Plant KPDES permit # KY0028789 (effective 7/1/07-6/30/12)

The Wheelwright plant is a 0.225 MGD plant owned and operated by Wheelwright Utilities. It is located in the Upper Left Fork Beaver Creek subwatershed and the effluent is discharged at RM 0.35 of Otter Creek. It serves a total population of 217 in and around Wheelwright (171 residents), Upper Burton (11 residents) and Lower Burton (35 residents). The wastewater treatment process for this facility consists of an extended aeration plant with chlorine disinfection and dechlorination. Sludge is processed by drying beds and is hauled to a landfill. KPDES permit limits for this discharge are: <u>E</u>. <u>coli</u> effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. A review of DMRs from July 2007 through December 2009 indicates 4 months with exceedances of permit limits for <u>E</u>. <u>coli</u>. Prior to July 2007, this facility reported fecal coliform and 1 month showed an exceedance of permit limits from Jan 2007 through June 2007.

Prestonsburg WWTP and Landfarm KPDES Permit # KY0027413 (effective 3/1/10-2/28/15)

The Prestonsburg plant is a 1 MGD facility owned and operated by the Prestonsburg City's Utilities Commission. It is located outside of the Beaver Creek Watershed and the effluent is discharged at RM 53.2 of Levisa Fork. It serves a population of 7,523 in the city of Prestonsburg and the surrounding area including the Allen area, which is within the Beaver Creek Mainstem subwatershed. Sewer lines extend from Allen to the Prestonsburg WWTP and the Prestonsburg City's Utilities Commission is responsible for these lines (See Section 5.1.1.2 Illegal WLA Sources, below). The wastewater treatment process consists of screening, grit removal, primary settling, conventional activated sludge, secondary settling, chlorine disinfection, and dechlorination. Sludge is processed by aerobic digestion, belt filter press, and drying beds, then is hauled to a landfill for disposal. The treated effluent is occasionally used for irrigation of a golf course and for wash-down water in the treatment plant. KPDES permit limits for this discharge are: <u>E</u>. <u>coli</u> effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. This facility is under a consent judgment to demonstrate efforts to control and eventually eliminate two combined sewer overflows (neither of which are in the Beaver Creek Watershed).

5.1.1.2 Illegal WLA Sources

Illegal WLA sources, by definition, are not allowed in the watershed, and receive an allocation of zero in the TMDL process. Illegal sources related to KPDES-permitted human waste disposal include leaking sewer lines and sanitary sewer overflows. Leaking sewer lines and sanitary sewer overflows are the responsibility of the permitted owner of the sewerage system, thus in addition to their outfall effluent, the sewerage systems noted above are responsible for discharges from sewer lines under their control. Although the Prestonsburg WWTP is not in the Beaver Creek Watershed, the sewer lines that extend to Allen are in the Beaver Creek Watershed and are permitted under the Prestonsburg permit. Leaking sewer lines and sanitary sewer overflows are illegal sources of \underline{E} . coli (or fecal coliform) and thus a waste load of 0 colonies/day is assigned to these sources.

Note this Section of the TMDL is not intended to summarize the universe of potential illegal KPDES-permitted sources that may discharge pollutants into surface waters, nor does it attempt to summarize the universe of KPDES-permitted sources that may be operating illegally (e.g., outside of permit limits or conditions, etc.). Instead, it defines the illegal permitted sources that could be present in the watershed.

5.1.1.3 Package Treatment Plants in Beaver Creek Watershed

Allen Central High School KPDES permit # KY0079430 (effective 3/1/07-2/28/12)

Allen Central High School has a 0.011 MGD package treatment plant, which is treated by extended aeration with disinfection. The treated effluent is discharged to RM 8.3 of Right Fork Beaver Creek. It is located next to the Eastern STP and is required to eliminate its discharge and connect to a comprehensive sewer system when it comes available and can adequately treat the wastes. KPDES permit limits for this discharge are: <u>E. coli</u> effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. This facility is required to submit DMRs on a quarterly basis and a review of DMRs from the quarters ending March 2007 through September 2009 indicate 5 quarters with exceedances of permit limits for <u>E. coli</u>.

Beaver Creek Elementary School KPDES permit # KY0077542 (effective 5/1/07-4/30/12)

Beaver Creek Elementary School has a 0.007 MGD package plant with its discharge treated by screening, primary settling, activated sludge, secondary settling, and chlorine disinfection followed by disinfection. Effluent is discharged at RM 0.05 of Hall Branch. KPDES permit limits for this discharge are: <u>E</u>. <u>coli</u> effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. This facility is required to submit DMRs on a quarterly basis and a review of DMRs from the quarters ending June 2007 through December 2009 indicate no exceedances of permit limits for <u>E</u>. <u>coli</u>.

James A Duff Elementary School KPDES permit #KY0093017 (effective 3/1/07-2/28/12)

James A Duff Elementary School has 0.008 MGD package plant with its discharge treated by extended aeration with disinfection. The effluent is discharged at RM 9.3 of the Right Fork Beaver Creek. This discharge is required to be eliminated by connection to a comprehensive sewer system when it becomes available and can adequately treat wastes. KPDES permit limits for this discharge are: <u>E. coli</u> effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. This facility is required to submit DMRs on a quarterly basis and a review of DMRs from quarters ending June 2007 through September 2009 indicate no exceedances of permit limits for <u>E. coli</u>.

Jones Fork Elementary School KPDES permit # KY0087076 (effective 5/1/07-4/30/12)

Jones Fork Elementary School has a 0.006 MGD package plant with its discharge treated by screening, grit removal, primary settling, activated sludge, secondary settling, and chlorine disinfection followed by dechlorination. Its effluent is discharged at RM 5.55 of Jones Fork.

KPDES permit limits for this discharge are: <u>E</u>. <u>coli</u> effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. This facility is required to submit DMRs on a quarterly basis and a review of DMRs from quarters ending June 2007 through December 2009 indicate one quarter with an exceedance of permit limits for <u>E</u>. coli.

May Valley Elementary School KPDES permit # KY0106755 (effective 3/1/07-2/28/12)

May Valley Elementary School has a 0.006 MGD package plant with extended aeration and disinfection. Its effluent is discharged at RM 0.3 of Stephens Branch. This discharge is required to be eliminated by connection to a comprehensive sewer system when it becomes available and can adequately treat wastes. KPDES permit limits for this discharge are: <u>E</u>. <u>coli</u> effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. This facility is required to submit DMRs on a quarterly basis and a review of DMRs from quarters ending June 2007 through September 2009 indicate two quarters with an exceedance of permit limits for <u>E</u>. <u>coli</u>.

McDowell Elementary School KPDES #KY0079421 (effective 3/1/07-2/28/12)

McDowell Elementary School has a 0.015 MGD package plant with extended aeration and disinfection. Its effluent is discharged at RM 0.4 of Frasure Creek. This discharge is required to be eliminated by connection to a comprehensive sewer system when it becomes available and can adequately treat wastes. KPDES permit limits for this discharge are: <u>E</u>. <u>coli</u> effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. This facility is required to submit DMRs on a monthly basis and a review of DMRs from March 2007 through September 2009 indicate one month with an exceedance of permit limits for <u>E</u>. <u>coli</u>.

Osborne Elementary School KPDES permit #KY0089435 (effective 3/1/07-2/28/12)

Osborne Elementary School has a 0.0068 MGD package plant with extended aeration and disinfection. Its effluent is discharged to RM 0.1 of Riley Branch. This discharge is required to be eliminated by connection to a comprehensive sewer system when it becomes available and can adequately treat wastes. KPDES permit limits for this discharge are: <u>E</u>. <u>coli</u> effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. This facility is required to submit DMRs on a quarterly basis and a review of DMRs from quarters ending June 2007 through September 2009 indicate no exceedances of permit limits for <u>E</u>. <u>coli</u>.

South Floyd High School KPDES permit # KY0093912 (effective 3/1/07-2/28/12)

South Floyd High School has a 0.015 MGD package plant with extended aeration and disinfection. Its effluent is discharged at RM 19.3 of Left Fork Beaver Creek. This discharge is required to be eliminated by connection to a comprehensive sewer system when it becomes available and can adequately treat wastes. KPDES permit limits for this discharge are: <u>E. coli</u> effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a

maximum weekly average. This facility is required to submit DMRs on a monthly basis and a review of DMRs from March 2007 through September 2009 indicate eight months with exceedances of permit limits for <u>E</u>. coli.

S & V Mobile Home Park KPDES permit # KY0103233 (effective 4/1/07-6/30/12)

S & V Mobile Home Park has a 0.0099 MGD package plant with extended aeration and disinfection. Its effluent is discharged at RM 9.1 of Left Fork Beaver Creek. This discharge is required to be eliminated by connection to a comprehensive sewer system when it becomes available and can adequately treat wastes. KPDES permit limits for this discharge are: <u>E</u>. <u>coli</u> effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. This facility is required to submit DMRs on a quarterly basis and a review of DMRs from quarters ending September 2007 through December 2009 indicate two quarters with exceedances of permit limits for <u>E</u>. <u>coli</u>.

Left Fork Beaver Creek Townhouses KPDES permit # KY0096342 (effective 2/1/07-1/31/12)

Left Fork Beaver Creek Townhouses has a 0.018 MGD package plant with activated sludge, chlorine disinfection and dechlorination. Its effluent is discharged at RM 9.6 of Left Fork Beaver Creek. KPDES permit limits for this discharge are: <u>E. coli</u> effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. This facility is required to submit monthly DMRs and a review of DMRs from February 2007 through September 2009 indicate ten months with exceedances of permit limits for <u>E. coli</u>.

Warco Housing Project KPDES permit # KY0072974 (effective 1/1/07-12/31/11)

Warco Housing Project has a 0.025 MGD package plant with extended aeration and disinfection. Its effluent is discharged to RM 4.15 of Right Fork Beaver Creek. This discharge is required to be eliminated by connection to a comprehensive sewer system when it becomes available and can adequately treat wastes. KPDES permit limits for this discharge are: <u>E</u>. <u>coli</u> effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. This facility is required to submit monthly DMRs and a review of DMRs from January 2007 through September 2009 indicate five months with exceedances of permit limits for <u>E</u>. <u>coli</u>.

McDowell Appalachian Regional Hospital KPDES permit # KY0085791 (effective 3/1/07-2/28/12)

McDowell Appalachian Regional Hospital has a 0.02 MGD package plant with extended aeration and disinfection. Its effluent is discharged at RM 10.45 of the Left Fork Beaver Creek. This discharge is required to be eliminated by connection to a comprehensive sewer system when it becomes available and can adequately treat wastes. KPDES permit limits for this discharge are: <u>E</u>. <u>coli</u> effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. This facility is required to submit monthly DMRs and a review of DMRs from January 2007 through September 2009 indicate one month with an exceedance of permit limits for <u>E</u>. <u>coli</u>.

Consol of KY Inc-Jones Fork KPDES permit # KY0094510 (effective 5/1/06-11/30/06)

Consol of KY Inc-Jones Fork has a package treatment plant to treat bathhouse effluent with extended aeration. This treated effluent discharges to the coal preparation plant's static thickener and the underflow from this is discharged to a slurry impoundment permitted under KYG043632. The slurry impoundment discharges to RM 0.65 of Fourmile Branch. KPDES permit limits for this discharge are: Fecal coliform effluent gross limit of 200 colonies/100 ml as a monthly average and 400 colonies/100 ml as a maximum weekly average. This facility is required to submit monthly DMRs for fecal coliform and a review of DMRs from January 2007 through September 2009 indicate no exceedances of permit limits for fecal coliform.

McDowell General Store KPDES permit # KY0103136 (effective 12/1/07-11/30/12)

The McDowell General Store has a 0.0005 MGD package plant with aeration, sand filtration and chlorine treatment. Its effluent is discharged at RM 10.45 of Left Fork Beaver Creek. This discharge is required to be eliminated by connection to a comprehensive sewer system when it becomes available and can adequately treat wastes. KPDES permit limits for this discharge are: <u>E. coli</u> effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. This facility is required to submit quarterly DMRs and a review of DMRs indicate that "no discharge" has been evident to collect samples.

Golden Years Rest Home KPDES permit # KY0083089 (effective 4/1/07-3/31/12)

Golden Years Rest Home has a 0.01 MGD package plant with extended aeration and disinfection. Its effluent is discharged at RM 0.3 of Jones Fork. This discharge is required to be eliminated by connection to a comprehensive sewer system when it becomes available and can adequately treat wastes. KPDES permit limits for this discharge are: <u>E</u>. <u>coli</u> effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. This facility is required to submit monthly DMRs and a review of DMRs from April 2007 through September 2009 indicate four months with exceedances of permit limits for <u>E</u>. <u>coli</u>.

5.1.1.4 Home Units in Beaver Creek Watershed

There are 92 known home units in the Beaver Creek Watershed, each with a permitted design capacity of 0.0005 MGD. Home units are indicated on maps and in tables as "dwelling other than apartment". Home units are wastewater treatment systems designed for an individual home. Although there are many options for a home unit, the minimum requirements are extended aeration, sand filtration, and disinfection. KPDES permit limits for these discharges are: <u>E</u>. <u>coli</u> effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average or Fecal coliform effluent gross limit of 200 colonies/100 ml as a monthly average and 400 colonies/100 ml as a maximum weekly average. These discharges are required to be eliminated by connection to a comprehensive sewer system when it becomes available and can adequately treat wastes. A spot check of DMRs for home units indicated that they frequently do not discharge (no flow box is checked on the DMRs). A spot check of inspection reports for this type of source indicated issues such as chlorination tablets not in contact with the sanitary wastewater. A compliance report run on home units across KY indicated only a 3 % compliance rate with permit requirements (personal

communication Larry Sowder, 2010). Due to issues with home units, KDOW currently requires that all other options be eliminated before approving any permits for new home units (KDOW, 2010c).

5.1.2 Future Growth WLA

The Future Growth WLA is a portion of the allowable load that is set aside for expansion of existing KPDES-permitted sources or new KPDES-permitted sources in the watershed. This could include new or expanded sewerage treatment plants, new package plants, or possibly new home units. This is not a required element in TMDLs, but is optional. Reserving a future growth WLA component in a TMDL allows growth to occur in the watershed without needing to re-open the TMDL to allocate waste loads to these new or expanded sources. Any new discharges of \underline{E} . coli in the watershed must meet permit limits based on the Water Quality Standards in 401 KAR 10:031, and must not cause or contribute to an existing impairment.

Because of the sheer volume of permits for Home Units, it is possible that a permit has been missed; however this TMDL still applies to all sources of <u>E</u>. <u>coli</u> (or fecal coliform) regardless of whether or not they are indicated in the TMDL tables. Any KPDES-permitted source of sanitary wastewater not identified in this document will receive a TMDL load from the future growth WLA.

5.1.3 KPDES MS4 Storm Water

401 KAR 5:002(91) adopts the definition of Municipal Separate Storm Sewer Systems (MS4s) contained in 40 C.F.R. 122.26(b)(8) as:

"a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

- i. Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States;
- *ii.* Designed or used for collecting or conveying storm water;
- *iii.* Which is not a combined sewer; and
- *iv.* Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2."

EPA has categorized MS4s into three categories: small, medium, and large. The medium and large categories are regulated under the Phase I Storm Water program. Large systems, such as the cities of Lexington and Louisville, have populations in excess of 250,000. Medium systems have populations in excess of 100,000 but less than 250,000. However, there are currently no medium-sized systems in Kentucky. Phase I systems have five-year permitting cycles and have

annual reporting requirements, including monitoring. The small MS4 category includes all MS4s not covered under Phase I. Since this category covers a large number of systems, only a select group are regulated under the Phase II rule, either being automatically included based on population (i.e., having a total population over 10,000 or a population per square mile in excess of 1000) or on a case-by-case basis due to the potential to cause adverse impact on surface water(s). Water quality monitoring is not a requirement of Phase II MS4s, unless the waterbody has an approved TMDL and the MS4 causes or contributes to the impairment for which the TMDL was written. There are no MS4 Communities in the Beaver Creek Watershed; therefore, a waste load allocation to a MS4 does not apply.

5.1.4 KPDES-Permitted CSOs

Combined Sewer Overflows (CSOs) are discharges from combined sewers, (i.e., sewers that carry both sanitary and storm water flow in the same pipe). In accordance with U.S. EPA's Combined Sewer Overflow Control Policy (1994), KDOW has signed Consent Decrees or Consent Judgments with all CSO communities in Kentucky. Within each Consent Decree, Judgment Communities are required to submit a Long Term Control Plan (LTCP) as the blueprint by which CSOs must be remediated (e.g., through separation of combined sewers, treatment of their discharge, and/or reduction in frequency, duration or volume, etc.) until they meet the WQS. KDOW then approves or disapproves the LTCP. Individual CSOs are given outfall numbers under the community's KPDES permit. There are no combined sewers in the Beaver Creek watershed; therefore, a waste load allocation to permitted CSOs does not apply.

5.1.5 KPDES Animal Feeding Operations

Animal feeding operations (AFOs) are defined by 401 KAR 5:002 Section 1(5) as:

- "a lot or facility, other than an aquatic animal production facility, that meets one (1) of the following descriptions:
 - (a)1. "Large animal feeding operation" as defined in subsection (71) of this section; or
 2. "Medium animal feeding operation" as defined in subsection (83) of this section; and

(*b*) *If*:

- 1.a. Animals other than aquatic animals, have been, are, or will be stabled or confined and fed or maintained for a total of forty-five (45) days or more in a twelve (12) month period; and
- b. Crops, vegetation forage growth, or postharvest residues are not sustained in the normal growing season over any portion of the lot or facility."

Subsection 71 defines "large animal feeding operation" as:

"an AFO that stables or confines as many as or more than the numbers of animals specified in any of the following categories:

(a) 700 mature dairy cows, whether milked or dry;

(*b*) 1,000 veal calves;

- (c) 1,000 cattle other than mature dairy cows or veal calves. Cattle includes heifers, steers, bulls, or cow or calf pairs;
- (d) 2,500 swine each weighing fifty-five (55) pounds or more;
- (e) 10,000 swine each weighing less than fifty-five (55) pounds;
- (f) 500 horses;
- (g) 10,000 sheep or lambs;
- (*h*) 55,000 turkeys;
- (i) 30,000 laying hens or broilers, if the AFO uses a liquid manure handling system;
- (*j*) 125,000 chickens other than laying hens, if the AFO uses other than a liquid manure handling system;
- (k) 30,000 ducks, if the AFO uses other than a liquid manure handling system; or
- (1) 5,000 ducks, if the AFO uses a liquid manure handling system."

Subsection 83 defines "medium animal feeding operation" as:

"an AFO that stables or confines the type and number of animals within any of the following ranges:

- (a) 200 to 699 mature dairy cows, whether milked or dry;
- (*b*) 300 to 999 veal calves;
- (c) 300 to 999 cattle other than mature dairy cows or veal calves. Cattle includes heifers, steers, bulls, or cow or calf pairs;
- (d) 750 to 2,499 swine each weighing fifty-five (55) pounds or more;
- (e) 3,000 to 9,999 swine each weighing less than fifty-five (55) pounds;
- (f) 150 to 499 horses;
- (g) 3,000 to 9,999 sheep or lambs;
- (*h*) 16,500 to 54,999 turkeys;
- (i) 9,000 to 29,999 laying hens or broilers, if the AFO uses a liquid manure handling system;
- (*j*) 37,500 to 124,999 chickens, other than laying hens, if the AFO uses other than a liquid manure handling system;
- (k) 25,000 to 81,999 laying hens, if the AFO uses other than a liquid manure handling system;
- (l) 10,000 to 29,999 ducks, if the AFO uses other than a liquid manure handling system; or
- (m) 1,500 to 4,999 ducks if the AFO uses a liquid manure handling system."

401 KAR 5:002 further defines some AFOS as large, medium or small Confined Animal Feeding Operations (CAFOs) based upon definitions in 40 CFR 122.23:

"An AFO is defined as a Large CAFO if it stables or confines as many as or more than the numbers of animals specified in any of the following categories:

(i) 700 mature dairy cows, whether milked or dry;

(ii) 1,000 veal calves;

- (iii) 1,000 cattle other than mature dairy cows or veal calves. Cattle includes but is not limited to heifers, steers, bulls and cow/calf pairs;
- (iv) 2,500 swine each weighing 55 pounds or more;

- (v) 10,000 swine each weighing less than 55 pounds;
- (vi) 500 horses;

(vii) 10,000 sheep or lambs;

(viii) 55,000 turkeys;

- (ix) 30,000 laying hens or broilers, if the AFO uses a liquid manure handling system;
- (x) 125,000 chickens (other than laying hens), if the AFO uses other than a liquid manure handling system;
- (xi) 82,000 laying hens, if the AFO uses other than a liquid manure handling system; (xii) 30,000 ducks (if the AFO uses other than a liquid manure handling system); or
- (xiii) 5,000 ducks (if the AFO uses a liquid manure handling system)."

"An AFO is defined as a Medium CAFO if:

- *(i) The type and number of animals that it stables or confines falls within any of the following ranges:*
 - (A) 200 to 699 mature dairy cows, whether milked or dry;
 - (*B*) 300 to 999 veal calves;
 - (C) 300 to 999 cattle other than mature dairy cows or veal calves. Cattle includes but is not limited to heifers, steers, bulls and cow/calf pairs;
 - (D) 750 to 2,499 swine each weighing 55 pounds or more;
 - (E) 3,000 to 9,999 swine each weighing less than 55 pounds;
 - (*F*) 150 to 499 horses;
 - (G) 3,000 to 9,999 sheep or lambs;
 - (*H*) 16,500 to 54,999 turkeys;
 - (I) 9,000 to 29,999 laying hens or broilers, if the AFO uses a liquid manure handling system;
 - (J) 37,500 to 124,999 chickens (other than laying hens), if the AFO uses other than a liquid manure handling system;
 - (K) 25,000 to 81,999 laying hens, if the AFO uses other than a liquid manure handling system;
 - (L) 10,000 to 29,999 ducks (if the AFO uses other than a liquid manure handling system); or
- *(M)* 1,500 to 4,999 ducks (if the AFO uses a liquid manure handling system); and (ii) Either one of the following conditions are met:
 - (A) Pollutants are discharged into waters of the United States through a manmade ditch, flushing system, or other similar man-made device; or
 - (B) Pollutants are discharged directly into waters of the United States which originate outside of and pass over, across, or through the facility or otherwise come into direct contact with the animals confined in the operation."

A small CAFO is defined as an "AFO that is designated as a CAFO and is not a Medium CAFO." A small CAFO may be designated if:

"it is a significant contributor of pollutants to waters of the United States" or "it has been determined that one or more pollutants in the AFO's discharge contributes to an impairment in a downstream or adjacent State or Indian country water that is impaired for that pollutant." Additional requirements are that:

"no AFO may be designated as a CAFO unless:

(i) Pollutants are discharged into waters of the United States through a manmade ditch, flushing system, or other similar manmade device; or
(ii) Pollutants are discharged directly into waters of the United States which originate outside of the facility and pass over, across, or through the facility or otherwise come into direct contact with the animals confined in the operation.

401 KAR 5:060 allows an animal feeding operation to submit voluntary certification of nodischarge if there is no discharge from the AFO. AFOs that will or are anticipated to discharge to the waters of the Commonwealth are required to obtain a KPDES permit pursuant to 401 KAR 5:060, Section 10. "Discharge" means that process wastewater or water that comes into contact with the production area and discharges to the waters of the Commonwealth. Process wastewater means water directly or indirectly used in the operation of the AFO for any or all of the following: spillage or overflow from animal or poultry watering systems; washing, cleaning, or flushing pens, barns, manure pits, or other AFO facilities; direct contact swimming, washing, or spray cooling of animals; or dust control. Process wastewater also includes any water which comes into contact with any raw materials, products, or byproducts including manure, litter, feed, milk, eggs, or bedding. If the animal feeding operation is managing the waste generated at the facility as a liquid, a construction permit must be obtained pursuant to 401 KAR 5:005. Once defined as a CAFO, an operation must obtain either a KPDES General Permit or a KPDES Individual Permit depending upon the nature of the operation. Conditions of both types of permits include no discharge to surface waters. However, holders of a KPDES Individual Permit may discharge to surface waters during a 25-year (24-hour) or greater storm event. Currently, no AFOs or CAFOs have permits to discharge within the Beaver Creek watershed; therefore, a waste load allocation to AFOs or CAFOs does not apply.

5.2 Non-Permitted Sources (assigned a LA)

Non-permitted sources include all sources not permitted by the KPDES permitting program, and are often referred to as nonpoint sources. According to 401 KAR 10:001, nonpoint means "any source of pollutants not defined as a point source." While non-permitted sources are legal despite not having permits, their loads to surface water are still regulated by laws such as the Kentucky Agricultural Water Quality Act, federal Clean Water Act (i.e., the TMDL process) and 401 KAR 5:037 (Groundwater Protection Plans), among others. Non-permitted sources typically discharge pollutants to surface water in response to rain events. Rainfall data from the Price precipitation gage is shown in Figures 5.11 and 5.12 for the 2007 and 2008 PCR seasons, respectively (note: October 2008 data was not available at the time of writing of this document) (USGS, 2010). Red arrows indicate sampling dates for sites other than PRI095, which is displayed with the orange arrows. Of note is that samples collected during or following the June 27 and July 26, 2007 rain events tended to have much greater <u>E</u>. <u>coli</u> concentrations while samples collected on September 28, 2007, during a dry period, tended to have lower <u>E</u>. <u>coli</u> concentrations. These same trends were shown for samples collected during the July 31, 2008

rain event and during the August 22, 2008 extended dry period. These trends indicate that \underline{E} . <u>coli</u> was being washed into the stream as the result of rainfall (see data in Appendix B).

Non-permitted sources for <u>E</u>. <u>coli</u> (and fecal coliform) exist in the watershed, and fall into various categories including agriculture, impacts directly attributable to humans, household pets and natural background such as from wildlife. All sources not regulated by the KPDES program will be allocated a pollutant load under the Load Allocation (LA) portion of the TMDL.



Figure 5.11 Daily Precipitation (inches) from Price Gage during the 2007 PCR Season Note: No data indicates that the gage did not record information at that time. Red arrows indicate sampling dates for sites other than PRI095, which is displayed with the orange arrows.



Figure 5.12 Daily Precipitation (inches) from Price Gage during the 2008 PCR Season

Note: No data indicates that the gage did not record information at that time. Red arrows indicate sampling dates for sites other than PRI095, which is displayed with the orange arrows.

5.2.1 Human Waste Disposal

Human waste disposal is of particular concern in rural areas. One way to determine locations of potential un-sewered residential areas is to examine the difference between the locations of drinking water lines and sewer lines. This is shown in Figures 5.13 through 5.19. Proposed water and sewer lines are also displayed. These figures demonstrate that the majority of the Beaver Creek Watershed is not serviced by a sewer system. Additionally, some subwatersheds have no existing and no proposed sewer lines. The un-sewered areas either have Onsite Sewage Treatment and Disposal Systems (OSTDS; either permitted [Home Units] or unpermitted [septic tanks or other system]) or sewage is discharged via straight pipes.

The Kentucky Infrastructure Authority (KIA) compiled a report titled "Water Resource Development: A Strategic Plan for Wastewater Treatment" (KIA 2000) with data from the Regional Area Development Districts (ADDs). This report indicates that the Beaver Creek watershed has known failing septic systems and concentrations of straight pipes. The percent of population serviced by sewers (as of 1999) was approximately 20% for Floyd County and only

about 10% for Knott County. Non-permitted OSTDS, including septic tanks, are commonly used in areas where providing a centralized sewage collection and treatment system is not costeffective or practical. When properly sited, designed, constructed, maintained, and operated, septic systems are an effective means of disposing and treating domestic waste. The effluent from a well-functioning OSTDS is comparable to secondarily treated wastewater from a sewage treatment plant. When not functioning properly, they can be a source of <u>E</u>. <u>coli</u> (or fecal coliform) and other pollutants (e.g., nitrogen and phosphorus) to both groundwater and surface water. The soils information presented in Section 3.3 indicates that the soils in the Beaver Creek watershed are not ideal for installation of properly functioning septic systems.



Figure 5.13 Existing and Proposed Sewer Lines in the Beaver Creek Watershed

Final Beaver Creek Watershed <u>E</u>. <u>coli</u> TMDL



Figure 5.14 Existing and Proposed Water and Sewer Lines in the Mainstem Beaver Creek Subwatershed



Figure 5.15 Existing and Proposed Water and Sewer Lines in the Lower Left Fork Beaver Creek Subwatershed

Note: No sewer lines are currently in this subwatershed.

Final Beaver Creek Watershed <u>E</u>. <u>coli</u> TMDL



Figure 5.16 Existing and Proposed Water and Sewer Lines in the Upper Left Fork Beaver Creek Subwatershed



Figure 5.17 Existing and Proposed Water and Sewer Lines in the Lower Right Fork Beaver Creek Subwatershed



Figure 5.18 Existing and Proposed Water and Sewer Lines in the Middle Right Fork Beaver Creek Subwatershed



Figure 5.19 Proposed Water and Sewer Lines in the Upper Right Fork Beaver Creek Subwatershed

Note: No sewer lines are currently in this subwatershed and none are proposed.

5.2.2 Agriculture

The Kentucky Agriculture Water Quality Act (KRS 224.71-100 through 224.71-140) was passed by the 1994 General Assembly. The law focuses on the protection of surface water and groundwater resources from agricultural and silvicultural activities. The Act created the Kentucky Agriculture Water Quality Authority (KAWQA), a 15-member peer group made up of farmers and representatives from various agencies and organizations. The Act requires all farms greater than 10 acres in size to adhere to the Best Management Practices (BMPs) specified in the Kentucky Agriculture Water Quality Plan. Specific BMPs have been designated for all operations.

The U.S. Department of Agriculture (USDA) compiles agricultural statistics at the county level and reports results every five years in Agricultural Census reports. Select agricultural statistics reported in 2007 for the counties in the Beaver Creek Watershed are shown in Table 5.2 (USDA, 2007).

Statistia	County			
Statistic	Floyd	Knott		
Farms [# farms (acres)]	76 (7,785)	46 (6,937)		
Cattle and Calves Inventory [#farms (total # animals)]	32 (431)	20 (695)		
Beef [#farms (total # animals)]	27 (232)	19 /(D)		
Milk Cows [#farms (total # animals)]	- (-)	1 (D)		
Hogs and Pigs [#farms (total # animals)]	3 (15)	- (-)		
Sheep and Lambs [#farms (total # animals)]	2 (D)	1 (D)		
Layers 20 weeks old or older [#farms (total # animals)]	6 (86)	6 (120)		
Broilers & other meat-type chickens sold [#farms (total # animals)]	- (-)	- (-)		
Total Cropland [#farms (total acres)]	61 (2,002)	19 (2,704)		
Corn for grain [#farms (total acres)]	11 (276)	- (-)		
Wheat for grain [#farms (total acres)]	- (-)	- (-)		
Corn for silage [#farms (total acres)]	- (-)	- (-)		

Table 5.2 Agricultural Statistics (2007)

D = Withheld by USDA to avoid disclosing data for individual farms.

- = No data.

5.2.3 Kentucky No Discharge Operating Permit (KNDOP)

As stated in 401 KAR 5:005, facilities with agricultural waste handling systems or that dispose of their effluent by spray irrigation but do not discharge to surface waters are required to obtain a KNDOP from the KDOW prior to construction and operation. These operations handle liquid waste in a storage component of the operation (e.g. lagoon, pit, or tank) and land apply the waste via spray irrigation or injection to cropped acreages. Land application of the waste that results in

runoff to a stream is prohibited. Facilities that handle animal waste as a liquid are required to submit a Short Form B, construction plans, and a Comprehensive Nutrient Management Plan to the KDOW. Also included in KNDOP requirements are golf courses which land apply treated wastewater via spray irrigation, typically from a holding pond - some industrial operations also spray-irrigate. There are no KNDOPs in the Beaver Creek watershed.

5.2.4 Wildlife

Wildlife undoubtedly contribute <u>E</u>. <u>coli</u> (or fecal coliform) to the Beaver Creek watershed, noting the high percentage of forest in all subwatersheds. Table 5.3 shows the estimates of deer population and density by county in the Beaver Creek watershed, as provided by the Kentucky Department of Fish and Wildlife Resources (Kentucky Department of Fish and Wildlife Resources, 2006). Estimates on numbers of other types of animals are not available; however, there is an Elk release site in the watershed and several wildlife management areas exist as shown in Figures 5.20 and 5.21. Although wildlife contribute <u>E</u>. <u>coli</u> (or fecal coliform) to surface water, such contributions represent natural background conditions, and do not receive a reduction as part of the TMDL.

Tuble 5.5 Deer Density in Counties of Deaver Creek Watershed
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County	Deer Per Square Mile	Total Number of Deer
Floyd	8	3,258
Knott	12	4,052



Figure 5.20 Wildlife Management Areas in the Lower Right Fork Beaver Creek Subwatershed



Figure 5.21 Wildlife Management areas and Elk Release Site in the Middle Right Fork Beaver Creek Subwatershed

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 20 is under site 31.

5.2.5 Household Pets

Although household pets undoubtedly exist in these watersheds, their contribution is deemed to be minimal compared to other sources.

5.2.6 Illegal LA Sources

Illegal LA sources related to human waste disposal include failing septic systems, and straight pipes. Straight pipes receive a LA of 0 while failing septic tanks receive an LA equivalent to a properly functioning septic system (i.e. only the load above that of a properly functioning system receives a LA of 0). In the course of eliminating failing septic systems and straight pipes that exist in the watershed, the pollutant load carried could be routed to functional septic systems, to an existing sewage treatment plant, or possibly to a future KPDES-permitted point source such as a package treatment plant or permitted home unit for an individual residence. If routed to functional septic systems, the load will be reduced between 99% and 99.9%, after pathogen

losses in the soil column are accounted for (EPA, 2002). If routed to a KPDES-permitted source, it must conform to the requirements for these sources.

Note this Section of the TMDL is not intended to summarize the universe of potential illegal LA sources that may discharge pollutants into surface waters. Instead, it defines the illegal LA sources known to be present in this watershed (failing septic systems and straight pipes).

6.0 Total TMDL

The WQC in 401 KAR 10:031 (Kentucky's Surface Water Standards) for the PCR use are based on both fecal coliform bacteria and <u>E</u>. <u>coli</u> bacteria. For this TMDL, the <u>E</u>. <u>coli</u> criterion was applied as the samples were not analyzed for fecal coliform. Per 401 KAR 10:031:

"The following criteria shall apply to waters designated as primary contact recreation use during the primary contact recreation season of May 1 through October 31: Fecal coliform content or <u>Escherichia coli</u> content shall not exceed 200 colonies per 100 ml or 130 colonies per 100 ml respectively as a geometric mean based on not less than five (5) samples taken during a thirty (30) day period. Content also shall not exceed 400 colonies per 100 ml in twenty (20) percent or more of all samples taken during a thirty (30) day period for fecal coliform or 240 colonies per 100 ml for <u>Escherichia coli</u>."

Additionally:

"The following criteria shall apply to waters designated for secondary contact recreation use during the entire year: Fecal coliform content shall not exceed 1000 colonies per 100 ml as a thirty (30) day geometric mean based on not less than five (5) samples; nor exceed 2000 colonies per 100 ml in twenty (20) percent or more of all samples taken during a thirty (30) day period."

There are insufficient <u>E</u>. <u>coli</u> measurements to calculate a 5-sample, 30-day geometric mean, so the instantaneous criterion of 240 colonies per 100 ml was applied to calculate allowable loadings to bring the watershed into compliance with the PCR designated use. See Section 7.0 for TMDL loading calculations.

7.0 Methodology

A TMDL calculation (as defined in Section 1.2) is performed as follows:

$$TMDL = WLA + LA + MOS$$

The WLA has two components:

WLA = KPDES-permitted WLA + Future Growth WLA

Because \underline{E} . <u>coli</u> colonies are expressed as a concentration, a method must be used to convert the allowable concentration of bacteria to an allowable load. Additionally, a method to divide this allowable load to sources in the watershed must be used.

The Water Quality Criteria (WQC) in 401 KAR 10:031 (Kentucky's Surface Water Standards) for the PCR use are based on both fecal coliform and <u>E</u>. <u>coli</u> bacteria. For this TMDL document, the <u>E</u>. <u>coli</u> criterion for PCR use was applied. The criterion states that <u>E</u>. <u>coli</u> shall not exceed 130 colonies/100 ml as a geometric mean based on not less than 5 samples taken during a 30-day period and shall not exceed 240 colonies/per 100 ml in 20% or more of all samples taken during a 30-day period. These limits are applicable during the recreation season of May 1 through October 31.

There are insufficient <u>E</u>. <u>coli</u> measurements to calculate a 5-sample, 30-day geometric mean, so the criterion of 240 colonies/100 ml was used as the WQC in order to calculate TMDLs to bring impaired segments into compliance with the PCR designated use. Because Kentucky has a dual standard for the PCR designated use, development of TMDLs using the <u>E</u>. <u>coli</u> criterion are sufficient to provide TMDLs for fecal coliform listed segments (i.e., development of <u>E</u>. <u>coli</u> TMDLs will protect the PCR use regardless of whether a segment is impaired for <u>E</u>. <u>coli</u>, fecal coliform, or both indicators). Additionally, because the instantaneous limit is lower for PCR than for SCR (400 colonies/ml versus 2000 colonies/ml) development of TMDLs for the PCR season also protects segments impaired for the SCR use due to fecal coliform.

7.1 Data Validation

Data collected by Eastern Kentucky University for this TMDL was validated as follows:

- <u>E</u>. <u>coli</u> samples taken outside the PCR months of May through October were not considered during TMDL analysis.
- Quality Analysis/Quality Control Samples (e.g., duplicates) were not considered during TMDL analysis.
- Some samples were reported using either the *less than* (denoted using the "<") symbol or the *greater than* (denoted using the ">") symbol, indicating the true concentration was unknown but was either below or above the reported value, respectively. For these samples, the reported value was used verbatim. For *greater than* values, the exact value of the exceedance is unknown and likely higher than the number reported, however the

sample still provides insight into the status of the waterbody at the time the sample was taken.

- Only samples collected from a flowing stream were considered in analysis.
- Discharge data that consisted of velocity alone (no stream area determined) was eliminated from consideration in the analysis.
- Any discharge data that was indicated to be suspect due to possible operator error was eliminated from consideration in the analysis.

7.2 TMDL Components

The TMDL calculation must take into account seasonality and other factors that affect the relationship between pollutant inputs and the ability of the stream to meet its designated uses.

7.2.1 Seasonality

In Kentucky regulations, the PCR use is defined to apply to the period beginning May 1 and ending October 31. For this TMDL, seasonality is considered because samples were collected twice a month to provide data over the entire PCR season.

7.2.2 Critical Condition

The critical condition for nonpoint source <u>E</u>. <u>coli</u> (or fecal coliform) loadings is typically an extended dry period followed by a rainfall runoff event. During the dry weather period, pathogen indicators build up on the land surface, and are washed off by subsequent rainfall. Conversely, the critical condition for point source loading typically occurs during periods of low stream flow when dilution is minimized. Sampling was performed during both types of conditions (during or following rain events and during extended dry periods). The Beaver Creek watershed contains both types of sources; therefore the critical condition for each impaired segment is defined by the sample showing the greatest concentration, which was generally collected during rainfall events.

7.2.3 Determine Mean Annual Flow

The Pathogen TMDL SOP (KDOW, 2009) was followed to determine flows and TMDLs for this document. The USGS publishes Mean Annual Flow (MAF) data on the internet via the "Hydrology of Kentucky" geographic data explorer (http://kygeonet.ky.gov/kyhydro/main.htm). The MAF is calculated from multiple regression equations found in the USGS Report "Low-Flow Characteristics of Kentucky Streams" (Martin 2002). Mean Annual Flows were used to convert concentrations of <u>E</u>. <u>coli</u> into loads of <u>E</u>. <u>coli</u>. The MAF was determined at the downstream end of each impaired segment. When multiple sites were located on one impaired segment, the MAF for upstream sites was determined at the sample site location while it was determined at the end of the impaired segment for the downstream-most site. The MAF for each site was then adjusted by either adding or subtracting flow based on any KPDES-permitted dischargers of pathogen indicators or KDOW permitted stream water withdrawals in the watershed upstream of a sample site (yielding the Adjusted MAF for that site). The additions for KPDES-permitted sources of pathogen indicators were set at the design capacity (in cfs) of the facility. The subtractions for stream water withdrawals were set at the maximum permitted water withdrawal (in cfs). Water withdrawals from groundwater or from surface impoundments

was assumed not to impact in-stream flow so water withdrawals of these types were not subtracted from the MAF.

7.2.4 Existing Loads

Although not a part of a TMDL, existing loads were determined using the monitoring data collected by EKU. Existing loads provide a basis by which to determine the percent reduction that would have been required to meet the TMDL limits at the time of sample collection. For each sample site, the sample with the greatest concentration of <u>E</u>. <u>coli</u> was used as the existing concentration for the site. This provides a worst-case scenario for percent reduction calculations (i.e., the percent reduction is the greatest required to bring existing loads to the TMDL loading requirements). Existing loads were calculated as:

Greatest		Adjusted		Conversion Faster		
Concentration	×	MAF	×		=	Existing Load (billion
(colonies/100ml)		(cfs)		.0244657584		colonies/day)

where the conversion factor converts cfs to ml/day and colonies to billion colonies.

7.2.5 Total TMDL

The Total TMDL is the allowable loading in a watershed. Loads are portioned from this load to the MOS, WLA, and LA.

Total TMDLs were calculated for each site using the <u>E</u>. <u>coli</u> criterion of 240 colonies/100 ml:

240 (colonies/100ml)	×	Adjusted MAF (cfs)	×	Conversion Factor .0244657584	=	Total TMDL (billion colonies/day)
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7.2.6 Calculation of Margin of Safety

There are two methods for incorporating a MOS in the TMDL analysis: implicitly include the MOS using conservative assumptions, or explicitly set aside a (numerical) portion of the TMDL as the MOS. For this TMDL, a 10% explicit MOS (i.e., 10% of the WQC, or 24 colonies/100ml,) was set. Additionally, an implicit MOS was incorporated in loading calculations for KPDES-permitted sources by setting their flow at the maximum design capacity. The explicit MOS load for each site was calculated as:

$\frac{24}{(\text{colonies/100ml})} \times \frac{\text{MAF}}{(\text{cfs})} \times \frac{\text{MAF}}{.0244657584} = \frac{\text{MOS}}{\text{colonies/day}}$	24 (colonies/100ml)	×	Adjusted MAF (cfs)	×	Conversion Factor .0244657584	=	MOS (billion colonies/day)
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7.2.7 Calculation of Target Load

The Target Load is defined as the load at the WQC minus the explicit MOS load. It was calculated for each site by subtracting the explicit MOS from the Total TMDL:

Target Load = Total TMDL - MOS.

It can also be calculated as:

216		Adjusted		Conversion Faster		
210	x	MAF	x	Conversion Factor	=	Target Load (billion
(colonies/100ml)		(cfs)		.0244657584		colonies/day)
		(CIS)				

7.2.8 Calculation of Percent Reduction

A percent reduction is not part of the TMDL calculation, however, for informational purposes, a percent reduction was calculated for each site to show the percent reduction that would have been required at the time the samples were taken in order to meet the Target Load. The percent reduction was calculated as:

Percent Reduction (%) = [(Existing Load – Target Load) / Existing Load] * 100

While providing additional information, the percent reduction calculation is not equivalent to the TMDL. The TMDL is the load that the waterbody can assimilate while still meeting its designated uses (i.e., PCR and SCR). The percent reduction is a determination of how much the measured concentration exceeded the Target Load at the time the samples were taken. It does not determine the percent reduction needed at any other time, as the in-stream concentrations are likely to be different. Unlike the calculated percent reductions, the TMDL is a constant based upon the WQC whereas the percent reduction changes based on in-stream concentrations.

Regardless of the procedure used to estimate percent reductions for each sampling station, reductions from existing conditions ultimately must be effected within a given watershed only until all stream segments meet the PCR use, or until all sources save wildlife are discharging in compliance with the WQC. However, once the WQC is met, all sources (save wildlife) must continue to discharge at a concentration that meets the WQC.

7.2.9 Calculation of WLAs for Each KPDES Permitted Source

The WLA is the allocation given to KPDES-permitted sources within the TMDL. For these sources, the WLAs are calculated based on the permitted concentration limits and facility design flow (in units of cfs) using the following equation:

240	×	Design Flow	v	Conversion Factor	_	WLA (billion
(colonies/100ml)		(cfs)	X	.0244657584	_	colonies/day)

The design capacity in MGD was converted to cfs by multiplying by 1.54723 to convert days to seconds and million gallons to cubic feet.

7.2.10 Calculation of Remainder

The Remainder is not part of the TMDL; however, it is used in the TMDL calculations. It is determined as the Target Load minus the sum of all WLAs for KPDES-permitted sources.

7.2.11 Calculation of Future Growth WLA

Because the WLA must account for all KPDES-permitted sources, TMDLs will often account for future growth of these sources (i.e., an increase in the number of KPDES-permitted sources or in the loading per discharger) in order to avoid having to re-open the TMDL and change the WLA when new or expanding sources come online. Future growth is represented by a portion of the TMDL Target which is set aside (i.e., is not part of the LA nor is it part of the WLA for current/known sources). It can also account for existing storm water sources which are later discovered to discharge the pollutant of concern, even though this fact was not known at the time the TMDL was written. Of course, any and all of the sources mentioned above must meet the WQC and KDOW's permitting requirements. The amount set aside for future growth is determined by the following formula, which assumes that growth occurs more rapidly in developed areas (which is determined by the sum of developed open space, developed low intensity, developed medium intensity and developed high intensity areas) than in rural areas:

Percent Developed Area in the Subwatershed	% of Remainder Set Aside for Future Growth WLA
≥25%	5%
$\geq 20\% - <25\%$	4%
$\geq 15\% - <20\%$	3%
$\geq 10\% - <15\%$	2%
$\geq \! 5\% - \! < \! 10\%$	1%
<5%	0.5%

Table 7.1 Future Growth WLA Formula

The Future Growth WLA is calculated as the Remainder multiplied by the appropriate percentage from Table 7.1.

Future Growth WLA = Remainder * Future Growth WLA percentage

7.2.12 Calculation of LA

The LA is where non-KPDES-permitted sources (e.g., nonpoint sources, or those sources not permitted by KPDES) receive their allocation within the TMDL. Non-KPDES-permitted sources include non-KPDES permitted OSTDS (i.e. septic systems), wildlife, household pets and facilities (e.g., farms, landfarms for municipal STP sludge) with properly functioning BMPs. Facilities with failing or non-existing BMPs as well as failing septic systems are also included in the LA, but these are illegal sources and KDOW expects compliance efforts to target these sources for elimination so that legally operating sources do not bear the burden of implementing reductions beyond achieving the WQC in order to accommodate the loading from illegal sources. Load Allocations are calculated for each site as follows:

LA= Remainder – Future Growth WLA.

The available sampling data were insufficient to apportion the existing loading among the various LA sources; therefore, it is lumped to all LA sources.

7.3 Determining TMDL for Impaired Segment

If there was only one sample site on an impaired segment, the TMDL for that site is the TMDL for the impaired segment. There were a few cases where multiple sites were sampled on one impaired segment. When this occurred, the TMDL was determined using the MAF from the downstream station, while the existing condition and percent reduction were determined by the greatest exceedance (see Section 7.2.4). Note that the TMDL, WLAs, MOS, LA, and Future Growth WLA for the downstream-most site do not change by inserting this greatest exceedance into calculations for the downstream-most site, only the existing load and percent reduction change. This is because TMDLs were determined by the WQC for \underline{E} . coli, not by the sample data that were collected. In other words, the WQC determines where the stream needs to be while the sample data determines how far it has to go to get there.

7.4 Additional Calculations

In addition to TMDL calculations, calculations of instantaneous loads and unit area loads were performed on the sample data. This provides information about actual loadings observed in the watershed at the time of sampling. Instantaneous loads were calculated on each sample result (if flow was also measured) as follows:

Observed <u>E</u> . <u>coli</u> Concentration (colonies/100ml)	×	Observed Flow (cfs)	×	Conversion Factor .0244657584	=	Instantaneous Load (billion colonies/day)
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These instantaneous loads were then converted to unit area loads in million colonies/day/acre by dividing by the watershed area (in acres) and multiplying by 1000 to convert from billion colonies/day to million colonies/day. This provides information about how much load is coming from each acre of land in the subwatershed above the sample site. This varies as the <u>E</u>. coli

concentration changes across sample dates. By comparing unit area loads across sites on one sample date, subwatersheds that contribute greater loadings of bacteria can be identified (see unit area load results in Appendix D).

8.0 TMDLs for Individual Stream Segments

In order to group the subwatersheds affected by this TMDL report in a logically progressive way, an analysis of impaired segments is presented beginning at the headwaters of the Left Fork moving downstream to its mouth, the headwaters of the Right Fork moving downstream to its mouth, then progressing downstream on Beaver Creek.

Descriptions of each impaired subwatershed are presented along with tables of land cover, general subwatershed information, sample data, water withdrawals (if any), and TMDL allocations. The land cover table for each segment includes the percentage used to calculate the Future Growth WLA. The Waterbody Identification number (WBID) is included in the table of general information about the impaired segment. This number is a unique identifier assigned to all assessed waters in KY.

The TMDL tables include KPDES-permitted source information and TMDL allocations and can be interpreted as follows:

The columns with the blue highlight indicate the TMDL allocations. The rows with green highlight indicate KPDES permit information and the design capacity (in cfs) that feeds into the WLA calculation for each KPDES-permitted source. The WLA (in blue) for a particular KPDES-permitted source is on the same row as the information for the KPDES-permitted source (in green). The purple highlight indicates the sum of KPDES flow inputs that were added to the MAF of each site.

For segments with multiple sample sites, only the TMDL table for the impaired segment is shown in Section 8. However, TMDL tables for the additional sites are shown in Appendix E.

8.1 Caleb Fork RM 0.0 to 1.2



Figure 8.1 Caleb Fork RM 0.0 to 1.2

Caleb Fork is a second order stream located in the Upper Left Fork Beaver Creek subwatershed in Floyd County (Figure 8.1). Information about Caleb Fork, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.1. The WBID number for all sites is a unique identifier issued by the Division of Water for all assessed segments. It is based upon the USGS Geographic Names Information System (USGS, 1999) with a KY in front of the GNIS number and a _## where ## is a segment identification number. To save space, the KY has been left off the beginning of the WBID #. Caleb Fork has a catchment of 1,220 acres (1.9 square miles) with a 90% forested and 4.8 % developed land cover (Table 8.2). This subwatershed is entirely un-sewered. This subwatershed has neither KPDES-permitted pathogen dischargers nor water withdrawals. Sampling data from site 36 is presented in Table 8.3, and the TMDL allocations in Table 8.4.

Table 8.1 Caleb Fork RM 0.0 to 1.2 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
	Caleb								
Caleb	Fork 0.0								
Fork	to 1.2	488598_01	Floyd	1220.19	1.907	2nd order			
								-	
			Sample	Sample			+ to	from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
36	36	0.2	37.32805	-82.6898	2.7	0	0	0	2.7

Table 8.2 Caleb Fork RM 0.0 to 1.2 Subwatershed Land Cover

	Watershed	Watershed		Future Growth
Land Cover	Acres	Square Miles	% of Total Area	WLA %
Open Water	0.00	0.00	0.00	
Developed	58.31	0.09	4.78	0.5
Barren Land	5.12	0.01	0.42	
Forest/Shrubland	1108.03	1.73	90.81	
Grassland/Herbaceous	47.85	0.07	3.92	
Pasture/ Hay	0.89	0.00	0.07	
Cultivated Crops	0.00	0.00	0.00	
Wetlands	0.00	0.00	0.00	
Total	1220.19	1.91	100.00	

Table 8.3 Caleb Fork RM 0.0 to 1.2 Data (Site 36)

	<u>E</u> . <u>coli</u>		Instantaneous	Unit Area Load
	(colonies/100	Flow	Load (billion <u>E</u> .	(million <u>E</u> . <u>coli</u>
Collection Date	mls)	(cfs)	<u>coli</u> colonies/day)	colonies/day/acre)
05/16/08	11000	1.085	292.00	239.31
05/30/08	17000	4.3302	1801.01	1476.01
06/13/08	3400	N/A	N/A	N/A
6/13/08 (QA Sample)	2900	N/A	N/A	N/A
06/27/08	3000	0.326	23.93	19.61
07/11/08	5300	N/A	N/A	N/A
07/31/08	17000	0.308	128.10	104.99
08/08/08	3600	0.260	22.90	18.77
08/22/08	800	0.07	1.37	1.12
09/12/08	2600	0.1	6.36	5.21
09/20/08	5000	0.0334	4.09	3.35
10/17/08	>80000	0.211	412.98	338.46
10/24/08	240	0.088	0.52	0.42
Greatest Concentration	80000			

TMDL Table					<u>E</u> . <u>coli</u> (billion colonies/day)	
					5284.6038	Existing Load
					15.8538	Total TMDL
					1.5854	MOS
					14.2684	TMDL Target
AI number	KPDES #	Discharger Facility Name	Туре	Design Capacity (cfs)	99.73	% reduction
N/A	N/A	N/A	N/A	N/A	0.0000	KPDES WLA
			Addition to MAF (sum of cfs)	0.00	14.2684	remainder
					0.0713	Future Growth WLA ⁽¹⁾
					0.0713 14.1971	Total WLA LA

Table 8.4	TMDI	Calculations	for Caleb	Creek RM	0.0 - 1.2
1 able 0.4	IMDL	Calculations	IOI Caleb	CIECK KIVI	0.0-1.2

Note:

(1) Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.



8.2 Clear Creek RM 0.0 to 4.9

Figure 8.2 Clear Creek RM 0.0 to 4.9

Clear Creek is a third order stream located in the Upper Left Fork Beaver Creek subwatershed in Floyd County (Figure 8.2). Information about Clear Creek, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.5. It has a catchment of 3,308 acres (5.2 square miles) with an 86% forested and 7% developed land cover (Table 8.6). This subwatershed is entirely un-sewered. There are no stream water withdrawals in this subwatershed. Sampling data from site 39 is presented in Table 8.7 and TMDL allocations in Table 8.8.

Table 6.5 Clear Cleek Kivi 0.0 to 4.9 Informatio	Table	8.5	Clear	Creek	RM	0.0	to 4.	9 I	nform	ation
--	-------	-----	-------	-------	----	-----	-------	-----	-------	-------

	Stream				Square				
Stream	Segment	WBID #	County	Acres	Miles	Stream Order			
	Clear								
Clear	Creek 0.0	489611_							
Creek	to 4.9	01	Floyd	3307.66	5.17	3rd order			
								-	
		Sample	Sample	Sample			+ to	from	Adjusted
EKU	MAP Site	Point	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	#	RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
39	39	0.05	37.38850	-82.73075	7.1	0	0.00232	0	7.1023

Table 8.6 Clear Creek RM 0.0 to 4.9 Subwatershed Land Cover

	Watershed	Watershed	% of Total	Future Growth
Land Cover	Acres	Square Miles	Area	WLA %
Open Water	0.00	0.00	0.00	
Developed	231.83	0.36	7.01	1.0
Barren Land	22.25	0.03	0.67	
Forest/Shrubland	2836.22	4.43	85.75	
Grassland/Herbaceous	170.64	0.27	5.16	
Pasture/Hay	46.05	0.07	1.39	
Cultivated Crops	0.44	0.00	0.01	
Wetlands	0.22	0.00	0.01	
Totals	3307.66	5.17	100.00	

Table 8.7 Clear Creek RM 0.0 to 4.9 Data (Site 39)

	<u>E</u> . <u>coli</u>		Instantaneous Load	Unit Area Load
	(colonies/100	Flow	(billion <u>E</u> . <u>coli</u>	(million <u>E</u> . <u>coli</u>
Collection Date	mls)	(cfs)	colonies/day)	colonies/day/acre)
05/16/08	200	1.045	5.11	1.55
05/30/08	220	0.9205	4.95	1.50
06/13/08	710	1.003	17.42	5.27
06/27/08	310	0.625	4.74	1.43
6/27/08 (QA Sample)	330	N/A	N/A	N/A
07/11/08	330	0.692	5.59	1.69
07/31/08	>80000	8.345	16333.34	4938.03
7/31/08 (QA Sample)	31000	N/A	N/A	N/A
08/08/08	290	0.491	3.48	1.05
08/22/08	470	0.322	3.70	1.12
09/12/08	1800	0.656	28.89	8.73
09/20/08	320	0.1716	1.34	0.41
10/17/08	280	0.484	3.32	1.00
10/24/08	120	0.184	0.54	0.16
Greatest Concentration	80000			

					E. coli	
TMDL					(billion	
Table					colonies/day)	
					y /	Existing
					13901.0933	Load
						Total
					41.7033	TMDL
					4.1703	MOS
						TMDL
					37.5330	Target
		Discharger		Design		
AI		Facility		Capacity		%
number	KPDES #	Name	Туре	(cfs)	99.73	reduction
			Dwelling			
		MEADE	Other than			KPDES
1266	KYG400970	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Druglling			
		COOK	Dweiling Other then			KDDES
1173	KYG400790	RESIDENCE	A partment	0.0007736	0 0045	KEDES WIA
1175	KIG 400770	RESIDENCE	Apartment	0.0007730	0.0045	WLA
			Dwelling			
1007	121/0 400752	BINGHAM	Other than	0.0007726	0.0045	KPDES
1237	KYG400753	RESIDENCE	Apartment	0.0007736	0.0045	WLA
						Total
						KPDES
					0.0136	WLA
			Addition			
			to MAF			
			(sum of			
-			cfs)	0.0023208	37.5193	remainder
						Futuro
						Growth
					0.3752	$WLA^{(1)}$
						Total
					0.3888	WLA
					37.1441	LA
	1		1	1		

Note:

(1) Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.



8.3 Jacks Creek RM 0.0 to 4.4

Figure 8.3 Jacks Creek RM 0.0 to 4.4

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 37 is under site 45.

Jacks Creek is a third order stream located in the Upper Left Fork Beaver Creek subwatershed in Floyd County (Figure 8.3). Information about Jacks Creek, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.9. It has a catchment of 3,721 acres (5.8 square miles) with an 86% forested and 5.4% developed land cover (Table 8.10). This subwatershed is entirely un-sewered. There are no stream water withdrawals in this subwatershed. Sampling data from site 38 is presented in Table 8.11 and TMDL allocations in Table 8.12.

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
	Jacks								
	Creek								
Jacks	0.0 to								
Creek	4.4	495089_01	Floyd	3721.05	5.81	3rd order			
								-	
			Sample	Sample			+ to	from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
38	38	0.1	37.36347	-82.73338	8.1	0	0.00077	0	8.1008

Table 8.9 Jacks Creek RM 0.0 to 4.4 Information

Table 8.10 Jacks Creek RM 0.0 to 4.4 Subwatershed Land Cover

	Watershed	Watershed	% of Total	Future Growth
Land Cover	Acres	Square Miles	Area	WLA %
Open Water	0.00	0.00	0.00	
Developed	200.75	0.31	5.39	1.0
Barren Land	40.24	0.06	1.08	
Forest	3187.95	4.98	85.67	
Grassland/Herbaceous	257.88	0.40	6.93	
Pasture/Hay	32.46	0.05	0.87	
Cultivated Crops	1.56	0.00	0.04	
Wetlands	0.22	0.00	0.01	
Totals	3721.05	5.81	100.00	

Table 8.11 Jacks Creek RM 0.0 to 4.4 Data (Site 38)

			Instantaneous Load	Unit Area Load
	<u>E</u> . <u>coli</u>	Flow	(billion <u>E</u> . <u>coli</u>	(million <u>E</u> . <u>coli</u>
Collection Date	(colonies/100 mls)	(cfs)	colonies/day)	colonies/day/acre)
05/16/08	480	2.623	30.80	8.28
05/30/08	700	17.677	302.74	81.36
06/13/08	1000	1.3287	32.51	8.74
06/27/08	3700	1.027	92.97	24.98
07/11/08	450	1.026	11.29	3.03
07/31/08	9000	4.856	1069.25	287.35
08/08/08	520	1.164	14.81	3.98
08/22/08	180	0.714	3.14	0.85
09/12/08	1800	2.853	125.64	33.77
09/20/08	560	1.215	16.65	4.47
10/17/08	600	0.642	9.42	2.53
10/17/08 (QA Sample)	800	N/A	N/A	N/A
10/24/08	90	0.397	0.87	0.23
10/24/08 (QA Sample)	180	N/A	N/A	N/A
Greatest Concentration	9000			

Final Beaver Creek Watershed E. coli TMDL

1 abic 0.12 1 MIDL 101 Jacks CICCK INVI 0.0 10 4	Table 8.12	2 TMDL	for Jacks	Creek RM	0.0 to 4.4
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TMDL Table					<u>E</u> . <u>coli</u> (billion colonies/day)	
					1783.7241	Existing Load
					47.5660	Total TMDL
					4.7566	MOS
					42.8094	TMDL Target
AI number	KPDES #	Discharger Facility Name	Туре	Design Capacity (cfs)	97.60	% reduction
4349	KYG401133	JONES RESIDENCE	Dwelling Other than Apartment	0.000774	0.0045	KPDES WLA
			Addition to MAF (sum of cfs)	0.000774	42.8048	remainder
					0.4280	Future Growth WLA ⁽¹⁾
					0.4325	Total WLA
					42.3768	LA

Note: (1) Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.



8.4 Otter Creek RM 0.0 to 0.5

Figure 8.4 Otter Creek RM 0.0 to 0.5 Note: Due to map resolution, some sites are masked by symbols for other sites. Site 37 is under site 45.

Otter Creek is a second order stream located in the Upper Left Fork Beaver Creek subwatershed in Floyd County (Figure 8.4). Information about Otter Creek, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.13. It has a catchment of 2,123 acres (3.3 square miles) with an 85% forested and 7.4% developed land cover (Table 8.14). This subwatershed is partially sewered around the city of Wheelwright (see Figure 8.5). There are no stream water withdrawals in this subwatershed. Sampling data from site 37 is presented in Table 8.15 and TMDL allocations in Table 8.16.

C true or me	Stream		Country	A	Square	Starson Orden			
Stream	Segment	WBID #	County	Acres	Milles	Stream Order			
	Otter								
	Creek								
Otter	0.0 to								
Creek	0.5	KY500021_01	Floyd	2123.24	3.32	2nd order			
			Sample	Sample			⊥ to	from	Adjusted
			Sample	Sample			± 10	- 110111	Aujusicu
EKU	MAP	Sample Point	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
37	37	0.05	37.35389	-82.71650	4.6	0	0.34890	0.00000	4.9489

Table 8.13 Otter Creek RM 0.0 to 0.5 Information

Table 8.14 Otter Creek RM 0.0 to 0.5 Subwatershed Land Cover

	Watershed	Watershed	% of Total	Future Growth
Land Cover	Acres	Square Miles	Area	WLA %
Open Water	0.00	0.00	0.00	
Developed	157.33	0.25	7.41	1.0
Barren Land	29.55	0.05	1.39	
Forest/Shrubland	1807.92	2.82	85.15	
Grassland/Herbaceous	122.66	0.19	5.78	
Pasture/Hay	4.89	0.01	0.23	
Cultivated Crops	0.67	0.00	0.03	
Wetlands	0.22	0.00	0.01	
Totals	2123.24	3.32	100.00	

Table 8.15 Otter Creek RM 0.0 to 0.5 Data (Site 37)

			Instantaneous Load	Unit Area Load
	<u>E</u> . <u>coli</u>	Flow	(billion <u>E</u> . <u>coli</u>	(million <u>E</u> . <u>coli</u>
Collection Date	(colonies/100 mls)	(cfs)	colonies/day)	colonies/day/acre)
05/16/08	6000	1.461	214.47	101.01
05/30/08	38000	6.935	6447.46	3036.61
06/13/08	2000	1.1368	55.63	26.20
06/27/08	490	0.744	8.92	4.20
07/11/08	2700	1.787	118.04	55.60
07/31/08	>80000	1.959	3834.27	1805.86
08/08/08	730	0.931	16.63	7.83
08/22/08	570	0.224	3.12	1.47
09/12/08	2900	0.875	62.08	29.24
09/20/08	>80000	0.3732	730.45	344.03
10/17/08	2400	0.417	24.49	11.53
10/24/08	250	0.289	1.77	0.83
Greatest				
Concentration	80000			



Figure 8.5 Sewer Lines in Otter Creek Subwatershed

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 37 is under site 45.

1 4010 0.1			0.5			
					E. coli	
TMDL					(billion	
Table					colonies/day)	
1 4010					colonies/uay)	
						Existing
					9686.2876	Load
						Total
					20.0580	
					29.0509	
		'			2.9059	MOS
						TMDL
					26,1530	Target
					20.1000	Turget
				Design		
AI		Discharger		Capacity		%
number	KPDES #	Facility Name	Type	(cfs)	99.73	reduction
						VDDEC
10.501		WHEELWKIGHT	Sewerage	0.010106505		KPDES
40534	KY0028789	STP	System	0.348126525	2.0441	WLA
			Dwelling			
			Other then			VDDES
11005	WNC 401500		Other than	0.000772615	0.0045	NPDES
44695	KYG401580	RESIDENCE	Apartment	0.000773615	0.0045	WLA
						Total
						KPDES
					2 0486	WLA
			Addition		2.0700	
			to MAF			
			(sum of			
			cfs)	0.34890014	24.1043	remainder
						T
						Future
						Growth
					0.2410	WLA ⁽¹⁾
						Total
					2.2896	WLA
					23.8633	LA

Table 8.16 TMDL for Otter Creek RM 0.0 to 0.5

Note:

(1) Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.

8.5 Left Fork Beaver Creek RM 18.7 to 28.6



Figure 8.6 Left Fork Beaver Creek RM 18.7 to 28.6

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 37 is under site 45.

The Left Fork Beaver Creek at RM 18.7 is a fourth order stream located in Floyd County. Its subwatershed is identical to the Upper Left Fork Beaver Creek subwatershed (Figure 8.6). Information about this subwatershed, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.17. It has a catchment of 7,019 acres (11 square miles) with an 87% forested and 6.9% developed land cover (Table 8.18). Portions of this subwatershed are sewered around the city of Wheelwright (see Figure 5.18). There are no stream water withdrawals in this subwatershed. This segment had two sample sites and data from sites 45 and 46 is presented in Table 8.19. Because both sites had the same greatest concentration (>80,000), the downstream-most site (site 46) was used to set the TMDL. The TMDL calculations for site 45 are shown in Appendix E. The TMDL for Left Fork Beaver RM 18.7 to 28.6 (site 46) is shown in Table 8.20.

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
	Left		2						
	Fork								
Left	Beaver								
Fork	Creek								
Beaver	18.7 to								
Creek	28.6	496194_04	Floyd	7019.46	10.97	4th order			
			Sample	Sample			+ to	- from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
45	45	23.4	37.35390	-82.71630	15.4	23.4	0.00077	0.00000	15.4008
46	46	19.6	37.38095	82.73524	35	18.7	0.38495	0.00000	35.3850

Table 8.17 Left Fork Beaver Creek RM 18.7 to 28.6 Information

Table 8.18 Left Fork Beaver (Creek RM 18.7 to 28.	.6 Subwatershed Land Cover
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		Watershed		
	Watershed	Square	% of Total	Future Growth
Land Cover	Acres	Miles	Area	WLA %
Open Water	0.00	0.00	0.00	
Developed	482.05	0.75	6.87	1.0
Barren Land	59.62	0.09	0.85	
Forest/ Shrubland	6114.97	9.55	87.11	
Grassland/Herbaceous	332.34	0.52	4.73	
Pasture/ Hay	29.36	0.05	0.42	
Cultivated Crops	0.89	0.00	0.01	
Wetlands	0.22	0.00	0.00	
Totals	7019.46	10.97	100.00	

Table 8.19 Left Fork Beaver Creek RM 18.7 to 28.6 Data (Sites 45 and 46)

Site 45				
	<u>E</u> . <u>coli</u>		Instantaneous Load	Unit Area Load
	(colonies/100	Flow	(billion <u>E</u> . <u>coli</u>	(million <u>E</u> . <u>coli</u>
Collection Date	mls)	(cfs)	colonies/day)	colonies/day/acre)
05/16/08	3900	4.395	419.36	59.74
05/30/08	1400	21.576	739.02	105.28
06/13/08	2500	0.138	8.44	1.20
06/27/08	580	1.103	15.65	2.23
07/11/08	310	0.555	4.21	0.60
07/31/08	>80000	5.316	10404.80	1482.28
08/08/08	740	0.689	12.47	1.78
08/22/08	600	0.508	7.46	1.06
09/12/08	30000	0.520	381.67	54.37
09/20/08	2000	0.158	7.73	1.10
10/17/08	6800	0.958	159.38	22.71
10/24/08	860	0.433	9.11	1.30
10/24/08 (QA Sample)	390	N/A	N/A	N/A
Greatest Concentration	80000			
Site 46				
Site 46	<u>E</u> . <u>coli</u>		Instantaneous Load	Unit Area Load
Site 46	<u>E</u> . <u>coli</u> (colonies/100	Flow	Instantaneous Load (billion <u>E</u> . <u>coli</u>	Unit Area Load (million <u>E</u> . <u>coli</u>
Site 46 Collection Date	<u>E</u> . <u>coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E</u> . <u>coli</u> colonies/day)	Unit Area Load (million <u>E</u> . <u>coli</u> colonies/day/acre)
Site 46 Collection Date 05/16/08	<u>E</u> . <u>coli</u> (colonies/100 mls) 800	Flow (cfs) 8.799	Instantaneous Load (billion <u>E</u> . <u>coli</u> colonies/day) 172.22	Unit Area Load (million <u>E</u> . <u>coli</u> colonies/day/acre) 10.66
Site 46 Collection Date 05/16/08 05/30/08	<u>E</u> . <u>coli</u> (colonies/100 mls) 800 290	Flow (cfs) 8.799 72.576	Instantaneous Load (billion <u>E</u> . <u>coli</u> colonies/day) 172.22 514.93	Unit Area Load (million <u>E</u> . <u>coli</u> colonies/day/acre) 10.66 31.86
Site 46 Collection Date 05/16/08 05/30/08 06/13/08	<u>E. coli</u> (colonies/100 mls) 800 290 130	Flow (cfs) 8.799 72.576 5.353	Instantaneous Load (billion <u>E</u> . <u>coli</u> colonies/day) 172.22 514.93 17.03	Unit Area Load (million <u>E</u> . <u>coli</u> colonies/day/acre) 10.66 31.86 1.05
Site 46 Collection Date 05/16/08 05/30/08 06/13/08 06/27/08	E. <u>coli</u> (colonies/100 mls) 800 290 130 90	Flow (cfs) 8.799 72.576 5.353 2.727	Instantaneous Load (billion <u>E</u> . <u>coli</u> colonies/day) 172.22 514.93 17.03 6.00	Unit Area Load (million <u>E</u> . <u>coli</u> colonies/day/acre) 10.66 31.86 1.05 0.37
Site 46 Collection Date 05/16/08 05/30/08 06/13/08 06/27/08 07/11/08	<u>E. coli</u> (colonies/100 mls) 800 290 130 90 130	Flow (cfs) 8.799 72.576 5.353 2.727 3.555	Instantaneous Load (billion <u>E</u> . <u>coli</u> colonies/day) 172.22 514.93 17.03 6.00 11.31	Unit Area Load (million <u>E</u> . <u>coli</u> colonies/day/acre) 10.66 31.86 1.05 0.37 0.70
Site 46 Collection Date 05/16/08 05/30/08 06/13/08 06/27/08 07/11/08 07/31/08	E. <u>coli</u> (colonies/100 mls) 800 290 130 90 130 >80000	Flow (cfs) 8.799 72.576 5.353 2.727 3.555 23.673	Instantaneous Load (billion <u>E</u> . <u>coli</u> colonies/day) 172.22 514.93 17.03 6.00 11.31 46334.23	Unit Area Load (million <u>E</u> . <u>coli</u> colonies/day/acre) 10.66 31.86 1.05 0.37 0.70 2867.24
Site 46 Collection Date 05/16/08 05/30/08 06/13/08 06/27/08 07/11/08 07/31/08 7/31/08 (QA Sample)	E. <u>coli</u> (colonies/100 mls) 800 290 130 90 130 >80000 17000	Flow (cfs) 8.799 72.576 5.353 2.727 3.555 23.673 N/A	Instantaneous Load (billion <u>E. coli</u> colonies/day) 172.22 514.93 17.03 6.00 11.31 46334.23 N/A	Unit Area Load (million <u>E</u> . <u>coli</u> colonies/day/acre) 10.66 31.86 1.05 0.37 0.70 2867.24 N/A
Site 46 Collection Date 05/16/08 05/30/08 06/13/08 06/27/08 07/11/08 07/31/08 7/31/08 (QA Sample) 08/08/08	E. <u>coli</u> (colonies/100 mls) 800 290 130 90 130 >80000 17000 170	Flow (cfs) 8.799 72.576 5.353 2.727 3.555 23.673 N/A 4.089	Instantaneous Load (billion <u>E</u> . coli colonies/day) 172.22 514.93 17.03 6.00 11.31 46334.23 N/A 17.01	Unit Area Load (million <u>E</u> . <u>coli</u> colonies/day/acre) 10.66 31.86 1.05 0.37 0.70 2867.24 N/A 1.05
Site 46 Collection Date 05/16/08 05/30/08 06/13/08 06/27/08 07/11/08 07/31/08 7/31/08 (QA Sample) 08/08/08 08/22/08	E. coli (colonies/100 mls) 800 290 130 90 130 90 130 90 130 90 130 90 130 30	Flow (cfs) 8.799 72.576 5.353 2.727 3.555 23.673 N/A 4.089 1.406	Instantaneous Load (billion <u>E. coli</u> colonies/day) 172.22 514.93 17.03 6.00 11.31 46334.23 N/A 17.01 1.03	Unit Area Load (million <u>E</u> . <u>coli</u> colonies/day/acre) 10.66 31.86 1.05 0.37 0.70 2867.24 N/A 1.05 0.06
Site 46 Collection Date 05/16/08 05/30/08 06/13/08 06/27/08 07/11/08 07/31/08 7/31/08 (QA Sample) 08/08/08 08/22/08 09/12/08	E. coli (colonies/100 mls) 800 290 130 90 130 90 130 580000 17000 1700 30 1100	Flow (cfs) 8.799 72.576 5.353 2.727 3.555 23.673 N/A 4.089 1.406 3.633	Instantaneous Load (billion <u>E</u> . coli colonies/day) 172.22 514.93 17.03 6.00 11.31 46334.23 N/A 17.01 1.03 97.77	Unit Area Load (million <u>E</u> . <u>coli</u> colonies/day/acre) 10.66 31.86 1.05 0.37 0.70 2867.24 N/A 1.05 0.06 6.05
Site 46 Collection Date 05/16/08 05/30/08 06/13/08 06/27/08 07/11/08 07/31/08 7/31/08 (QA Sample) 08/08/08 09/12/08 09/12/08	E. coli (colonies/100 mls) 800 290 130 90 130 90 130 90 130 90 130 90 130 30 1100 30	Flow (cfs) 8.799 72.576 5.353 2.727 3.555 23.673 N/A 4.089 1.406 3.633 1.2618	Instantaneous Load (billion <u>E. coli</u> colonies/day) 172.22 514.93 17.03 6.00 11.31 46334.23 N/A 17.01 1.03 97.77 0.93	Unit Area Load (million <u>E</u> . <u>coli</u> colonies/day/acre) 10.66 31.86 1.05 0.37 0.70 2867.24 N/A 1.05 0.06 6.05 0.06
Site 46 Collection Date 05/16/08 05/30/08 06/13/08 06/27/08 07/11/08 07/31/08 7/31/08 (QA Sample) 08/08/08 08/22/08 09/12/08 09/20/08 9/20/08 (QA Sample)	E. coli (colonies/100 mls) 800 290 130 90 130 90 130 50	Flow (cfs) 8.799 72.576 5.353 2.727 3.555 23.673 N/A 4.089 1.406 3.633 1.2618 N/A	Instantaneous Load (billion <u>E</u> . coli colonies/day) 172.22 514.93 17.03 6.00 11.31 46334.23 N/A 17.01 1.03 97.77 0.93 N/A	Unit Area Load (million <u>E</u> . <u>coli</u> colonies/day/acre) 10.66 31.86 1.05 0.37 0.70 2867.24 N/A 1.05 0.06 6.05 0.06 N/A
Site 46 Collection Date 05/16/08 05/30/08 06/13/08 06/27/08 07/11/08 07/31/08 7/31/08 (QA Sample) 08/08/08 09/12/08 09/20/08 9/20/08 (QA Sample) 10/17/08	E. coli (colonies/100 mls) 800 290 130 90 130 90 130 90 130 90 130 90 130 90 130 90 130 90 130 90 130 90 17000 1700 30 1100 30 50 90	Flow (cfs) 8.799 72.576 5.353 2.727 3.555 23.673 N/A 4.089 1.406 3.633 1.2618 N/A 2.10	Instantaneous Load (billion <u>E. coli</u> colonies/day) 172.22 514.93 17.03 6.00 11.31 46334.23 N/A 17.01 1.03 97.77 0.93 N/A 4.62	Unit Area Load (million <u>E</u> . <u>coli</u> colonies/day/acre) 10.66 31.86 1.05 0.37 0.70 2867.24 N/A 1.05 0.06 6.05 0.06 N/A 0.29
Site 46 Collection Date 05/16/08 05/30/08 06/13/08 06/27/08 07/11/08 07/31/08 7/31/08 (QA Sample) 08/08/08 09/12/08 09/20/08 9/20/08 (QA Sample) 10/17/08 10/24/08	E. coli (colonies/100 mls) 800 290 130 90 130 90 130 200 17000 17000 17000 17000 17000 30 1100 30 50 90 130	Flow (cfs) 8.799 72.576 5.353 2.727 3.555 23.673 N/A 4.089 1.406 3.633 1.2618 N/A 2.10 1.057	Instantaneous Load (billion <u>E</u> . coli colonies/day) 172.22 514.93 17.03 6.00 11.31 46334.23 N/A 17.01 1.03 97.77 0.93 N/A 4.62 3.36	Unit Area Load (million <u>E</u> . <u>coli</u> colonies/day/acre) 10.66 31.86 1.05 0.37 0.70 2867.24 N/A 1.05 0.06 6.05 0.06 N/A 0.29 0.21

Table 8.20 TMDL for L	Left Fork Beaver	Creek RM	18.7 to 28.6
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10010 0.20		olk beuvel eleek l	101110.7 to 20.0			
					E. coli	
TMDL					(billion	
Table					colonies/day)	
1000					coronics, duy)	Existing
Site 16					60257 5721	Land
Sile 40					09237.3721	Load
						Total
					207.7727	TMDL
					20.7772	MOG
					20.7773	MOS
						TMDL
					186 9954	Target
				Design	100.7754	Target
		Disahangan		Composity		0/
A.Y. 1	KDDEC //	Discharger	T	Capacity	00.72	%
AI number	KPDES #	Facility Name	Туре	(cfs)	99.73	reduction
		WHEEL WRIGHT	Sewerage			KPDES
40534	KV0028780	STD	System	0.3481265	2 0441	
40334	K10020709	511	System	0.3461203	2.0441	WLA
		OSBORNE				KPDES
35251	KY0089435	ELEM SCHOOL	School	0.0105212	0.0618	WLA
		SOUTH FLOYD				KPDES
35260	KY0093912	HIGH SCHOOL	School	0.0232084	0.1363	WLA
		IONEG				VDDEC
12.10		JONES	Dwelling Other	0.000		KPDES
4349	KYG401133	RESIDENCE	than Apartment	0.0007736	0.0045	WLA
		TACKETT	Dwelling Other			KPDES
7/181	KVG401470	PESIDENCE	than A partment	0.0007736	0.0045	WI A
/4101	K10401470	KESIDENCE		0.0007730	0.0045	WLA
		CAUDILL	Dwelling Other			KPDES
44695	KYG401580	RESIDENCE	than Apartment	0.0007736	0.0045	WLA
			· · · · ·			
		COCHRAN	Dwelling Other			KPDES
48897	KYG401646	RESIDENCE	than Apartment	0.0007736	0.0045	WLA
						Total
						KPDES
					2.2603	WLA
			Addition to			
			MAF (sum of			
			cfs)	0.3849506	184.7351	remainder
						Future
						Crosseth
						Growin
					1.8474	WLA (1)
						Total
					4.1077	WLA
					182,8877	LA
1	1	1	1	L		

Note:

(1) Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.

8.6 Frasure Creek RM 0.0 to 5.2



Figure 8.7 Frasure Creek RM 0.0 to 5.2

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 47 is under site 40.

Frasure Creek is a third order stream located in the Lower Left Fork Beaver Creek subwatershed in Floyd County (Figure 8.7). Information about Frasure Creek, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.21. It has a catchment of 7,360 acres (11.5 square miles) with an 83% forested and 5.1% developed land cover (Table 8.22). This subwatershed is entirely un-sewered. There are no stream water withdrawals in this subwatershed. This segment had two sample sites and data from sites 41 and 42 is presented in Table 8.23. Site 41 had the greatest concentration (71,000) so this concentration was used to set the existing loads and percent reduction for the impaired segment. However, to extrapolate to the end of the impaired segment, the Adjusted MAF from site 42 (15.6325 cfs) was used as the flow to set the TMDL for this impaired segment. The TMDL calculations for site 41 and 42 are shown in Appendix E while the TMDL for Frasure Creek RM 0.0 to 5.2 is shown in Table 8.24.

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
	Frasure								
	Creek								
Frasure	0.0 to								
Creek	5.2	492466_01	Floyd	3494.33	5.46	3rd order			
			Sample	Sample			+ to	- from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
41	41	3.25	37.42650	-82.70880	7.6	3.25	0.00077	0.00000	7.6008
42	42	0.25	37.45560	-82.73680	15.6	0	0.03249	0.00000	15.6325

Table 8.21 Frasure Creek RM 0.0 to 5.2 Subwatershed Information

Table 8.22 Frasure Creek RM 0.0 to 5.2 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	0.00	0.00	0.00	
Developed	376.21	0.59	5.11	1.0 ⁽¹⁾
Barren Land	115.46	0.18	1.57	
Forest/Shrubland	6099.62	9.53	82.87	
Grassland/Herbaceous	611.81	0.96	8.31	
Pasture/ Hay	151.51	0.24	2.06	
Cultivated Crops	5.56	0.01	0.08	
Wetlands	0.00	0.00	0.00	
Totals	7360.17	11.50	100.00	

⁽¹⁾ Note: The subwatershed upstream of Site 41 had 3.4% of its total area in the developed land cover category so 0.5% was used to determine the Future Growth WLA in the TMDL calculations for Site 41.

Table 8.23 Frasure Creek RM 0.0 to 5.2 Data (Sites 41 and 42)

			,	
Site 41				
	\underline{E} . <u>coli</u>		Instantaneous Load	Unit Area Load
	(colonies/100		(billion <u>E</u> . <u>coli</u>	(million <u>E</u> . <u>coli</u>
Collection Date	mls)	Flow (cfs)	colonies/day)	colonies/day/acre)
05/16/08	2000	N/A	N/A	N/A
05/30/08	1600	0.9202	36.02	10.31
06/13/08	170	0.3155	1.31	0.38
06/27/08	450	0.29	3.19	0.91
07/31/08	71000	18.8592	0.00	0.00
08/08/08	1700	0.474	32759.73	9375.11
8/8/08 (QA Sample)	360	N/A	19.71	5.64
09/12/08	13000	0.7636	N/A	N/A
09/20/08	1000	0.391	242.87	69.50
Greatest				
Concentration	71000 ⁽¹⁾		9.57	2.74
Site 42				
	<u>E</u> . <u>coli</u>		Instantaneous Load	Unit Area Load
	(colonies/100		(billion <u>E</u> . <u>coli</u>	(million <u>E</u> . <u>coli</u>
Collection Date	mls)	Flow (cfs)	colonies/day)	colonies/day/acre)
05/16/08	160	N/A	N/A	N/A
05/30/08	400	1.3342	13.06	1.77
06/13/08	570	6.321	88.15	11.98
06/27/08	560	0.8631	11.83	1.61
07/31/08	43000	N/A	N/A	N/A
08/08/08	440	0.588	6.33	0.86
08/22/08	900	0.116	2.55	0.35
8/22/08 (QA Sample)	1100	N/A	N/A	N/A
09/12/08	3300	0.709	57.24	7.78
9/12/08 (QA Sample)	3600	N/A	N/A	N/A
09/20/08	1900	0.256	11.90	1.62
10/17/08	3200	0.476	37.27	5.06
10/24/08	760	0.211	3.92	0.53
Greatest				

Note: ⁽¹⁾ Indicates concentration used to set existing load and percent reduction for impaired segment.

					<u>E</u> . <u>coli</u>	
TMDL					(billion	
Table					colonies/day)	
					07154 7145	Existing
					27154.7145	Load
					01 2007	Total
					91.7906	TMDL
					9.1791	MOS
					92 (115	
				Design	82.0115	Target
ΔT		Discharger		Design		0/
Al	VDDEC #	Discharger Equility Nome	Tuna	Capacity	00.70	%
number	KIDES#	MCDOWELL	Туре	(018)	99.70	reduction
						KDDES
35252	KV0079421	SCHOOL	School	0.0232084	0 1363	WI A
33232	K 10077421	SCHOOL	Dwelling	0.0232004	0.1303	WLA
		MITCHELL	Other than			KPDES
1269	KYG400478	RESIDENCE	Apartment	0.0007736	0.0045	WLA
1207			Dwelling	0.0007720		
		STUMBO	Other than			KPDES
1327	KYG400601	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		DYE	Other than			KPDES
1182	KYG400614	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		HALL	Other than			KPDES
1202	KYG400969	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		HOWELL	Other than			KPDES
4356	KYG401040	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		MOORE	Other than			KPDES
35887	KYG401533	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		BLANKENSHIP	Other than	0.000	0.001	KPDES
50021	KYG401692	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			VDDDC
71426	VVC 401000	NEWMAN	Other than	0.0007726	0.0045	KPDES
/1436	K1G401809	KESIDENCE	Apartment	0.0007736	0.0045	WLA
		COMDS	Dwelling			VDDES
74242	KVC401921	COMBS	A portmont	0.0007726	0.0045	MI A
14243	KIU401021	RESIDENCE	Apartment	0.0007730	0.0045	VVLA

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				Design	<u>E</u> . <u>coli</u>	
AI		Discharger		Capacity	(billion	
number	KPDES #	Facility Name	Туре	(cfs)	colonies/day)	
			Dwelling			
		HARVEL	Other than			KPDES
79525	KYG401931	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		MARTIN	Other than			KPDES
81193	KYG401970	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		LITTLE	Other than			KPDES
103052	KYG402117	RESIDENCE	Apartment	0.0007736	0.0045	WLA
						Total
						KPDES
					0.1908	WLA
			Addition			
			to MAF			
			(sum of			
			cfs)	0.0324918	82.4207	remainder
						Future
						Growth
					0.8242	$\mathbf{WLA}^{(1)}$
						Total
					1.0150	WLA
					81.5965	LA

Note:

(1) Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.

This data is distributed by the Comm onwealth of Kentucky, ographic Information (DGI), located in Frankfort, This data is available at http://kygeonet.ky.gov Viles n of Ge KV et.ky.go 0.125 0.25 0.75 0.5 0 Kentucki Prepared by: TMDL Section, KDOW 6/24/10 Legend Streams E. coli Sample Sites Simpson Branch 0.0 to 1.8 Open Water Developed, Open Space Developed Low Intensity Developed, Medium Intensity Developed, High Intensity Barren Land (Rock,Sand,Clay) Deciduous Forest MAGOFFIN Evergreen Forest REATHIT Mixed Forest FLOYD Shrub/Scrub Grasslands/Herbaceous Pasture/Hav Cultivated Crops KNOT Woody Wetlands PIKE Emergent Herbaceous Wetlands Dwelling other than Apartment I FTCHE

8.7 Simpson Branch RM 0.0 to 1.8

Figure 8.8 Simpson Branch RM 0.0 to 1.8

Simpson Branch is a second order stream located in the Lower Left Fork Beaver Creek subwatershed in Floyd County (Figure 8.8). Information about Simpson Branch, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.25. It has a catchment of 1,259 acres (2 square miles) with an 88% forested and 3.6% developed land cover (Table 8.26). This subwatershed is entirely un-sewered. There are no stream water withdrawals in this subwatershed. Sampling data from site 44 is presented in Table 8.27 and TMDL allocations in Table 8.28.

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
	Simpson								
	Branch								
Simpson	0.0 to								
Branch	1.8	503532_01	Floyd	1258.93	1.97	2nd order			
			Sample	Sample			+ to	- from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
44	44	0.2	37.47600	-82.74252	2.6	0	0.00077	0.00000	2.6008

Table 8.25 Simpson Branch RM 0.0 to 1.8 Information

Table 8.26 Simpson Branch RM 0.0 to 1.8 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	0.22	0.00	0.02	
Developed	44.84	0.07	3.56	0.5
Barren Land	5.77	0.01	0.46	
Forest/Shrubland	1110.64	1.74	88.22	
Grassland/Herbaceous	55.72	0.09	4.43	
Pasture/Hay	40.40	0.06	3.21	
Cultivated Crops	1.33	0.00	0.11	
Wetlands	0.00	0.00	0.00	
Totals	1258.93	1.97	100.00	

Table 8.27 Simpson Branch RM 0.0 to 1.8 Data (Site 44)

Collection Date	<u>E</u> . <u>coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E</u> . <u>coli</u> colonies/day)	Unit Area Load (million <u>E</u> . <u>coli</u> colonies/day/acre)
05/16/08	30	N/A	N/A	N/A
05/30/08	40	0.2607	0.26	0.20
06/13/08	100	0.9723	2.38	1.89
07/31/08	54000	N/A	N/A	N/A
08/08/08	210	0.058	0.30	0.24
08/22/08	40	N/A	N/A	N/A
09/12/08	440	0.0624	0.67	0.53
09/20/08	160	0.077	0.30	0.24
10/24/08	1500	0.0465	1.71	1.36
Greatest Concentration	54000			

Table 8.2	8 TMDL for Si	mpson Branch RM	[0.0 to 1.8	

		1				
					E. coli	
					(billion	
TMDI					colonies/	
Table					day	
Table					uay)	D
						Existing
					3436.0145	Load
						Total
					15.2712	TMDL
					1.5271	MOS
						TMDL
					13.7441	Target
				Design		
AI		Discharger		Capacity		%
number	KPDFS #	Facility Name	Type	(cfs)	99.60	reduction
number			Турс	(015)	77.00	reduction
			Dwelling			
		WILLIAMSON	Other then			KDDES
74000	WWC 401 40C	DECIDENCE		0.0007726	0.0045	
/4022	KYG401406	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Addition			
			to MAF			
			(sum of			
			cfs)	0.0007736	13.7395	remainder
						Future
						Growth
					0.0687	WLA ⁽¹⁾
						Total
					0.0732	WLA
					13.6708	LA

Note: ⁽¹⁾ Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.



8.8 Spurlock Creek RM 0.0 to 0.6

Figure 8.9 Spurlock Creek RM 0.0 to 0.6

Spurlock Creek is a third order stream located in the Lower Left Fork Beaver Creek subwatershed in Floyd County (Figure 8.9). Information about Spurlock Creek, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.29. It has a catchment of 2,468 acres (3.9 square miles) with a 79% forested and 7.6% developed land cover (Table 8.30). This subwatershed is entirely un-sewered. Note that the upper portion of this subwatershed (above RM 0.6) has a fully supporting segment (see information for fully supporting segments in Appendix F). There are no stream water withdrawals in this subwatershed. Sampling data from site 51 is presented in Table 8.31 and TMDL allocations in Table 8.32.

							_		
	Stream				Square				
Stream	Segment	WBID #	County	Acres	Miles	Stream Order			
	Spurlock								
	Creek								
Spurlock	0.0 to								
Creek	0.6	504191_01	Floyd	2468.29	3.86	3rd order			
			Sample	Sample			+ to	- from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
51	51	0.1	37.53080	-82.74220	5.1	0	0.00309	0.00000	5.1031

Table 8.29 Spurlock Creek RM 0.0 to 0.6 Information

Table 8.30 Spurlock Creek RM 0.0 to 0.6 Subwatershed Land Cover

	Watershed	Watershed	% of Total	Future Growth
Land Cover	Acres	Square Miles	Area	WLA %
Open Water	5.11	0.01	0.21	
Developed	188.64	0.29	7.64	1.0
Barren Land	67.32	0.11	2.73	
Forest/Shrubland	1945.26	3.04	78.81	
Grassland/Herbaceous	217.52	0.34	8.81	
Pasture/Hay	39.55	0.06	1.60	
Cultivated Crops	4.67	0.01	0.19	
Wetlands	0.22	0.00	0.01	
Totals	2468.29	3.86	100.00	

Table 8.31 Spurlock Creek RM 0.0 to 0.6 Data (Site 51)

	<u>E</u> . <u>coli</u> (colonies/100	Flow	Instantaneous Load (billion E.	Unit Area Load (million E. coli
Collection Date	mls)	(cfs)	<u>coli</u> colonies/day)	colonies/day/acre)
05/16/08	500	24.131	295.19	119.59
05/30/08	4100	15.727	1577.57	639.13
06/13/08	410	11.539	115.75	46.89
06/27/08	360	7.051	62.10	25.16
07/11/08	600	N/A	N/A	N/A
07/31/08	49000	46.941	56273.91	22798.74
7/31/08 (QA Sample)	46000	46.941	N/A	N/A
08/08/08	400	5.676	55.55	22.50
08/22/08	450	1.677	18.46	7.48
09/12/08	1400	20.251	693.64	281.02
09/20/08	1100	3.884	104.53	42.35
10/17/08	600	3.514	51.58	20.90
10/24/08	10	2.294	0.56	0.23
Greatest				
Concentration	49000			

TMDL Table					<u>E</u> . <u>coli</u> (billion colonies/ day)	
					6117.7027	Existing Load
					29.9643	Total TMDL
					2.9964	MOS
						TMDL
					26.9678	Target
				Design		
AI		Discharger	-	Capacity		%
number	KPDES #	Facility Name	Туре	(cfs)	99.60	reduction
			Dwelling			KDDEG
16111	VVC 401 (01	WILLIAMSON	Other than	0.00077261	0.0045	KPDES
40144	K1G401001	KESIDENCE	Duralling	0.00077301	0.0045	WLA
		CASE	Other then			VDDES
1161	KYG400692	RESIDENCE	Apartment	0.00077361	0 0045	WLA
1101	KIG +00072	RESIDENCE	Dwelling	0.00077501	0.0042	
		SHREWBERRY	Other than			KPDES
1315	KYG400677	RESIDENCE	Apartment	0.00077361	0.0045	WLA
			Dwelling			
		CASTLE	Other than			KPDES
1162	KYG400678	RESIDENCE	Apartment	0.00077361	0.0045	WLA
						Total
						KPDES
					0.0180	WLA
			Addition			
			to MAF			
			(sum of	0.00200446	26.0407	· 1
			cis)	0.00309446	26.9497	remainder
						r uture Crowth
					0 2695	$\mathbf{WLA}^{(1)}$
			 		0.2075	Total
					0.2875	WLA
					26.6802	LA

Note: ⁽¹⁾ Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.



8.9 Sizemore Branch RM 0.0 to 2.0

Figure 8.10 Sizemore Branch RM 0.0 to 2.0

Sizemore Branch is a first order stream located in the Lower Left Fork Beaver Creek subwatershed in Floyd County (Figure 8.10). Information about Sizemore Branch, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.33. It has a catchment of 990 acres (1.5 square miles) with an 80% forested and 7% developed land cover (Table 8.34). This subwatershed is entirely un-sewered. There are no stream water withdrawals in this subwatershed. Sampling data from site 43 is presented in Table 8.35 and TMDL allocations in Table 8.36.

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Sizemore	Sizemore Branch	503590-01	Floyd	989 59	1 55	1st order			
Drahen	0.0 10 2.0	505570_01	Tioyu	707.57	1.55	1st order			
			Sample	Sample			+ to	- from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
43	43	0.05	37.47028	-82.75408	2.1	0	0.00309	0.00000	2.1031

Table 8.33 Sizemore Branch RM 0.0 to 2.0 Information

Table 8.34 Sizemore Branch RM 0.0 to 2.0 Subwatershed Land Cover

	Watershed	Watershed	% of Total	Future Growth
Land Cover	Acres	Square Miles	Area	WLA %
Open Water	0.00	0.00	0.00	
Developed	68.95	0.11	6.97	1.0
Barren Land	6.01	0.01	0.61	
Forest/Shrubland	789.18	1.23	79.75	
Grassland/Herbaceous	81.19	0.13	8.20	
Pasture/Hay	42.93	0.07	4.34	
Cultivated Crops	1.33	0.00	0.13	
Wetlands	0.00	0.00	0.00	
Totals	989.59	1.55	100.00	

Table 8.35 Sizemore Branch RM 0.0 to 2.0 Data (site 43)

			Instantaneous		
	<u>E</u> . <u>coli</u>		Load (billion <u>E</u> .	Unit Area Load	
	(colonies/100	Flow	<u>coli</u>	(million <u>E</u> . <u>coli</u>	
Collection Date	mls)	(cfs)	colonies/day)	colonies/day/acre)	
05/16/08	800	N/A	N/A	N/A	
05/30/08	270	0.1229	0.81	0.82	
5/30/08 (QA Sample)	220	N/A	N/A	N/A	
06/13/08	300	0.1023	0.75	0.76	
06/27/08	760	0.0669	1.24	1.26	
07/31/08	9000	N/A	N/A	N/A	
08/08/08	350	0.152	1.30	1.32	
08/22/08	700	0.084	1.44	1.45	
09/12/08	1700	0.0865	3.60	3.64	
09/20/08	39000	0.154	146.94	148.49	
9/20/08 (QA Sample)	27000	N/A	N/A	N/A	
10/17/08	1200	0.2832	8.31	8.40	
10/24/08	72000	N/A	N/A	N/A	
Greatest Concentration	72000				

TMDL Table					<u>E</u> . <u>coli</u> (billion colonies/ day)	
					2704 (727	Existing
					3/04.6/3/	
					12.3489	TMDL
					1.2349	MOS
						TMDL
					11.1140	Target
		Discharger		Design		
AI		Facility		Capacity		%
number	KPDES #	Name	Туре	(cfs)	99.70	reduction
			Dwelling			
		YOUMANS	Other than			KPDES
1369	KYG400724	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		HICKS	Other than			KPDES
1218	KYG400567	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		COLLINS	Other than			KPDES
1168	KYG400854	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
11.00		COLLINS	Other than	0.000	0.0045	KPDES
1168	KYG401516	RESIDENCE	Apartment	0.000774	0.0045	WLA
						Total
					0.0100	KPDES
			A 1 1.		0.0180	WLA
			Addition to			
			MAF (sum	0.002004	11.0050	
			OI CIS)	0.003094	11.0959	remainder
						Future
					0 1110	Growth WIA ⁽¹⁾
					0.1110	Total
					0.1290	WLA
					10.08/0	T A
					10.9849	LA

Note:

(1) Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.


8.10 Spewing Camp Branch RM 0.0 to 3.1

Figure 8.11 Spewing Camp Branch RM 0.0 to 3.1

Spewing Camp Branch is a second order stream located in the Lower Left Fork Beaver Creek subwatershed in Floyd County (Figure 8.11). Information about Spewing Camp Branch, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.37. It has a catchment of 1,572 acres (2.5 square miles) with an 85% forested and 3.7% developed land cover (Table 8.38). This subwatershed is entirely un-sewered. There are no stream water withdrawals in this subwatershed. Sampling data from site 40 is presented in Table 8.39 and TMDL allocations in Table 8.40.

	Stream				Square				
Stream	Segment	WBID #	County	Acres	Miles	Stream Order			
	Spewing								
	Camp								
	Branch								
Spewing	0.0 to								
Camp	3.1	504061_01	Floyd	1572.02	2.46	2nd order			
			Sample	Sample			+ to	- from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
40	40	0.05	37.43039	-82.73443	3.4	0	0.00155	0.00000	3.4015

Table 8.37 Spewing Camp Branch RM 0.0 to 3.1 Information

Table 8.38 Spewing Camp Branch RM 0.0 to 3.1 Subwatershed Land Cover

	Watershed	Watershed	% of Total	Future Growth
Land Cover	Acres	Square Miles	Area	WLA %
Open Water	4.00	0.01	0.25	
Developed	57.39	0.09	3.65	0.5
Barren Land	45.82	0.07	2.91	
Forest/Shrubland	1340.68	2.09	85.28	
Grassland/Herbaceous	106.77	0.17	6.79	
Pasture/Hay	15.13	0.02	0.96	
Cultivated Crops	2.00	0.00	0.13	
Wetlands	0.22	0.00	0.01	
Totals	1572.02	2.46	100.00	

Table 8.39 Spewing Camp Branch RM 0.0 to 3.1 Data (Site 40)

	<u>E</u> . <u>coli</u>		Instantaneous	Unit Area Load
	(colonies/100		Load (billion <u>E</u> .	(million <u>E</u> . <u>coli</u>
Collection Date	mls)	Flow (cfs)	<u>coli</u> colonies/day)	colonies/day/acre)
05/16/08	1300	N/A	N/A	N/A
05/30/08	<10	0.122	0.03	0.02
06/13/08	200	0.0464	0.23	0.14
6/13/08 (QA Sample)	300	N/A	N/A	N/A
06/27/08	100	0.0476	0.12	0.07
07/11/08	310	0.098	0.74	0.47
07/31/08	52000	25.9819	33054.68	21026.88
08/08/08	40	5.278	5.17	3.29
08/22/08	90	0.065	0.14	0.09
8/22/08 (QA Sample)	160	N/A	N/A	N/A
09/12/08	190	0.522	2.43	1.54
09/20/08	<10	0.065	0.02	0.01
10/17/08	190	0.0408	0.19	0.12
10/17/08 (QA Sample)	190	N/A	N/A	N/A
10/24/08	10	0.038	0.01	0.01
Greatest Concentration	52000			

	r					
					E. coli	
					(billion	
TMDI					colonies/	
Table					dav	
Table					uay)	Evicting
					1007 51 15	Existing
					4327.5145	Load
						Total
					19.9731	TMDL
					1.9973	MOS
						TMDI
					17 0758	Torgot
					17.9730	Target
		Discharger		Design		
AI		Facility		Capacity		%
number	KPDFS #	Name	Type	(cfs)	99 58	reduction
number		Ivanic	Type	(013)	77.50	reduction
			Dwelling			
		BARTLEY	Other than			KPDES
4405	KYG401197	RESIDENCE	Anartment	0.00077361	0 0045	WLA
1105	RIGIOII	REDIDERCE	ripurtment	0.00077501	0.0042	
			Dwelling			
		YORK	Other than			KPDES
49354	KYG401654	RESIDENCE	Apartment	0.00077361	0.0045	WLA
						Total
						KPDES
					0.0090	WLA
			Addition to			
			MAF (sum			
			of cfs)	0.00154723	17.9667	remainder
						Future
						Crowth
					0.0000	
					0.0898	WLA
						Total
					0.0988	WLA
					17.8769	LA

Table 8.40 TMDL for Spewing Camp Branch RM 0.0 to 3.1

8.11 Left Fork Beaver Creek RM 11.4 to 13.55



Figure 8.12 Left Fork Beaver Creek RM 11.4 to 13.55

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 37 is under site 45 and site 40 is under site 47.

Left Fork Beaver Creek at RM 13.55 is a fourth order stream located in Floyd County (Figure 8.12). Information about Left Fork Beaver Creek at RM 13.55, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.41. Its watershed encompasses all of the Upper Left Fork Beaver Creek subwatershed and upper portions of the Lower Left Fork Beaver Creek subwatershed. It has a catchment of 25,003 acres (39.1 square miles) with an 85% forested and 6.8% developed land cover (Table 8.42). Portions of this subwatershed around the city of Wheelwright are sewered (see Figure 5.16). There is one stream water withdrawal in this subwatershed at RM 15.36 of the Left Fork Beaver Creek (see Table 8.43). Sampling data from site 48 is presented in Table 8.44 and TMDL allocations in Table 8.45.

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
	Left								
Left	Fork Beaver								
Fork	Creek								
Beaver	11.4 to								
Creek	13.55	496194_02	Floyd	25003.22	39.07	4th order			
			Sample	Sample			+ to	- from	Adjuste
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
48	48	11.8	37.44780	-82.73840	53.4	11.4	0.39114	0.09283	53.698

Table 8.41 Left Fork Beaver Creek RM 11.4 to 13.55 Information

Table 8.42 Left Fork Beaver Creek RM 11.4 to 13.55 Subwatershed Land Cover

	Watershed	Watershed	% of Total	Future Growth
Land Cover	Acres	Square Miles	Area	WLA %
Open Water	4.01	0.01	0.02	
Developed	1698.37	2.65	6.79	1.0
Barren Land	254.32	0.40	1.02	
Forest/Shrubland	21252.92	33.21	85.00	
Grassland/ Herbaceous	1446.28	2.26	5.78	
Pasture/ Hay	316.85	0.50	1.27	
Cultivated Crops	28.70	0.04	0.11	
Wetlands	1.78	0.00	0.01	
Totals	25003.22	39.07	100.00	

Table 8.43 Left Fork Beaver Creek RM 11.4 to 13.55 Water Withdrawals

AI		Withdrawal	Withdrawal	Facility	Facility
number	Source Description	Facility Name	(cfs)	Latitude	Longitude
	RM 15.36 of Left	Elk Horn Coal			
1299	Fork Beaver Creek	Co LLC	0.09283372	37.40129	-82.74175
		subtraction			
		from MAF			
		(sum of cfs)	0.09283372		

Table 8.44 Left Fork Beaver Creek RM 11.4 to 13.55 Data (Site 48)

			= (
	<u>E</u> . <u>coli</u>		Instantaneous Load	Unit Area Load
	(colonies/100	Flow	(billion <u>E</u> . <u>coli</u>	(million <u>E</u> . <u>coli</u>
Collection Date	mls)	(cfs)	colonies/day)	colonies/day/acre)
05/16/08	130	N/A	N/A	N/A
05/30/08	100	9.071	22.19	0.89
06/13/08	80	7.686	15.04	0.60
06/27/08	250	4.4441	27.18	1.09
07/31/08	69000	N/A	N/A	N/A
08/08/08	250	6.695	40.95	1.64
08/22/08	100	1.373	3.36	0.13
09/12/08	2100	114.166	5865.63	234.60
09/20/08	110	2.553	6.87	0.27
10/17/08	50	2.8575	3.50	0.14
10/24/08	190	1.4364	6.68	0.27
Greatest Concentration	69000			

Table 8.45 TMDL for Left Fork Beaver Creek RM 11.4 to 13.55

1 4010 0.1	5 11012 101	Left I ofk Deuve		10 15.55		
TMDL					<u>E</u> . <u>coli</u> (billion	
Table					colonies/ day)	
					90650.1145	Existing Load
					315.3047	Total TMDL
					31.5305	MOS
					202 7742	TMDI Torrat
				Destan	265.7745	TWDL Target
AT		D' 1		Design		
Al	KDDEG #	Discharger	T	Capacity	00.00	
number	KPDES #	Facility Name	Гуре	(CIS)	99.69	% reduction
		BINGHAM	Dwelling Other			
1237	KYG400753	RESIDENCE	than Apartment	0.000774	0.0045	KPDES WLA
		MEADE	Dwelling Other			
1266	KVG400070	RESIDENCE	than Apartment	0.000774	0.0045	KPDES WI A
1200	K10400970	COOK	Dwelling Other	0.000774	0.0045	
1172	KNC 400700	DESIDENCE	bweining Other	0.000774	0.0045	VDDEC WI A
11/3	KIG400790	KESIDENCE	than Apartment	0.000774	0.0045	KPDES WLA
1074	XXC 400714	MULLINS	Dwelling Other	0.000774	0.0045	
1274	KYG400/14	RESIDENCE	than Apartment	0.000774	0.0045	KPDES WLA
		DYE	Dwelling Other			
4333	KYG401140	RESIDENCE	than Apartment	0.000774	0.0045	KPDES WLA
		JONES	Dwelling Other			
4349	KYG401133	RESIDENCE	than Apartment	0.000774	0.0045	KPDES WLA
		OSBORNE				
35251	KY0089435	ELEM SCHOOL	School	0.010521	0.0618	KPDES WLA
		WHEEL-	Sewerage			
40534	KY0028789	WRIGHT STP	System	0.348127	2.0441	KPDES WLA
		CAUDILL	Dwelling Other			
44695	KYG401580	RESIDENCE	than Apartment	0.000774	0.0045	KPDES WLA
		COCHRAN	Dwelling Other			
48897	KYG401646	RESIDENCE	than Apartment	0.000774	0.0045	KPDES WLA
		YORK	Dwelling Other			
49354	KYG401654	RESIDENCE	than Anartment	0.000774	0.0045	KPDES WLA
17551	III G IOI 00 I	TACKETT	Dwelling Other	0.000771		
74181	KYG401470	RESIDENCE	than Anartment	0.000774	0 0045	KPDES WLA
71101	RIGIOII/0	MULLINS II	Dwelling Other	0.000771	0.0042	
74062	KYG401442	RESIDENCE	than Apartment	0.000774	0 0045	KPDFS WI A
74002	K10+01++2	RESIDENCE BADTI EV	Dwolling Other	0.000774	0.0045	
4405	KVG401107	DARILLI	then Apertment	0.000774	0.0045	KDDES WI A
4403	K10401197	SOUTH ELOVD		0.000774	0.0045	KI DES WLA
25260	KV0002012		Sahaal	0.022208	0 1262	KDDES WI A
33200	K10093912	IIIOII SCHOOL	School	0.023208	0.1303	T AL VDDES
					2.20(2	TOTAL KPDES
			A 111.1		2.2962	WLA
			Addition to MAF	0.201120	201 4776	
			(sum of cfs)	0.391139	281.4776	remainder
						Future Growth
					2.8148	WLA ⁽¹⁾
					5.1110	Total WLA
					278.6628	LA

Note:

8.12 Left Fork Beaver Creek RM 0.0 to 11.4



Figure 8.13 Left Fork Beaver Creek RM 0.0 to 11.4

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 27 is under site 35, site 32 is under site 33, site 37 is under site 45, and site 40 is under site 47.

Left Fork Beaver Creek at RM 0.0 is a fourth order stream located in Floyd County (Figure 8.13). Its subwatershed encompasses all of the Upper and Lower Left Fork Beaver Creek subwatersheds. Information about Left Fork Beaver 0.0 to 11.4, including sample site locations, waterbody identification number (WBID), and MAF is shown in Table 8.46. It has a catchment of 46,862 acres (73 square miles) with an 82% forested and 6.8% developed land cover (Table 8.47). Portions of this subwatershed are sewered around the city of Wheelwright (see Figure 5.16). There are two stream water withdrawals in this subwatershed at RMs 15.36 and 2.4 of Left Fork Beaver Creek (see Table 8.48). This segment had two sample sites and data from sites 49 and 50 is presented in Table 8.49. Site 49 had the greatest concentration (53,000) so this concentration was used to set the existing loads and percent reduction for the impaired segment. However, to extrapolate to the end of the impaired segment, the Adjusted MAF from site 50 (97.7535 cfs) was used as the flow to set the TMDL for this impaired segment. The TMDL calculations for site 49 and 50 are shown in Appendix E while the TMDL for Left Fork Beaver Creek RM 0.0 to 11.4 is shown in Table 8.50.

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
	Left								
	Fork								
Left	Beaver								
Fork	Creek								
Beaver	0.0 to								
Creek	11.4	496194_01	Floyd	46861.59	73.221	4th order			
			Sample	Sample			+ to	- from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
49	49	5.6	37.50640	-82.75550	84.5	5.6	0.50857	0.09283	84.9157
50	50	0.3	37.55640	-82.74970	98	0	0.51476	0.76124	97.7535

|--|

Table 8.47 Left Fork Beaver Creek RM 0.0 to 11.4 Subw	atershed Land Cover
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	Watershed	Watershed	% of Total	Future Growth
Land Cover	Acres	Square Miles	Area	WLA %
Open Water	12.46	0.02	0.03	
Developed	3207.43	5.01	6.84	1.0
Barren Land	483.82	0.76	1.03	
Forest/Shrubland	38659.82	60.41	82.50	
Grassland/Herbaceous	3224.34	5.04	6.88	
Pasture/Hay	1178.07	1.84	2.51	
Cultivated Crops	90.31	0.14	0.19	
Wetlands	5.34	0.01	0.01	
Totals	46861.59	73.22	100.00	

Table 8.48 Left Fork Beaver Creek RM 0.0 to 11.4 Water Withdrawals

	Source	Withdrawal	Withdrawal	Facility	Facility
AI number	Description	Facility Name	(cfs)	Latitude	Longitude
	RM 15.36 of				
	Left Fork	Elk Horn Coal Co			
1299	Beaver Creek	LLC	0.09283372	37.40129	-82.74175
	RM 2.4 of				
	Left Fork	Black Diamond			
78571	Beaver Creek	Mining	0.6684028	37.53192	-82.74364
		subtraction from			
		MAF (sum of cfs)	0.76123652		

Table 8.49 Left Fork Beaver Creek RM 0.0 to 11.4 Data (Sites 49 and 50)

Site 49				
	<u>E</u> . <u>coli</u>		Instantaneous Load	Unit Area Load
	(colonies/100	Flow	(billion <u>E</u> . <u>coli</u>	(million <u>E</u> . <u>coli</u>
Collection Date	mls)	(cfs)	colonies/day)	colonies/day/acre)
05/16/08	170	N/A	N/A	N/A
05/30/08	30	11.975	8.79	0.22
5/30/08 (QA Sample)	20	N/A	N/A	N/A
06/13/08	60	7.4685	10.96	0.27
06/27/08	110	7.915	21.30	0.53
07/31/08	53000	37.108	48117.39	1202.13
08/08/08	70	8.333	14.27	0.36
08/22/08	<10	1.803	0.44	0.01
09/12/08	380	N/A	N/A	N/A
9/12/08 (QA Sample)	240	N/A	N/A	N/A
09/20/08	130	1.8648	5.93	0.15
10/17/08	100	3.999	9.78	0.24
10/24/08	170	3.356	13.96	0.35
Greatest Concentration	53000			
Site 50				
	<u>E</u> . <u>coli</u>		Instantaneous Load	Unit Area Load
	(colonies/100	Flow	(billion <u>E</u> . <u>coli</u>	(million <u>E</u> . <u>coli</u>
Collection Date	mls)	(cfs)	colonies/day)	colonies/day/acre)
05/16/08	390	N/A	N/A	N/A
05/30/08	600	N/A	N/A	N/A
06/13/08	220	N/A	N/A	N/A
6/13/08 (QA Sample)	190	N/A	N/A	N/A
06/27/08	70	N/A	N/A	N/A
07/11/08	390	12.956	123.62	2.64
07/31/08	27000	N/A	N/A	N/A
08/08/08	220	5.708	30.72	0.66
08/22/08	240	0.0144	0.08	0.00
09/12/08	16000	22.148	8669.88	185.01
09/20/08	170	3.596	14.96	0.32
10/17/08	190	3 1 5 5	13.89	0.30
	180	5.155	15.07	0.50
10/24/08	10	3.413	0.84	0.02

Table 8.50	TMDL for	Left Fork	Beaver	Creek RM	0.0 to 11.4
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10010 0.	50 IMBE 10	Left I ofk Deuve		0 10 11.1		
TMDL					<u>E</u> . <u>coli</u> (billion	
Table					colonies/day)	
					• /	Existing
					126755.5507	Load
					120700.0007	Total
					572 0974	TMDI
					5/3.98/4	
					57.3987	MOS
						TMDL
					516.5887	Target
				Design		
AI		Discharger		Capacity		
number	KPDES #	Facility Name	Type	(cfs)	99.59	% reduction
	11 2 25	WHEEL WRIGHT	Sewerage	(•15)	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	KPDFS
40524	KV0020700	STD	Stwerage	0 2481265	2.0441	
40334	K10020709		System	0.5461205	2.0441	
		MCDOWELL	~			KPDES
35252	KY0079421	ELEM SCHOOL	School	0.0232084	0.1363	WLA
		MCDOWELL				
		APPALACHIAN				KPDES
1134	KY0085791	REG HOSP	Hospital	0.0309446	0.1817	WLA
		OSBORNE	•			KPDES
35251	KY0089435	ELEM SCHOOL	School	0.0105212	0.0618	WLA
55251	IX10007155	SOUTH FLOVD	Bellool	0.0105212	0.0010	KDDES
25260	KX0002012		Cabaal	0.0020084	0.12(2	
35200	K10093912	HIGH SCHOOL	School	0.0232084	0.1303	WLA
		LEFT BEAVER				
		CREEK	Apartment			KPDES
1255	KY0096342	TOWNHOUSES	Building	0.0278501	0.1635	WLA
		MCDOWELL				
		DOLLAR				
		GENERAL	Department			KPDES
1263	KV0103136	STORE	Store	0.0007736	0 0045	WIA
1205	K 10105150	STORE	Mobile Home	0.0007750	0.0045	VDDES
1205	WW0102222			0.0152176	0.0000	
1305	KY0103233	S & V MHP	Site	0.0153176	0.0899	WLA
			Dwelling			
		MITCHELL	Other than			KPDES
1269	KYG400478	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		BLACKBURN	Other than			KPDES
1143	KYG400479	RESIDENCE	Apartment	0.0007736	0.0045	WLA
	2.20.17		Dwelling			
		HICKS	Other than			KPDFS
1210	VVC 4005 (7	DESIDENCE		0.0007726	0.0045	
1218	K10400567	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		WRIGHT	Other than			KPDES
1367	KYG400579	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		STUMBO	Other than			KPDES
1327	KYG400601	RESIDENCE	Apartment	0.0007736	0.0045	WLA
1021	1110100001		Dwelling	0.0007750	0.0010	
		DVE	Other then			KDDES
1100	KNC 400 C1 4			0.0007726	0.0045	
1182	KYG400614	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		CURRENT	Other than			KPDES
4250	KYG400659	RESIDENCE	Apartment	0.0007736	0.0045	WLA

				Design		
AI		Discharger		Capacity	E. coli (billion	
number	KPDES #	Facility Name	Type	(cfs)	colonies/day)	
		, , , , , , , , , , , , , , , , , , ,	Dwelling		,	
		SHREWBERRY	Other than			KPDES
1315	KYG400677	RESIDENCE	Apartment	0.0007736	0.0045	WLA
1010	1110100011	TELSID LITEL	Dwelling	0.0007720		
		CASTI F	Other than			KPDFS
1162	KVG400678	RESIDENCE	Apartment	0.0007736	0.0045	WI A
1102	K10+00070	RESIDENCE	Dwolling	0.0007730	0.0045	
		CASE	Other then			KDDES
1161	WVC 400602	DESIDENCE		0.0007726	0.0045	KI DES
1101	K10400092	RESIDENCE	Druglling	0.0007730	0.0045	VV LA
		MULTING	Dweining			KDDEC
1074	XXXC 40071 4	MULLINS	Other than	0.0007726	0.0045	KPDES
1274	KYG400/14	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		YOUMANS	Other than			KPDES
1369	KYG400724	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		BINGHAM	Other than			KPDES
1237	KYG400753	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		COOK	Other than			KPDES
1173	KYG400790	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		COLLINS	Other than			KPDES
1168	KYG400854	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		HALL	Other than			KPDES
1202	KYG400969	RESIDENCE	Apartment	0.0007736	0.0045	WLA
1202		TELSID LITEL	Dwelling	0.0007720		
		MEADE	Other than			KPDES
1266	KYG400970	RESIDENCE	Apartment	0.0007736	0 0045	WIA
1200	K10+00770	RESIDENCE	Dwelling	0.0007750	0.0045	
		HOWELI	Other then			KDDES
1356	KVC401040	DESIDENCE	A partmont	0.0007736	0.0045	
4550	K10401040	RESIDENCE	Druglling	0.0007730	0.0045	VV LA
		IONES	Other ther			VDDEC
4240	VVC 401122	JUNES		0.0007726	0.0045	WI A
4349	K10401153	RESIDENCE	Ducilia	0.0007730	0.0045	WLA
		DVE	Dwelling			VDDEC
4222	KVC 401140	DIE	Other than	0.0007726	0.0045	KPDES WL
4333	KYG401140	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			UDDDG
(222	WWG 1044 I	TACKETT	Other than	0.000	0.0045	KPDES
4332	KYG401142	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		BARTLEY	Other than			KPDES
4405	KYG401197	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		LAWSON	Other than			KPDES
15635	KYG401271	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		WILLIAMSON	Other than			KPDES
74022	KYG401406	RESIDENCE	Apartment	0.0007736	0.0045	WLA

				Design		
AT		Discharger		Capacity	E coli (billion	
number	KPDES #	Facility Name	Type	(cfs)	<u>colonies/dav</u>)	
number	KIDLS#	Facility Name	Dualling	(CIS)	colonies/day)	
		STUMDO	Dweining			VDDEC
74025	VVC 401 400	STUMBU	Other than	0.0007726	0.0045	KPDES WLA
74025	KYG401409	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		MULLINS II	Other than			KPDES
74062	KYG401442	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		TACKETT	Other than			KPDES
74181	KYG401470	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		COLLINS	Other than			KPDES
1168	KYG401516	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		MOORE	Other than			KPDES
35887	KYG401533	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		CAUDILL	Other than			KPDES
44695	KYG401580	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		DINGUS	Other than			KPDES
45073	KYG401582	RESIDENCE	Apartment	0.0007736	0.0045	WLA
	1110.01002	10000000	Dwelling	0.0007720		
		GEARHEART	Other than			KPDES
15396	KYG401587	RESIDENCE		0.0007736	0 0045	WI A
+3370	K10+01507	REDIDENCE	Dwelling	0.0007730	0.0042	
		ΗΔΙΙ	Other than			KPDFS
45070	KVG401500	RESIDENCE		0.0007736	0.0045	WI A
43070	K10401390	RESIDENCE	Dwolling	0.0007730	0.0045	WLA
		WILLIAMSON	Other then			KDDES
46144	KVC401601	DESIDENCE		0.0007736	0.0045	WI A
40144	K10401001	RESIDENCE	Dualling	0.0007730	0.0045	VV LA
		DUEE	Dweining			VDDEC
10001	VVC 401645		Other than	0.0007726	0.0045	MPDES WIA
48804	K10401045	RESIDENCE	Apartment	0.0007736	0.0045	WLA
		COCUDAN	Dwelling			LADDEC
40007	WWO 401 CAC	COCHKAN	Other than	0.0007726	0.0045	KPDES
48897	K1G401646	RESIDENCE	Apartment	0.0007736	0.0045	WLA
		NODK	Dwelling			WDDDG
10251	WW0 401 654	YORK	Other than	0.0007726	0.004	KPDES
49354	KYG401654	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		BLANKENSHIP	Other than	0.000	0.0015	KPDES
50021	KYG401692	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		NEWMAN	Other than	0.000	0.0045	KPDES
71436	KYG401809	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		COMBS	Other than			KPDES
74243	KYG401821	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		LITTLE	Other than			KPDES
75141	KYG401851	RESIDENCE	Apartment	0.0007736	0.0045	WLA

				Design		
AI		Discharger		Capacity	<u>E</u> . <u>coli</u> (billion	
number	KPDES #	Facility Name	Туре	(cfs)	colonies/day)	
			Dwelling			
		HARVEL	Other than			KPDES
79525	KYG401931	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		MARTIN	Other than			KPDES
81193	KYG401970	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		HOPKINS	Other than			KPDES
82471	KYG402002	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		LITTLE	Other than			KPDES
103052	KYG402117	RESIDENCE	Apartment	0.0007736	0.0045	WLA
						Total
						KPDES
					3.0226	WLA
			Addition to			
			MAF (sum of			
			cfs)	0.5147631	513.5661	remainder
						Future
						Growth
					5.1357	WLA ⁽¹⁾
					8.1582	Total WLA
					508.4304	LA

Note:



8.13 Right Fork Beaver Creek RM 30.3 to 33.4

Figure 8.14 Right Fork Beaver Creek RM 30.3 to 33.4

The Right Fork Beaver Creek at RM 30.3 is a fourth order stream located in the Upper Right Fork Beaver Creek subwatershed in Knott County (Figure 8.14). Information about the Right Fork Beaver Creek RM 30.3 to 33.4 subwatershed, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.51. It has a catchment of 16,909 acres (26.4 square miles) with an 83% forested and 5.3% developed land cover (Table 8.52). This subwatershed is entirely un-sewered. There is one stream water withdrawal in this subwatershed at RM 40.6 of Right Fork Beaver Creek (Table 8.53). Sampling data from site 13 is presented in Table 8.54 and TMDL allocations in Table 8.55.

	<u> </u>								
Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
	Right								
	Fork								
Right	Beaver								
Fork	Creek								
Beaver	30.3 to								
Creek	33.4	501863_04	Knott	16908.97	26.42	4th order			
			Sample	Sample			+ to	- from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
13	13	30.3	37.35989	-82.78935	43.3	30.3	0.01083	0.41002	42.9008

Table 8.51 Right Fork Beaver Creek RM 30.3 to 33.4 Information

Table 8.52 Right Fork Beaver Creek RM 30.3 to 33.4 Subwatershed Land Cover

		Watershed	% of	Future
	Watershed	Square	Total	Growth
Land Cover	Acres	Miles	Area	WLA %
Open Water	11.12	0.02	0.07	
Developed	893.21	1.40	5.28	1.0
Barren Land	265.50	0.41	1.57	
Forest/Shrubland	13956.50	21.81	82.54	
Grassland/Herbaceous	1570.73	2.45	9.29	
Pasture/Hay	202.35	0.32	1.20	
Cultivated Crops	9.12	0.01	0.05	
Wetlands	0.44	0.00	0.00	
Totals	16908.97	26.42	100.00	

Table 8.53 Right Fork Beaver Creek RM 30.3 to 33.4 Water Withdrawals

AI		Withdrawal	Withdrawal	Facility	Facility
number	Source Description	Facility Name	(cfs)	Latitude	Longitude
		ICG Knott Co			
	RM 40.6 Right	LLC (860-			
2528	Fork Beaver Creek	8012)	0.4100156	37.32166	-82.80366
		subtraction			
		from MAF			
		(sum of cfs)	0.4100156		

September, 2010

Table 8.54 Right Fork Beaver Creek RM 30.3 to 33.4 Data (Site 13)						
	<u>E</u> . <u>coli</u>		Instantaneous Load	Unit Area Load		
	(colonies/100	Flow	(billion <u>E</u> . <u>coli</u>	(million <u>E</u> . <u>coli</u>		
Collection Date	mls)	(cfs)	colonies/day)	colonies/day/acre)		
05/15/07	260	18.872	120.05	7.10		
05/30/07	190	1.976	9.19	0.54		
06/13/07	320	4.861	38.06	2.25		
06/27/07	560	55.059	754.35	44.61		
07/10/07	370	1.537	13.91	0.82		
7/10/07 (QA Sample)	330	1.537	N/A	N/A		
07/26/07	1900	14.412	669.94	39.62		
08/17/07	320	1.384	10.84	0.64		
08/31/07	210	N/A	N/A	N/A		
09/13/07	110	1.829	4.92	0.29		
09/28/07	110	0.59	1.59	0.09		
10/12/07	<10	0.612	0.15	0.01		
10/12/07 (QA Sample)	<10	0.612	0.15	0.01		
11/16/07 (outside PCR						
season)	430	1.4244	14.99	0.89		
Greatest Concentration	1900					

l	able 8.55 I	MDL for Righ	IL FOLK Deaver	Creek KIVI :	50.5 10 55.4		
	TMDL					<u>E</u> . <u>coli</u> (billion	
	Table					colonies/day)	
							Existing
						1994.2419	Load
						251.9042	Total TMDL
I						25.1904	MOS
I							TMDL
						226.7138	Target
			Discharger		Design		0/
	Al	KDDEC #	Facility	Trues	Capacity	99.62	% madu ati am
ł	number	KPDES #	Name	Туре	(CIS)	88.03	reduction
			BEAVER CREEK ELEM				KPDES
	33945	KY0077542	SCHOOL	School	0.0108306	0.0636	WLA
				Addition to MAF (sum of			
				cfs)	0.0108306	226.6502	remainder
						2.2665	Future Growth WLA ⁽¹⁾
						2.3301	Total WLA
						224.3837	LA

Table 8.55 TMDL for Right Fork Beaver Creek RM 30.3 to 33.4

Note:



8.14 Caney Fork RM 0.0 to 7.5

Figure 8.15 Caney Fork RM 0.0 to 7.5

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 33 is under site 32.

Caney Fork is a third order stream located in the Middle Right Fork Beaver Creek subwatershed in Knott County (Figure 8.15). Information about Caney Fork, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.56. It has a catchment of 15,657.3 acres (24.5 square miles) with an 80% forested and 4.7% developed land cover (Table 8.57). Portions of this subwatershed in the headwaters around Alice Lloyd College are sewered (Figure 8.16). There are several wildlife management areas in this subwatershed. There is one stream water withdrawal in this subwatershed at RM 4.2 of Caney Creek (Table 8.58). Sampling data from site 32 is presented in Table 8.59 and TMDL allocations in Table 8.60.

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
	Caney								
Caney	Fork 0.0								
Fork	to 7.5	48862_01	Knott	15657.29	24.47	3rd order			
			Sample	Sample			+ to	- from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
32	32	0.05	37.41672	-82.79799	33.4	0	0.15472	1.00570	32.5490

Table 8.56 Caney Fork RM 0.0 to 7.5 Information

Table 8.57 Caney Fork RM 0.0 to 7.5 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	8.89	0.01	0.06	
Developed	735.26	1.15	4.70	0.5
Barren Land	248.35	0.39	1.59	
Forest/Scrubland	12464.78	19.48	79.61	
Grassland/Herbaceous	1933.87	3.02	12.35	
Pasture/Hay	258.80	0.40	1.65	
Cultivated Crops	6.45	0.01	0.04	
Wetlands	0.89	0.00	0.01	
Totals	15657.29	24.46	100.00	

Table 8.58 Caney Fork RM 0.0 to 7.5 Water Withdrawals

AI number	Source Description	Withdrawal Facility Name	Withdrawal (cfs)	Facility Latitude	Facility Longitude
3502	RM 4.2 of Caney Creek	ICG Knott Co LLC	1.005699	37.3884	-82.82856
		subtraction from MAF (sum of cfs)	1.005699		



Figure 8.16 Caney Fork Sewer Lines

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 33 is under site 32.

	<u>E</u> . <u>coli</u> (colonies/100		Instantaneous Load (billion E. coli	Unit Area Load (million E. coli
Collection Date	mls)	Flow (cfs)	colonies/day)	colonies/day/acre)
05/15/07	100	151.9515	371.76	23.74
05/30/07	300	4.797	35.21	2.25
06/13/07	110	2.131	5.74	0.37
06/27/07	430	5.698	59.94	3.83
07/10/07	210	1.233	6.33	0.40
07/26/07	690	20.379	344.03	21.97
08/17/07	400	1.705	16.69	1.07
08/31/07	260	N/A	N/A	N/A
09/14/07	170	0.105	0.44	0.03
09/28/07	30	0.084	0.06	0.00
10/12/07	<10	0.275	0.07	0.00
11/16/07 (outside PCR season)	710	1.2337	21.43	1.37
Greatest Concentration	690			

Table 8.59 Can	ey Fork RM 0.0	to 7.5 Data (Site 32)
----------------	----------------	-----------------------

					E coli	
TMDI					(billion	
Table					colonies/day)	
1 aoic					colonics/day)	
					5 40 4500	Existing
					549.4722	Load
						Total
					191.1208	TMDL
					19.1121	MOS
						TMDL
					172.0087	Target
		51.1				
		Discharger		Design		
Al		Facility	-	Capacity	<0 7 0	%
number	KPDES #	Name	Туре	(cts)	68.70	reduction
		KNOTT CO				
		WATER &				
		SEWER	Sewerage			KPDES
2527	KY0042854	DIST	System	0.1547229	0.9085	WLA
			Addition			
			to MAF			
			(sum of			
			cfs)	0.1547229	171.1002	remainder
						Futuro
						Growth
					0.8555	$\mathbf{WLA}^{(1)}$
						Total
					1.764	WLA
					170.2447	LA

Note:

8.15 Jones Fork RM 0.0 to 9.9



Figure 8.17 Jones Fork RM 0.0 to 9.9

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 20 is under site 31 and site 33 is under site 32.

Jones Fork is a third order stream located in the Middle Right Fork Beaver Creek subwatershed in Knott County (Figure 8.17). Information about Jones Fork, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.61. It has a catchment of 14,630.2 acres (2.9 square miles) with an 80% forested and 3.8% developed land cover (Table 8.62). This subwatershed is entirely un-sewered. There are several wildlife management areas in this subwatershed. There are no stream water withdrawals in this subwatershed. Sampling data from site 20 is presented in Table 8.63 and TMDL allocations in Table 8.64.

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
	Jones								
Jones	Fork 0.0								
Fork	to 9.9	495499_01	Knott	14630.21	22.86	3rd order			
			Sample	Sample			+ to	- from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
20	20	0.05	37.46684	-82.83148	30.8	0	0.03017	0	30.8302

Table 8.61 Jones Fork RM 0.0 to 9.9 Information

Table 8.62 Jones Fork RM 0.0 to 9.9 Subwatershed Land Cover

	Watershed	Watershed	% of Total	Future Growth
Land Cover	Acres	Square Miles	Area	WLA %
Open Water	52.70	0.08	0.36	
Developed	556.14	0.87	3.80	0.5
Barren Land	344.00	0.54	2.35	
Forest/Shrubland	11649.82	18.20	79.63	
Grassland/Herbaceous	1716.23	2.68	11.73	
Pasture/Hay	293.52	0.46	2.01	
Cultivated Crops	16.68	0.03	0.11	
Wetlands	1.11	0.00	0.01	
Totals	14630.21	22.86	100.00	

Table 8.63 Jones Fork RM 0.0 to 9.9 Data (Site 20)

	<u>E</u> . <u>coli</u>		Instantaneous Load	Unit Area Load
	(colonies/100	Flow	(billion <u>E</u> . <u>coli</u>	(million <u>E</u> . <u>coli</u>
Collection Date	mls)	(cfs)	colonies/day)	colonies/day/acre)
05/15/07	140	1.219	4.18	0.29
05/30/07	320	3.587	28.08	1.92
06/13/07	280	2.101	14.39	0.98
06/27/07	3100	2.128	161.40	11.03
07/10/07	370	1.062	9.61	0.66
07/26/07	4300	4.294	451.74	30.88
08/17/07	20	0.455	0.22	0.02
08/31/07	290	0.217	1.54	0.11
09/14/07	180	0.304	1.34	0.09
9/14/07 (QA/Sample)	70	N/A	N/A	N/A
09/28/07	170	0.107	0.45	0.03
10/12/07	<10	0.035	0.01	0.00
11/16/07 (outside PCR				
season)	120	4.091	12.01	0.82
Greatest Concentration	4300			

Table 8.64 TMDL for Jones Fork RM 0.0 to 9.9

TMDL Table(billion colonies/day)	
3243.4191	Existing Load
181.0280	Total TMDL
18.1028	MOS
162.9252	TMDL Target
AI numberDischarger FacilityDesignAI numberFacilityDesignVerticeVerticeVerticeAI numberKPDES #NameTypeCapacity (cfs)94.98	% reduction
JONES JONES FORK ELEM 35359 KY0087076 SCHOOL School 0.0092834 0.0545	KPDES WLA
46147KYG401603CHILDERS RESIDENCEDwelling Other than Apartment0.00077360.0045	KPDES WLA
CONSOL OF KY INC JONESBituminous Coal & Lig,2514KY0094510FORKSurface0.00464170.0273	KPDES WLA
GOLDEN YEARSIntermediate Care2517KY0083089HOMEFacility0.01547230.0908	KPDES WLA
0.1771	Total KPDES WLA
Addition to MAF (sum of cfs) 0.0301710 162.7481	remainder
0.0301710 102.7481	Future Growth WLA ⁽¹⁾
0.9908	Total WLA

Note:

8.16 Right Fork Beaver Creek RM 17.4 to 23.3



Figure 8.18 Right Fork Beaver Creek RM 17.4 to 23.3

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 32 is under site 33, site 20 is under site 31, and site 40 is under site 47.

Right Fork Beaver Creek at RM 17.4 is a fourth order stream located in Floyd County (Figure 8.18). Its subwatershed encompasses the entire Upper and portions of the Middle Right Fork Beaver Creek subwatersheds. Information about Right Fork Beaver Creek RM 17.4 to 23.3, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.65. It has a catchment of 49,402 acres (77.2 square miles) with an 81% forested and 5.4% developed land cover (Table 8.66). Portions of this subwatershed around Pippa Passes, Alice Lloyd College, and Wayland are sewered (see Figure 5.18). There are three stream water withdrawals in this subwatershed (Table 8.67). Sampling data from site 31 is presented in Table 8.68 and TMDL allocations in Table 8.69.

	U						_		
Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
	Right								
	Fork								
Right	Beaver								
Fork	Creek								
Beaver	17.4 to								
Creek	23.3	501863_02	Floyd	49402.07	77.19	4th order			-
			Sample	Sample			+ to	- from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
31	31	17.5	37.46730	-82.83000	104.7	17.4	0.32260	1.43119	103.5914

Table 8.65 Right Fork Beaver Creek RM 17.4 to 23.3 Information

Table 8.66 Right Fork Beaver Creek RM 17.4 to 23.3 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	20.46	0.03	0.04	
Developed	2666.57	4.17	5.40	1.0
Barren Land	623.28	0.97	1.26	
Forest/Shrubland	39856.27	62.28	80.68	
Grassland/Herbaceous	5325.58	8.32	10.78	
Pasture/ Hay	877.00	1.37	1.78	
Cultivated Crops	28.68	0.04	0.06	
Wetlands	4.22	0.01	0.01	
	49402.07	77.19	100.00	

Table 8.67 Right Fork Beaver Creek RM 17.4 to 23.3 Water Withdrawals

AI	Source	Withdrawal	Withdrawal	Facility	Facility
number	Description	Facility Name	(cfs)	Latitude	Longitude
	RM 40.6				
	Right Fork	ICG Knott Co			
	Beaver	LLC (860-			
2528	Creek	8012)	0.4100156	37.32166	-82.80366
	RM 31.0				
	Right Fork	Deane Mining			
	Beaver	LLC (860-			
2525	Creek	5318)	0.01547229	37.41038	-82.78096
3502	RM 4.2 of Caney Creek	ICG Knott Co LLC	1.005699	37.3884	-82.82856
		subtraction from MAF (sum of cfs)	1.4311869		

Table 8.68 Right Fork Beaver Creek RM 17.4 to 23.3 Data (Site 31)

Collection Date	<u>E</u> . <u>coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E</u> . coli colonies/day)	Unit Area Load (million <u>E</u> . <u>coli</u> colonies/day/acre)
05/15/07	180	3.172	13.97	0.28
05/30/07	200	3.587	17.55	0.36
06/13/07	300	10.346	75.94	1.54
06/27/07	4100	16.049	1609.87	32.59
07/10/07	150	N/A	N/A	N/A
07/26/07	2900	41.221	2924.66	59.20
08/17/07	430	4.732	49.78	1.01
08/31/07	150	2.551	9.36	0.19
09/14/07	220	2.619	14.10	0.29
09/28/07	110	1.429	3.85	0.08
9/28/27 (QA Sample)	70	N/A	N/A	N/A
10/12/07	70	1.481	2.54	0.05
11/16/07 (outside PCR season)	180	18.054	79.51	1.61
Greatest Concentration	4100			

010 0.07		light I Olk Dea	Ver Creek Ri	M 17.1 to 25		
MDL Fable					<u>E</u> . <u>coli</u> (billion colonies/day)	
					10391.2139	Existing Load
					608.2662	Total TMDL
					60.8266	MOS
					547.4396	TMDL Target
AI umber	KPDES #	Discharger Facility Name	Туре	Design Capacity (cfs)	94.73	% reduction
2527	KY0042854	KNOTT CO WATER & SEWER DIST	Sewerage System	0.1547229	0.9085	KPDES WLA
33945	KY0077542	BEAVER CREEK ELEM SCHOOL	School	0.0108306	0.0636	KPDES WLA
1293	KYG400836	PERKINS RESIDENCE	Dwelling Other than Apartment	0.0007736	0.0045	KPDES WLA
4336	KYG401125	CRUM RESIDENCE	Dwelling Other than Apartment	0.0007736	0.0045	KPDES WLA
35761	KY0105228	WAYLAND STP	Sewerage System	0.1547229	0.9085	KPDES WLA
1243	KYG400915	KESTER RESIDENCE	Dwelling Other than Apartment	0.0007736	0.0045	KPDES WLA
					1.8941	Total KPDES WLA
			Addition to MAF			
			(sum of cfs)	0.3225972	545.5453	remainder
					5 4555	Future Growth
					5.4555	Total
					7.3496	WLA
					540.0899	LA

Note:

8.17 Salt Lick Creek RM 0.0 to 6.8



Figure 8.19 Salt Lick Creek RM 0.0 to 6.8

Salt Lick Creek is a third order stream located in the Middle Right Fork Beaver Creek subwatershed in Floyd County (Figure 8.19). Information about Salt Lick Creek, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.70. It has a catchment of 8,114.4 acres (12.7 square miles) with an 84% forested and 5.4% developed land cover (Table 8.71). This subwatershed is entirely un-sewered. There are no stream water withdrawals in this subwatershed. Sampling data from site 24 is presented in Table 8.72 and TMDL allocations in Table 8.73.

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
	Salt								
	Lick								
Salt	Creek								
Lick	0.0 to								
Creek	6.8	502845_01	Floyd	8114.44	12.68	3rd order			
			Sample	Sample			+ to	- from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
24	24	0.65	37.49563	82.84959	16.8	0	0.00387	0.00000	16.8039

Table 8.70 Salt Lick Creek RM 0.0 to 6.8 Information

Table 8.71 Salt Lick Creek RM 0.0 to 6.8 Subwatershed Land Cover

	Watershed Watershed		% of Total	Future Growth
Land Cover	Acres	Square Miles	Area	WLA %
Open Water	0.22	0.00	0.00	
Developed	435.28	0.68	5.36	1.0
Barren Land	53.60	0.08	0.66	
Forest/Shrubland	6807.70	10.64	83.90	
Grassland/Herbaceous	546.49	0.85	6.73	
Pasture/Hay	250.89	0.39	3.09	
Cultivated Crops	18.46	0.03	0.23	
Wetlands	1.78	0.00	0.02	
Totals	8114.44	12.68	100.00	

Table 8.72 Salt Lick Creek RM 0.0 to 6.8 Data (Site 24)

			Instantaneous	Unit Area Load
	<u>E</u> . <u>coli</u>	Flow	Load (billion <u>E</u> .	(million <u>E</u> . <u>coli</u>
Collection Date	(colonies/100 mls)	(cfs)	<u>coli</u> colonies/day)	colonies/day/acre)
05/15/07	4100	1.608	161.30	19.88
05/30/07	755	1.035	19.12	2.36
06/13/07	48000	0.299	351.13	43.27
06/27/07	66000	1.504	2428.57	299.29
07/10/07	800	0.117	2.29	0.28
07/26/07	1400	0.596	20.41	2.52
08/17/07	90	N/A	N/A	N/A
08/31/07	10	N/A	N/A	N/A
8/31/07 (QA Sample)	30	N/A	N/A	N/A
09/14/07	28000	N/A	N/A	N/A
09/28/07	140	N/A	N/A	N/A
11/16/07 (outside PCR				
season)	1100	N/A	N/A	N/A
Greatest Concentration	66000			

					<u>E</u> . <u>coli</u>	
TMDL					(billion	
Table					colonies/day)	F • <i>c</i>
					07122 0700	Existing
					2/155.0/00	Total
					98.6687	TMDL
					9.8669	MOS
						TMDL
					88.8018	Target
		Discharger		Design		
AI		Facility		Capacity		%
number	KPDES #	Name	Туре	(cfs)	99.67	reduction
			Dwelling			
		HALL	Other than			KPDES
74185	KYG401475	RESIDENCE	Apartment	0.0007736	0.0045	WLA
		KIDD	Dwelling			VDDDC
50050	XXC 401720	KIDD	Other than	0.0007726	0.0045	KPDES
50950	KYG401730	RESIDENCE	Apartment	0.0007736	0.0045	WLA
		SHEDHEDD	Dwelling			VDDES
1314	KVG400844	DESIDENCE	A partment	0.0007736	0.0045	MPDES WLA
1314	KIU 400044	RESIDENCE	Dwelling	0.0007730	0.0045	
		GREEN	Other than			KPDES
1199	KYG400603	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		CASTLE	Other than			KPDES
4350	KYG401113	RESIDENCE	Apartment	0.0007736	0.0045	WLA
						Total
						KPDES
					0.0225	WLA
			Addition			
			to MAF			
			(sum of	0.0000000	00 5501	
			cts)	0.0038681	88.7791	remainder
						Future
					0 8878	Growth WLA ⁽¹⁾
					0.0070	Total
					0.9103	WLA
					87.8913	LA

Note:



8.18 Turkey Creek RM 0.0 to 5.9

Figure 8.20 Turkey Creek RM 0.0 to 5.9

Turkey Creek is a second order stream located in the Lower Right Fork Beaver Creek subwatershed in Floyd County (Figure 8.20). Information about Turkey Creek, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.74. It has a catchment of 3,403 acres (5.3 square miles) with a 75% forested and 4.6% developed land cover (Table 8.75). This subwatershed is entirely un-sewered. There are no stream water withdrawals in this subwatershed. Sampling data from site 27 is presented in Table 8.76 and TMDL allocations in Table 8.77.

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
	Turkey								
	Creek								
Turkey	0.0 to								
Creek	5.9	505598_01	Floyd	3402.79	5.32	2nd order			
			Sample	Sample			+ to	- from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
27	27	0.05	37.53184	82.78877	7	0	0.00232	0.00000	7.0023

Table 8.74 Turkey Creek RM 0.0 to 5.9 Information

Table 8.75 Turkey Creek RM 0.0 to 5.9 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	0.22	0.00	0.01	
Developed	157.05	0.25	4.62	0.5
Barren Land	23.58	0.04	0.69	
Forest/Shrubland	2545.47	3.98	74.81	
Grassland/Herbaceous	474.93	0.74	13.96	
Pasture/Hay	197.76	0.31	5.81	
Cultivated Crops	3.78	0.01	0.11	
Wetlands	0.00	0.00	0.00	
Total	3402.79	5.32	100.00	

Table 8.76 Turkey Creek RM 0.0 to 5.9 Data (site 27)

	<u>E</u> . <u>coli</u>		Instantaneous	Unit Area Load
	(colonies/100	Flow	Load (billion <u>E</u> .	(million <u>E</u> . <u>coli</u>
Collection Date	mls)	(cfs)	<u>coli</u> colonies/day)	colonies/day/acre)
05/16/07	1600	10.6148	415.52	122.11
05/30/07	2400	0.389	22.84	6.71
06/13/07	3300	0.2	16.15	4.75
06/27/08	2900	0.411	29.16	8.57
07/10/07	1100	0.114	3.07	0.90
07/26/07	170	0.156	0.65	0.19
08/17/07	59000	N/A	N/A	N/A
08/31/07	1000	N/A	N/A	N/A
09/14/07	16900	N/A	N/A	N/A
09/28/07	4600	N/A	N/A	N/A
10/12/07	3200	N/A	N/A	N/A
11/16/07 (outside PCR				
season)	2800	0.449	30.76	9.04
Greatest Concentration	59000			

Table 8.77 TMDL	for Turkey C	Creek RM 0.0 to 5.9
-----------------	--------------	---------------------

					<u>E</u> . <u>coli</u> (billion	
TMDL Table					colonies/ dav)	
						Existing
					10107.7083	Load
					41.1161	Total TMDL
					4.1116	MOS
					37.0045	TMDL Target
		Discharger		Design		
AI		Facility		Capacity		%
number	KPDES #	Name	Туре	(cfs)	99.63	reduction
			Dwelling			
		MULLINS	Other than			KPDES
1276	KYG400975	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		COOTT	Dwelling			VDDEC
50627	VVC 401721	SCOTT	Other than	0.000772615	0.0045	KPDES
50627	KIG401721	RESIDENCE	Dwalling	0.000773015	0.0045	WLA
		FRASURE	Other than			KPDFS
4344	KYG401121	RESIDENCE	Apartment	0.000773615	0 0045	WLA
1011			- ipul intent	0.000772012		Total
						KPDES
					0.0135	WLA
			Addition to			
			MAF (sum			
			of cfs)	0.002320844	36.9909	remainder
						Future
						Growth
					0.1850	
					0 1095	Total WI A
					0.1905	
					36.8059	LA

Note:



8.19 Right Fork Beaver Creek RM 0.0 to 17.4

Figure 8.21 Right Fork Beaver Creek RM 0.0 to 17.4

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 27 is under site 35, site 32 is under site 33, site 20 is under site 31, site 37 is under site 45, and site 40 is under site 47.

Right Fork Beaver Creek at RM 0.0 is a fourth order stream located in Floyd County (Figure 8.21). Its subwatershed encompasses the entire Upper, Middle, and Lower Right Fork Beaver Creek subwatersheds. Information about Right Fork Beaver Creek RM 0.0 to 17.4, including sample site locations, waterbody identification number (WBID), and MAF is shown in Table 8.78. It has a catchment of 99,096 acres (154.8 square miles) with a 79% forested and 6% developed land cover (Table 8.79). Portions of the subwatershed are sewered (see Figures 5.18 and 5.19). There are three stream water withdrawals in this subwatershed (Table 8.80). This segment had four sample sites and data from sites 30, 30a, 34, and 35 and is presented in Table 8.81. Site 30 had the greatest concentration (13,000) so this concentration was used to set the existing loads and percent reduction for the impaired segment. However, to extrapolate to the end of the impaired segment, the Adjusted MAF from site 30a (204.9477 cfs) was used as the flow to set the TMDL for this impaired segment. The TMDL calculations for sites 30, 30a, 34, and 35 are shown in Appendix E while the TMDL for Right Fork Beaver Creek RM 0.0 to 17.4 is shown in Table 8.82.
Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
	Right								
	Fork								
Right	Beaver								
Fork	Creek								
Beaver	0.0 to								
Creek	17.4	501863_01	Floyd	99095.56	154.84	4th order			
			Sample	Sample			+ to	- from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
30	30	1.4	37.55905	-82.77234	204.7	1.4	0.47809	1.43119	203.7469
30a	30a	0.2	37.55840	-82.75550	205.9	0	0.47887	1.43119	204.9477
34	34	11.2	37.51286	-82.83616	169.3	11.2	0.35818	1.43119	168.2270
35	35	5.7	37.52986	-82.79064	189.1	5.7	0.43554	1.43119	188.1044

Table 8.78 Right Fork Beaver Creek RM 0.0 to 17.4 Information

Table 8.79 Right Fork Beaver Creek RM 0.0 to 17.4 Subwatershed Land Cover

	Watershed	Watershed		Future Growth
Land Cover	Acres	Square Miles	% of Total Area	WLA %
Open Water	76.27	0.12	0.08	
Developed	5934.03	9.27	5.99	1.0
Barren Land	1207.26	1.89	1.22	
Forest/Shrubland	77884.04	121.69	78.59	
Grassland/Herbaceous	10803.79	16.88	10.90	
Pasture/Hay	3009.60	4.70	3.04	
Cultivated Crops	165.89	0.26	0.17	
Wetlands	14.68	0.02	0.01	
Total	99095.56	154.84	100.00	

Table 8.80 Right Fork Beaver Creek RM 0.0 to 17.4 Water Withdrawals

AI		Withdrawal	Withdrawal	Facility	Facility
number	Source Description	Facility Name	(cfs)	Latitude	Longitude
		ICG Knott Co			
	RM 40.6 Right Fork	LLC (860-			
2528	Beaver Creek	8012)	0.4100156	37.32166	-82.80366
		Deane Mining			
	RM 31.0 Right Fork	LLC (860-			
2525	Beaver Creek	5318)	0.01547229	37.41038	-82.78096
2502	RM 4.2 of Caney	ICG Knott Co	1.005/00	27 2994	92 92956
3502	Стеек	LLC	1.005699	37.3884	-82.82856
		subtraction			
		from MAF			
		(sum of cfs)	1.43118689		

Table 8.81 Right Fork Beaver Creek RM 0.0 to 17.4 Data (Sites 30, 30a, 34, and 35)

Site 30				
	<u>E</u> . <u>coli</u> (colonies/100		Instantaneous Load (billion E.	Unit Area Load (million E. coli
Collection Date	mls)	Flow (cfs)	coli colonies/day)	colonies/day/acre)
05/16/07	310	70.79	536.90	5.45
05/30/07	310	29.77	225.79	2.29
5/30/07 (QA Sample)	490	N/A	N/A	N/A
06/13/07	180	19.27	84.86	0.86
06/27/07	3700	63.551	5752.85	58.40
07/10/07	220	11.799	63.51	0.64
07/26/07	13000	N/A	N/A	
08/17/07	210	7.202	37.00	0.38
8/17/07 (QA Sample)	140	N/A	N/A	N/A
08/31/07	160	N/A	N/A	N/A
09/14/07	180	N/A	N/A	N/A
09/28/07	330	N/A	N/A	N/A
10/12/07	40	25.701	25.15	0.26
11/16/07 (outside PCR				
season)	110	0.371	1.00	0.01
Greatest Concentration	13000			
Greatest Concentration	13000			
Greatest Concentration Site 30a	13000			
Greatest Concentration Site 30a	<u>13000</u> <u>E</u> . <u>coli</u>		Instantaneous	Unit Area Load
Greatest Concentration Site 30a	<u>E. coli</u> (colonies/100		Instantaneous Load (billion <u>E</u> .	Unit Area Load (million <u>E</u> . <u>coli</u>
Greatest Concentration Site 30a Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E</u> . <u>coli</u> colonies/day)	Unit Area Load (million <u>E</u> . <u>coli</u> colonies/day/acre)
Greatest Concentration Site 30a Collection Date 05/16/08	<u>E. coli</u> (colonies/100 mls) 560	Flow (cfs) 65.85	Instantaneous Load (billion <u>E</u> . <u>coli</u> colonies/day) 902.20	Unit Area Load (million <u>E</u> . <u>coli</u> colonies/day/acre) 9.10
Greatest Concentration Site 30a Collection Date 05/16/08 05/30/08	<u>E. coli</u> (colonies/100 mls) 560 140	Flow (cfs) 65.85 26.3	Instantaneous Load (billion <u>E</u> . <u>coli</u> colonies/day) 902.20 90.08	Unit Area Load (million <u>E</u> . <u>coli</u> colonies/day/acre) 9.10 0.91
Greatest Concentration Site 30a Collection Date 05/16/08 05/30/08 06/13/08	<u>E. coli</u> (colonies/100 mls) 560 140 500	Flow (cfs) 65.85 26.3 26.876	Instantaneous Load (billion <u>E</u> . <u>coli</u> colonies/day) 902.20 90.08 328.77	Unit Area Load (million <u>E</u> . <u>coli</u> colonies/day/acre) 9.10 0.91 3.32
Greatest Concentration Site 30a Collection Date 05/16/08 05/30/08 06/13/08 06/27/08	13000 <u>E. coli</u> (colonies/100 mls) 560 140 500 250	Flow (cfs) 65.85 26.3 26.876 10.230	Instantaneous Load (billion <u>E</u> . <u>coli</u> colonies/day) 902.20 90.08 328.77 62.57	Unit Area Load (million <u>E. coli</u> colonies/day/acre) 9.10 0.91 3.32 0.63
Greatest Concentration Site 30a Collection Date 05/16/08 05/30/08 06/13/08 06/27/08 07/11/08	13000 <u>E. coli</u> (colonies/100 mls) 560 140 500 250 680	Flow (cfs) 65.85 26.3 26.876 10.230 44.002	Instantaneous Load (billion <u>E</u> . <u>coli</u> colonies/day) 902.20 90.08 328.77 62.57 732.05	Unit Area Load (million <u>E</u> . <u>coli</u> colonies/day/acre) 9.10 0.91 3.32 0.63 7.39
Greatest Concentration Site 30a Collection Date 05/16/08 05/30/08 06/13/08 06/27/08 07/11/08 07/31/08	13000 <u>E. coli</u> (colonies/100 mls) 560 140 500 250 680 3800	Flow (cfs) 65.85 26.3 26.876 10.230 44.002 N/A	Instantaneous Load (billion <u>E</u> . <u>coli</u> colonies/day) 902.20 90.08 328.77 62.57 732.05 N/A	Unit Area Load (million <u>E</u> . <u>coli</u> colonies/day/acre) 9.10 0.91 3.32 0.63 7.39 N/A
Greatest Concentration Site 30a Collection Date 05/16/08 05/30/08 06/13/08 06/27/08 06/27/08 07/11/08 07/31/08 08/08/08	13000 E. coli (colonies/100 mls) 560 140 500 250 680 3800 500	Flow (cfs) 65.85 26.3 26.876 10.230 44.002 N/A 22.4328	Instantaneous Load (billion <u>E</u> . <u>coli</u> colonies/day) 902.20 90.08 328.77 62.57 732.05 N/A 274.42	Unit Area Load (million <u>E</u> . <u>coli</u> colonies/day/acre) 9.10 0.91 3.32 0.63 7.39 N/A 2.77
Greatest Concentration Site 30a Collection Date 05/16/08 05/30/08 06/13/08 06/27/08 06/27/08 07/11/08 07/31/08 08/08/08 08/08/08	13000 <u>E. coli</u> (colonies/100 mls) 560 140 500 250 680 3800 500 150	Flow (cfs) 65.85 26.3 26.876 10.230 44.002 N/A 22.4328 7.995	Instantaneous Load (billion <u>E</u> . <u>coli</u> colonies/day) 902.20 90.08 328.77 62.57 732.05 N/A 274.42 29.34	Unit Area Load (million <u>E</u> . <u>coli</u> colonies/day/acre) 9.10 0.91 3.32 0.63 7.39 N/A 2.77 0.30
Greatest Concentration Site 30a Collection Date 05/16/08 05/30/08 06/13/08 06/27/08 07/11/08 07/31/08 08/08/08 08/22/08 09/12/08	13000 <u>E. coli</u> (colonies/100 mls) 560 140 500 250 680 3800 500 150 110	Flow (cfs) 65.85 26.3 26.876 10.230 44.002 N/A 22.4328 7.995 11.121	Instantaneous Load (billion <u>E</u> . <u>coli colonies/day)</u> 902.20 90.08 328.77 62.57 732.05 N/A 274.42 29.34 29.93	Unit Area Load (million <u>E. coli</u> colonies/day/acre) 9.10 0.91 3.32 0.63 7.39 N/A 2.77 0.30 0.30
Greatest Concentration Site 30a Collection Date 05/16/08 05/30/08 06/13/08 06/27/08 07/11/08 07/31/08 08/08/08 08/22/08 09/12/08 09/12/08 09/20/08	13000 <u>E. coli</u> (colonies/100 mls) 560 140 500 250 680 3800 500 150 110 120	Flow (cfs) 65.85 26.3 26.876 10.230 44.002 N/A 22.4328 7.995 11.121 7.015	Instantaneous Load (billion <u>E</u> . coli colonies/day) 902.20 90.08 328.77 62.57 732.05 N/A 274.42 29.34 29.93 20.60	Unit Area Load (million <u>E</u> . <u>coli</u> colonies/day/acre) 9.10 0.91 3.32 0.63 7.39 N/A 2.77 0.30 0.30 0.21
Greatest Concentration Site 30a Collection Date 05/16/08 05/30/08 06/13/08 06/27/08 07/11/08 08/08/08 08/22/08 09/12/08 09/20/08 10/17/08	13000 <u>E. coli</u> (colonies/100 mls) 560 140 500 250 680 3800 500 150 110 120 50	Flow (cfs) 65.85 26.3 26.876 10.230 44.002 N/A 22.4328 7.995 11.121 7.015 8.743	Instantaneous Load (billion <u>E</u> . <u>coli</u> colonies/day) 902.20 90.08 328.77 62.57 732.05 N/A 274.42 29.34 29.93 20.60 10.70	Unit Area Load (million <u>E</u> . <u>coli</u> colonies/day/acre) 9.10 0.91 3.32 0.63 7.39 N/A 2.77 0.30 0.30 0.30 0.21 0.11
Greatest Concentration Site 30a Collection Date 05/16/08 05/30/08 06/13/08 06/27/08 06/27/08 07/11/08 07/31/08 08/08/08 08/22/08 09/12/08 09/12/08 10/17/08 10/17/08 10/24/08	13000 E. coli (colonies/100 mls) 560 140 500 250 680 3800 500 150 150 150 110 120 500 90	Flow (cfs) 65.85 26.3 26.876 10.230 44.002 N/A 22.4328 7.995 11.121 7.015 8.743 7.326	Instantaneous Load (billion <u>E</u> . <u>coli</u> colonies/day) 902.20 90.08 328.77 62.57 732.05 N/A 274.42 29.34 29.93 20.60 10.70 16.13	Unit Area Load (million <u>E</u> . <u>coli</u> colonies/day/acre) 9.10 0.91 3.32 0.63 7.39 N/A 2.77 0.30 0.30 0.30 0.21 0.11 0.16

Site 34				
	<u>E</u> . <u>coli</u>		Instantaneous	Unit Area Load
	(colonies/100		Load (billion <u>E</u> .	(million <u>E</u> . <u>coli</u>
Collection Date	mls)	Flow (cfs)	<u>coli</u> colonies/day)	colonies/day/acre)
05/15/07	80	18.505	36.22	0.45
05/30/07	290	24.19	171.63	2.13
06/13/07	390	18.952	180.83	2.24
06/27/07	5900	21.113	3047.62	37.77
07/10/07	300	9.207	67.58	0.84
07/26/07	5100	69.501	8672.01	107.46
08/17/07	150	7.962	29.22	0.36
08/31/07	130	N/A	N/A	N/A
09/14/07	210	3.97	20.40	0.25
09/28/07	100	1.933	4.73	0.06
10/12/07	120	3.6554	10.73	0.13
11/17/07 (outside PCR				
season)	3300	19.807	1599.16	19.82
11/17/07 (QA Sample)	2100	N/A	N/A	N/A
Greatest Concentration	5900			
Site 35				
	<u>E</u> . <u>coli</u>		Instantaneous	Unit Area Load
	(colonies/100		Load (billion <u>E</u> .	(million <u>E</u> . <u>coli</u>
Collection Date	mls)	Flow (cfs)	<u>coli</u> colonies/day)	colonies/day/acre)
05/16/07	140	N/A	N/A	N/A
05/30/07	190	27.832	129.38	1.43
06/13/07	340	N/A	NT / A	
06/27/07		1 1/ 2 1	IN/A	N/A
00/21/07	3500	N/A N/A	N/A N/A	N/A N/A
6/27/07 (QA Sample)	3500 2400	N/A N/A	N/A N/A N/A	N/A N/A N/A
6/27/07 (QA Sample) 07/10/07	3500 2400 50	N/A N/A N/A	N/A N/A N/A N/A	N/A N/A N/A N/A
6/27/07 (QA Sample) 07/10/07 07/26/07	3500 2400 50 6700	N/A N/A N/A N/A	N/A N/A N/A N/A N/A	N/A N/A N/A N/A N/A
6/27/07 (QA Sample) 07/10/07 07/26/07 7/26/07 (QA Sample)	3500 2400 50 6700 1100	N/A N/A N/A N/A N/A	N/A N/A N/A N/A N/A N/A	N/A N/A N/A N/A N/A N/A
6/27/07 (QA Sample) 07/10/07 07/26/07 7/26/07 (QA Sample) 08/17/07	3500 2400 50 6700 1100 170	N/A N/A N/A N/A N/A 6.893	N/A N/A N/A N/A N/A 28.67	N/A N/A N/A N/A N/A 0.32
6/27/07 (QA Sample) 07/10/07 07/26/07 7/26/07 (QA Sample) 08/17/07 08/31/07	3500 2400 50 6700 1100 170 70	N/A N/A N/A N/A N/A 6.893 N/A	N/A N/A N/A N/A N/A 28.67 N/A	N/A N/A N/A N/A N/A 0.32 N/A
6/27/07 (QA Sample) 07/10/07 07/26/07 7/26/07 (QA Sample) 08/17/07 08/31/07 09/14/07	3500 2400 50 6700 1100 170 70 310	N/A	N/A N/A N/A N/A N/A 28.67 N/A N/A	N/A N/A N/A N/A N/A 0.32 N/A N/A N/A
6/27/07 (QA Sample) 07/10/07 07/26/07 7/26/07 (QA Sample) 08/17/07 08/31/07 09/14/07 09/28/07	3500 2400 50 6700 1100 170 70 310 640	N/A	N/A	N/A
6/27/07 (QA Sample) 07/10/07 07/26/07 7/26/07 (QA Sample) 08/17/07 08/31/07 09/14/07 09/28/07 10/12/07	3500 2400 50 6700 1100 170 70 310 640 310	N/A N/A	N/A N/A N/A N/A N/A N/A N/A N/A N/A 28.67 N/A N/A N/A 28.10 N/A N/A N/A N/A N/A N/A N/A N/A	N/A N/A N/A N/A N/A N/A N/A N/A N/A 0.32 N/A N/A 0.32 N/A 0.32 N/A 0.24
6/27/07 (QA Sample) 07/10/07 07/26/07 7/26/07 (QA Sample) 08/17/07 08/31/07 09/14/07 09/28/07 10/12/07 11/17/07 (outside PCR	3500 2400 50 6700 1100 170 70 310 640 310	N/A N/A N/A N/A N/A 6.893 N/A N/A N/A 2.925	N/A N/A N/A N/A N/A N/A N/A N/A N/A 28.67 N/A N/A 28.267 N/A 22.18	N/A N/A N/A N/A N/A N/A N/A N/A 0.32 N/A N/A 0.32 N/A 0.32 N/A 0.32 N/A
6/27/07 (QA Sample) 07/10/07 07/26/07 7/26/07 (QA Sample) 08/17/07 08/31/07 09/14/07 09/28/07 10/12/07 11/17/07 (outside PCR season)	3500 2400 50 6700 1100 170 70 310 640 310 2600	N/A N/A N/A N/A N/A 6.893 N/A N/A N/A 2.925 N/A	N/A N/A N/A N/A N/A 28.67 N/A N/A N/A 22.18 N/A	N/A N/A N/A N/A N/A N/A N/A 0.32 N/A 0.32 N/A 0.32 N/A 0.32 N/A N/A N/A N/A N/A N/A N/A

Table 8.82 TMDL for Right Fork Beaver Creek RM 0.0 to 17.4

		0				
TMDL					<u>E</u> . <u>coli</u> (billion	
Table					colonies/day)	
						Existing
					65184.6057	Load
						Total
					1203.4081	TMDL
					120.3408	MOS
						TMDL
					1083.0673	Target
				Design		
AI		Discharger Facility	_	Capacity		%
number	KPDES #	Name	Туре	(cfs)	98.34	reduction
		KNOTT CO	G			TABLE
0.507	111100 1005 1	WATER &	Sewerage	0.154700	0.0005	KPDES
2527	KY0042854	SEWER DIST	System	0.154723	0.9085	WLA
		WARCO	A			VDDEG
1250	XX0072074	HOUSING	Apartment	0.029691	0.0051	KPDES
1352	KY0072974	PROJECT	Building	0.038681	0.22/1	WLA
		ALLEN CENTRAL HICH				VDDES
25254	VV0070420		Sabaal	0.01702	0.0000	KPDES WLA
55254	K10079450	SCHOOL	School	0.01702	0.0999	WLA
		GOLDEN YEARS	Intermediate			KPDES
2517	KY0083089	REST HOME	Care Facility	0.015472	0.0908	WLA
		JONES FORK				KPDES
35359	KY0087076	ELEM SCHOOL	School	0.009283	0.0545	WLA
		JAMES A DUFF				KPDES
35258	KY0093017	ELEM SCHOOL	School	0.012378	0.0727	WLA
			Bituminous			
		CONSOL OF KY	Coal & Lig,			KPDES
2514	KY0094510	INC JONES FORK	Surface	0.004642	0.0273	WLA
057(1	1110105000		Sewerage	0.154500	0.000 -	KPDES
35761	KY0105228	WAYLAND STP	System	0.154723	0.9085	WLA
82002	VV0106755	MAY VALLEY	0.11	0.000202	0.0545	KPDES
82092	KY0106755	ELEM SCHOOL	School	0.009283	0.0545	
25260	VV0107051	ΕΛΩΤΕΡΝΙΩΤΟ	Sewerage	0.029691	0 2271	KPDES WLA
55200	K1010/031	EASTERN ST	Dwelling	0.030001	0.44/1	WLA
		GOBL F	Other than			KPDFS
1196	KYG400590	RESIDENCE	Apartment	0.000774	0.0045	WLA
1170	110100000		Dwelling	0.000777	010010	,, 1011
		GREEN	Other than			KPDES
1199	KYG400603	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		ALLEN	Other than			KPDES
1133	KYG400642	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		MITCHELL	Other than			KPDES
1270	KYG400666	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		HOOVER	Other than			KPDES
1222	KYG400730	RESIDENCE	Apartment	0.000774	0.0045	WLA

				Design		
AI		Discharger Facility		Capacity	<u>E</u> . <u>coli</u> (billion	
number	KPDES #	Name	Туре	(cfs)	colonies/day)	
			Dwelling			
		TURNER	Other than			KPDES
1343	KYG400778	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		PERKINS	Other than			KPDES
1293	KYG400836	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		SHEPHERD	Other than			KPDES
1314	KYG400844	RESIDENCE	Apartment	0.000774	0.0045	WI A
1511	RIGIOUOTI	RESIDENCE	Dwelling	0.000771	0.0042	VV L21X
		VESTED	Other then			KDDES
1242	VVC400015	DESIDENCE		0.000774	0.0045	NI DES
1245	K10400913	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			VDDDC
1074		MULLINS	Other than	0.00077	0.004	KPDES
1276	KYG400975	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		MAY	Other than			KPDES
4327	KYG401073	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		CASTLE	Other than			KPDES
4350	KYG401113	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		FRASURE	Other than			KPDES
4344	KYG401121	RESIDENCE	Apartment	0.000774	0.0045	WLA
1511	1110101121	TELSID LI (CL	Dwelling	0.000771		
		CRIM	Other than			KDDES
1336	KVG401125	RESIDENCE		0.000774	0.0045	WI A
4550	K10401123	RESIDENCE	Dualling	0.000774	0.0045	WLA
			Dweining			VDDEC
10050	WWC 401010	SHEPPAKD	Other than	0.000774	0.0045	KPDES
12253	KYG401218	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		WEBB	Other than			KPDES
15655	KYG401296	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		EVERIDGE	Other than			KPDES
15807	KYG401352	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		WILLIAMSON	Other than			KPDES
33378	KYG401353	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		HALL	Other than			KPDES
74185	KYG401475	RESIDENCE	Apartment	0.000774	0.0045	WLA
/ 1105	110101175		Dwelling	0.000777	00010	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
		WALLACE	Other than			KPDFS
43120	KYG401540	RESIDENCE	Apartment	0.000774	0.0045	WI A
+3120	K10401340	RESIDENCE	Dwalling	0.000774	0.0043	WLA
			Dweiling			KDDEC
1222.1	WWO 401 540	PRATER	Other than	0.00077.4	0.004	KPDES
43224	KYG401548	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		CHILDERS	Other than			KPDES
46147	KYG401603	RESIDENCE	Apartment	0.000774	0.0045	WLA

				Design		
AI		Discharger Facility		Capacity	<u>E</u> . <u>coli</u> (billion	
number	KPDES #	Name	Туре	(cfs)	colonies/day)	
			Dwelling			
		LAFERTY	Other than			KPDES
47022	KYG401638	RESIDENCE	Apartment	0.000774	0.0045	WLA
		acom.	Dwelling			WDDDG
50607	XXXC 401701	SCOTT	Other than	0.000774	0.0045	KPDES
50627	KYG401/21	RESIDENCE	Apartment	0.000774	0.0045	WLA
		VIDD	Dwelling Other ther			VDDEC
50050	KVC401720	DESIDENCE		0.000774	0.0045	KPDES WLA
30930	K10401750	RESIDENCE	Dualling	0.000774	0.0045	WLA
		ISON	Other than			KPDFS
54879	KYG401772	RESIDENCE	Apartment	0.000774	0 0045	WI A
54077	K10+01//2	RESIDENCE	Dwelling	0.000774	0.0045	
		HOWARD	Other than			KPDES
75556	KYG401857	RESIDENCE	Apartment	0.000774	0.0045	WLA
10000		REDIDERCE	Dwelling	0.000771		
		BILITER	Other than			KPDES
76078	KYG401876	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		SCARBERRY	Other than			KPDES
81570	KYG401981	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		COOK	Other than			KPDES
84292	KYG402025	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		PRATER	Other than			KPDES
97291	KYG402063	RESIDENCE	Apartment	0.000774	0.0045	WLA
						Total
					2 0110	KPDES WLA
			Addition to		2.0110	WLA
			MAE (sum of			
			cfs)	0.478867	1080 2555	remainder
			(15)	0.770007	1000.2333	Future
						Growth
					10.8026	WLA
						Total
					13.6144	WLA
					1069.4529	LA

Note: (1) Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.

8.20 Arkansas Creek RM 0.0 to 3.6



Figure 8.22 Arkansas Creek RM 0.0 to 3.6

Arkansas Creek is a third order stream located in the Mainstem Beaver Creek subwatershed in Floyd County (Figure 8.22). Information about Arkansas Creek, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.83. It has a catchment of 1,990 acres (3.1 square miles) with a 75% forested and 6.7% developed land cover (Table 8.84). This subwatershed is entirely un-sewered. There are no stream water withdrawals in this subwatershed. Sampling data from site 2 is presented in Table 8.85 and TMDL allocations in Table 8.86.

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
	Arkansas								
	Creek								
Arkansas	0.0 to								
Creek	3.6	486027_01	Floyd	1990.21	3.11	3rd order			
			Sample	Sample			+ to	- from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
2	2	0.05	37.57810	-82.73170	4.1	0	0.00542	0.00000	4.1054

Table 8.83 Arkansas Creek RM 0.0 to 3.6 Information

Table 8.84 Arkansas Creek RM 0.0 to 3.6 Subwatershed Land Cover

	Watershed	Watershed	% of Total	Future Growth
Land Cover	Acres	Square Miles	Area	WLA %
Open Water	0.00	0.00	0.00	
Developed	132.35	0.21	6.65	1.0
Barren Land	8.69	0.01	0.44	
Forest/Shrubland	1497.78	2.34	75.26	
Grassland/Herbaceous	267.38	0.42	13.43	
Pasture/Hay	82.44	0.13	4.14	
Cultivated Crops	1.34	0.00	0.07	
Wetlands	0.22	0.00	0.01	
Totals	1990.21	3.11	100.00	

Table 8.85 Arkansas Creek RM 0.0 to 3.6 Data (Site 2)

	<u>E</u> . <u>coli</u>		Instantaneous	Unit Area Load
	(colonies/100	Flow	Load (billion <u>E</u> .	(million <u>E</u> . <u>coli</u>
Collection Date	mls)	(cfs)	<u>coli</u> colonies/day)	colonies/day/acre)
05/16/08	580	0.8	11.35	5.70
05/30/08	70	0.142	0.24	0.12
06/13/08	140	0.155	0.53	0.27
06/27/08	50	0.902	1.10	0.55
07/11/08	680	0.541	9.00	4.52
07/31/08	>80000	1.541	3016.14	1515.49
08/08/08	340	25.5346	212.41	106.73
08/22/08	130	8.3208	26.46	13.30
09/12/08	140	0.0511	0.18	0.09
09/20/08	290	0.013	0.09	0.05
10/17/08	2400	0.14	8.22	4.13
10/24/08	110	0.03	0.08	0.04
Greatest Concentration	80000			

Table 8.86 TMDL	for Arkansas	Creek RM 0.0 to 3.6	
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					<u>E</u> . <u>coli</u>	
TMDL					(billion	
Table					colonies/day)	
						Existing
					8035.3679	Load
						Total
					24.1061	TMDL
					2.4106	MOS
						TMDL
					21.6955	Target
		Discharger		Design		
AI		Facility		Capacity		%
number	KPDES #	Name	Туре	(cfs)	99.73	reduction
		ROWE	Dwelling Other			KPDES
1304	KYG400339	RESIDENCE	than Apartment	0.000774	0.0045	WLA
		LAWSON	Dwelling Other			KPDES
1248	KYG400593	RESIDENCE	than Apartment	0.000774	0.0045	WLA
		STURGILL	Dwelling Other			KPDES
1328	KYG400936	RESIDENCE	than Apartment	0.000774	0.0045	WLA
		ROSE	Dwelling Other			KPDES
4342	KYG401126	RESIDENCE	than Apartment	0.000774	0.0045	WLA
		COOLEY	Dwelling Other			KPDES
4331	KYG401143	RESIDENCE	than Apartment	0.000774	0.0045	WLA
		MCKINNEY	^			
		JR	Dwelling Other			KPDES
53921	KYG401764	RESIDENCE	than Apartment	0.000774	0.0045	WLA
		ALLEN	Dwelling Other			KPDES
76185	KYG401883	RESIDENCE	than Apartment	0.000774	0.0045	WLA
			P ========			Total
						KPDES
					0.0315	WLA
			Addition to			,, 131 1
			MAF (sum of			
			cfs)	0.005415	21.6637	remainder
			•15)	0.000 110	21.0007	Temamaer
						Future
						Growth
					0.2166	$WLA^{(1)}$
						Total
ļ					0.2481	WLA
					21.4471	LA

Note:

(1) Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.

8.21 Buck Branch RM 0.0 to 2.8



Figure 8.23 Buck Branch RM 0.0 to 2.8

Buck Branch is a second order stream located in the Mainstem Beaver Creek subwatershed in Floyd County (Figure 8.23). Information about Buck Branch, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.87. It has a catchment of 1,840 acres (2.9 square miles) with an 83% forested and 9.7% developed land cover (Table 8.88). This subwatershed is partially sewered near its mouth (see Figure 8.24). There are no stream water withdrawals in this subwatershed. Sampling data from site 1 is presented in Table 8.89 and TMDL allocations in Table 8.90.

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
	Buck								
	Branch								
Buck	0.0 to								
Branch	2.8	488192_01	Floyd	1840.33	2.88	2nd order			
			Sample	Sample			+ to	- from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
1	1	0.05	37.57060	-82.75620	3.7	0	0.00309	0.00000	3.7031

Table 8.87 Buck Branch RM 0.0 to 2.8 Information

Table 8.88 Buck Branch RM 0.0 to 2.8 Subwatershed Land Cover

	Watershed	Watershed	% of Total	Future Growth
Land Cover	Acres	Square Miles	Area	WLA %
Open Water	0.00	0.00	0.00	
Developed	178.94	0.28	9.72	1.0
Barren Land	5.91	0.01	0.32	
Forest/Shrubland	1534.74	2.40	83.39	
Grassland/Herbaceous	118.88	0.19	6.46	
Pasture/Hay	80.59	0.13	4.38	
Cultivated Crops	3.78	0.01	0.21	
Wetlands	0.24	0.00	0.01	
Totals	1840.33	2.88	100.00	

Table 8.89 Buck Branch RM 0.0 to 2.8 Data (Site 1)

	\underline{E} . <u>coli</u>	Flow	Instantaneous Load	Unit Area Load (million E, coli
Collection Date	mls)	(cfs)	colonies/day)	colonies/day/acre)
05/16/08	1700	1.132	47.08	25.58
05/30/08	2500	0.223	13.64	7.41
06/13/08	1700	0.298	12.39	6.73
06/27/08	740	0.117	2.12	1.15
6/27/2008 (QA sample)	460	N/A	N/A	N/A
07/11/08	3000	0.323	23.71	12.88
07/31/08	64000	1.003	1570.51	853.38
08/08/08	2700	0.3072	20.29	11.03
08/22/08	170	0.0885	0.37	0.20
09/12/08	700	0.078	1.34	0.73
09/20/08	560	0.056	0.77	0.42
10/17/08	300	0.117	0.86	0.47
10/24/08	250	0.114	0.70	0.38
Greatest Concentration	64000			

Final Beaver Creek Watershed E. coli TMDL



Figure 8.24 Buck Branch Sewer Lines

Table 8.90 TMDL	for Buck Branch RM 0.0 to 2.8
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TMDL Table					<u>E</u> . <u>coli</u> (billion colonies/day)	
1000					coronnes/ duy j	Existing
					5798.3369	Load
						Total
					21.7438	TMDL
					2.1744	MOS
						TMDL
					19.5694	Target
				Design		
AI		Discharger		Capacity		%
number	KPDES #	Facility Name	Туре	(cfs)	99.66	reduction
			Dwelling			
		JACOBS	Other than			KPDES
1232	KYG400806	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		DEROSSETT	Other than			KPDES
1180	KYG400520	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		CARRAWAY	Other than			KPDES
1158	KYG400787	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		ROWE	Other than			KPDES
75746	KYG401868	RESIDENCE	Apartment	0.0007736	0.0045	WLA
						Total
						KPDES
					0.0180	WLA
			Addition			
			to MAF			
			(sum of	0.0000045	10 5510	·
			cts)	0.0030945	19.5512	remainder
						Future
					0 1055	
					0.1955	
					0.0125	
					0.2135	
					19.3557	LA

Note:

(1) Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.

8.22 Beaver Creek RM 0.0 to 7.1



Figure 8.25 Beaver Creek RM 0.0 to 7.1

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 2 is under site 3, site 30a is to the immediate left of site 50, site 27 is under site 35, site 20 is under site 31, site 32 is under site 33, site 37 is under site 45, and site 40 is under site 47.

Beaver Creek at RM 0.0 is a fifth order stream located in Floyd County (Figure 8.25). Information about Beaver Creek RM 0.0 to 7.1, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.91. It has a catchment of 153,670 acres (240.1 square miles) with an 80% forested and 6.5% developed land cover (Table 8.92). Portions of this watershed are sewered; especially in larger cities (see Figures 5.13 through 5.19). There are five stream water withdrawals in this subwatershed (Table 8.93). This segment had three sample sites and data from sites 3, 4, and PRI095 is presented in Table 8.94. Site PRI095 had the greatest concentration (19,000) so this concentration was used to set the existing loads and percent reduction for the impaired segment. However, to extrapolate to the end of the impaired segment, the Adjusted MAF from site 4 (316.8101 cfs) was used as the flow to set the TMDL for this impaired segment. The TMDL calculations for sites 3, 4, and PRI095 are shown in Appendix E while the TMDL for Beaver Creek RM 0.0 to 7.1 is shown in Table 8.95.

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
	Beaver								
	Creek								
Beaver	0.0 to								
Creek	7.1	486610_01	Floyd	153669.77	240.11	5th order			
			Sample	Sample			+ to	- from	Adjusted
	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
3	3	3.9	37.57950	-82.73200	309.8	3.9	1.19400	2.19242	308.8016
PRI095	95	1.1	37.60280	-82.72754	317	1.1	1.20096	2.19242	316.0085
4	4	0.2	37.61178	-82.73071	317.8	0	1.20251	2.19242	316.8101

Table 8.91 Beaver Creek RM 0.0 to 7.1 Information

Table 8.92 Beaver Creek RM 0.0 to 7.1 Subwatershed Land Cover

	Watershed	Watershed	% of Total	Future Growth
Land Cover	Acres	Square Miles	Area	WLA %
Open Water	89.41	0.14	0.06	
Developed	9935.56	15.52	6.47	1.0
Barren Land	1724.06	2.69	1.12	
Forest/Shrubland	122227.36	190.98	79.54	
Grassland/Herbaceous	14736.76	23.03	9.59	
Pasture/ Hay	4628.17	7.23	3.01	
Cultivated Crops	305.80	0.48	0.20	
Wetlands	22.68	0.04	0.01	
Totals	153669.77	240.11	100.00	

Table 8.93 Beaver Creek RM 0.0 to 7.1 Water Withdrawals

AI		Withdrawal	Withdrawal	Facility	Facility
number	Source Description	Facility Name	(cfs)	Latitude	Longitude
		ICG Knott Co			
	RM 40.6 Right Fork	LLC (860-			
2528	Beaver Creek	8012)	0.4100156	37.32166	-82.80366
		Deane Mining			
	RM 31.0 Right Fork	LLC (860-			
2525	Beaver Creek	5318)	0.01547229	37.41038	-82.78096
	RM 15.36 of Left	Elk Horn Coal			
1299	Fork Beaver Creek	Co LLC	0.09283372	37.40129	-82.74175
	RM 4.2 of Caney	ICG Knott Co			
3502	Creek	LLC	1.005699	37.3884	-82.82856
		Black			
	RM 2.4 of Left Fork	Diamond			
78571	Beaver Creek	Mining	0.6684028	37.53192	-82.74364
		subtraction			
		from MAF			
		(sum of cfs)	2.19242341		

Table 8.94 Beaver Creek RM 0.0 to 7.1 Data (Sites 3, 4, and PRI095)

Site 3				
	<u>E</u> . <u>coli</u>	Flow	Instantaneous Load (billion	Unit Area Load (million
Collection Date	(colonies/100 mls)	(cfs)	<u>E</u> . <u>coli</u> colonies/day)	<u>E</u> . <u>coli</u> colonies/day/acre)
05/16/08	1100	N/A	N/A	N/A
05/30/08	130	43.987	139.90	0.94
06/13/08	430	45.528	478.97	3.21
06/27/08	180	18.869	83.10	0.56
07/11/08	610	60.4	901.42	6.04
7/11/08 (QA Sample)	550	N/A	N/A	N/A
07/31/08	4500	N/A	N/A	N/A
08/08/08	240	0.0075	0.04	0.00
09/12/08	390	23.475	223.99	1.50
09/20/08	90	9.925	21.85	0.15
10/17/08	90	9.692	21.34	0.14
10/24/08	750	9.081	166.63	1.12
Greatest concentration	4500			
Site 4				
	<u>E</u> . <u>coli</u>	Flow	Instantaneous Load (billion	Unit Area Load (million
Collection Date	(colonies/100 mls)	(cfs)	<u>E</u> . <u>coli</u> colonies/day)	<u>E</u> . <u>coli</u> colonies/day/acre)
05/16/08	300	N/A	N/A	N/A
05/30/08	290	33.798	239.80	1.56
06/13/08	630	34.654	534.14	3.48
06/27/08	180	22.534	99.24	0.65
07/11/08	1500	64.465	2365.78	15.40
07/31/08	1900	N/A	N/A	N/A
08/08/08	270	23.691	156.50	1.02
08/22/08	250	6.8769	42.06	0.27
09/12/08	90	18.639	41.04	0.27
09/20/08	380	11.850	110.17	0.72
9/20/08 (QA Sample)	190	N/A	N/A	N/A
10/17/08	210	8.251	42.39	0.28
10/24/08	70	11.35	19.44	0.13
10/24/08 (QA Sample)	70	N/A	N/A	N/A
Greatest concentration	1900			
Site PRI095				
	E. coli	Flow	Instantaneous Load (billion	Unit Area Load (million
Collection Date	(colonies/100 mls)	(cfs)	E. coli colonies/day)	E. coli colonies/day/acre)
5/17/07	2700	N/A		N/A
6/14/07	656	N/A	N/A	N/A
7/19/07	426	N/A	N/A	N/A
8/14/07	500	N/A	N/A	N/A
9/20/07	268	N/A	N/A	N/A
10/18/07	261	N/A	N/A	N/A
5/21/08	450	N/A	N/A	N/A
6/17/08	19000	N/A	N/A	N/A
7/16/08	220	N/A	N/A	N/A
10/15/08	240	N/A	N/A	N/A
Greatest concentration	19000			

Table 8.95 TMDL for Beaver Creek RM 0.0 to 7.1

TMDL					<u>E</u> . <u>coli</u> (billion	
Table					colonies/day)	
						Existing
					147268.9800	Load
					1112000000	Total
					1860.2397	TMDL
					186 02/0	MOS
					100.0240	TMDI
					1674 2158	Target
		Discharger Fasility		Design	1074.2136	
A I number	VDDEC #	Nome	Tuna	Conceptu (ofe)	09.94	% reduction
AI IIUIIIDEI	KIDES#	Iname	Type	Capacity (CIS)	90.00	VDDES
1262	KX0026021	MADTINICTO	Sewerage	0 19566749	1 0002	KPDES WLA
1202	K 10020921	MAKTIN STP	System	0.18500748	1.0902	
40524	KN0020700	WHEELWKIGHI	Sewerage	0.249126525	0.0441	KPDES WLA
40534	KY0028789	SIP VNOTT CO	System	0.348126525	2.0441	WLA
		KNOTT CO	G			KDDEG
0507	111100 40054	WATER &	Sewerage	0.1545000	0.000	KPDES
2527	KY0042854	SEWER DIST	System	0.1547229	0.9085	WLA
		WARCO				
		HOUSING	Apartment			KPDES
1352	KY0072974	PROJECT	Building	0.038680725	0.2271	WLA
220.45		BEAVER CREEK	<u> </u>	0.010020.002	0.0707	KPDES
33945	KY0077542	ELEM SCHOOL	School	0.010830603	0.0636	WLA
0.50.50		MCDOWELL	<u> </u>	0.00000.405		KPDES
35252	KY0079421	ELEM SCHOOL	School	0.023208435	0.1363	WLA
		ALLEN				WEDDEG
		CENTRAL HIGH	~		0.0000	KPDES
35254	KY0079430	SCHOOL	School	0.017/019519	0.0999	WLA
		GOLDEN YEARS	Intermediate			KPDES
2517	KY0083089	RESTHOME	Care Facility	0.01547229	0.0908	WLA
		MCDOWELL				WDDDG
1124	WW0005701	APPALACHIAN	TT 1/1	0.02004450	0 1015	KPDES
1134	KY0085791	REG HOSP	Hospital	0.03094458	0.1817	WLA
25250	1110000000	JONES FORK	G 1 1	0.0000000000	0.0545	KPDES
35359	KY008/0/6	ELEM SCHOOL	School	0.009283374	0.0545	WLA
0.50.51		OSBORNE ELEM	<u> </u>	0.010501155	0.0(10	KPDES
35251	KY0089435	SCHOOL	School	0.010521157	0.0618	WLA
		JAMES A DUFF	~			KPDES
35258	KY0093017	ELEM SCHOOL	School	0.012377832	0.0727	WLA
		SOUTH FLOYD	~			KPDES
35260	KY0093912	HIGH SCHOOL	School	0.023208438	0.1363	WLA
		CONTOL OF MA	Bituminous			WDDDG
2514	WW0004510	CONSOL OF KY	Coal & Lig,	0.004641606	0.0050	KPDES WILL
2514	KY0094510	INC JONES FORK	Surface	0.004641686	0.0273	WLA
		LEFT BEAVER				VDDDG
1055	WW000 CO 10	CREEK	Apartment	0.007050102	0.1(35	KPDES
1255	KY0096342	TOWNHOUSES	Building	0.027850122	0.1635	WLA
		MCDOWELL				
		DOLLAR	D			
12.52		GENERAL	Department	0.000550.005	0.004	KPDES
1263	KY0103136	STORE	Store	0.000773615	0.0045	WLA
1005	WW0102222		Mobile	0.015015575	0.0000	KPDES
1305	KY0103233	S & V MHP	Home Site	0.01531/56/	0.0899	WLA

		Discharger Facility		Design	E. coli (billion	
AI number	KPDES #	Name	Туре	Capacity (cfs)	colonies/day)	
			Sewerage		• ·	KPDES
35761	KY0105228	WAYLAND STP	System	0.1547229	0.9085	WLA
		MAYVALLEV				KPDFS
82092	KY0106755	ELEM SCHOOL	School	0.009283375	0.0545	WLA
			Sewerage			KPDES
35260	KY0107051	EASTERN STP	System	0.038680729	0.2271	WLA
			Dwelling			
		ROWE	Other than			KPDES
1304	KYG400339	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		MITCHEI I	Dwelling Other then			KDDES
1269	KYG400478	RESIDENCE	Apartment	0.000773615	0.0045	WLA
120)	III C 100 I/O	TEDELITEE	Dwelling	0.000772012		
		BLACKBURN	Other than			KPDES
1143	KYG400479	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
1100	WWG 400500	DEROSSETT	Other than	0.000772615	0.0045	KPDES
1180	KYG400520	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		HICKS	Other than			KPDES
1218	KYG400567	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		WRIGHT	Other than			KPDES
1367	KYG400579	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
1106	KNC 400500	GOBLE	Other than	0.000772615	0.0045	KPDES
1190	KIG400590	RESIDENCE	Dwelling	0.000773015	0.0045	WLA
		LAWSON	Other than			KPDES
1248	KYG400593	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		STUMBO	Other than			KPDES
1327	KYG400601	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		CDEEN	Dwelling			VDDEG
1100	KVG400603	GREEN	Apartment	0.000773615	0.0045	WI A
1177	1110400005	RESIDENCE	Dwelling	0.000775015	0.0043	
		MCKINNEY	Other than			KPDES
1265	KYG400612	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
1100			Other than	0.000770.015	0.0047	KPDES
1182	KYG400614	DYE RESIDENCE	Apartment	0.000773615	0.0045	WLA
		ΔΙΙΕΝ	Other than			KPDFS
1133	KYG400642	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			,, 2011
		CURRENT	Other than			KPDES
4250	KYG400659	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			UDE 20
1070	WWO ADDOCCC	MITCHELL	Other than	0.000772615	0.0045	KPDES
1270	KYG400666	RESIDENCE	Apartment	0.000773615	0.0045	WLA

		Discharger Facility		Design	<u>E</u> . <u>coli</u> (billion	
AI number	KPDES #	Name	Туре	Capacity (cfs)	colonies/day)	
			Dwelling			
		SHREWBERRY	Other than			KPDES
1315	KYG400677	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		CASTLE	Dwelling Others there			VDDEC
1162	KVG400678	RESIDENCE	A partment	0.000773615	0.0045	WI A
1102	K10400078	RESIDENCE	Dwelling	0.000773013	0.0045	WLA
		CASE	Other than			KPDES
1161	KYG400692	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		MULLINS	Other than			KPDES
1274	KYG400714	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		VOUNANG	Dwelling			VDDDG
1260	KNC 400724	YOUMANS	Other than	0.000772615	0.0045	KPDES WLA
1309	K1G400724	RESIDENCE	Dwolling	0.000773015	0.0045	WLA
		HOOVER	Other than			KPDFS
1222	KYG400730	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		TILLSID LI (CL	Dwelling	01000772012		
		BINGHAM	Other than			KPDES
1237	KYG400753	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		TURNER	Other than			KPDES
1343	KYG400778	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			KDDEG
1150	VVC 400797		Other than	0.000772615	0.0045	KPDES WLA
1138	K10400787	RESIDENCE	Dwelling	0.000775015	0.0045	WLA
		COOK	Other than			KPDES
1173	KYG400790	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		JACOBS	Other than			KPDES
1232	KYG400806	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
1000		PERKINS	Other than	0.000772.615	0.0045	KPDES
1293	KYG400836	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		SHEPHERD	Other than			KPDFS
1314	KYG400844	RESIDENCE	Apartment	0.000773615	0.0045	WLA
1314	110-000-+	RESIDENCE	Dwelling	0.000773013	0.0010	
		COLLINS	Other than			KPDES
1168	KYG400854	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		KESTER	Other than			KPDES
1243	KYG400915	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		OTUDOU I	Dwelling			VDDEG
1220	KVG400026	DESIDENCE	A partmant	0.000772615	0.0045	WI A
1328	KIU400930	KESIDENCE	Dwelling	0.000773015	0.0045	WLA
		HALL	Other than			KPDES
1202	KYG400969	RESIDENCE	Apartment	0.000773615	0.0045	WLA

		Discharger Facility		Design	E coli (billion	
AI number	KPDES #	Name	Type	Capacity (cfs)	colonies/dav)	
			Dwelling)	
		MEADE	Other than			KPDES
1266	KYG400970	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
1054		MULLINS	Other than	0.000		KPDES
1276	KYG400975	RESIDENCE	Apartment	0.0007/3615	0.0045	WLA
		HOWELI	Dwelling Other then			VDDES
1356	KYG401040	RESIDENCE		0.000773615	0 0045	WI A
-330	KI GHOIDHO	RESIDENCE	Dwelling	0.000775015	0.0045	
		MAY	Other than			KPDES
4327	KYG401073	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		CASTLE	Other than			KPDES
4350	KYG401113	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			VPDEG
42.4.4	WWG 401101	FRASURE	Other than	0.000772615	0.0045	KPDES
4344	KYG401121	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		CRIM	Other than			KDDES
4336	KYG401125	RESIDENCE	Apartment	0.000773615	0.0045	WLA
1550	R10101125	REDIDERCE	Dwelling	0.000775015	0.0045	
		ROSE	Other than			KPDES
4342	KYG401126	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		JONES	Other than			KPDES
4349	KYG401133	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			VDDEG
1333	KVG401140	DVE RESIDENCE	A partment	0.000773615	0.0045	WI A
-333	K10+011+0	DILKLSIDLICL	Dwelling	0.000775015	0.0045	
		TACKETT	Other than			KPDES
4332	KYG401142	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		COOLEY	Other than			KPDES
4331	KYG401143	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			VDDDG
1105	KVC401107	BARTLEY	Other than	0.000772615	0.0045	KPDES WL A
4405	K1040119/	KESIDENCE	Dwelling	0.000773015	0.0045	WLA
		SHEPPARD	Other than			KPDES
12253	KYG401218	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		LAWSON	Other than			KPDES
15635	KYG401271	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		WEBB	Other than	0.000	0.004	KPDES
15655	KYG401296	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		EVEDIDCE	Dwelling Other ther			KDDES
15807	KYG401352	RESIDENCE	Apartment	0.000773615	0.0045	WI A
15007	MIG 401332	REDERCE	ripartment	0.000775015	0.0045	

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		Discharger Facility		Design	<u>E</u> . <u>coli</u> (billion	
AI numbe	r KPDES #	Name	Туре	Capacity (cfs)	colonies/day)	
			Dwelling			
		WILLIAMSON	Other than			KPDES
33378	KYG401353	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		WILLIAMSON	Other than			KPDFS
74022	KYG401406	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		STUMBO	Other than			KPDES
74025	KYG401409	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		MULTINS II	Dwelling Other than			KDDES
74062	KYG401442	RESIDENCE	Apartment	0.000773615	0.0045	WLA
11002			Dwelling			
		TACKETT	Other than			KPDES
74181	KYG401470	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		TTATT	Dwelling Other ther			KDDEG
74185	KYG401475	RESIDENCE	Apartment	0.000773615	0.0045	KPDES WLA
74105	KI0+01+75	RESIDENCE	Dwelling	0.000775015	0.0045	
		COLLINS	Other than			KPDES
1168	KYG401516	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			VDDDG
25902	KVC 401520	KEATHLEY	Other than	0.000772615	0.0045	KPDES WLA
53892	K10401529	KESIDENCE	Dwelling	0.000775015	0.0045	VV LA
		MOORE	Other than			KPDES
35887	KYG401533	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
42120	WWG 401540	WALLACE	Other than	0.000772615	0.0045	KPDES
43120	KYG401540	RESIDENCE	Dwelling	0.000773615	0.0045	WLA
		MCKINNEY	Other than			KPDES
36057	KYG401541	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
10001		PRATER	Other than	0.000770.015		KPDES
43224	KYG401548	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		CAUDILL	Other than			KPDES
44695	KYG401580	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		DINGUS	Other than			KPDES
45073	KYG401582	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		GEARHFART	Other than			KPDFS
45396	KYG401587	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		HALL	Other than			KPDES
45070	KYG401590	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		WILLIAMSON	Dwelling Other than			KDDEC
46144	KYG401601	RESIDENCE	Apartment	0.000773615	0.0045	WLA

AI number	KPDES #	Discharger Facility Name	Туре	Design Capacity (cfs)	<u>E</u> . <u>coli</u> (billion colonies/day)	
46147	KYG401603	CHILDERS RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA
47022	KYG401638	LAFERTY RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA
48864	KYG401645	DUFF	Dwelling Other than	0.000773615	0.0045	KPDES WLA
48897	KYG401646	COCHRAN	Dwelling Other than	0.000773615	0.0045	KPDES WLA
49354	KYG401654	YORK	Dwelling Other than	0.000773615	0.0045	KPDES WLA
50021	KYG401692	BLANKENSHIP RESIDENCE	Other than Apartment	0.000773615	0.0045	KPDES WLA
50138	KYG401699	JUSTICE RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA
50627	KYG401721	SCOTT RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA
50950	KYG401730	KIDD RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA
53921	KYG401764	MCKINNEY JR RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA
54879	KYG401772	ISON RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA
71436	KYG401809	NEWMAN RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA
74243	KYG401821	COMBS RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA
75141	KYG401851	LITTLE RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA
75556	KYG401857	HOWARD RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA
75746	KYG401868	ROWE RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA
76078	KYG401876	BILITER RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA

Final Beaver Creek Watershed <u>E</u>. <u>coli</u> TMDL

		Discharger Facility		Design	<u>E</u> . <u>coli</u> (billion	
AI number	KPDES #	Name	Туре	Capacity (cfs)	colonies/day)	
			Dwelling			
7(105	WWG 401002	ALLEN	Other than	0.000772.615	0.0045	KPDES
76185	KYG401883	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling Others there			VDDEC
70525	KVC 401021		A portmont	0.000772615	0.0045	KPDES WLA
19323	K10401931	RESIDENCE	Dualling	0.000773013	0.0045	VV LA
		BENTI EV	Other than			KPDFS
79842	KVG/01936	RESIDENCE		0.000773615	0.0045	WI A
17042	K10+01/50	RESIDENCE	Dwelling	0.000773013	0.0045	WLA
		MARTIN	Other than			KPDES
81193	KYG401970	RESIDENCE	Apartment	0.000773615	0 0045	WLA
01175	III G 101770	REDIDERCE	Dwelling	0.000772012		
		SCARBERRY	Other than			KPDES
81570	KYG401981	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		HOPKINS	Other than			KPDES
82471	KYG402002	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		COOK	Other than			KPDES
84292	KYG402025	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		PRATER	Other than			KPDES
97291	KYG402063	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		LITTLE	Other than			KPDES
103052	KYG402117	RESIDENCE	Apartment	0.000773615	0.0045	WLA
						Total
						KPDES
			A 1111		7.0609	WLA
			Addition to			
			MAP (sum	1 202506296	1667 1540	romainder
}			of cis)	1.202300380	1007.1349	Future
						Growth
					16 6715	$\mathbf{W} \mathbf{L} \mathbf{A}^{(1)}$
}					10.0710	Total
					23.7324	WLA
					1650.4834	LA

Note:

(1) Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.

8.23 TMDL Summary

A TMDL summary matrix is presented in Table 8.96. The total KPDES-permitted WLA and the Total WLA (KPDES-permitted WLA + Future Growth WLA) are included at the botto <u>coli</u> colonies per day while percent reduction is expressed as a percentage.

Table 8.96 TMDL Summary Matrix

Loads are in units of												Spewing	Left Fork		Right Fork									
billion <u>E</u> .	Percent						Left Fork		Simpson		Sizemore	Camp	Beaver	Left Fork	Beaver			Right Fork			Right Fork		Buck	
<u>coli</u>	Reduction is		Caleb Fork PM	Clear Creek	Jacks Creak PM	Otter Crook PM	Beaver Crook PM	Frasure Crook PM	Branch BM 0.0 to	Spurlock	Branch BM 0.0 to	Branch BM 0.0 to	Creek RM	Beaver Crook PM	Creek RM	Caney Fork PM	Jones Fork PM	Beaver Crook PM	Salt Lick	Turkey Crook BM	Beaver Crook PM	Arkansas Crook PM	Branch BM 0.0 to	Beaver Creak 0.0 to
day	a percentage		0.0 to 1.2	4.9	0.0 to 4.4	0.0 to 0.5	18.7 to 28.6	0.0 to 5.2	1.8	0.0 to 0.6	2.0	3.1	13.55	0.0 to 11.4	33.4	0.0 to 7.5	0.0 to 9.9	17.4 to 23.3	0.0 to 6.8	0.0 to 5.9	0.0 to 17.4	0.0 to 3.6	2.8	7.1
	1	Existing	5284 6038	13901 0933	1783 7241	9686 2876	69257 5721	27154 7145	3436.0145	6117 7027	3704 6737	4327 5145	90650 1145	126755 5507	1994 2419	549 4722	3243 4191	10391 2139	27133 8788	10107 7083	65184 6057	8035 3679	5798 3369	147268 9800
		Total	15.0520	13701.0733	1703.7241	20.0500	0)257.5721	01 5004	15 0510	0117.7027	12 2 4 9 9	10.0521	215 20 45	120755.5507	251.00.42	101 1000	101.0000	(00.2((2	27135.6766	10107.7005	1202 4001	0055.5077	3170.3307	10(0.0205
		MOS	15.8538	41.7033	47.5660	29.0589	207.7727	91.7906 9.1791	15.2712	29.9643	12.3489	19.9731	315.3047	5739874	251.9042	191.1208	181.0280	608.2662 60.8266	<u>98.6687</u> 9.8669	41.1161	1203.4081	24.1061	21.7438	1860.2397
		TMDL	14.2694	27 5220	42 8004	26,1520	196.0054	92 (115	12 7441	200078	11 11 40	17.0759	202 77 42	516 5997	20.1704	172 0097	1(2,0252	547 4200	99.9019	27.0045	1092.0672	21.4100	10.5(04	1(74.0159
		percent	14.2084	37.5550	42.8094	20.1530	180.9954	82.0115	13./441	20.9078	11.1140	17.9758	283.7743	510.5887	220.7138	172.0087	162.9252	547.4396	88.8018	37.0045	1085.0675	21.6955	19.5694	10/4.2158
AI #	KPDES #	reduction KPDES	99.73	99.73	97.60	99.73	99.73	99.70	99.60	99.56	99.70	99.58	99.69	99.59	88.63	68.70	94.98	94.73	99.67	99.63	98.34	99.73	99.66	98.86
1133	KYG400642	WLA KPDES																			0.0045			0.0045
1134	KY0085791	WLA												0.1817										0.1817
1143	KYG400479	WLA												0.0045										0.0045
1158	KYG400787	KPDES WLA																					0.0045	0.0045
1161	KYG400692	KPDES WLA								0.0045				0.0045										0.0045
1162	KYG400678	KPDES WLA								0 0045				0 0045										0.0045
1162	KYC 400954	KPDES WILA				· · · · · · · · · · · · · · · · · · ·					0.0045			0.0045	· · · · · · · · · · · · · · · · · · ·									0.0045
1108	K10400834	KPDES									0.0045			0.0045										0.0045
1168	KYG401516	WLA KPDES									0.0045			0.0045										0.0045
1173	KYG400790	WLA KPDES		0.0045									0.0045	0.0045										0.0045
1180	KYG400520	WLA KPDES																					0.0045	0.0045
1182	KYG400614	WLA KPDES						0.0045						0.0045										0.0045
1196	KYG400590	WLA KDDES	· ·			·		·					·	· ·			·	· · · · · · · · · · · · · · · · · · ·		· · ·	0.0045	· ·		0.0045
1199	KYG400603	WLA																	0.0045		0.0045			0.0045
1202	KYG400969	KPDES WLA						0.0045						0.0045										0.0045
1218	KYG400567	KPDES WLA									0.0045			0.0045										0.0045
1222	KYG400730	KPDES WLA																			0.0045			0.0045
1232	KYG400806	KPDES WLA																					0.0045	0.0045
1237	KYG400753	KPDES WLA		0 0045									0.0045	0 0045										0.0045
1237	KVC/00015	KPDES WL A		0.0010									0.0010	0.0010				0.0045			0.0045			0.0045
1243	K10400913	KPDES																0.0045			0.0045	0.0047		0.0045
1248	K10400593	KPDES												0.1.00								0.0045		0.1/25
1255	KY0096342	WLA KPDES												0.1635										0.1635
1262	KY0026921	WLA KPDES																						1.0902
1263	KY0103136	WLA												0.0045										0.0045

om of this table. All loads are expressed in units of billion \underline{E}	d in units of billion \underline{E} .
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September, 2010

Loads are												Spowing	L oft Fork		Right									
billion <u>E</u> .	Percent		6.1.1			0.1	Left Fork	F	Simpson	6 1 1	Sizemore	Camp	Beaver	Left Fork	Beaver	G		Right Fork		T 1	Right Fork		Buck	
<u>coli</u> <u>colonies</u> /	expressed as		Fork RM	RM 0.0 to	Jacks Creek RM	Otter Creek RM	Beaver Creek RM	Frasure Creek RM	RM 0.0 to	Creek RM	RM 0.0 to	RM 0.0 to	11.4 to	Beaver Creek RM	30.3 to	Fork RM	Jones Fork RM	Beaver Creek RM	Creek RM	Creek RM	Beaver Creek RM	Arkansas Creek RM	Branch RM 0.0 to	Beaver Creek 0.0 to
day	a percentage	KPDES	0.0 to 1.2	4.9	0.0 to 4.4	0.0 to 0.5	18.7 to 28.6	0.0 to 5.2	1.8	0.0 to 0.6	2.0	3.1	13.55	0.0 to 11.4	33.4	0.0 to 7.5	0.0 to 9.9	17.4 to 23.3	0.0 to 6.8	0.0 to 5.9	0.0 to 17.4	0.0 to 3.6	2.8	7.1
1265	KYG400612	WLA KPDES																						0.0045
1266	KYG400970	WLA KPDES		0.0045									0.0045	0.0045										0.0045
1269	KYG400478	WLA						0.0045						0.0045										0.0045
1270	KYG400666	KPDES WLA																			0.0045			0.0045
1274	KYG400714	KPDES WLA											0.0045	0.0045										0.0045
1276	KYG400975	KPDES WLA																		0.0045	0.0045			0.0045
1293	KYG400836	KPDES WLA					·	· · · · · · · · · · · · · · · · · · ·					·		·	·		0.0045		·	0.0045			0.0045
1204	KVG400220	KPDES WL A																010010			010012	0.0045		0.0045
1205	KT0400559	KPDES												0.0000								0.0045		0.0045
1305	KY0103233	WLA KPDES												0.0899										0.0899
1314	KYG400844	WLA KPDES																	0.0045		0.0045			0.0045
1315	KYG400677	WLA KPDES								0.0045				0.0045										0.0045
1327	KYG400601	WLA KPDES						0.0045						0.0045										0.0045
1328	KYG400936	WLA KPDES																				0.0045		0.0045
1343	KYG400778	WLA																			0.0045			0.0045
1352	KY0072974	KPDES WLA																			0.2271			0.2271
1367	KYG400579	KPDES WLA												0.0045										0.0045
1369	KYG400724	KPDES WLA			. <u> </u>						0.0045			0.0045										0.0045
2514	KY0094510	KPDES WLA															0.0273				0.0273			0.0273
2517	KY0083089	KPDES WLA															0.0908				0.0908			0.0908
2527	KY0042854	KPDES WLA														0.9085		0.9085			0.9085			0.9085
4250	KVG400659	KPDES WLA												0.0045										0.0045
4230	KYC401072	KPDES WLA											·	0.0045	·	·					0.0045			0.0045
4327	K10401075	KPDES																			0.0045			0.0045
4331	KYG401143	WLA KPDES																				0.0045		0.0045
4332	KYG401142	WLA KPDES												0.0045										0.0045
4333	KYG401140	WLA KPDES											0.0045	0.0045										0.0045
4336	KYG401125	WLA KPDES																0.0045			0.0045			0.0045
4342	KYG401126	WLA																				0.0045		0.0045
4344	KYG401121	WLA																		0.0045	0.0045			0.0045
4349	KYG401133	KPDES WLA			0.0045		0.0045						0.0045	0.0045										0.0045
4350	KYG401113	KPDES WLA																	0.0045		0.0045			0.0045
4356	KYG401040	KPDES WLA						0.0045						0.0045										0.0045
4405	KYG401197	KPDES WLA										0.0045	0.0045	0.0045										0.0045

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in units of billion E. Percent (coli) Percent (coli) Caleb Caleb Cercek RM Left Fork Spewing (Camp Left Fork Beaver Left Fork Beaver Left Fork Beaver Right Fork Beaver Right Fork Beaver Creek RM Spewing Left Fork Beaver Creek RM Spewing Left Fork Beaver Creek RM Caney Jones Beaver Caney Jones	ArkansasBuck Branch RM 0.0 to 2.8Beaver Creek 0.0 to 7.10.0 to 3.62.87.10.00450.00450.00450.00450.00450.0045
coli Reduction is Caleb Clear Creek Jacks Otter Beaver Frasure Branch Spurlock Branch Creek RM Creek RM Caney Jones Beaver Salt Lick Turkey Beaver colonies/ day percentage Fork RM RM 0.0 to 0.0 to 1.2 Creek RM Creek RM Creek RM RM 0.0 to 0.0 to 1.2 Creek RM O.0 to 0.4 0.0 to 0.5 18.7 to 28.6 0.0 to 5.2 1.8 0.0 to 0.5 2.0 3.1 13.55 0.0 to 1.1.4 33.4 0.0 to 7.5 0.0 to 9.9 17.4 to 23.3 0.0 to 6.8 0.0 to 1.3 0.0 to 6.8 0.0 to 5.9 0.0 to 1.4 0.0 to 1.4 0.0 to 7.5	Arkansas Branch Beaver Creek RM RM 0.0 to Creek 0.0 t 0.0 to 3.6 2.8 7.1 0.0045 0.0045 0.0045 0.0045
day a percentage 0.0 to 1.2 4.9 0.0 to 4.4 0.0 to 0.5 18.7 to 28.6 0.0 to 5.2 1.8 0.0 to 0.6 2.0 3.1 13.55 0.0 to 11.4 33.4 0.0 to 7.5 0.0 to 9.9 17.4 to 23.3 0.0 to 6.8 0.0 to 5.9 0.0 to 17.4 12253 KYG401218 KPDES WLA WLA Image: Constraint of the state of	0.0 to 3.6 2.8 7.1 0.0045 0.0045 0.0045 0.0045 0.0045 0.0045
12253 KYG40121 WLA WLA Image: Constraint of the	0.0045 0.0045 0.0045 0.0045 0.0045 0.0045
15635 KYG401271 WLA	0.0045 0.0045 0.0045
	0.0045
KPDES KPDES 15655 KYG401296 WLA Image: Constraint of the second	0.0045
Image: Note of the state of the st	
33378 KYG401353 WLA WLA 0.0045	0.0045
33945 KY0077542 WLA 6 6 7 6 7 7 6 7 7 7 6 7 7 7 7 7 7 7 7	0.0636
35251 KY0089435 WLA 0 0.0618 0	0.0618
35252 KY0079421 WLA	0.1363
35254 KY0079430 WLA	0,0999
35257 K100/950 HER 0.0099	0.0727
35256 KY003012 WLA	0.1363
	0.1305
S220 K1010/051 WLA Control Control Control Control	0.22/1
35359 KY008/0/6 WLA Company Company <thcompany< th=""> <thcompany< th=""> <thcompa< td=""><td>0.0545</td></thcompa<></thcompany<></thcompany<>	0.0545
35761 KY0105228 WLA Image: Constraint of the state of the s	0.9085
3587 KYG401533 WLA 0.0045 0.0045 0.0045 KPDES 0	0.0045
35892 KYG401529 WLA Image: Constraint of the state of the sta	0.0045
36057 KYG401541 WLA Image: Constraint of the system of	0.0045
40534 KY0028789 WLA	2.0441
43120 KYG401540 WLA	0.0045
43224 KYG401548 WLA Image: Constraint of the second	0.0045
Attorn NT DES Output Output<	0.0045
45070 KYG401590 WLAN C C C C C C C C C C C C C C C C C C C	0.0045
45073 KYG401582 WLA Main	0.0045
45396 KYG401587 WLA MIA MIA <th< td=""><td>0.0045</td></th<>	0.0045
46144 KYG401601 WLA Mathematical Mathmathmatical <th< td=""><td>0.0045</td></th<>	0.0045
46147 KYG401603 WLA 0.0045 0.0045	0.0045
47022 KYG401638 WLA 0.0045	0.0045
48864 KYG401645 WLA	0.0045
4887 KYG401646 WLA	0.0045
49354 KYG401654 WLA	0.0045
50021 KYG401692 WL A	0.0045
5011 KTG401692 HEAR CONTROL CONTRO	0.0045

September, 2010

								1				1			1	1							1	
Loads are															Right									
in units of												Spewing	Left Fork		Fork									
billion E.	Percent						Left Fork		Simpson		Sizemore	Camp	Beaver	Left Fork	Beaver			Right Fork			Right Fork		Buck	
coli	Reduction is		Caleb	Clear Creek	Jacks	Otter	Beaver	Frasure	Branch	Spurlock	Branch	Branch	Creek RM	Beaver	Creek RM	Caney	Jones	Beaver	Salt Lick	Turkey	Beaver	Arkansas	Branch	Beaver
colonies/	expressed as		Fork RM	RM 0.0 to	Creek RM	Creek RM	Creek RM	Creek RM	RM 0.0 to	Creek RM	RM 0.0 to	RM 0.0 to	11.4 to	Creek RM	30.3 to	Fork RM	Fork RM	Creek RM	Creek RM	Creek RM	Creek RM	Creek RM	RM 0.0 to	Creek 0.0 to
day	a percentage		0.0 to 1.2	4.9	0.0 to 4.4	0.0 to 0.5	18.7 to 28.6	0.0 to 5.2	1.8	0.0 to 0.6	2.0	3.1	13.55	0.0 to 11.4	33.4	0.0 to 7.5	0.0 to 9.9	17.4 to 23.3	0.0 to 6.8	0.0 to 5.9	0.0 to 17.4	0.0 to 3.6	2.8	7.1
	1 0	KPDES																						
50627	KYG401721	WLA																		0.0045	0.0045			0.0045
00027	1110101/21	KPDES	1												1	1				010010				010012
50950	KYG401730	WIA																	0.0045		0.0045			0.0045
50750	RIG 101750	KPDFS																	0.0042		0.0042			0.0042
53921	KVG401764	WI A																				0.0045		0.0045
33721	K10401704	KDDES																				0.0045		0.0045
54870	KVG401772	WI A																			0.0045			0.0045
54677	K10401772	KPDFS																			0.0045			0.0045
71/136	KVG401809	WI A						0.0045						0.0045										0.0045
71450	K1040100)	KDDES						0.0045						0.0045										0.0045
74022	KVG401406	WI A							0.0045					0.0045										0.0045
74022	K10401400	VILA							0.0045					0.0045										0.0045
74025	KVG401400	WI A					·				· · · · · · · · · · · · · · · · · · ·			0.0045							· · · · · · · · · · · · · · · · · · ·			0.0045
74025	K10401409	KDDES												0.0045										0.0045
74062	KVG401442	WI A											0.0045	0.0045										0.0045
74002	K10401442	VDDES											0.0045	0.0045										0.0045
74191	KVG401470	WI A					0.0045						0.0045	0.0045										0.0045
/4101	K10401470	VDDES	1				0.0045						0.0045	0.0045	1	-								0.0043
74195	KVG401475	MI A																	0.0045		0.0045			0.0045
/4165	K10401475	WLA																	0.0045		0.0045			0.0045
74242	KNC 401921	KPDES						0.0045						0.0045										0.0045
14245	K10401621	WLA						0.0045						0.0045										0.0045
75141	VVC 401951	KPDES WLA												0.0045							·			0.0045
/3141	K10401651	WLA												0.0045										0.0045
75556	VVC 401957	MI A																			0.0045			0.0045
/5550	K1G401857	WLA																			0.0045			0.0045
75716	VVC 401969	KPDES WLA																					0.0045	0.0045
/3/40	K10401808	WLA																					0.0045	0.0045
76079	VVC 401976	KPDES WIA																			0.0045			0.0045
/00/8	K10401870	WLA																			0.0045			0.0045
76105	WWG 401002	KPDES																				0.0045		0.0045
/6185	KYG401883	WLA																				0.0045		0.0045
70525	KNC 401021	KPDES						0.0045		· · · · · · · · · · · · · · · · · · ·				0.0045							· · · · · · · · · · · · · · · · · · ·		·	0.0045
19323	K10401951	WLA						0.0045						0.0045										0.0045
70042	WWG 401026	KPDES																						0.0045
79842	KYG401936	WLA																						0.0045
91102	KNC 401070	KPDES						0.0045						0.0045										0.0045
81195	K10401970	WLA						0.0045						0.0045										0.0045
91570	KVC 401091	KPDES WLA																			0.0045			0.0045
81370	K10401981	WLA																			0.0045			0.0045
82002	VV0106755	KPDES WLA																			0.0545			0.0545
82092	K10100733	WLA VDDES																			0.0545			0.0545
82471	KYG402002	WI A		·	· · · · · · · · · · · · · · · · · · ·	·	·			·				0.0045		· · · · · · · · · · · · · · · · · · ·	·				· · · · · · · · · · · · · · · · · · ·			0.0045
02471	K10402002	KPDFS												0.0045										0.0045
84202	KVG402025	WI A																			0.0045			0.0045
04292	KT0402023	KPDFS																			0.0045			0.0045
97291	KYG402063	WLA																			0 0045			0.0045
77271	R10402005	KPDES																			0.0042			0.0045
103052	KYG402117	WLA						0 0045						0.0045										0.0045
105052		KPDES						0.00-12						0.0045										0.0040
1297	KY0027413	WLA																						0.0000
1271	110027413	Total																						0.0000
		KPDES																						
		WLA	0.000	0.0135	0.0045	2,0486	2.2602	0.1903	0.0045	0.018	0.018	0.009	2.2962	3.0206	0.0636	0.9085	0.1771	1,8941	0.0225	0.0135	2.8104	0.0315	0.018	7,060855
		remainder	14 2684	37 5193	42,8048	24 1043	184 7351	82,4207	13 7395	26 9497	11.0959	17.9667	281 4776	513 5661	226 6502	171 1002	162.7481	545 5453	88 7791	36 9909	1080 2555	21.6637	19 5512	1667 1549
		Future	12001	01.0175	.2.0010	2015	10.17501	02.1207	10.1070	20.2177		1,1,9007	20111110	010.0001	220.0002	17111002	102.7101	0.0.0100	00	00.7707	100012000	21.0007	17.0012	100/11017
		Growth																						
		WLA ⁽¹⁾	0.0713	0.3752	0.4280	0.2410	1.8474	0.8242	0.0687	0.2695	0.1110	0.0898	2.8148	5.1357	2.2665	0.8555	0.8137	5,4555	0.8878	0.1850	10.8026	0.2166	0.1955	16.6715
		Total		010102	0.1200		210174		0.0007			0,0000	_101 10	511001			0.0101				2010020			1510/10
		WLA	0.07134	0.3887	0.4325	2.2896	4.1076	1.0145	0.0732	0.2875	0.129	0.0988	5.111	8.1563	2.3301	1.764	0.9908	7.3496	0.9103	0.1985	13.613	0.2481	0.2135	23.7324
		LA	14.1971	37.1441	42.3768	23.8633	182.8877	81.5965	13.6708	26.6802	10.9849	17.8769	278.6628	508.4304	224.3837	170.2447	161.9343	540.0899	87.8913	36.8059	1069.4529	21.4471	19.3557	1650.4834

Note: ⁽¹⁾ Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.8.24

8.24 Translation of WLAs into Permit Limits

All WLAs will be translated into KPDES permit limits as an <u>E</u>. <u>coli</u> effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average or as a Fecal coliform effluent gross limit of 200 colonies/100 ml as a monthly average and 400 colonies/100 ml as a maximum weekly average.

9.0 Implementation

Section 303(e) of the Clean Water Act and 40 CFR Part 130, Section 130.5, require states to have a continuing planning process (CPP) composed of several parts specified in the Act and the regulation. The CPP provides an outline of agency programs and the available authority to address water issues. Under the CPP umbrella, the Watershed Management Branch will provide technical support and leadership with developing and implementing watershed plans to address water quality and quantity problems and threats. Developing watershed plans enables more effective targeting of limited restoration funds and resources, thus improving environmental benefit, protection and recovery.

The in-stream pathogen data used to develop the TMDLs for impaired segments in the Beaver Creek Watershed do not allow loads to be quantitatively allocated to the different sources within the watershed. Therefore, no specific recommendations for remediation are offered until additional watershed planning is conducted. Development of a watershed plan will provide an integrative approach for identifying and describing what actions that should be taken in order to meet WQC, how the actions will be accomplished, who will undertake the actions and when the actions will be completed. This TMDL will provide a foundation for developing a detailed watershed plan. At present, no watershed plan is under development for the Beaver Creek watershed. However, KDOW welcomes future planning efforts by third parties (i.e., local stakeholders) for watershed plans and BMP implementation.

10.0 Public Participation

This TMDL was published for a 30-day public comment beginning August 4, 2010 and ending September 3, 2010. A notification was sent to all newspapers in the Commonwealth of Kentucky and advertisements were purchased in three local newspapers in the vicinity of the Beaver Creek watershed: The Floyd County Times (Prestonsburg, KY in Floyd County, circulation 3923), The Appalachian News-Express (Pikeville, KY in Pike County, circulation 7100), and the Troublesome Creek Times (Hindman, KY in Knott County, circulation 4665). Additionally, the public notice was distributed electronically through the 'Nonpoint Source Pollution Control' mailing list and via SNIPS, an electronic news bulletin sent to approximately 1,600 entities. No public comments were received on this TMDL document.

11.0 References

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Appendix A. Land Cover Definitions

Table A.1 National Land-Cover Database Class Descriptions (taken from Homer et. al., 2004)

11. Open Water - All areas of open water, generally with less than 25% cover of vegetation or soil.

21. **Developed, Open Space** - Includes areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20 percent of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes

22. **Developed, Low Intensity** - Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20-49 percent of total cover. These areas most commonly include single-family housing units.

23. **Developed, Medium Intensity** - Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50-79 percent of the total cover. These areas most commonly include single-family housing units.

24. **Developed, High Intensity** - Includes highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80 to100 percent of the total cover.

31. **Barren Land (Rock/Sand/Clay)** - Barren areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15% of total cover.

41. **Deciduous Forest** - Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75 percent of the tree species shed foliage simultaneously in response to seasonal change.

42. **Evergreen Forest** - Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75 percent of the tree species maintain their leaves all year. Canopy is never without green foliage.

43. **Mixed Forest** - Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75 percent of total tree cover.

52. **Shrub/Scrub** - Areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20 percent of total vegetation. This class includes true shrubs, young trees in an early successional stage, or trees stunted from environmental conditions.

71. **Grassland/Herbaceous** - Areas dominated by grammanoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.

81. **Pasture/Hay** - Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20 percent of total vegetation.

82. **Cultivated Crops** - Areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20 percent of total vegetation. This class also includes all land being actively tilled.

90. Woody Wetlands - Areas where forest or shrubland vegetation accounts for greater than 20 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water.

95. Emergent Herbaceous Wetlands - Areas where perennial herbaceous vegetation accounts for greater than 80 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water.

Appendix B.	<u>E</u> . <u>coli</u> Monitoring	Data
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Site	Segment	Segment Latitude Longitude Date						
1	Buck Branch 0.0 to 2.8	37.5706	-82.7562	05/16/08	1700	1.132		
				05/30/08	2500	0.223		
				06/13/08	1700	0.298		
				06/27/08	740	0.117		
				6/2//08 (QA sample)	460	N/A		
				07/31/08	64000	1.003		
				08/08/08	2700	0.3072		
				08/22/08	170	0.0885		
				09/12/08	700	0.078		
				09/20/08	560	0.056		
				10/17/08	300	0.117		
		05 5501	00 5015	10/24/08	250	0.114		
2	Arkansas Creek 0.0 to 3.6	37.5781	-82.7317	05/16/08	580	0.8		
			· · · · · · · · · · · · · · · · · · ·	05/30/08	70	0.142		
				06/13/08	140	0.155		
				06/27/08	50	0.902		
				07/11/08	680	0.541		
				07/31/08	>80000	1.541		
				08/08/08	340	25.5346		
				08/22/08	130	8.3208		
				09/12/08	140	0.0511		
				09/20/08	290	0.013		
				10/17/08	2400	0.14		
				10/24/08	110	0.03		
3	Beaver Creek 0.0 to 7.1	37.5795	-82.732	05/16/08	1100	N/A		
				05/30/08	130	43.987		
				06/13/08	430	45.528		
				06/27/08	180	18.869		
				07/11/08	610	60.4		
				7/11/08 (QA Sample)	550	N/A		
				07/31/08	4500	N/A		
				08/08/08	240	0.0075		
				09/12/08	390	23.475		
				09/20/08	90	9.925		
				10/17/08	90	9.692		
				10/24/08	750	9.081		

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Site	Segment	Latitude	Longitude	Date	<u>E</u> . <u>coli</u> (colonies/ 100ml)	Flow (cfs)
PR1095	Beaver Creek 0.0 to 7.1	37 6028	-82 72754	5/17/07	2700	N/A
1 11075	Deaver Creek 0.0 to 7.1	37.0020	-02.72734	6/14/07	656	N/A N/A
				7/19/07	426	N/A
				8/14/07	500	N/A
				9/20/07	268	N/A
				10/18/07	261	N/A
				5/21/08	450	N/A
				6/17/08	19000	N/A
				10/15/08	220	N/A
		25 (1150	00 50051	10/15/08	240	N/A
4	Beaver Creek 0.0 to 7.1	37.61178	-82.73071	05/16/08	300	N/A
				05/30/08	290	33.798
				06/13/08	630	34.654
				06/27/08	180	22.534
				07/11/08	1500	64.465
				07/31/08	1900	N/A
				08/08/08	270	23.691
				08/22/08	250	6.8769
				09/12/08	90	18.639
				09/20/08	380	11.850
				9/20/08 (QA Sample)	190	N/A
				10/17/08	210	8.251
				10/24/08	70	11.35
				10/24/08 (QA Sample)	70	N/A
13	Right Fork Beaver Creek	37 35989	82 78035	05/15/07	260	18 872
15	30.3 10 33.4	51.55707	-02.70755	05/13/07	100	1.076
				05/30/07	190	1.970
				06/13/07	320	4.861
				06/27/07	560	55.059
				0//10/0/	370	1.537
				1/10/07 (QA Sample)	330	1.557
				07/26/07	1900	14.412
				08/17/07	320	1.384
				08/31/07	210	N/A
				09/13/07	110	1.829
				09/28/07	110	0.59
				10/12/07	<10	0.612
				10/12/07 (QA Sample)	<10	0.612
				11/16/07	430	1.4244
Site	Segment	Latitude	Longitude	Date	<u>E</u> . <u>coli</u> (colonies/ 100ml)	Flow (cfs)
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20	Jones Fork 0.0 to 9.9	37.46684	-82.83148	05/15/07	140	1.219
				05/30/07	320	3.587
				06/13/07	280	2.101
				06/27/07	3100	2.128
				07/10/07	370	1.062
				07/26/07	4300	4.294
				08/17/07	20	0.455
				08/31/07	290	0.217
				09/14/07	180	0.304
				9/14/07 (QA/Sample)	70	N/A
				09/28/07	170	0.107
				10/12/07	<10	0.035
				11/16/07	120	4.091
22	Rock Fork 0.0 to 7.0	37.48001	-82.83621	05/16/07	160	5.226
				05/30/07	70	2.975
				06/13/07	50	2.315
				06/27/07	1600	2.025
				07/10/07	80	1.705
				07/26/07	1900	1.887
				08/17/07	60	1.485
				08/31/07	60	N/A
				09/14/07	200	1.924
				09/28/07	110	0.955
				10/12/07	00	1.025 N/A
				11/16/07	90	N/A
24	Salt Lick Creek 0.0 to 6.8	37 10563	82 84050	05/15/07	4100	1.597
24	Salt Lick Creek 0.0 to 0.0	57.47505	02.04737	05/30/07	755	1.000
				06/13/07	48000	0.299
			· · · · · · · · · · · · · · · · · · ·	06/27/07	66000	1.504
				07/10/07	800	0.117
				07/26/07	1400	0.596
				08/17/07	90	N/A
				08/31/07	10	N/A
				8/31/07 (OA Sample)	30	N/A
				09/14/07	28000	N/A
				09/28/07	140	N/A
				11/16/07	1100	N/A

Site	Segment	Latitude	Longitude	Date	<u>E</u> . <u>coli</u> (colonies/ 100ml)	Flow (cfs)
27	Turkey Creek 0.0 to 5.9	37.53184	82.78877	05/16/07	1600	10.6148
				05/30/07	2400	0.389
				06/13/07	3300	0.2
				06/27/08	2900	0.411
				07/10/07	1100	0.114
				07/26/07	170	0.156
				08/17/07	59000	N/A
				08/31/07	1000	N/A
				09/14/07	16900	N/A
				09/28/07	4600	N/A
				10/12/07	3200	N/A
				11/16/07	2800	0.449
	Right Fork Beaver Creek			11/10/07	2000	0.772
30	0.0 to 17.4	37.55905	-82.77234	05/16/07	310	70.79
				05/30/07	310	29.77
				5/30/07 (QA Sample)	490	N/A
				06/13/07	180	19.27
				06/27/07	3700	63.551
				07/10/07	220	11.799
				07/26/07	13000	N/A
				$\frac{08/17/07}{8/17/07}$	210	7.202
				08/31/07	140	N/A N/A
				09/14/07	180	N/A
				09/28/07	330	N/A
				10/12/07	40	25.701
				11/16/07	110	0.371
30a	0.0 to 17.4	37,5584	-82.7555	05/16/08	560	65.85
				05/30/08	140	26.3
				06/13/08	500	26.876
				06/27/08	250	10.230
				07/11/08	680	44 002
				07/31/08	3800	N/A
				08/08/08	500	22.4328
				08/22/08	150	7.995
				09/12/08	110	11.121
				09/20/08	120	7.015
				10/17/08	50	8.743
				10/24/08	90	7.326

Site	Segment	Latitude	Longitude	Date	<u>E</u> . <u>coli</u> (colonies/ 100ml)	Flow (cfs)
bite	Right Fork Beaver Creek	Latitude	Longitude	Date	1001111)	((13)
31	17.4 to 23.3	37.4673	-82.83	05/15/07	180	3.172
				05/30/07	200	3.587
				06/13/07	300	10.346
				06/27/07	4100	16.049
				07/10/07	150	N/A
				07/26/07	2900	41.221
				08/17/07	430	4.732
				08/31/07	150	2.551
				09/14/07	220	2.619
				09/28/07	110	1.429
				9/28/07 (QA Sample)	70	N/A
				10/12/07	70	1.481
				11/16/07	180	18.054
32	Caney Fork 0.0 to 7.5	37.41672	-82.79799	05/15/07	100	151.9515
				05/30/07	300	4.797
				06/13/07	110	2.131
				06/27/07	430	5.698
				07/10/07	210	1.233
				07/26/07	690	20.379
				08/17/07	400	1.705
				08/31/07	260	N/A
				09/14/07	170	0.105
				09/28/07	30	0.084
				10/12/07	<10	0.275
				11/16/07	710	1.2337
	Right Fork Beaver Creek					
33	23.3 to 30.3	37.4173	-82.79682	05/15/07	150	431.7758
				05/30/07	<10	5.073
				06/27/07	330	4.539
				07/10/07	150	2.844
				07/26/07	2500	20.381
				08/17/07	100	2.148
				08/31/07	150	N/A
				09/14/07	180	2.088
				09/28/07	10	N/A
				10/12/07	20	N/A
				11/16/07	290	2.4992

Sito	Sogmont	Latituda	Longitudo	Data	<u>E</u> . <u>coli</u> (colonies/ 100ml)	Flow (ofs)
Site	Right Fork Beaver Creek	Latitude	Longitude	Daic	100111)	((15)
34	0.0 to 17.4	37 51286	-82,83616	05/15/07	80	18 505
0.			021021010	05/30/07	290	24.19
				06/13/07	390	18.952
				06/27/07	5900	21.113
				07/10/07	300	9.207
				07/26/07	5100	69.501
				08/17/07	150	7.962
				08/31/07	130	N/A
				09/14/07	210	3.97
				09/28/07	100	1.933
				10/12/07	3300	5.0554 10.807
				11/17/07 (OA Sample)	2100	N/A
	Right Fork Beaver Creek			(Qribampio)	2100	1,711
35	0.0 to 17.4	37.52986	-82.79064	05/16/07	140	N/A
				05/30/07	190	27.832
				06/13/07	340	N/A
				06/27/07	3500	N/A
				6/27/07 (QA Sample)	2400	N/A
				07/10/07	50	N/A
				07/26/07	6700	N/A
				7/26/07 (QA Sample)	1100	N/A
				08/17/07	170	6.893
				08/31/07	70	N/A
				09/14/07	310	N/A
				09/28/07	640	N/A
				10/12/07	310	2.925
				11/17/07	2600	N/A
36	Caleb Fork 0.0 to 1.2	37.32805	-82.68984	05/16/08	11000	1.085
				05/30/08	17000	4.3302
				06/13/08	3400	N/A
				6/13/08 (QA Sample)	2900	N/A
				06/27/08	3000	0.326
				07/11/08	5300	N/A
				07/31/08	17000	0.308
				08/08/08	3600	0.260
				08/22/08	800	0.07
				09/12/08	2600	0.1
				09/20/08	5000	0.0334
				10/17/08	>80000	0.211
				10/24/08	240	0.088

Site	Segment	Latitude	Longitude	Date	<u>E</u> . <u>coli</u> (colonies/ 100ml)	Flow (cfs)
37	Otter Creek 0.0 to 0.5	37,35389	-82,7165	05/16/08	6000	1.461
			0211100	05/30/08	38000	6.935
				06/13/08	2000	1.1368
				06/27/08	490	0.744
				07/31/08	2700	1.787
				08/08/08	730	0.931
				08/22/08	570	0.224
				09/12/08	2900	0.875
				09/20/08	>80000	0.3732
				10/17/08	2400	0.417
				10/24/08	250	0.289
38	Jacks Creek 0.0 to 4.4	37.36347	-82.73338	05/16/08	480	2.623
				05/30/08	700	17.677
				06/13/08	1000	1.3287
				06/27/08	3700	1.027
				07/11/08	450	1.026
				07/31/08	9000	4.856
				08/08/08	520	1.164
				08/22/08	180	0.714
				09/12/08	1800	2.853
				09/20/08	560	1.215
				10/17/08	600	0.642
				10/17/08 (QA Sample)	800	N/A
				10/24/08	90	0.397
				10/24/08 (QA Sample)	180	N/A
39	Clear Creek 0.0 to 4.9	37.3885	-82.73075	05/16/08	200	1.045
				05/30/08	220	0.9205
				06/13/08	710	1.003
				06/27/08	310	0.625
				6/27/08 (QA Sample)	330	N/A
				07/11/08	330	0.692
				07/31/08	>80000	8.345
				7/31/08 (QA Sample)	31000	N/A
				08/08/08	290	0.491
				08/22/08	470	0.322
				09/12/08	1800	0.656
				09/20/08	320	0.1716
				10/17/08	280	0.484
				10/24/08	120	0.184

Site	Segment	Latitude	Longitude	Date	<u>E</u> . <u>coli</u> (colonies/ 100ml)	Flow (cfs)
bitte	Spewing Camp Branch 0.0	Lutitude	Longitude	Dutt	1001111)	(015)
40	to 3.1	37.43039	-82.73443	05/16/08	1300	N/A
				05/30/08	<10	0.122
				06/13/08	200	0.0464
				6/13/08 (QA Sample)	300	N/A
				06/27/08	100	0.0476
				07/11/08	310	0.098
				07/31/08	52000	25.9819
				08/08/08	40	5.278
				08/22/08	90	0.065
				8/22/08 (QA Sample)	160	N/A
				09/12/08	190	0.522
				09/20/08	<10	0.065
				10/17/08	190	0.0408
				10/17/08 (QA Sample)	190	N/A
				10/24/08	10	0.038
41	Frasure Creek 0.0 to 5.2	37.4265	-82.7088	05/16/08	2000	N/A
				05/30/08	1600	0.9202
				06/13/08	170	0.3155
				06/27/08	450	0.29
				07/31/08	71000	18.8592
	·			08/08/08	1700	0.474
				8/8/08 (QA Sample)	360	N/A
				09/12/08	13000	0.7636
42	Frasure Creek 0.0 to 5.2	37.4556	-82.7368	05/16/08	160	N/A
				05/30/08	400	1.3342
				06/13/08	570	6.321
				06/27/08	560	0.8631
				07/31/08	43000	N/A
				08/08/08	440	0.588
				08/22/08	900	0.116
				8/22/08 (QA Sample)	1100	N/A
				09/12/08	3300	0.709
				9/12/08 (QA Sample)	3600	N/A
				09/20/08	1900	0.256
				10/17/08	3200	0.476
				10/24/08	760	0.211

Site	Segment	Latituda	Longitude	Date	<u>E</u> . <u>coli</u> (colonies/ 100ml)	Flow (cfs)
Site	Sizemore Branch 0.0 to	Latitute	Longitude	Date	100111)	((15)
43	2.0	37.47028	-82.75408	05/16/08	800	N/A
				05/30/08	270	0.1229
				5/30/08 (QA Sample)	220	N/A
				06/13/08	300	0.1023
				06/27/08	760	0.0669
				07/31/08	9000	N/A
				08/08/08	350	0.152
				08/22/08	700	0.084
				09/12/08	1700	0.0865
				09/20/08	39000	0.154
				9/20/08 (QA Sample)	27000	N/A
				10/17/08	1200	0.2832
				10/24/08	72000	N/A
44	Simpson Branch 0.0 to 1.8	37.476	-82.74252	05/16/08	30	N/A
				05/30/08	40	0.2607
				06/13/08	100	0.9723
				07/31/08	54000	N/A
				08/08/08	210	0.058
				08/22/08	40	N/A
				09/12/08	440	0.0624
				09/20/08	160	0.077
				10/24/08	1500	0.0465
45	Left Fork Beaver Creek 18.7 to 28.6	37.3539	-82.7163	05/16/08	3900	4.395
	·			05/30/08	1400	21.576
				06/13/08	2500	0.138
				06/27/08	580	1.103
				07/11/08	310	0.555
				07/31/08	>80000	5.316
				08/08/08	740	0.689
				08/22/08	600	0.508
				09/12/08	30000	0.520
				09/20/08	2000	0.158
				10/17/08	6800	0.958
				10/24/08	860	0.433
				10/24/08 (OA Sample)	390	N/A

Site	Segment	Latitude	Longitude	Date	<u>E</u> . <u>coli</u> (colonies/ 100ml)	Flow (cfs)
Site	Left Fork Beaver Creek	Latitude	Longitude	Date	100111)	((15)
46	18.7 to 28.6	37.38095	82.73524	05/16/08	800	8.799
				05/30/08	290	72.576
				06/13/08	130	5.353
				06/27/08	90	2.727
				07/11/08	130	3.555
				$\frac{07/31/08}{7/31/08}$ (OA Sample)	>80000	23.073 N/A
				08/08/08	17000	4.089
				08/22/08	30	1.406
				09/12/08	1100	3.633
	·			09/20/08	30	1 2618
				9/20/08 (OA Sample)	50	N/A
				10/17/08	90	2 10
				10/24/08	130	1.057
	Left Fork Beaver Creek					
47	13.55 to 18.7	37.42999	-82.73404	05/16/08	90	N/A
				05/30/08	300	7.0056
				06/13/08	40	4.5576
				06/27/08	40	2.8755
				07/11/08	10	4.733
				07/31/08	7500	26.059
				08/08/08	210	0.032
				8/8/08 (QA Sample)	250	N/A
				08/22/08	100	2.025
				09/12/08	230	6.1594
				09/20/08	30	3.2045
				10/17/08	130	2.695
				10/24/08	110	1.4958
48	Left Fork Beaver Creek 11.4 to 13.55	37.4478	-82.7384	05/16/08	130	N/A
				05/30/08	100	9.071
				06/13/08	80	7.686
				06/27/08	250	4.4441
				07/31/08	69000	N/A
				08/08/08	250	6.695
				08/22/08	100	1.373
				09/12/08	2100	114.166
				09/20/08	110	2.553
				10/17/08	50	2.8575
				10/24/08	190	1.4364

Site	Segment	Latitude	Longitude	Date	<u>E</u> . <u>coli</u> (colonies/ 100ml)	Flow (cfs)
10	Left Fork Beaver Creek	25 50 54			150	27/4
49	0.0 to 11.4	37.5064	-82.7555	05/16/08	1/0	N/A
				05/30/08	30	11.975
				5/30/08 (QA Sample)	20	N/A
				06/13/08	60	7.4685
				06/27/08	110	7.915
				07/31/08	53000	37.108
				08/08/08	70	8.333
				08/22/08	<10	1.803
				09/12/08	380	N/A
				9/12/08 (QA Sample)	240	N/A
				09/20/08	130	1.8648
				10/17/08	100	3.999
				10/24/08	170	3.356
50	Left Fork Beaver Creek 0.0 to 11.4	37.5564	-82.7497	05/16/08	390	N/A
				05/30/08	600	N/A
				06/13/08	220	N/A
				6/13/08 (QA Sample)	190	N/A
				06/27/08	70	N/A
				07/11/08	390	12.956
				07/31/08	27000	N/A
				08/08/08	220	5.708
				08/22/08	240	0.0144
				09/12/08	16000	22.148
				09/20/08	170	3.596
				10/17/08	180	3.155
				10/24/08	10	3.413
51	Spurlock Creek 0.0 to 0.6	37.5308	-82.7422	05/16/08	500	24.131
				05/30/08	4100	15.727
				06/13/08	410	11.539
				06/27/08	360	7.051
				07/11/08	600	N/A
				07/31/08	49000	46.941
				7/31/08 (QA Sample)	46000	46.941
				08/08/08	400	5.676
				08/22/08	450	1.677
				09/12/08	1400	20.251
				09/20/08	1100	3.884
				10/17/08	600	3 514
				10/24/08	10	2.294

Site	Segment	Latitude	Longitude	Date	<u>E. coli</u> (colonies/ 100ml)	Flow (cfs)
52	Spurlock Creek 0.6 to 4.0	37.52725	-82.73617	05/16/08	10	2.113
				05/30/08	110	0.498
				06/13/08	30	0.538
				06/27/08	20	0.721
				07/11/08	110	0.832
				07/31/08	>80000	13.349
				08/08/08	60	0.1285
				8/8/08 (QA Sample)	40	N/A
				08/22/08	<10	0.072
				09/12/08	70	0.801
				09/20/08	20	0.601
				10/17/08	30	0.633
				10/24/08	<10	0.505

EASTERN STP	KY0107051	<u>E</u> . <u>coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Dec-09	266	1300
30-Nov-09	606	2420
31-Oct-09	19	89
30-Sep-09	17	61
31-Aug-09	1	2
31-Jul-09	237	1414
30-Jun-09	1	1
31-May-09	289	418
30-Apr-09	57	150
31-Mar-09	358	1400
28-Feb-09	15	30
31-Jan-09	22	50
31-Dec-08	13	20
30-Nov-08	C = NO DISCHARGE	
31-Oct-08		
30-Sep-08		
31-Aug-08	C = NO DISCHARGE	
31-Jul-08	C = NO DISCHARGE	
30-Jun-08	C = NO DISCHARGE	

Appendix C. Discharge Monitoring Report Data

KNOTT CO WATER & SEWER DIST	KY0042854	<u>E</u> . <u>coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Dec-09		
30-Nov-09	6	131
31-Oct-09	106	2048
30-Sep-09	269	2420
31-Aug-09	26	131
31-Jul-09	34	117
30-Jun-09	88	120
31-May-09	26	119
30-Apr-09	78	261
31-Mar-09	5	109
28-Feb-09	7	66
31-Jan-09	320	> 2420
31-Dec-08	83	409
30-Nov-08	37	117
31-Oct-08	23	82
30-Sep-08	6	63
31-Aug-08	7	173

Final Beaver Creek Watershed <u>E</u>. <u>coli</u> TMDL

KNOTT CO WATER & SEWER DIST	KY0042854	<u>E</u> . <u>coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Jul-08	5	79
30-Jun-08	16	101
31-May-08	3	26
30-Apr-08	58	2420
31-Mar-08	129	> 2420
29-Feb-08	10	166
31-Jan-08	12	34
31-Dec-07	4	10
30-Nov-07	21	488
31-Oct-07	41	> 2420
30-Sep-07	11	281
31-Aug-07	4	25
fecal colifor	rm reporting begins here	
31-Jul-07	40	5000
30-Jun-07	BMDL	BMDL
31-May-07	19	65
30-Apr-07	12	20
31-Mar-07	BMDL	BMDL
2/29/2007	<10	<10
31-Jan-07	<10	<10

MARTIN STP	KY0026921	Fecal Coliform (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Dec-09		
30-Nov-09	BMDL	BMDL
31-Oct-09	BMDL	BMDL
30-Sep-09	22	109
31-Aug-09	BMDL	BMDL
31-Jul-09	BMDL	BMDL
30-Jun-09	BMDL	BMDL
31-May-09		
30-Apr-09	BMDL	BMDL
31-Mar-09	13	30
28-Feb-09	14	30
31-Jan-09	53	92
31-Dec-08	10	10
30-Nov-08	BMDL	BMDL
31-Oct-08	BMDL	BMDL
30-Sep-08	18	99
31-Aug-08	11	15
31-Jul-08	BMDL	BMDL
30-Jun-08	49.51	1214

MARTIN STP	KY0026921	Fecal Coliform (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-May-08	47	79
30-Apr-08	73	1746
31-Mar-08	30	270
29-Feb-08	23	590
31-Jan-08	19	129
31-Dec-07	40	158
30-Nov-07	665	2828
31-Oct-07	1863	20976
30-Sep-07	BMDL	BMDL
31-Aug-07	247	150000
31-Jul-07	BMDL	BMDL
30-Jun-07		
31-May-07		
30-Apr-07	11000	11000
31-Mar-07	28	624
28-Feb-07		
31-Jan-07	< 10	< 10

WAYLAND STP	KY0105228	<u>E</u> . <u>coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Dec-09		
30-Nov-09		
31-Oct-09		
30-Sep-09		
31-Aug-09		
31-Jul-09	7	2420
30-Jun-09		
31-May-09	< 1	< 1
30-Apr-09	3	10
31-Mar-09	< 10	< 10
28-Feb-09	1122	66000
31-Jan-09	19	270
31-Dec-08	10	10
fe	cal coliform reporting begin	ns here
30-Nov-08	<10	<10
31-Oct-08	10	10
30-Sep-08	15	50
31-Aug-08	10	10
31-Jul-08	<10	<10
30-Jun-08	10	10
31-May-08	10	10

WAYLAND STP	KY0105228	<u>E</u> . <u>coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
30-Apr-08	<10	<10
31-Mar-08	54	600
28-Feb-08	36	600
31-Jan-08	<51	<600
31-Dec-07	BMDL	BMDL
30-Nov-07	BMDL	BMDL
31-Oct-07	BMDL	BMDL
30-Sep-07	24	350
31-Aug-07	BMDL	BMDL
31-Jul-07	BMDL	BMDL
30-Jun-07	10	10
31-May-07	BMDL	BMDL
30-Apr-07	BMDL	BMDL
31-Mar-07	BMDL	BMDL
28-Feb-07	<10	<10
31-Jan-07	<10	<10

WHEELWRIGHT STP	KY0028789	<u>E</u> . <u>coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Dec-09	15	31
30-Nov-09	14	23
31-Oct-09	3	5
30-Sep-09	8	20
31-Aug-09	25	119
31-Jul-09	7	25
30-Jun-09	3	11
31-May-09	4	12
30-Apr-09	7	< 10
31-Mar-09	< 10	< 10
28-Feb-09	< 10	< 10
31-Jan-09	10	10
31-Dec-08	68	
30-Nov-08	10	10
31-Oct-08	38	120
30-Sep-08	84	260
31-Aug-08	18	40
31-Jul-08	54	170
30-Jun-08	40	120
31-May-08	53	130
30-Apr-08	10	10
31-Mar-08	< 10	< 10
29-Feb-08	68	300

WHEELWRIGHT STP	KY0028789	<u>E</u> . <u>coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Jan-08	< 10	< 10
31-Dec-07	18	30
30-Nov-07	15	30
31-Oct-07	16	40
30-Sep-07	195	710
31-Aug-07	14	30
31-Jul-07	388	1900
fecal coliform reporting begins here		
30-Jun-07	41	160
31-May-07	32	360
30-Apr-07	66	600
31-Mar-07	10	10
2/29/2007	10	10
31-Jan-07	14	60

ALLEN CENTRAL HIGH SCHOOL	KY0079430	<u>E</u> . <u>coli</u> (colonies/100ml)
Quarter Ending	Average Concentration	Maximum Concentration
31-Dec-09		
30-Sep-09	10	10
30-Jun-09	163	276
31-Mar-09	3	3
31-Dec-08	20	20
30-Sep-08	23	548
30-Jun-08	101	< 2420
31-Mar-08	39	39
31-Dec-07	22	22
30-Sep-07	28	2420
30-Jun-07	85	2420
31-Mar-07		

BEAVER CREEK ELEM SCHOOL	KY0077542	<u>E</u> . <u>coli</u> (colonies/100ml)
Quarter Ending	Average Concentration	Maximum Concentration
31-Dec-09	BMDL	BMDL
30-Sep-09	BMDL	BMDL
30-Jun-09	BMDL	BMDL
31-Mar-09	BMDL	BMDL
31-Dec-08	BMDL	BMDL
30-Sep-08	BMDL	BMDL
30-Jun-08	BMDL	BMDL
31-Mar-08	1	1

BEAVER CREEK ELEM SCHOOL	KY0077542	E. coli (colonies/100ml)
Quarter Ending	Average Concentration	Maximum Concentration
31-Dec-07	BMDL	BMDL
30-Sep-07	BMDL	BMDL
30-Jun-07	6	6

JAMES A DUFF ELEM SCHOOL	KY0093017	<u>E</u> . <u>coli</u> (colonies/100ml)
Quarter Ending	Average Concentration	Maximum Concentration
31-Dec-09		
30-Sep-09	39	39
30-Jun-09	2	2
31-Mar-09	1	1
31-Dec-08	6	6
30-Sep-08	12	12
30-Jun-08	22	22
31-Mar-08	36	36
31-Dec-07	14	14
30-Sep-07	49	49
30-Jun-07	1	1
31-Mar-07		

JONES FORK ELEM SCHOOL	KY0087076	<u>E</u> . <u>coli</u> (colonies/100ml)
Quarter Ending	Average Concentration	Maximum Concentration
31-Dec-09	BMDL	BMDL
30-Sep-09	BMDL	BMDL
30-Jun-09	BMDL	BMDL
31-Mar-09	BMDL	BMDL
31-Dec-08	BMDL	BMDL
30-Sep-08	BMDL	BMDL
30-Jun-08	BMDL	BMDL
31-Mar-08	BMDL	BMDL
31-Dec-07	9	9
30-Sep-07	150	150
30-Jun-07	4	4

MAY VALLEY ELEM SCHOOL	KY0106755	<u>E</u> . <u>coli</u> (colonies/100ml)
Quarter Ending	Average Concentration	Maximum Concentration
31-Dec-09		
30-Sep-09	24	24
30-Jun-09	21	146

MAY VALLEY ELEM SCHOOL	KY0106755	<u>E</u> . <u>coli</u> (colonies/100ml)
Quarter Ending	Average Concentration	Maximum Concentration
31-Mar-09	2	2
31-Dec-08	21	21
30-Sep-08	BMDL	BMDL
30-Jun-08	75	1120
31-Mar-08	12	12
31-Dec-07	117	> 2420
30-Sep-07	4	4
30-Jun-07	84	84
31-Mar-07		

MCDOWELL ELEM SCHOOL	KY0079421	E. coli (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Jan-10		
31-Dec-09		
30-Nov-09		
31-Oct-09		
30-Sep-09	BMDL	BMDL
31-Aug-09	88	88
31-Jul-09	BMDL	BMDL
30-Jun-09	BMDL	BMDL
31-May-09	BMDL	BMDL
30-Apr-09	BMDL	BMDL
31-Mar-09	BMDL	BMDL
28-Feb-09	BMDL	BMDL
31-Jan-09	BMDL	BMDL
31-Dec-08	23	23
30-Nov-08	BMDL	BMDL
31-Oct-08	11	11
30-Sep-08	5	5
31-Aug-08	BMDL	BMDL
31-Jul-08	BMDL	BMDL
30-Jun-08	35	35
31-May-08	BMDL	BMDL
30-Apr-08	2	2
31-Mar-08	BMDL	BMDL
29-Feb-08	1	1
31-Jan-08	BMDL	BMDL
31-Dec-07	BMDL	BMDL
30-Nov-07	10	10
31-Oct-07	3	3
30-Sep-07	BMDL	BMDL
31-Aug-07	114	326

MCDOWELL ELEM SCHOOL	KY0079421	<u>E</u> . <u>coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Jul-07	23	23
30-Jun-07	1	1
31-May-07	BMDL	BMDL
30-Apr-07	BMDL	BMDL
31-Mar-07	BMDL	BMDL

OSBORNE ELEM SCHOOL	KY0089435	<u>E</u> . <u>coli</u> (colonies/100ml)
Quarter Ending	Average Concentration	Maximum Concentration
31-Dec-09		
30-Sep-09	1	1
30-Jun-09	2	2
31-Mar-09	15	15
31-Dec-08	2	2
30-Sep-08	3	3
30-Jun-08	BMDL	BMDL
31-Mar-08	1	1
31-Dec-07	1	1
30-Sep-07	33	33
30-Jun-07	20	20
31-Mar-07		

SOUTH FLOYD HIGH SCHOOL	KY0093912	<u>E</u> . <u>coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Jan-10		
31-Dec-09		
30-Nov-09		
31-Oct-09		
30-Sep-09	BMDL	BMDL
31-Aug-09	3	3
31-Jul-09	BMDL	BMDL
30-Jun-09	BMDL	BMDL
31-May-09	BMDL	BMDL
30-Apr-09	3	3
31-Mar-09	19	372
28-Feb-09	5	5
31-Jan-09	35	201
31-Dec-08	387	2420
30-Nov-08	14	195
31-Oct-08	1	1
30-Sep-08	24	24
31-Aug-08	15	15

SOUTH FLOYD HIGH SCHOOL	KY0093912	<u>E</u> . <u>coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Jul-08	6	6
30-Jun-08	BMDL	BMDL
31-May-08	12	12
30-Apr-08	358	2420
31-Mar-08	49	< 2420
29-Feb-08	49	> 2420
31-Jan-08	103	154
31-Dec-07	74	74
30-Nov-07	51	516
31-Oct-07	18	18
30-Sep-07	18	18
31-Aug-07	6	6
31-Jul-07	12	12
30-Jun-07	1	1
31-May-07	BMDL	BMDL
30-Apr-07	98	> 2420
31-Mar-07	120	> 2420

S & V MHP	KY0103233	<u>E</u> . <u>coli</u> (colonies/100ml)
Quarter	Average Concentration	Maximum Concentration
Oct-Dec 09	BMDL	BMDL
Jul -Sept 09	BMDL	BMDL
Apr-Jun 09	BMDL	BMDL
Jan-Mar 09	49	> 2420
Oct-Dec 08	214	214
Jul-Sept 08	99	99
Apr-Jun 08	4	4
Jan- Mar 08	BMDL	BMDL
Oct-Dec 07	1	1
Jul-Sept 07	2	2
fecal coliform reporting begins here		
Apr-Jun 07	BMDL	BMDL
Jan-Mar 07	BMDL	BMDL

LEFT BEAVER CREEK TOWNHOUSES	KY0096342	<u>E</u> . <u>coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Dec-09		
30-Nov-09		
31-Oct-09		
30-Sep-09	3	3
31-Aug-09	50	50

Final Beaver Creek Watershed <u>E</u>. <u>coli</u> TMDL

LEFT BEAVER CREEK TOWNHOUSES	KY0096342	<u>E</u> . <u>coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Jul-09	20	20
30-Jun-09	534	2420
31-May-09	49	49
30-Apr-09	27	27
31-Mar-09	194	1986
28-Feb-09	BMDL	BMDL
31-Jan-09	115	115
31-Dec-08	1414	1414
30-Nov-08	30	727
31-Oct-08	18	18
30-Sep-08	31	31
31-Aug-08	12	12
31-Jul-08	190	387
30-Jun-08	BMDL	BMDL
31-May-08	332.5	649
30-Apr-08	20	20
31-Mar-08	127	127
29-Feb-08	113	113
31-Jan-08	43	43
31-Dec-07	35	35
30-Nov-07	19	19
31-Oct-07	36	36
30-Sep-07	31	31
31-Aug-07	62	150
31-Jul-07	674	830
30-Jun-07	561	575
31-May-07	54	54
30-Apr-07	108	613
31-Mar-07	17	17
28-Feb-07	300	579
fecal coliform reporting begins here		
Jan-07	59	59

WARCO HOUSING PROJECT	KY0072974	<u>E</u> . <u>coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Jan-10		
31-Dec-09		
30-Nov-09		
31-Oct-09		
30-Sep-09	BMDL	BMDL
31-Aug-09	BMDL	BMDL
31-Jul-09	3	3
30-Jun-09	2	2

Final Beaver Creek Watershed <u>E</u>. <u>coli</u> TMDL

WARCO HOUSING PROJECT	KY0072974	<u>E</u> . <u>coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-May-09	1	1
30-Apr-09	BMDL	BMDL
31-Mar-09	BMDL	BMDL
28-Feb-09	BMDL	BMDL
31-Jan-09	17	17
31-Dec-08	15	15
30-Nov-08	19	378
31-Oct-08	41	41
30-Sep-08	17	17
31-Aug-08	96	96
31-Jul-08	75	921
30-Jun-08	1218.5	> 2420
31-May-08	108	108
30-Apr-08	93	185
31-Mar-08	4	4
29-Feb-08	579	579
31-Jan-08	179	179
31-Dec-07	BMDL	BMDL
30-Nov-07	29	29
31-Oct-07	1	1
30-Sep-07	3	3
31-Aug-07	BMDL	BMDL
31-Jul-07	BMDL	BMDL
30-Jun-07	1	1
31-May-07	5	5
30-Apr-07	1	1
31-Mar-07	BMDL	BMDL
28-Feb-07	BMDL	BMDL
31-Jan-07	BMDL	BMDL

MCDOWELL APPALACHIAN REG HOSP	KY0085791	<u>E</u> . <u>coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Dec-09		
30-Nov-09		
31-Oct-09		
30-Sep-09	56.7	56.7
31-Aug-09	68.3	68.3
31-Jul-09	<25	<25
30-Jun-09	51.7	51.7
31-May-09	90	90
30-Apr-09	< 18	< 18
31-Mar-09	96.7	96.7

MCDOWELL APPALACHIAN REG HOSP	KY0085791	E. coli (colonies/100ml)	
Month	Average Concentration	Maximum Concentration	
28-Feb-09	40	40	
31-Jan-09	82.2	82.2	
31-Dec-08	57.1	57.1	
30-Nov-08	28.3	28.3	
31-Oct-08	41.3	41.3	
30-Sep-08	< 8.1	< 8.1	
31-Aug-08	< 26.3	< 26.3	
31-Jul-08	77.8	77.8	
30-Jun-08	34.9	34.9	
31-May-08	84.4	84.4	
30-Apr-08	58.7	58.7	
31-Mar-08	92.2	92.2	
29-Feb-08	117.8	117.8 50.8	
31-Jan-08	50.8		
31-Dec-07	117.8	117.8	
30-Nov-07	105.6	105.6	
31-Oct-07	83.3	83.3	
30-Sep-07	101.6	101.6	
31-Aug-07	65.1	65.1	
31-Jul-07	120.6	120.6	
30-Jun-07	144.4	144.4	
31-May-07	44.4	44.4	
30-Apr-07	4	4	
fecal coliform reporting begi	ns here		
31-Mar-07	26	26	
2/29/2007	37	37	
31-Jan-07	36	36	

		Fecal coliform
CONSOL OF KY INC JONES FORK	KY0094510	(colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Jan-10		
31-Dec-09		
30-Nov-09		
31-Oct-09		
30-Sep-09	no flow	
31-Aug-09	no flow	
31-Jul-09	no flow	
30-Jun-09	<10	<10
31-May-09	80	80
30-Apr-09	<10	<10
31-Mar-09	no flow	

		Fecal coliform
CONSOL OF KY INC JONES FORK	KY0094510	(colonies/100ml)
Month	Average Concentration	Maximum Concentration
28-Feb-09	10	10
31-Jan-09	10	10
31-Dec-08	< 10	< 10
30-Nov-08	10	10
31-Oct-08	< 10	< 10
30-Sep-08	60	60
31-Aug-08	110	110
31-Jul-08	< 10	< 10
30-Jun-08	20	20
31-May-08	20	20
30-Apr-08	10	10
31-Mar-08	20	20
29-Feb-08	< 10	< 10
31-Jan-08	30	30
31-Dec-07	20	20
30-Nov-07	10	10
31-Oct-07	10	10
30-Sep-07		
31-Aug-07		
31-Jul-07		
30-Jun-07	40	40
31-May-07	< 10	< 10
30-Apr-07	40	40
31-Mar-07	< 10	< 10
28-Feb-07	30	30
31-Jan-07	10	10

MCDOWELL DOLLAR GENERAL		
STORE	KY0103136	<u>E</u> . <u>coli</u> (colonies/100ml)
Quarter Ending	Average Concentration	Maximum Concentration
31-Dec-09		
30-Sep-09		
30-Jun-09	***	***
31-Mar-09	C = NO DISCHARGE	
31-Dec-08	C = NO DISCHARGE	
30-Sep-08	C = NO DISCHARGE	
30-Jun-08	C = NO DISCHARGE	
Jan-Mar 08	C = NO DISCHARGE	
31-Dec-07	8 = OTHER	
fecal coliform reporting	begins here	
Jul-Sept 07	C = NO DISCHARGE	
Apr-Jun 07	***	***

GOLDEN YEARS REST HOME	KY0083089	<u>E. coli</u> (colonies/100ml)		
Month	Average Concentration	Maximum Concentration		
31-Jan-10				
31-Dec-09				
30-Nov-09				
31-Oct-09				
30-Sep-09	13	13		
31-Aug-09	101	101		
31-Jul-09	< 1	< 1		
30-Jun-09	2	2		
31-May-09	< 1	< 1		
30-Apr-09	< 1	< 1		
31-Mar-09	< 10	< 10		
28-Feb-09	1300	1300		
31-Jan-09	380	380		
31-Dec-08	< 10	< 10		
30-Nov-08	< 10	< 10		
31-Oct-08	10	10		
30-Sep-08	< 10	< 10		
31-Aug-08	< 10	< 10		
31-Jul-08	< 10	< 10		
30-Jun-08	280	280		
31-May-08	10	10		
30-Apr-08	< 10	< 10		
31-Mar-08	< 10	< 10		
29-Feb-08	30	30		
31-Jan-08	< 10	< 10		
31-Dec-07	14000	14000		
30-Nov-07	< 10	< 10		
31-Oct-07	< 10	< 10		
30-Sep-07	< 10	< 10		
31-Aug-07	< 10	< 10		
31-Jul-07	< 10	< 10		
30-Jun-07	< 10	< 10		
31-May-07	< 10	< 10		
30-Apr-07	< 10	< 10		
fecal colif	orm reporting begins here			
31-Mar-07	< 10	< 10		
2/29/2007	< 10	< 10		
31-Jan-07	< 10	< 10		

Appendix D. Unit Area Load Information

Site	5/15	5/16	5/30	6/13	6/27	7/10	7/26	8/17	8/31	9/13	9/14	9/28	10/12	11/16
13	7.1		0.5	2.3	44.6	0.8	39.6	0.6		0.3		0.1	0.0	0.9
20	0.3		1.9	1.0	11.0	0.7	30.9	0.0	0.1		0.1	0.0	0.0	0.8
22		3.8	1.0	0.5	14.9	0.6	16.4	0.4			1.8	0.5	0.5	4.4
24	19.9		2.4	43.3	299.3	0.3	2.5							
27		122.1	6.7	4.7	8.6	0.9	0.2							9.0
30		5.5	2.3	0.9	58.4	0.6		0.4					0.3	0.0
31	0.3		0.4	1.5	32.6		59.2	1.0	0.2		0.3	0.1	0.1	1.6
32	23.7		2.2	0.4	3.8	0.4	22.0	1.1			0.0	0.0	0.0	1.4
33	58.3		0.1	0.5	1.3	0.4	45.9	0.2			0.3			0.7
34	0.4		2.1	2.2	37.8	0.8	107.5	0.4			0.3	0.1	0.1	19.8
35			1.4					0.3					0.2	

Table D.1 2007 Unit Area Loadings (<u>E</u>. <u>coli</u> million colonies/day/acre)

Table D.2 2008 Unit Area Loadings (<u>E</u>. <u>coli</u> million colonies/day/acre)

-									<u> </u>			
Site	5/16	5/30	6/13	6/27	7/11	7/31	8/8	8/22	9/12	9/20	10/17	10/24
1	25.6	7.4	6.7	1.2	12.9	853.4	11.0	0.2	0.7	0.4	0.5	0.4
2	5.7	0.1	0.3	0.6	4.5	1515.5	106.7	13.3	0.1	0.0	4.1	0.0
3		0.9	3.2	0.6	6.0		0.0		1.5	0.1	0.1	1.1
4		1.6	3.5	0.6	15.4		1.0	0.3	0.3	0.7	0.3	0.1
36	239.3	1476.0			19.6		105.0	18.8	1.1	5.2	3.3	338.5
37	101.0	3036.6	26.2	4.2	55.6	1805.9	7.8	1.5	29.2	344.0	11.5	0.8
38	8.3	81.4	8.7	25.0	3.0	287.4	4.0	0.8	33.8	4.5	2.5	0.2
39	1.5	1.5	5.3	1.4	1.7	4938.0	1.1	1.1	8.7	0.4	1.0	0.2
40		0.0	0.1	0.1	0.5	21026.9	3.3	0.1	1.5	0.0	0.1	0.0
41		10.3	0.4	0.9		9375.1	5.6		69.5	2.7		
42		1.8	12.0	1.6			0.9	0.3	7.8	1.6	5.1	0.5
43		0.8	0.8	1.3			1.3	1.5	3.6	148.5	8.4	
44		0.2	1.9				0.2		0.5	0.2		1.4
45	59.7	105.3	1.2	2.2	0.6	1482.3	1.8	1.1	54.4	1.1	22.7	1.3
46	10.7	31.9	1.1	0.4	0.7	2867.2	1.1	0.1	6.1	0.1	0.3	0.2
47		2.3	0.2	0.1	0.1	211.9	0.0	0.2	1.5	0.1	0.4	0.2
48		0.9	1.1			1.6	0.1	234.6	0.3	0.1	0.3	
49		0.2	0.3	0.5		1202.1	0.4	0.0		0.1	0.2	0.3
50					2.6		0.7	0.0	185.0	0.3	0.3	0.0
51	119.6	639.1	46.9	25.2		22798.7	22.5	7.5	281.0	42.3	20.9	0.2
52	0.2	0.6	0.2	0.2	1.0	11249.6	0.1	0.0	0.6	0.1	0.2	0.1
30a	9.1	0.9	3.3	0.6	7.4		2.8	0.3	0.3	0.2	0.1	0.2

Appendix E. TMDLs for Additional Sites

Beaver Creek Site 3



Figure E.1 Beaver Creek Site 3

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 2 is under site 3, site 30a is to the immediate left of site 50, site 27 is under site 35, site 20 is under site 31, site 32 is under site 33, site 37 is under site 45, and site 40 is under site 47.

Beaver Creek at site 3 (RM 3.9) is a fifth order stream located in the Mainstem Beaver Creek Subwatershed in Floyd County (Figure E.1). Information about Beaver Creek site 3, including sample site location, waterbody identification number (WBID), and MAF is shown in Table E.1. It has a catchment of 149,202 acres (233 square miles) with an 80% forested and 6.4 % developed land cover (Table E.2). Portions of this watershed are sewered; especially in larger cities (see Figures 5.13 through 5.19). There are five stream water withdrawals in this subwatershed (Table E.3). Sampling data from site 3 is presented in Table E.4, and the TMDL allocations in Table E.5.

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
	Beaver								
	Creek								
Beaver	0.0 to								
Creek	7.1	486610_01	Floyd	149201.88	233.13	5th order			
			Sample	Sample			+ to	- from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
3	3	3.9	37.57950	-82.73200	309.8	3.9	1.19400	2.19242	308.8016

Table E.1 Beaver Creek RM 0.0 to 7.1 Site 3 Information

Table E.2 Beaver Creek Site 3 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	89.18	0.14	0.06	
Developed	9530.28	14.89	6.39	1
Barren Land	1703.77	2.66	1.14	
Forest Shrubland	118935.31	182.40	79.71	
Grassland/Herbaceous	14272.84	22.30	9.57	
Pasture/ Hay	4365.16	6.82	2.93	
Cultivated Crops	284.44	0.44	0.19	
Wetlands	20.91	0.03	0.01	
Totals	149201.88	233.13	100.00	

Table E.3 Beaver Creek Site 3 Water Withdrawals

AI		Withdrawal Facility	Withdrawal	Facility	Facility
number	Source Description	Name	(cfs)	Latitude	Longitude
	RM 40.6 Right	ICG Knott Co LLC			
2528	Fork Beaver Creek	(860-8012)	0.4100156	37.32166	-82.80366
	RM 31.0 Right	Deane Mining LLC			
2525	Fork Beaver Creek	(860-5318)	0.01547229	37.41038	-82.78096
	RM 15.36 of Left	Elk Horn Coal Co			
1299	Fork Beaver Creek	LLC	0.09283372	37.40129	-82.74175
	RM 4.2 of Caney				
3502	Creek	ICG Knott Co LLC	1.005699	37.3884	-82.82856
	RM 2.4 of Left	Black Diamond			
78571	Fork Beaver Creek	Mining	0.6684028	37.53192	-82.74364
		subtraction from			
		MAF (sum of cfs)	2.19242341		

Table E.4 Beaver Creek Site 3 Data

			Instantaneous	
	<u>E</u> . <u>coli</u>		Load (billion <u>E</u> .	Unit Area Load
	(colonies/100		<u>coli</u>	(million <u>E</u> . <u>coli</u>
Collection Date	mls)	Flow (cfs)	colonies/day)	colonies/day/acre)
05/16/08	1100	N/A	N/A	N/A
05/30/08	130	43.987	139.90	0.94
06/13/08	430	45.528	478.97	3.21
06/27/08	180	18.869	83.10	0.56
07/11/08	610	60.4	901.42	6.04
7/11/2008 (QA				
Sample)	550	N/A	N/A	N/A
07/31/08	4500	N/A	N/A	N/A
08/08/08	240	0.0075	0.04	0.00
09/12/08	390	23.475	223.99	1.50
09/20/08	90	9.925	21.85	0.15
10/17/08	90	9.692	21.34	0.14
10/24/08	750	9.081	166.63	1.12
Greatest Concentration	4500			

Table E.5 TMDLs for Beaver Creek Site 3

TMDL					<u>E</u> . <u>coli</u> (billion	
Table					colonies/day)	
14010					colonics, aug)	Existing
					22007 7011	Land
					55997.7911	Load
						Total
					1813.2155	TMDL
					181.3216	MOS
						TMDL
					1631.8940	Target
				Design		
AI		Discharger		Capacity		
number	KPDES #	Facility Name	Type	(cfs)	95.20	% reduction
		-	Sewerage	, , ,		KPDES
1262	KY0026921	MARTIN STP	System	0.1856675	1.0902	WLA
		WHEELWRIGHT	Sewerage			KPDES
40534	KY0028789	STP	System	0.3481265	2.0441	WLA
		KNOTT CO	*			
		WATER &	Sewerage			KPDES
2527	KY0042854	SEWER DIST	System	0.1547229	0.9085	WLA
		WARCO	•			
		HOUSING	Apartment			KPDES
1352	KY0072974	PROJECT	Building	0.0386807	0.2271	WLA
		BEAVER				
		CREEK ELEM				KPDES
33945	KY0077542	SCHOOL	School	0.0108306	0.0636	WLA

					Design		
	AI		Discharger		Capacity	E. coli (billion	
	number	KPDES #	Facility Name	Type	(cfs)	colonies/day)	
			MCDOWELL				KPDES
	35252	KY0079421	FI FM SCHOOL	School	0.0232084	0 1363	WLA
	33232	R10077421	ALLEN	Belloor	0.0232004	0.1303	VV L22X
			CENTRAL UICU				VDDES
	25254	XX0070420		Cabaal	0.0170105	0.0000	KPDE5
	35254	K100/9430	SCHOOL	School	0.0170195	0.0999	WLA
			GOLDEN	T			VIDDEG
			YEARS REST	Intermediate			KPDES
	2517	KY0083089	HOME	Care Facility	0.0154723	0.0908	WLA
			MCDOWELL				
			APPALACHIAN				KPDES
	1134	KY0085791	REG HOSP	Hospital	0.0309446	0.1817	WLA
			JONES FORK				KPDES
	35359	KY0087076	ELEM SCHOOL	School	0.0092834	0.0545	WLA
			OSBORNE				KPDES
	35251	KY0089435	ELEM SCHOOL	School	0.0105212	0.0618	WLA
	00201	11100007.000	IAMES A DUFE	2011001	0.0100212	000020	KPDES
	35258	KY0093017	FI FM SCHOOL	School	0.0123778	0.0727	WI A
	33230	K 10075017	SOUTH ELOVD	School	0.0123770	0.0727	KDDES
	25260	KV0002012		School	0.0222084	0 1262	
	33200	K10093912	CONCOL OF VV	Ditenting	0.0232084	0.1303	WLA
			CONSOL OF KY	Bituminous			KDDDG
	0.51.4		INC JONES	Coal & Lig,	0.0046445	0.00=0	KPDES
	2514	KY0094510	FORK	Surface	0.0046417	0.0273	WLA
			LEFT BEAVER				
			CREEK	Apartment			KPDES
	1255	KY0096342	TOWNHOUSES	Building	0.0278501	0.1635	WLA
			MCDOWELL				
			DOLLAR				
			GENERAL	Department			KPDES
	1263	KY0103136	STORE	Store	0.0007736	0.0045	WLA
				Mobile Home			KPDES
	1305	KY0103233	S & V MHP	Site	0.0153176	0.0899	WLA
				Sewerage			KPDES
	35761	KY0105228	WAYLAND STP	System	0 1547229	0 9085	WLA
ļ	55701		MAY VALLEY	System	0.10 (722)	0.2002	KPDFS
	82002	KV0106755	ELEM SCHOOL	School	0.0002834	0.0545	WI A
	62092	K10100755	ELEWI SCHOOL	School	0.0092834	0.0345	
ļ	252(0	VV0107051	EASTEDNISTD	Sewerage	0.0296907	0 2271	MI DES
ļ	35260	K1010/051	EASTERN STP	System	0.0386807	0.22/1	WLA
ļ				Dwelling			WDDD
	1.0.10		MITCHELL	Other than		0.00 <i>1</i> =	KPDES
	1269	KYG400478	RESIDENCE	Apartment	0.0007736	0.0045	WLA
				Dwelling			
			BLACKBURN	Other than			KPDES
ļ	1143	KYG400479	RESIDENCE	Apartment	0.0007736	0.0045	WLA
ļ				Dwelling			
ļ			DEROSSETT	Other than			KPDES
ļ	1180	KYG400520	RESIDENCE	Apartment	0.0007736	0.0045	WLA
				Dwelling			
ļ			HICKS	Other than			KPDES
ļ	1218	KYG400567	RESIDENCE	Apartment	0.0007736	0.0045	WLA
ļ			212222	Dwelling			
			WRIGHT	Other than			KPDFS
ļ	1367	KYG400579	RESIDENCE	Apartment	0.0007736	0 0045	WI A
	1507	1110-000/7	RESIDENCE	Apartment	0.0007750	0.0045	

				Design		
ΔI		Discharger		Canacity	E coli (billion	
number	KDDES #	Facility Name	Type	(cfs)	<u>colonies/dav</u>)	
number	KIDLS#		Type D 11	(C18)	colonies/uay)	
		60.DV 7	Dwelling			
		GOBLE	Other than			KPDES
1196	KYG400590	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		STUMBO	Other than			KPDES
1327	KYG400601	RESIDENCE	Anartment	0.0007736	0.0045	WLA
1027	1110.00001	TILLBID LITED	Dwelling	0.0007720		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
		CDEEN	Other ther			VDDEC
1100	WWG 400 (02	UKEEN	Other than	0.0007726	0.0045	KPDES
1199	KYG400603	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		MCKINNEY	Other than			KPDES
1265	KYG400612	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		DYE	Other than			KPDES
1182	KYG400614	RESIDENCE	Anartment	0.0007736	0 0045	WI A
1102	1115100014	RESIDENCE	Dwelling	0.0007750	5.00-10	
			Other ther			KDDEC
1122	WWC 400 CA2	ALLEN	Other than	0.0007726	0.0045	KPDES
1155	KYG400642	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		CURRENT	Other than			KPDES
4250	KYG400659	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		MITCHELL	Other than			KPDES
1270	KYG400666	RESIDENCE	Anartment	0.0007736	0.0045	WLA
1270	III G 100000	TELSID LI (CL	Dwelling	0.0007720	010010	
		CUDEWBEDDV	Other then			VDDES
1215	VVC400677			0.0007726	0.0045	WI A
1515	KIG400077	RESIDENCE	Apartment	0.0007730	0.0045	WLA
			Dwelling			
		CASTLE	Other than			KPDES
1162	KYG400678	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		CASE	Other than			KPDES
1161	KYG400692	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		MULLINS	Other than			KPDES
1274	KYG400714	RESIDENCE	Anartment	0.0007736	0.0045	WLA
12/1		ILDIDEI (CE	Dwelling	0.0007750	00010	
		VOLIMANS	Other then			KDDEC
12(0	KNC 400724	IOUMANS		0.0007726	0.0045	MI DES
1309	KI 0400724	RESIDENCE	Apartment	0.0007736	0.0045	WLA
		110.01	Dwelling			
		HOOVER	Other than			KPDES
1222	KYG400730	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		BINGHAM	Other than			KPDES
1237	KYG400753	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		TURNER	Other than			KPDES
1343	KYG400778	RESIDENCE	Apartment	0.0007736	0.0045	WLA
1313	1110100770	RESIDENCE	Dwelling	0.0007750	0.0010	
		CADDAWAY	Other ther			KDDES
11.50		CAKKAWAY	Other than	0.000552.0	0.004	KPDES
1158	KYG400/8/	RESIDENCE	Apartment	0.0007736	0.0045	WLA

				Design		
AI		Discharger		Capacity	<u>E</u> . <u>coli</u> (billion	
number	KPDES #	Facility Name	Type	(cfs)	colonies/day)	
			Dwelling			
		COOK	Other than			KPDES
1173	KYG400790	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		JACOBS	Other than			KPDES
1232	KYG400806	RESIDENCE	Apartment	0.0007736	0.0045	WLA
1202	1110.00000	TILLDID LITTOL	Dwelling	0.0007720		
		PERKINS	Other than			KPDES
1293	KYG400836	RESIDENCE	Apartment	0.0007736	0.0045	WI A
1275	RIG100050	RESIDENCE	Dwelling	0.0007750	0.0042	
		SHEDHEDD	Other than			KPDFS
1314	KVG400844	RESIDENCE		0.0007736	0.0045	
1514	K10400044	RESIDENCE	Dwolling	0.0007730	0.0045	WLA
		COLUNS	Other then			VDDES
1169	VVC400954	DESIDENCE		0.0007726	0.0045	WI A
1108	KIU4006J4	RESIDENCE	Drugilling	0.0007730	0.0045	VV LA
		VECTED	Dweining			KDDEC
1242	KNC 400015	RESIEK	Other than	0.0007726	0.0045	KPDES WLA
1243	K1G400915	RESIDENCE	Apartment	0.0007736	0.0045	WLA
		TTATT	Dwelling			VDDEG
1000	WWG 4000 60	HALL	Other than	0.0007726	0.0045	KPDES
1202	KYG400969	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			WDDDG
		MEADE	Other than			KPDES
1266	KYG400970	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		MULLINS	Other than			KPDES
1276	KYG400975	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		HOWELL	Other than			KPDES
4356	KYG401040	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		MAY	Other than			KPDES
4327	KYG401073	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		CASTLE	Other than			KPDES
4350	KYG401113	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		FRASURE	Other than			KPDES
4344	KYG401121	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		CRUM	Other than			KPDES
4336	KYG401125	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		JONES	Other than			KPDES
4349	KYG401133	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		DYE	Other than			KPDES
4333	KYG401140	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		TACKETT	Other than			KPDES
4332	KYG401142	RESIDENCE	Apartment	0.0007736	0.0045	WLA

				Design		
AI		Discharger		Canacity	E coli (billion	
number	KPDFS #	Facility Name	Type	(cfs)	<u>colonies/dav</u>)	
number			Dwolling	(013)	colonics/day)	
			Dwennig			KDDEC
4405		BARILEY	Other than	0.000	0.00.4 -	KPDES
4405	KYG401197	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		SHEPPARD	Other than			KPDES
12253	KYG401218	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		LAWSON	Other than			KPDES
15635	KYG401271	RESIDENCE	Anartment	0.0007736	0 0045	WLA
15055	RIGIOIZ/I	RESIDENCE	Dwelling	0.0007750	0.0042	
		WEDD	Other ther			VDDES
15655	KNC 401206	WEDD	Other than	0.0007726	0.0045	KPDE5
15655	KYG401296	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		EVERIDGE	Other than			KPDES
15807	KYG401352	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		WILLIAMSON	Other than			KPDES
33378	KYG401353	RESIDENCE	Apartment	0.0007736	0.0045	WLA
00070	11101010000	TILLDID LITTOL	Dwelling	0.0007720	010010	
		WILLIAMSON	Other then			KDDES
74022	VVC401406	DESIDENCE		0.0007726	0.0045	
74022	K10401400	RESIDENCE	Apartment	0.0007730	0.0045	WLA
			Dwelling			WDDDG
		STUMBO	Other than			KPDES
74025	KYG401409	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		MULLINS II	Other than			KPDES
74062	KYG401442	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		TACKETT	Other than			KPDES
74181	KYG401470	RESIDENCE	Anartment	0.0007736	0 0045	WLA
71101	RIGIOIII	RESIDENCE	Dwelling	0.0007750	0.0042	
		нат	Other then			VDDES
74105	XXC 401 475	DECIDENCE		0.0007726	0.0045	NI DES
/4185	K1G401475	KESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		COLLINS	Other than			KPDES
1168	KYG401516	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		MOORE	Other than			KPDES
35887	KYG401533	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		WALLACE	Other than			KPDES
43120	KYG401540	RESIDENCE	Anartment	0.0007736	0 0045	WIA
43120	N10 401340	RESIDENCE	Dwelling	0.0007750	0.0010	
			Other ther			KDDEC
42004	VVC 4015 49	DESIDENCE		0.0007726	0.0045	
43224	K10401548	RESIDENCE	Apartment	0.0007736	0.0045	WLA
		a	Dwelling			
		CAUDILL	Other than			KPDES
44695	KYG401580	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		DINGUS	Other than			KPDES
45073	KYG401582	RESIDENCE	Apartment	0.0007736	0.0045	WLA

				Design		
AI		Discharger		Capacity	E. coli (billion	
number	KPDES #	Facility Name	Type	(cfs)	colonies/day)	
			Dwelling		y /	
		GEARHEART	Other than			KPDES
45396	KYG401587	RESIDENCE	Apartment	0.0007736	0.0045	WLA
10070	III G IOI207	TELSID LITEL	Dwelling	0.0007720	0.0012	
		НАЦ	Other than			KDDES
45070	KVC401500	DESIDENCE	A partmont	0.0007736	0.0045	
43070	K10401390	RESIDENCE	Dwalling	0.0007730	0.0045	VV LA
		WILLIAMSON	Dweining Other ther			VDDEC
46144	VVC 401(01	WILLIAWISON	A norther than	0.0007726	0.0045	KPDES WLA
40144	K10401001	RESIDENCE	Apartment	0.0007730	0.0045	WLA
			Dwelling			VDDDG
4 6 1 4 7	WWG 401 (02	CHILDERS	Other than	0.0007726	0.004	KPDES
46147	KYG401603	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		LAFERTY	Other than			KPDES
47022	KYG401638	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		DUFF	Other than			KPDES
48864	KYG401645	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		COCHRAN	Other than			KPDES
48897	KYG401646	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		YORK	Other than			KPDES
49354	KYG401654	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		BLANKENSHIP	Other than			KPDES
50021	KYG401692	RESIDENCE	Apartment	0.0007736	0.0045	WLA
00021	1110.010/2	TELDID LITED	Dwelling	0.0007720		
		SCOTT	Other than			KPDES
50627	KYG401721	RESIDENCE	Apartment	0.0007736	0 0045	WLA
50027	K10+01721	RESIDENCE	Dwelling	0.0007750	0.0045	
			Other then			KDDES
50050	KVC401720	DESIDENCE		0.0007736	0.0045	
50950	K10401730	NICHOLAS	Dwelling	0.0007730	0.0045	WLA
		NICHOLAS	Dweining			LADDEC
54970	KVC 401772	ISON	A norther than	0.0007726	0.0045	KPDES WLA
54879	K10401772	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			VDDDC
71426	WWG 401000	NEWMAN	Other than	0.0007726	0.0045	KPDES
/1436	KYG401809	RESIDENCE	Apartment	0.0007736	0.0045	WLA
		001 77 7	Dwelling			
		COMBS	Other than	0.000	C	KPDES
74243	KYG401821	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		LITTLE	Other than			KPDES
75141	KYG401851	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		HOWARD	Other than			KPDES
75556	KYG401857	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		ROWE	Other than			KPDES
75746	KYG401868	RESIDENCE	Apartment	0.0007736	0.0045	WLA

				Design		
AI		Discharger		Capacity	<u>E</u> . <u>coli</u> (billion	
number	KPDES #	Facility Name	Туре	(cfs)	colonies/day)	
			Dwelling			
		BILITER	Other than			KPDES
76078	KYG401876	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		HARVEL	Other than			KPDES
79525	KYG401931	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		MARTIN	Other than			KPDES
81193	KYG401970	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		SCARBERRY	Other than			KPDES
81570	KYG401981	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		HOPKINS	Other than			KPDES
82471	KYG402002	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		COOK	Other than			KPDES
84292	KYG402025	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		PRATER	Other than			KPDES
97291	KYG402063	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		LITTLE	Other than			KPDES
103052	KYG402117	RESIDENCE	Apartment	0.0007736	0.0045	WLA
						Total
						KPDES
					7.0109	WLA
			Addition to			
			MAF (sum of			
			cfs)	1.1939966	1624.8831	remainder
						Future
						Growth
					16.2488	WLA
					23.2597	Total WLA
					1608.6343	LA

Beaver Creek Site PRI095



Figure E.2 Beaver Creek Site PRI095

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 2 is under site 3, site 30a is to the immediate left of site 50, site 27 is under site 35, site 20 is under site 31, site 32 is under site 33, site 37 is under site 45, and site 40 is under site 47.

Beaver Creek at site PRI095 (RM 1.1) is a fifth order stream located in the Mainstem Beaver Creek Subwatershed in Floyd County (Figure E.2). Information about Beaver Creek site PRI095, including sample site location, waterbody identification number (WBID), and MAF is shown in Table E.6. It has a catchment of 153,028 acres (239 square miles) with a 78% forested and 6.4% developed land cover (Table E.7). Portions of this watershed are sewered; especially in larger cities (see Figures 5.13 through 5.19). There are five stream water withdrawals in this subwatershed (Table E.8). Sampling data from site PRI095 is presented in Table E.9, and the TMDL allocations in Table E.10.

	Stream				Square				
Stream	Segment	WBID #	County	Acres	Miles	Stream Order			
	Beaver								
	Creek								
Beaver	0.0 to			153027.5					
Creek	7.1	486610_01	Floyd	9	239.11	5th order			
			Sample	Sample			+ to	- from	Adjuste
	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	d MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
PRI095	95	1.1	37.6028	-82.7275	317	1.1	1.201	2.1924	316.009

Table E.6 Beaver Creek Site PRI095 Information

Table E.7 Beaver Creek Site PRI095 Subwatershed Land Cover

L and Cover	Watershed	Watershed Square Miles	% of Total Area	Future Growth WLA %
	00.17	0.14		VI L1 1 70
Open Water	89.17	0.14	0.06	
Developed	9848.83	15.39	6.44	1.0
Barren Land	1722.86	2.69	1.13	
Forest/Shrubland	119419.22	186.59	78.04	
Grassland/Herbaceous	14689.87	22.95	9.60	
Pasture/Hay	4586.87	7.17	3.00	
Cultivated Crops	304.41	0.48	0.20	
Wetlands	22.01	0.03	0.01	
Totals	153027.60	239.11	100.00	

Table E.8 Beaver Creek Site PRI095 Water Withdrawals

AI	Source	Withdrawal Facility	Withdrawal,	Facility	Facility
number	Description	Name	cfs	Latitude	Longitude
	RM 40.6 Right				
	Fork Beaver	ICG Knott Co LLC			
2528	Creek	(860-8012)	0.4100156	37.32166	-82.80366
	RM 31.0 Right				
	Fork Beaver	Deane Mining LLC			
2525	Creek	(860-5318)	0.01547229	37.41038	-82.78096
	RM 15.36 of Left				
	Fork Beaver	Elk Horn Coal Co			
1299	Creek	LLC	0.09283372	37.40129	-82.74175
	RM 4.2 of Caney				
3502	Creek	ICG Knott Co LLC	1.005699	37.3884	-82.82856
	RM 2.4 of Left				
	Fork Beaver	Black Diamond			
78571	Creek	Mining	0.6684028	37.53192	-82.74364
		subtraction from			
		MAF (sum of cfs)	2.19242341		
Table E.9 Beaver Creek Site PRI095 Data

	<u>E</u> . <u>coli</u>		Instantaneous Load	Unit Area Load
	(colonies/100	Flow	(billion <u>E</u> . <u>coli</u>	(million <u>E</u> . <u>coli</u>
Collection Date	mls)	(cfs)	colonies/day)	colonies/day/acre)
5/17/07	2700	N/A	N/A	N/A
6/14/07	656	N/A	N/A	N/A
7/19/07	426	N/A	N/A	N/A
8/14/07	500	N/A	N/A	N/A
9/20/07	268	N/A	N/A	N/A
10/18/07	261	N/A	N/A	N/A
5/21/08	450	N/A	N/A	N/A
6/17/08	19000	N/A	N/A	N/A
7/16/08	220	N/A	N/A	N/A
10/15/08	240	N/A	N/A	N/A
Greatest Concentration	19000			

Table E.10 TMDLs for Beaver Creek Site PRI095

TMDL					<u>E</u> . <u>coli</u> (billion	
Table					colonies/day)	
						Existing
					146896.3813	Load
						Total
					1855.5332	TMDL
					185.5533	MOS
						TMDL
					1669.9799	Target
AI		Discharger Facility		Design		
number	KPDES #	Name	Туре	Capacity (cfs)	98.86	% reduction
			Sewerage			KPDES
1262	KY0026921	MARTIN STP	System	0.1856675	1.0902	WLA
		WHEELWRIGHT	Sewerage			KPDES
40534	KY0028789	STP	System	0.3481265	2.0441	WLA
		KNOTT CO				
		WATER &	Sewerage			KPDES
2527	KY0042854	SEWER DIST	System	0.1547229	0.9085	WLA
		WARCO				
		HOUSING	Apartment			KPDES
1352	KY0072974	PROJECT	Building	0.0386807	0.2271	WLA
		BEAVER CREEK				KPDES
33945	KY0077542	ELEM SCHOOL	School	0.0108306	0.0636	WLA
		MCDOWELL				KPDES
35252	KY0079421	ELEM SCHOOL	School	0.0232084	0.1363	WLA
		ALLEN				
		CENTRAL HIGH				KPDES
35254	KY0079430	SCHOOL	School	0.0170195	0.0999	WLA
		GOLDEN YEARS	Intermediate			KPDES
2517	KY0083089	REST HOME	Care Facility	0.0154723	0.0908	WLA
		MCDOWELL				
		APPALACHIAN				KPDES
1134	KY0085791	REG HOSP	Hospital	0.0309446	0.1817	WLA

Final Beaver Creek Watershed <u>E</u>. <u>coli</u> TMDL

AI		Discharger Facility		Design	<u>E</u> . <u>coli</u> (billion	
number	KPDES #	Name	Туре	Capacity (cfs)	colonies/day)	
		JONES FORK				KPDES
35359	KY0087076	ELEM SCHOOL	School	0.0092834	0.0545	WLA
		OSBORNE ELEM				KPDES
35251	KY0089435	SCHOOL	School	0.0105212	0.0618	WLA
		JAMES A DUFF				KPDES
35258	KY0093017	ELEM SCHOOL	School	0.0123778	0.0727	WLA
		SOUTH FLOYD				KPDES
35260	KY0093912	HIGH SCHOOL	School	0.023208438	0.1363	WLA
			Bituminous			
		CONSOL OF KY	Coal & Lig,			KPDES
2514	KY0094510	INC JONES FORK	Surface	0.0046417	0.0273	WLA
		LEFT BEAVER				
		CREEK	Apartment			KPDES
1255	KY0096342	TOWNHOUSES	Building	0.0278501	0.1635	WLA
		MCDOWELL				
		DOLLAR				
		GENERAL	Department			KPDES
1263	KY0103136	STORE	Store	0.0007736	0.0045	WLA
			Mobile			KPDES
1305	KY0103233	S & V MHP	Home Site	0.0153176	0.0899	WLA
			Sewerage			KPDES
35761	KY0105228	WAYLAND STP	System	0.1547229	0.9085	WLA
		MAY VALLEY				KPDES
82092	KY0106755	ELEM SCHOOL	School	0.0092834	0.0545	WLA
			Sewerage			KPDES
35260	KY0107051	EASTERN STP	System	0.038680729	0.2271	WLA
			Dwelling			
		ROWE	Other than		.	KPDES
1304	KYG400339	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			WEDDIG
12.00	XXXC 400 470	MITCHELL	Other than	0.000772	0.0045	KPDES
1269	KYG400478	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			VDDEC
1142	KNC 400 470	BLACKBURN	Other than	0.0007726	0.0045	KPDES WLA
1145	K10400479	KESIDENCE	Dualling	0.0007730	0.0045	WLA
		DEDOSSETT	Other then			VDDES
1180	KVG400520	PESIDENCE		0.0007736	0.0045	WI A
1100	K10400320	RESIDENCE	Dwelling	0.0007750	0.0043	WLA
		HICKS	Other than			KPDFS
1218	KYG400567	RESIDENCE	Apartment	0.0007736	0.0045	WLA
1210	110 100301	RESIDENCE	Dwelling	0.0007750	0.0010	
		WRIGHT	Other than			KPDES
1367	KYG400579	RESIDENCE	Apartment	0.0007736	0.0045	WLA
		212222	Dwelling			
		GOBLE	Other than			KPDES
1196	KYG400590	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		LAWSON	Other than			KPDES
1248	KYG400593	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		STUMBO	Other than			KPDES
1327	KYG400601	RESIDENCE	Apartment	0.0007736	0.0045	WLA

AI		Discharger Facility		Design	E coli (billion	
number	KPDES #	Name	Type	Capacity (cfs)	colonies/day)	
			Dwelling)	
		GREEN	Other than			KPDES
1199	KYG400603	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		MCKINNEY	Other than			KPDES
1265	KYG400612	RESIDENCE	Apartment	0.0007736	0.0045	WLA
1200	1110100012	TILLSID LI (CL	Dwelling	0.0007720		
			Other than			KPDES
1182	KYG400614	DYE RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		ALLEN	Other than			KPDES
1133	KYG400642	RESIDENCE	Apartment	0.0007736	0.0045	WLA
1100	1110100012	TILLSID LI (CL	Dwelling	0.0007720		
		CURRENT	Other than			KPDES
4250	KYG400659	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		MITCHELL	Other than			KPDES
1270	KYG400666	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		SHREWBERRY	Other than			KPDES
1315	KYG400677	RESIDENCE	Apartment	0.0007736	0.0045	WLA
1515	1110100077	REDIDERCE	Dwelling	0.0007750	010010	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
		CASTLE	Other than			KPDES
1162	KYG400678	RESIDENCE	Apartment	0.0007736	0.0045	WLA
1102		10.512 21 (02	Dwelling	010007720	010010	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
		CASE	Other than			KPDES
1161	KYG400692	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		MULLINS	Other than			KPDES
1274	KYG400714	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		YOUMANS	Other than			KPDES
1369	KYG400724	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		HOOVER	Other than			KPDES
1222	KYG400730	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		BINGHAM	Other than			KPDES
1237	KYG400753	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		TURNER	Other than			KPDES
1343	KYG400778	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		CARRAWAY	Other than			KPDES
1158	KYG400787	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		COOK	Other than			KPDES
1173	KYG400790	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		JACOBS	Other than			KPDES
1232	KYG400806	RESIDENCE	Apartment	0.0007736	0.0045	WLA

AI	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E</u> . <u>coli</u> (billion colonies/day)	
numoer		Tunio	Dwelling		coronics, aug y	
		PERKINS	Other than			KPDES
1293	KYG400836	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		SHEPHERD	Other than			KPDES
1314	KYG400844	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
11.00		COLLINS	Other than	0.000550.6		KPDES
1168	KYG400854	RESIDENCE	Apartment	0.0007736	0.0045	WLA
		VECTED	Dwelling Others there			VDDEC
1242	KVC400015	KESTEK	Other than	0.0007726	0.0045	KPDES WLA
1245	K10400913	RESIDENCE	Dwelling	0.0007730	0.0045	VV LA
		STURGILI	Other than			KPDES
1328	KYG400936	RESIDENCE	Apartment	0.0007736	0.0045	WLA
1520	110100000	TESTE LIVE	Dwelling	0.0007750	00010	
		HALL	Other than			KPDES
1202	KYG400969	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		MEADE	Other than			KPDES
1266	KYG400970	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		MULLINS	Other than			KPDES
1276	KYG400975	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
1050	WWG 401040	HOWELL	Other than	0.0007726	0.0045	KPDES
4356	KYG401040	RESIDENCE	Apartment	0.0007736	0.0045	WLA
		MAX	Dwelling Other ther			VDDES
1327	KYG401073	RESIDENCE		0.0007736	0.0045	WI A
7321	K10401075	RESIDENCE	Dwelling	0.0007730	0.0045	WLA
		CASTLE	Other than			KPDES
4350	KYG401113	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		FRASURE	Other than			KPDES
4344	KYG401121	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		CRUM	Other than			KPDES
4336	KYG401125	RESIDENCE	Apartment	0.0007736	0.0045	WLA
		DOGE	Dwelling			
42.40	WW0401104	ROSE	Other than	0.0007706	0.0045	KPDES
4342	KYG401126	KESIDENCE	Apartment	0.0007736	0.0045	WLA
		IONES	Other than			KDDES
4349	KYG401133	RESIDENCE	Anartment	0.0007736	0.0045	WLA
1319	110101155	RESIDENCE	Dwelling	0.0007750	0.0010	VY LOL X
			Other than			KPDES
4333	KYG401140	DYE RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		TACKETT	Other than			KPDES
4332	KYG401142	RESIDENCE	Apartment	0.0007736	0.0045	WLA

AT		Discharger Facility		Design	E coli (billion	
Al	KPDFS #	Name	Type	Capacity (cfs)	<u>colonies/day</u>)	
number	KI DES #	Ivanic	Dwelling	Capacity (CIS)	colonics/day)	
		COOLEY	Other than			KPDFS
4331	KYG401143	RESIDENCE	Apartment	0.0007736	0 0045	WI A
+331	K10+011+3	RESIDENCE	Dwelling	0.0007730	0.0045	WLA
		ΒΔΡΤΙ ΕΥ	Other than			KDDES
4405	KYG401197	RESIDENCE	Apartment	0.0007736	0 0045	WLA
1105	RTO IOTI /	RESIDENCE	Dwelling	0.0007750	0.0012	
		SHEPPARD	Other than			KPDES
12253	KYG401218	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		LAWSON	Other than			KPDES
15635	KYG401271	RESIDENCE	Apartment	0.0007736	0.0045	WLA
-			Dwelling			
		WEBB	Other than			KPDES
15655	KYG401296	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		EVERIDGE	Other than			KPDES
15807	KYG401352	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		WILLIAMSON	Other than			KPDES
33378	KYG401353	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		WILLIAMSON	Other than			KPDES
74022	KYG401406	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		STUMBO	Other than			KPDES
74025	KYG401409	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			WDD DG
74062	WWG 401 442	MULLINS II	Other than	0.0007726	0.0045	KPDES
/4062	KYG401442	RESIDENCE	Apartment	0.0007736	0.0045	WLA
		TACKETT	Dwelling			VDDEC
74191	KVC 401 470	IACKEII	A portmont	0.0007726	0.0045	KPDES WLA
/4181	K10401470	RESIDENCE	Dwelling	0.0007750	0.0045	VV LA
		НАТТ	Other than			KDDES
7/185	KYG401475	RESIDENCE		0.0007736	0 0045	WI A
74105	110401473	REDIDENCE	Dwelling	0.0007750	0.0040	
		COLLINS	Other than			KPDES
1168	KYG401516	RESIDENCE	Apartment	0.0007736	0.0045	WLA
1100			Dwelling		510010	, , , , , , , , , , , , , , , , , , , ,
		KEATHLEY	Other than			KPDES
35892	KYG401529	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		MOORE	Other than			KPDES
35887	KYG401533	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		WALLACE	Other than			KPDES
43120	KYG401540	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		PRATER	Other than			KPDES
43224	KYG401548	RESIDENCE	Apartment	0.0007736	0.0045	WLA

	AI		Discharger Facility		Design	E coli (billion	
	number	KPDES #	Name	Type	Capacity (cfs)	colonies/dav)	
İ				Dwelling		· · · · · · · · · · · · · · · · · · ·	
			CAUDILL	Other than			KPDES
	44695	KYG401580	RESIDENCE	Apartment	0.0007736	0.0045	WLA
İ				Dwelling			
			DINGUS	Other than			KPDES
	45073	KYG401582	RESIDENCE	Apartment	0.0007736	0.0045	WLA
Ì				Dwelling			
			GEARHEART	Other than			KPDES
	45396	KYG401587	RESIDENCE	Apartment	0.0007736	0.0045	WLA
				Dwelling			
			HALL	Other than			KPDES
	45070	KYG401590	RESIDENCE	Apartment	0.0007736	0.0045	WLA
				Dwelling			
			WILLIAMSON	Other than			KPDES
	46144	KYG401601	RESIDENCE	Apartment	0.0007736	0.0045	WLA
				Dwelling			
			CHILDERS	Other than			KPDES
ļ	46147	KYG401603	RESIDENCE	Apartment	0.0007736	0.0045	WLA
				Dwelling			
	47000	XXXC 401 (20	LAFERTY	Other than	0.0007726	0.004	KPDES
	47022	KYG401638	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			DUFF	Dwelling			VDDEG
	100 6 1	WWG 401 CAF	DUFF	Other than	0.0007726	0.0045	KPDES
	48864	KYG401645	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			COCUDAN	Dwelling			VDDEC
	10007	VVC401646	DESIDENCE		0.0007726	0.0045	KPDES WLA
ł	40077	K10401040	RESIDENCE	Dwolling	0.0007730	0.0045	VV LA
			VORK	Other than			KPDFS
	49354	KYG401654	RESIDENCE	Apartment	0.0007736	0 0045	WLA
1	77557	K10 +0100+	RESIDENCE	Dwelling	0.0007750	0.0045	WLA
			BLANKENSHIP	Other than			KPDES
	50021	KYG401692	RESIDENCE	Apartment	0.0007736	0.0045	WLA
				Dwelling			
			SCOTT	Other than			KPDES
	50627	KYG401721	RESIDENCE	Apartment	0.0007736	0.0045	WLA
				Dwelling			
			KIDD	Other than			KPDES
	50950	KYG401730	RESIDENCE	Apartment	0.0007736	0.0045	WLA
l				Dwelling			
			MCKINNEY JR	Other than			KPDES
ļ	53921	KYG401764	RESIDENCE	Apartment	0.0007736	0.0045	WLA
				Dwelling			
ļ			ISON	Other than			KPDES
	54879	KYG401772	RESIDENCE	Apartment	0.0007736	0.0045	WLA
				Dwelling			
	71404	WWG 401000	NEWMAN	Other than	0.0007724	0.004	KPDES
	71436	KYG401809	RESIDENCE	Apartment	0.0007736	0.0045	WLA
				Dwelling			VDDDG
	74040	WWG 401001	COMBS	Other than	0.0007724	0.0045	KPDES
	14243	KYG401821	RESIDENCE	Apartment	0.0007736	0.0045	WLA

AI	KDDEC #	Discharger Facility	Towns	Design	<u>E. coli</u> (billion	
number	KPDES #	Name	Type Drugtling	Capacity (cfs)	colonies/day)	
			Dweining Other ther			VDDES
75141	KVG401851	DESIDENCE		0.0007736	0.0045	WI A
73141	K10401051	RESIDENCE	Dwolling	0.0007730	0.0045	VV LA
			Other then			KDDES
75556	KVG401857	DESIDENCE		0.0007736	0.0045	WI A
13330	K10401057	RESIDENCE	Dwelling	0.0007730	0.0045	WLA
		ROWE	Other than			KPDFS
75746	KYG401868	RESIDENCE	Apartment	0.0007736	0.0045	WLA
75710	RIGIOIO	RESIDENCE	Dwelling	0.0007750	0.0042	
		BILITER	Other than			KPDES
76078	KYG401876	RESIDENCE	Apartment	0.0007736	0.0045	WLA
10010		TILLSID LI (CL	Dwelling	010007720		
		ALLEN	Other than			KPDES
76185	KYG401883	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		HARVEL	Other than			KPDES
79525	KYG401931	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		BENTLEY	Other than			KPDES
79842	KYG401936	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		MARTIN	Other than			KPDES
81193	KYG401970	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		SCARBERRY	Other than			KPDES
81570	KYG401981	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		HOPKINS	Other than			KPDES
82471	KYG402002	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		COOK	Other than			KPDES
84292	KYG402025	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
07001		PRATER	Other than	0.0005524	0.004	KPDES
97291	KYG402063	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			KDDDG
102052	KNC 402117	LITTLE	Other than	0.0007726	0.0045	KPDES WLA
103052	K1G402117	RESIDENCE	Apartment	0.0007736	0.0045	WLA Tratal
						I OTAL
					7 0519	WI A
			Addition to		7.0516	VV LA
			MAE (sum			
			of cfs)	1 2009592	1662 9281	remainder
			01 015)	1.2007572	1002.7201	Future
						Growth
					16.6293	WLA
					20:02/0	Tet-LIFT
					23.0811	Total WLA
					1646.2989	LA

Beaver Creek Site 4



Figure E.3 Beaver Creek Site 4

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 2 is under site 3, site 30a is to the immediate left of site 50, site 27 is under site 35, site 20 is under site 31, site 32 is under site 33, site 37 is under site 45, and site 40 is under site 47.

Beaver Creek at site 4 (RM 0.2) is a fifth order stream located in the Mainstem Beaver Creek Subwatershed in Floyd County (Figure E.3). Information about Beaver Creek site 4, including sample site location, waterbody identification number (WBID), and MAF is shown in Table E.11. It has a catchment of 153,670 acres (240 square miles) with an 80% forested and 6.5 % developed land cover (Table E.12). Portions of this watershed are sewered; especially in larger cities (see Figures 5.13 through 5.19). There are five stream water withdrawals in this subwatershed (Table E.13). Sampling data from site PRI095 is presented in Table E.14, and the TMDL allocations in Table E.15.

Stream	Stream	WRID #	County	Acres	Square Miles	Stream Order			
Sucam	Segment		County	Acies	whites	Sucan Oluci			
	Beaver								
	Creek								
Beaver	0.0 to								
Creek	7.1	486610_01	Floyd	153669.8	240.11	5th order			
			Sample	Sample			+ to	- from	Adjuste
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	d MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
4	4	0.2	37.6118	-82.7307	317.8	0	1.2025	2.1924	316.810

Table E.11 Beaver Creek Site 4 Information

Table E.12 Beaver Creek Site 4 Subwatershed Land Cover

			% of	
	Watershed	Watershed	Total	Future Growth
Land Cover	Acres	Square Miles	Area	WLA %
Open Water	89.41	0.14	0.06	
Developed	9935.56	15.52	6.47	1.0
Barren Land	1724.06	2.69	1.12	
Forest/Shrubland	122227.36	190.98	79.54	
Grassland/ Herbaceous	14736.76	23.03	9.59	
Pasture/Hay	4628.17	7.23	3.01	
Cultivated Crops	305.80	0.48	0.20	
Wetlands	22.68	0.04	0.01	
Totals	153669.77	240.11	100.00	

Table E.13 Beaver Creek Site 4 Water Withdrawals

AI		Withdrawal Facility	Withdrawal	Facility	Facility
number	Source Description	Name	(cfs)	Latitude	Longitude
	RM 40.6 Right Fork	ICG Knott Co LLC			
2528	Beaver Creek	(860-8012)	0.4100156	37.32166	-82.80366
	RM 31.0 Right Fork	Deane Mining LLC			
2525	Beaver Creek	(860-5318)	0.01547229	37.41038	-82.78096
	RM 15.36 of Left	Elk Horn Coal Co			
1299	Fork Beaver Creek	LLC	0.09283372	37.40129	-82.74175
	RM 4.2 of Caney				
3502	Creek	ICG Knott Co LLC	1.005699	37.3884	-82.82856
	RM 2.4 of Left Fork	Black Diamond			
78571	Beaver Creek	Mining	0.6684028	37.53192	-82.74364
		subtraction from			
		MAF	2.19242341		

Table E.14 Beaver Creek Site 4 Data

	<u>E</u> . <u>coli</u>	Flow	Instantaneous Load (billion <u>E</u> . <u>coli</u>	Unit Area Load (million <u>E</u> . <u>coli</u>
Collection Date	(colonies/100 mls)	(cfs)	colonies/day)	colonies/day/acre)
05/16/08	300	N/A	N/A	N/A
05/30/08	290	33.798	239.80	1.56
06/13/08	630	34.654	534.14	3.48
06/27/08	180	22.534	99.24	0.65
07/11/08	1500	64.465	2365.78	15.40
07/31/08	1900	N/A	N/A	N/A
08/08/08	270	23.691	156.50	1.02
08/22/08	250	6.8769	42.06	0.27
09/12/08	90	18.639	41.04	0.27
09/20/08	380	11.850	110.17	0.72
9/20/08 (QA Sample)	190	N/A	N/A	N/A
10/17/08	210	8.251	42.39	0.28
10/24/08	70	11.35	19.44	0.13
10/24/08 (QA Sample)	70	N/A	N/A	N/A
Greatest Concentration	1900			

Table E.15 TMDLs for Beaver Creek Site 4

					<u>E</u> . <u>coli</u>	
TMDL					(billion	
Table					colonies/day)	
						Existing
					14726.8980	Load
						Total
					1860.2397	TMDL
					186.0240	MOS
						TMDL
					1674.2158	Target
AI		Discharger Facility		Design		
number	KPDES #	Name	Туре	Capacity (cfs)	88.63	% reduction
			Sewerage			KPDES
1262	KY0026921	MARTIN STP	System	0.18566748	1.0902	WLA
		WHEELWRIGHT	Sewerage			KPDES
40534	KY0028789	STP	System	0.348126525	2.0441	WLA
		KNOTT CO				
		WATER &	Sewerage			KPDES
2527	KY0042854	SEWER DIST	System	0.1547229	0.9085	WLA
		WARCO	· · · ·			
		HOUSING	Apartment			KPDES
1352	KY0072974	PROJECT	Building	0.038680725	0.2271	WLA
		BEAVER CREEK				KPDES
33945	KY0077542	ELEM SCHOOL	School	0.010830603	0.0636	WLA
		MCDOWELL				KPDES
35252	KY0079421	ELEM SCHOOL	School	0.023208435	0.1363	WLA

					E coli	
AI		Discharger Facility		Design	(billion	
number	KPDES #	Name	Type	Capacity (cfs)	colonies/day)	
		ALLEN			(aug)	
		CENTRAL HIGH				KPDES
35254	KY0079430	SCHOOL	School	0.017019519	0.0999	WLA
	1110017.000	GOLDEN YEARS	Intermediate	0.01/01/01/	0.0777	KPDES
2517	KY0083089	REST HOME	Care Facility	0.01547229	0 0908	WLA
2317	R1 0005009	MCDOWFLI	Cure Fuelinty	0.015 17225	0.0700	
		APPAI ACHIAN				KPDES
1134	KY0085791	REG HOSP	Hospital	0.03094458	0 1817	WI A
1134	R10003771	IONES FORK	Hospitai	0.05074450	0.1017	KPDFS
35350	KV0087076	FI FM SCHOOI	School	0.000283374	0.0545	WI A
33337	K 10007070	OSBODNE ELEM	School	0.007203374	0.0343	KDDES
35251	KV0080435	SCHOOL	School	0.010521157	0.0618	WI A
55251	K10007433		School	0.010321137	0.0010	VILA VDDES
25259	KV0002017	JAMES A DUFF	Sabaal	0.010277820	0.0727	MI A
33238	K10093017	SOUTU ELOVD	School	0.012377632	0.0727	
25260	KV0002012		Sahaal	0.000000420	0 1262	KPDES WLA
55200	K10093912	nion SChool	Dituminana	0.025208458	0.1303	VV LA
		CONGOL OF VV	Bituminous			VDDEC
2514	VV0004510	CONSOL OF KY	Coal & Lig,	0.004641696	0.0272	KPDES WLA
2514	K10094510	INC JUNES FURK	Surface	0.004041080	0.0275	WLA
		LEFI BEAVER	• • •			KDDEG
1055	1/1/000 62 42	CREEK	Apartment	0.007050100	0.1/05	KPDES
1255	KY0096342	TOWNHOUSES	Building	0.027850122	0.1635	WLA
		MCDOWELL				
		DOLLAR				
		GENERAL	Department		0 00 / -	KPDES
1263	KY0103136	STORE	Store	0.000773615	0.0045	WLA
			Mobile			KPDES
1305	KY0103233	S & V MHP	Home Site	0.015317567	0.0899	WLA
			Sewerage			KPDES
35761	KY0105228	WAYLAND STP	System	0.1547229	0.9085	WLA
		MAY VALLEY				KPDES
82092	KY0106755	ELEM SCHOOL	School	0.009283375	0.0545	WLA
			Sewerage			KPDES
35260	KY0107051	EASTERN STP	System	0.038680729	0.2271	WLA
			Dwelling			
		ROWE	Other than			KPDES
1304	KYG400339	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		MITCHELL	Other than			KPDES
1269	KYG400478	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		BLACKBURN	Other than			KPDES
1143	KYG400479	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		DEROSSETT	Other than			KPDES
1180	KYG400520	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		HICKS	Other than			KPDES
1218	KYG400567	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		WRIGHT	Other than			KPDES
1367	KYG400579	RESIDENCE	Apartment	0.000773615	0.0045	WLA

ΔI		Discharger Facility		Design	<u>E</u> . <u>coli</u> (billion	
number	KPDES #	Name	Type	Capacity (cfs)	colonies/day)	
1100	WWG 400500	GOBLE	Dwelling Other than	0.000772(15	0.0047	KPDES
1196	KYG400590	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		LAWSON	Other then			VDDES
1248	KYG400593	RESIDENCE	Apartment	0.000773615	0.0045	WLA
1210			Dwelling	0.000772012		
		STUMBO	Other than			KPDES
1327	KYG400601	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		GREEN	Other than			KPDES
1199	KYG400603	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
10.55		MCKINNEY	Other than	0.000552.415	0.0045	KPDES
1265	KYG400612	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			VDDEC
1100	KVC400614	DVE DECIDENCE	A portmont	0.000772615	0.0045	KPDES WLA
1102	K10400014	DIERESIDENCE	Dwelling	0.000773013	0.0045	VV LA
		ALLEN	Other than			KPDES
1133	KYG400642	RESIDENCE	Apartment	0.000773615	0.0045	WLA
1100		THESE DITION	Dwelling			
		CURRENT	Other than			KPDES
4250	KYG400659	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		MITCHELL	Other than			KPDES
1270	KYG400666	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
1015	WWG 400 (77	SHREWBERRY	Other than	0.000772615	0.004	KPDES
1315	KYG400677	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		CASTLE	Dwelling Other ther			VDDES
1162	KVG400678	RESIDENCE		0.000773615	0.0045	WI A
1102	K10400078	RESIDENCE	Dwelling	0.000773013	0.0043	WLA
		CASE	Other than			KPDES
1161	KYG400692	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		MULLINS	Other than			KPDES
1274	KYG400714	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
10.00	WWG 40050	YOUMANS	Other than	0.000770.015	0.0045	KPDES
1369	KYG400724	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		HOOVED	Dwelling Other ther			KDDES
1222	KYG400730	RESIDENCE	Apartment	0.000773615	0 0045	WI A
1222	11 0 + 00 / 30	RESIDENCE	Dwelling	0.000775015	0.0040	TLA
		BINGHAM	Other than			KPDES
1237	KYG400753	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		TURNER	Other than			KPDES
1343	KYG400778	RESIDENCE	Apartment	0.000773615	0.0045	WLA

AI		Discharger Facility		Design	<u>E</u> . <u>coli</u> (billion	
number	KPDES #	Name	Туре	Capacity (cfs)	colonies/day)	
			Dwelling			
		CARRAWAY	Other than			KPDES
1158	KYG400787	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		COOK	Dwelling			
1172	WWC 400700	COOK	Other than	0.000772615	0.0045	KPDES
11/5	KIG400790	KESIDENCE	Duralling	0.000773015	0.0045	WLA
		LACOBS	Other than			KDDES
1232	KYG400806	RESIDENCE	Apartment	0.000773615	0 0045	WLA
1252		REDIDER(CE	Dwelling	0.000772012	010012	
		PERKINS	Other than			KPDES
1293	KYG400836	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		SHEPHERD	Other than			KPDES
1314	KYG400844	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		COLLINS	Other than			KPDES
1168	KYG400854	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			WDDDG
1042	WWC 400015	KESTER	Other than	0.000772615	0.0045	KPDES
1243	KYG400915	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		STUDCUL	Dwelling Other ther			VDDES
1228	KVG400036	DESIDENCE		0.000773615	0.0045	WI A
1520	K10400930	RESIDENCE	Dwelling	0.000773013	0.0045	VV LA
		HALL	Other than			KPDES
1202	KYG400969	RESIDENCE	Apartment	0.000773615	0.0045	WLA
1202			Dwelling	0.000772012	0.0012	
		MEADE	Other than			KPDES
1266	KYG400970	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		MULLINS	Other than			KPDES
1276	KYG400975	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		HOWELL	Other than			KPDES
4356	KYG401040	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		N / A X7	Dwelling			VDDEC
1227	KVG401072	MAY	A partmant	0.000772615	0.0045	KPDES WLA
4327	K10401073	RESIDENCE	Dwolling	0.000773015	0.0045	WLA
		CASTLE	Other than			KPDFS
4350	KYG401113	RESIDENCE	Apartment	0.000773615	0.0045	WLA
1000			Dwelling	0.000770010		
		FRASURE	Other than			KPDES
4344	KYG401121	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		CRUM	Other than			KPDES
4336	KYG401125	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		ROSE	Other than			KPDES
4342	KYG401126	RESIDENCE	Apartment	0.000773615	0.0045	WLA

	ΔI		Discharger Facility		Design	<u>E</u> . <u>coli</u> (billion	
	number	KPDES #	Name	Type	Capacity (cfs)	colonies/dav)	
F				Dwelling		,	
			JONES	Other than			KPDES
	4349	KYG401133	RESIDENCE	Apartment	0.000773615	0.0045	WLA
ſ				Dwelling			
				Other than			KPDES
	4333	KYG401140	DYE RESIDENCE	Apartment	0.000773615	0.0045	WLA
				Dwelling			
			TACKETT	Other than			KPDES
	4332	KYG401142	RESIDENCE	Apartment	0.000773615	0.0045	WLA
				Dwelling			
			COOLEY	Other than			KPDES
	4331	KYG401143	RESIDENCE	Apartment	0.000773615	0.0045	WLA
				Dwelling			
			BARTLEY	Other than			KPDES
L	4405	KYG401197	RESIDENCE	Apartment	0.000773615	0.0045	WLA
				Dwelling			
			SHEPPARD	Other than			KPDES
	12253	KYG401218	RESIDENCE	Apartment	0.000773615	0.0045	WLA
				Dwelling			
			LAWSON	Other than			KPDES
	15635	KYG401271	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			WEDD.	Dwelling			WEDERG
	15655	WWG 401207	WEBB	Other than	0.000772.615	0.0045	KPDES
-	15655	KYG401296	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			EVEDIDOE	Dwelling			WDDDG
	15007	XXC 401252	EVERIDGE	Other than	0.000772615	0.0045	KPDES
ł	15807	K1G401552	KESIDENCE	Apartment Druglling	0.000773015	0.0045	WLA
			WILLIAMSON	Other then			VDDES
	33378	KYG401353	RESIDENCE		0.000773615	0.0045	WI A
ł	33370	K10401555	RESIDENCE	Dwelling	0.000775015	0.0045	VV LA
			WILLIAMSON	Other than			KPDFS
	74022	KYG401406	RESIDENCE	Apartment	0.000773615	0.0045	WLA
F	71022	RIGIOIIOO	RESIDENCE	Dwelling	0.000775015	0.0012	
			STUMBO	Other than			KPDES
	74025	KYG401409	RESIDENCE	Apartment	0.000773615	0.0045	WLA
ľ				Dwelling			
			MULLINS II	Other than			KPDES
	74062	KYG401442	RESIDENCE	Apartment	0.000773615	0.0045	WLA
ľ				Dwelling			
			TACKETT	Other than			KPDES
	74181	KYG401470	RESIDENCE	Apartment	0.000773615	0.0045	WLA
				Dwelling			
			HALL	Other than			KPDES
Ļ	74185	KYG401475	RESIDENCE	Apartment	0.000773615	0.0045	WLA
				Dwelling			
	11.00		COLLINS	Other than	0.000550.015	0.0047	KPDES
L	1168	KYG401516	RESIDENCE	Apartment	0.000773615	0.0045	WLA
				Dwelling			VDDEC
	25902	KNC 401 520	REATHLEY	Other than	0.000772.615	0.0045	KPDES
Т	33892	KYG401529	RESIDENCE	Apartment	0.000//3615	0.0045	WLA

					<u>E</u> . <u>coli</u>	
AI	VDDES #	Discharger Facility	Tuno	Design	(billion	
number	KPDES #	Iname	Dwelling	Capacity (cis)	colonies/day)	
		MOORE	Other than			KPDES
35887	KYG401533	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		11251221(02	Dwelling			
		WALLACE	Other than			KPDES
43120	KYG401540	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		MCKINNEY	Other than			KPDES
36057	KYG401541	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		PRATER	Other than			KPDES
43224	KYG401548	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		C LUDIL	Dwelling			UDDDG
11005	WWG 401 500	CAUDILL	Other than	0.000772615	0.0045	KPDES
44695	KYG401580	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		DINCUS	Dwelling Other then			KDDES
45073	KVG401582	PESIDENCE		0.000773615	0.0045	WI A
+3073	K10401302	RESIDENCE	Dwelling	0.000775015	0.0045	WLA
		GEARHEART	Other than			KPDES
45396	KYG401587	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		HALL	Other than			KPDES
45070	KYG401590	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		WILLIAMSON	Other than			KPDES
46144	KYG401601	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		CHILDERS	Other than			KPDES
46147	KYG401603	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		LAFEDTY	Dwelling			VDDEC
47022	VVC 401629	LAFEKI I DESIDENCE	Other than	0.000772615	0.0045	KPDES WLA
47022	K10401058	KESIDENCE	Duralling	0.000775015	0.0045	WLA
		DUFF	Other than			KPDFS
48864	KYG401645	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		21222 21 (02	Dwelling			
		COCHRAN	Other than			KPDES
48897	KYG401646	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		YORK	Other than			KPDES
49354	KYG401654	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
50021	WWG 401 coo	BLANKENSHIP	Other than	0.000772417	0.0045	KPDES
50021	KYG401692	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		HISTICE	Dwelling Other ther			KDDES
50138	KYG401600	RESIDENCE	A partment	0.000773615	0.0045	WI A
50156	K10401077	RESIDENCE	Dwelling	0.000775015	0.0043	V LA
		SCOTT	Other than			KPDES
50627	KYG401721	RESIDENCE	Apartment	0.000773615	0.0045	WLA

ΔI		Discharger Facility		Design	<u>E</u> . <u>coli</u> (billion	
number	KPDES #	Name	Туре	Capacity (cfs)	colonies/day)	
			Dwelling			
		KIDD	Other than			KPDES
50950	KYG401730	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		MCKINNEY JR	Other than		0 00 1 7	KPDES
53921	KYG401764	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		ICON	Dwelling			VDDEC
54870	KVG401772	ISON	A portmont	0.000772615	0.0045	KPDES WLA
34079	K10401772	RESIDENCE	Dwolling	0.000773013	0.0045	VV LA
		NEWMAN	Other than			KPDFS
71436	KYG401809	RESIDENCE	Apartment	0.000773615	0 0045	WLA
71150		REDIDER(CE	Dwelling	0.000772012	010012	
		COMBS	Other than			KPDES
74243	KYG401821	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		LITTLE	Other than			KPDES
75141	KYG401851	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		HOWARD	Other than			KPDES
75556	KYG401857	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		ROWE	Other than	0.000550.615	0.004	KPDES
75746	KYG401868	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		DUITED	Dwelling			VDDEC
76079	KVC401976	BILITER	A portmont	0.000772615	0.0045	KPDES WLA
/00/8	K10401870	RESIDENCE	Dwolling	0.000775015	0.0045	WLA
		ALLEN	Other than			KPDFS
76185	KYG401883	RESIDENCE	Apartment	0.000773615	0 0045	WLA
70105		REDIDER(CE	Dwelling	0.000772012	010012	
		HARVEL	Other than			KPDES
79525	KYG401931	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		BENTLEY	Other than			KPDES
79842	KYG401936	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
01100		MARTIN	Other than	0.000552.415	0.0017	KPDES
81193	KYG401970	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		CADDEDDV	Dwelling			VDDEC
81570	KVG401001	SCAKBEKK I	A partmant	0.000772615	0.0045	WI A
01370	K10401981	RESIDENCE	Dwelling	0.000775015	0.0045	WLA
		HOPKINS	Other than			KPDFS
82471	KYG402002	RESIDENCE	Apartment	0.000773615	0.0045	WLA
02171			Dwelling	5.000772015		
		COOK	Other than			KPDES
84292	KYG402025	RESIDENCE	Apartment	0.000773615	0.0045	WLA
			Dwelling			
		PRATER	Other than			KPDES
97291	KYG402063	RESIDENCE	Apartment	0.000773615	0.0045	WLA

AI number	KPDES #	Discharger Facility Name	Туре	Design Capacity (cfs)	<u>E</u> . <u>coli</u> (billion colonies/day)	
102052	WWG 400117	LITTLE	Dwelling Other than	0.0007722615	0.004	KPDES
103052	KYG402117	RESIDENCE	Apartment	0.000773615	0.0045	WLA Total KPDES WLA
			Addition to MAF (sum of cfs)	1.202506386	1667.1549	remainder
					16.6715	Future Growth WLA
					23.7324	Total WLA
					1650.4834	LA



Right Fork Beaver Creek Site 30

Figure E.4 Right Fork Beaver Creek Site 30

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 27 is under site 35, site 20 is under site 31, site 32 is under site 33, site 37 is under site 45, and site 40 is under site 47.

Right Fork Beaver Creek at site 30 (RM 1.4) is a fourth order stream located in Floyd County (Figure E.4). Its watershed consists of the Upper, Middle, and the majority of the Lower Right Fork Beaver Creek subwatersheds and extends from Knott into Floyd County. Information about Right Fork Beaver Creek at site 30, including sample site location, waterbody identification number (WBID), and MAF is shown in Table E.16. It has a catchment of 98,511 acres (154 square miles) with a 79% forested and 6% developed land cover (Table E.17). There are several wildlife management areas and an Elk release site in this subwatershed (Figure E.4). Portions of this watershed are sewered; especially in larger cities (see Figures 5.17 and 5.18). There are three stream water withdrawals in this subwatershed (Table E.18). Sampling data from site 30 is presented in Table E.19, and the TMDL allocations in Table E.20.

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
	Right								
	Fork								
Right	Beaver								
Fork	Creek								
Beaver	0.0 to								
Creek	17.4	501863_01	Floyd	98510.89	153.923	4th order			
				Sample					
			Sample	Site			+ to	- from	Adjuste
EKU	MAP	Sample	Site	Longitud	MAF	RM of MAF	MAF	MAF	d MAF
Site #	Site #	Point RM	Latitude	e	(cfs)	Determination	(cfs)	(cfs)	(cfs)
30	30	1.4	37.5591	-82.7723	204.7	1.4	0.4781	1.4312	203.747

Table E.1	6 Right	Fork	Beaver	Creek	Site	30	Information
I doie L.I	0 Right	TOLK	Deaver	CICCK	bitte	50	mormation

Table E.17 Right Fork Beaver Creek Site 30 Subwatershed Land Cover

		Watershed	% of Total	Future Growth
Land Cover	Watershed Acres	Square Miles	Area	WLA %
Open Water	75.82	0.12	0.08	
Developed	5899.02	9.22	5.99	1
Barren Land	1200.14	1.88	1.22	
Forest/Shrubland	77424.52	120.98	78.59	
Grassland/Herbaceous	10740.04	16.78	10.90	
Pasture/ Hay	2991.84	4.67	3.04	
Cultivated Crops	164.91	0.26	0.17	
Wetlands	14.59	0.02	0.01	
Totals	98510.89	153.92	100.00	

Table E.18 Right Fork Beaver Cr	reek Site 30 Water Withdrawals
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AI	Source	Withdrawal Facility	Withdrawal,	Facility	Facility
number	Description	Name	cfs	Latitude	Longitude
	RM 40.6				
	Right Fork				
	Beaver	ICG Knott Co LLC (860-			
2528	Creek	8012)	0.410016	37.32166	-82.80366
	RM 31.0				
	Right Fork				
	Beaver	Deane Mining LLC (860-			
2525	Creek	5318)	0.015472	37.41038	-82.78096
	RM 4.2 of				
	Caney				
3502	Creek	ICG Knott Co LLC	1.005699	37.3884	-82.82856
		subtraction from MAF	1.431187		

Table E.19 Right Fork Beaver Creek Site 30 Data	ata
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	<u>E. coli</u>	Flow	Instantaneous Load (billion	Unit Area Load
Collection Date	mls)	(cfs)	colonies/day)	colonies/day/acre)
05/16/07	310	70.79	536.90	5.45
05/30/07	310	29.77	225.79	2.29
5/30/2007 (QA				
Sample)	490	N/A	N/A	N/A
06/13/07	180	19.27	84.86	0.86
06/27/07	3700	63.551	5752.85	58.40
07/10/07	220	11.799	63.51	0.64
07/26/07	13000	N/A	N/A	
08/17/07	210	7.202	37.00	0.38
8/17/2007 (QA				
Sample)	140	N/A	N/A	N/A
08/31/07	160	N/A	N/A	N/A
09/14/07	180	N/A	N/A	N/A
09/28/07	330	N/A	N/A	N/A
10/12/07	40	25.701	25.15	0.26
11/16/07 (outside PCR season)	110	0.371	1.00	0.01
Greatest Concentration	13000			

Table E.20 TMDLs for Right Fork Beaver Creek Site 30

TMDL					<u>E</u> . <u>coli</u> (billion	
Table					colonies/day)	
					64802.6938	Existing Load
					1196.3574	Total TMDL
					119.6357	MOS
					1076.7217	TMDL Target
				Design		
AI		Discharger		Capacity		
number	KPDES #	Facility Name	Туре	(cfs)	98.34	% reduction
		KNOTT CO				
		WATER &	Sewerage			KPDES
2527	KY0042854	SEWER DIST	System	0.154723	0.9085	WLA
		WARCO				
		HOUSING	Apartment			KPDES
1352	KY0072974	PROJECT	Building	0.038681	0.2271	WLA
		ALLEN				
		CENTRAL				
		HIGH				KPDES
35254	KY0079430	SCHOOL	School	0.01702	0.0999	WLA

				Design		
AI		Discharger		Capacity	<u>E</u> . <u>coli</u> (billion	
number	KPDES #	Facility Name	Туре	(cfs)	colonies/day)	
		GOLDEN				
		YEARS REST	Intermediate			KPDES
2517	KY0083089	HOME	Care facility	0.015472	0.0908	WLA
		JONES FORK				
		ELEM				KPDES
35359	KY0087076	SCHOOL	School	0.009283	0.0545	WLA
		JAMES A				
		DUFF ELEM				KPDES
35258	KY0093017	SCHOOL	School	0.012378	0.0727	WLA
		CONSOL OF	Bituminous			
		KY INC	Coal & Lig,			KPDES
2514	KY0094510	JONES FORK	Surface	0.004642	0.0273	WLA
		WAYLAND	Sewerage			KPDES
35761	KY0105228	STP	System	0.154723	0.9085	WLA
		MAY				
		VALLEY				
		ELEM	~			KPDES
82092	KY0106755	SCHOOL	School	0.009283	0.0545	WLA
			Sewerage			KPDES
35260	KY0107051	EASTERN STP	System	0.038681	0.2271	WLA
			Dwelling			
		GOBLE	Other than			KPDES
1196	KYG400590	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		GREEN	Other than			KPDES
1199	KYG400603	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
1100		ALLEN	Other than	0.000		KPDES
1133	KYG400642	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			KADDEG
1070	WWG 400 CCC	MITCHELL	Other than	0.000774	0.0045	KPDES
1270	KIG400666	RESIDENCE	Apartment	0.000774	0.0045	WLA
		HOOVED	Dwelling			VDDEG
1222	KNC 400720	HOUVER	A nortmant	0.000774	0.0045	KPDES WLA
1222	K10400750	RESIDENCE	Dwalling	0.000774	0.0045	WLA
		TURNER	Other than			KPDFS
1343	KYG400778	RESIDENCE	Apartment	0.000774	0 0045	WI A
1343	N10+00778	RESIDENCE	Dwelling	0.000774	0.0043	WLA
		PERKINS	Other than			KPDES
1293	KYG400836	RESIDENCE	Apartment	0.000774	0.0045	WLA
12/5	1110100000	itesidei (ee	Dwelling	0.000777	00010	
		SHEPHERD	Other than			KPDES
1314	KYG400844	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		KESTER	Other than			KPDES
1243	KYG400915	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		MULLINS	Other than			KPDES
1276	KYG400975	RESIDENCE	Apartment	0.000774	0.0045	WLA

					Design		
	AI		Discharger		Capacity	E. coli (billion	
r	umber	KPDES #	Facility Name	Type	(cfs)	colonies/day)	
		11220		Dwelling	(015)		
			MAY	Other than			KPDES
	4327	KYG401073	RESIDENCE	Apartment	0.000774	0 0045	WI A
	4527	K10+01075	RESIDENCE	Dwelling	0.000774	0.0045	
			CASTIE	Other then			VDDES
	1250	VVC401112	DESIDENCE		0.000774	0.0045	WI A
	4550	K10401115	RESIDENCE	Drugilling	0.000774	0.0045	WLA
				Dwelling			VDDEC
	42.4.4	WWG 401101	FRASURE	Other than	0.000774	0.0045	KPDES
	4344	KYG401121	RESIDENCE	Apartment	0.000774	0.0045	WLA
			CDIN	Dwelling			TIPPER
	100.6		CRUM	Other than	0.000774	0 00 / -	KPDES
	4336	KYG401125	RESIDENCE	Apartment	0.000774	0.0045	WLA
				Dwelling			
			SHEPPARD	Other than			KPDES
	12253	KYG401218	RESIDENCE	Apartment	0.000774	0.0045	WLA
				Dwelling			
			WEBB	Other than			KPDES
	15655	KYG401296	RESIDENCE	Apartment	0.000774	0.0045	WLA
				Dwelling			
			EVERIDGE	Other than			KPDES
	15807	KYG401352	RESIDENCE	Apartment	0.000774	0.0045	WLA
				Dwelling			
			WILLIAMSON	Other than			KPDES
	33378	KYG401353	RESIDENCE	Apartment	0.000774	0.0045	WLA
				Dwelling			
			HALL	Other than			KPDES
	74185	KYG401475	RESIDENCE	Apartment	0.000774	0.0045	WLA
				Dwelling			
			WALLACE	Other than			KPDES
L .	43120	KYG401540	RESIDENCE	Apartment	0.000774	0.0045	WLA
				Dwelling			
			PRATER	Other than			KPDES
	43224	KYG401548	RESIDENCE	Apartment	0.000774	0.0045	WLA
	13221		REDIDERCE	Dwelling	0.000771		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
			CHILDERS	Other than			KPDES
	46147	KYG401603	RESIDENCE	Apartment	0.000774	0.0045	WLA
				Dwelling	0.000777	00010	,, 12/1 X
			SCOTT	Other than			KPDES
	50627	KYG401721	RESIDENCE	Apartment	0.000774	0 0045	WLA
	20021	110401721	RESIDENCE	Dwelling	0.000774	0.0040	
			KIDD	Other than			KPDFS
	50050	KYG401730	RESIDENCE		0.000774	0.0045	
	50950	K10401730	RESIDENCE	Dwolling	0.000774	0.0045	WLA
			ISON	Other ther			KDDES
	5/1870	KVG401772	RESIDENCE		0.000774	0.0045	
	54019	K10401772	RESIDENCE	Dualling	0.000774	0.0043	WLA
				Other there			KDDEC
	75556	KVC 401957		A portroomt	0.000774	0.0045	KPDES
	13330	K1G40185/	RESIDENCE	Apartment	0.000774	0.0045	WLA
				Dwelling			VDDEG
		WWG (0105)	BILITER	Other than	0.000	0.0045	KPDES
	/60/8	KYG401876	RESIDENCE	Apartment	0.000774	0.0045	WLA

				Design		
AI		Discharger		Capacity	<u>E</u> . <u>coli</u> (billion	
number	KPDES #	Facility Name	Туре	(cfs)	colonies/day)	
			Dwelling			
		SCARBERRY	Other than			KPDES
81570	KYG401981	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		COOK	Other than			KPDES
84292	KYG402025	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		PRATER	Other than			KPDES
97291	KYG402063	RESIDENCE	Apartment	0.000774	0.0045	WLA
						Total
						KPDES
					2.8073	WLA
			Addition to			
			MAF (sum			
			of cfs)	0.478094	1073.9144	remainder
						Future
						Growth
					10.7391	WLA
					13.5464	Total WLA
					1063.1753	LA



Right Beaver Creek Site 30a

Figure E.5 Right Fork Beaver Creek Site 30a

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 27 is under site 35, site 20 is under site 31, site 32 is under site 33, site 37 is under site 45, and site 40 is under site 47.

Right Fork Beaver Creek at site 30a (RM 0.2) is a fourth order stream located in Floyd County (Figure E.5). Its watershed consists of the Upper, Middle, and Lower Right Fork Beaver Creek subwatersheds and extends from Knott into Floyd County. Information about Right Fork Beaver Creek at site 30a, including sample site location, waterbody identification number (WBID), and MAF is shown in Table E.21. It has a catchment of 99,096 acres (155 square miles) with a 79% forested and 6 % developed land cover (Table E.22). There are several wildlife management areas and an elk release site in this subwatershed (Figure E.5). Portions of this watershed are sewered; especially in larger cities (see Figures 5.17 and 5.18). There are three stream water withdrawals in this subwatershed (Table E.23). Sampling data from site 30a is presented in Table E.24, and the TMDL allocations in Table E.25.

Stroom	Stream	WRID #	County	Acros	Square	Stroom Order			
Sueam	Segment	W DID #	County	Actes	wines	Stream Order			
	Right								
	Fork								
Right	Beaver								
Fork	Creek								
Beaver	0.0 to								
Creek	17.4	501863_01	Floyd	99095.56	154.837	4th order			
			Sample	Sample			+ to	- from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
30a	30a	0.2	37.55840	-82.75550	205.9	0	0.47887	1.43119	204.9477

Table E.21 Right Fork Beaver Creek Site 30a Information

Table E.22 Right Fork Beaver Creek Site 30a Subwatershed Land Cover

	Watershed	Watershed		Future Growth
Land Cover	Acres	Square Miles	% of Total Area	WLA %
Open Water	76.27	0.12	0.08	
Developed	5934.03	9.27	5.99	1.0
Barren Land	1207.26	1.89	1.22	
Forest/Shrubland	77884.04	121.69	78.59	
Grassland/ Herbaceous	10803.79	16.88	10.90	
Pasture/Hay	3009.60	4.70	3.04	
Cultivated Crops	165.89	0.26	0.17	
Wetlands	14.68	0.02	0.01	
Total	99095.56	154.84	100.00	

Table E.23 Right Fork Beaver Creek Site 30a Water Withdrawals

AI	Source	Withdrawal Facility		Facility	Facility
number	Description	Name	Withdrawal, cfs	Latitude	Longitude
	RM 40.6				
	Right Fork	ICG Knott Co LLC			
2528	Beaver Creek	(860-8012)	0.4100156	37.32166	-82.80366
	RM 31.0				
	Right Fork	Deane Mining LLC			
2525	Beaver Creek	(860-5318)	0.01547229	37.41038	-82.78096
	RM 4.2 of				
3502	Caney Creek	ICG Knott Co LLC	1.005699	37.3884	-82.82856
		subtraction from			
		MAF	1.43118689		

			Instantaneous	
	<u>E</u> . <u>coli</u>		Load (billion <u>E</u> .	Unit Area Load
Collection	(colonies/100	Flow	<u>coli</u>	(million <u>E</u> . <u>coli</u>
Date	mls)	(cfs)	colonies/day)	colonies/day/acre)
05/16/08	560	65.85	902.20	9.10
05/30/08	140	26.3	90.08	0.91
06/13/08	500	26.876	328.77	3.32
06/27/08	250	10.230	62.57	0.63
07/11/08	680	44.002	732.05	7.39
07/31/08	3800	N/A	N/A	N/A
08/08/08	500	22.4328	274.42	2.77
08/22/08	150	7.995	29.34	0.30
09/12/08	110	11.121	29.93	0.30
09/20/08	120	7.015	20.60	0.21
10/17/08	50	8.743	10.70	0.11
10/24/08	90	7.326	16.13	0.16
Greatest				
Concentration	3800			

Table E.24 Righ	t Fork Beaver C	Creek Site 30	a Data

Table E.25 TMDLs for Right Fork Beaver Creek Site 30a

TMDL					<u>E</u> . <u>coli</u> (billion	
Table					colonies/day)	
					19053.9617	Existing Load
					1203.4081	Total TMDL
					120.3408	MOS
					1083.0673	TMDL Target
				Design		
AI		Discharger		Capacity		
number	KPDES #	Facility Name	Туре	(cfs)	94.32	% reduction
		KNOTT CO				
		WATER &	Sewerage			KPDES
2527	KY0042854	SEWER DIST	System	0.154723	0.9085	WLA
		WARCO				
		HOUSING	Apartment			KPDES
1352	KY0072974	PROJECT	Building	0.038681	0.2271	WLA
		ALLEN				
		CENTRAL				
		HIGH				KPDES
35254	KY0079430	SCHOOL	School	0.01702	0.0999	WLA
		GOLDEN				
		YEARS REST	Intermediate			KPDES
2517	KY0083089	HOME	Care Facility	0.015472	0.0908	WLA
		JONES FORK				
		ELEM				KPDES
35359	KY0087076	SCHOOL	School	0.009283	0.0545	WLA

				Design		
AI		Discharger		Capacity	<u>E</u> . <u>coli</u> (billion	
number	KPDES #	Facility Name	Туре	(cfs)	colonies/day)	
		JAMES A				
		DUFF ELEM				KPDES
35258	KY0093017	SCHOOL	School	0.012378	0.0727	WLA
		CONSOL OF	Bituminous			
		KY INC	Coal & Lig,			KPDES
2514	KY0094510	JONES FORK	Surface	0.004642	0.0273	WLA
		WAYLAND	Sewerage			KPDES
35761	KY0105228	STP	System	0.154723	0.9085	WLA
		MAY				
		VALLEY				
		ELEM				KPDES
82092	KY0106755	SCHOOL	School	0.009283	0.0545	WLA
			Sewerage			KPDES
35260	KY0107051	EASTERN STP	System	0.038681	0.2271	WLA
			Dwelling			
		GOBLE	Other than			KPDES
1196	KYG400590	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		GREEN	Other than			KPDES
1199	KYG400603	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		ALLEN	Other than			KPDES
1133	KYG400642	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		MITCHELL	Other than			KPDES
1270	KYG400666	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		HOOVER	Other than			KPDES
1222	KYG400730	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		TURNER	Other than			KPDES
1343	KYG400778	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		PERKINS	Other than			KPDES
1293	KYG400836	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		SHEPHERD	Other than			KPDES
1314	KYG400844	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		KESTER	Other than			KPDES
1243	KYG400915	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		MULLINS	Other than			KPDES
1276	KYG400975	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
1007		MAY	Other than	0.000774	0.004	KPDES
4327	KYG401073	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			UDDEC
1050	WWGADAAA	CASTLE	Other than	0.00055.1	0.004-	KPDES
4350	KYG401113	RESIDENCE	Apartment	0.000774	0.0045	WLA

				Design		
AI		Discharger		Capacity	<u>E</u> . <u>coli</u> (billion	
number	KPDES #	Facility Name	Туре	(cfs)	colonies/day)	
			Dwelling			
		FRASURE	Other than			KPDES
4344	KYG401121	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		CRUM	Other than			KPDES
4336	KYG401125	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		SHEPPARD	Other than			KPDES
12253	KYG401218	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		WEBB	Other than			KPDES
15655	KYG401296	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		EVERIDGE	Other than			KPDES
15807	KYG401352	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		WILLIAMSON	Other than			KPDES
33378	KYG401353	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		HALL	Other than			KPDES
74185	KYG401475	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		WALLACE	Other than			KPDES
43120	KYG401540	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		PRATER	Other than			KPDES
43224	KYG401548	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		CHILDERS	Other than			KPDES
46147	KYG401603	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		LAFERTY	Other than			KPDES
47022	KYG401638	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		SCOTT	Other than			KPDES
50627	KYG401721	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		KIDD	Other than			KPDES
50950	KYG401730	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		ISON	Other than			KPDES
54879	KYG401772	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		HOWARD	Other than	0.000	0.0017	KPDES
75556	KYG401857	RESIDENCE	Apartment	0.000774	0.0045	WLA
		D.1.	Dwelling			
7.070	WWG 404054	BILITER	Other than	0.00055.1	0.0047	KPDES
/60/8	KYG401876	RESIDENCE	Apartment	0.000774	0.0045	WLA
		GGADDEDDY	Dwelling			VDDDG
01550	WWGADADAA	SCARBERRY	Other than	0.00055.1	0.004=	KPDES
81570	KYG401981	RESIDENCE	Apartment	0.000774	0.0045	WLA

				Design		
AI		Discharger		Capacity	<u>E</u> . <u>coli</u> (billion	
number	KPDES #	Facility Name	Туре	(cfs)	colonies/day)	
			Dwelling			
		COOK	Other than			KPDES
84292	KYG402025	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		PRATER	Other than			KPDES
97291	KYG402063	RESIDENCE	Apartment	0.000774	0.0045	WLA
						Total
						KPDES
					2.8118	WLA
			Addition to			
			MAF (sum of			
			cfs)	0.478867	1080.2555	remainder
						Future
						Growth
					10.8026	WLA
					13.6144	Total WLA
					10.00 4500	TA
					1069.4529	LA



Right Fork Beaver Creek Site 34

Figure E.6 Right Fork Beaver Creek Site 34

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 27 is under site 35, site 20 is under site 31, site 32 is under site 33, site 37 is under site 45, and site 40 is under site 47.

Right Fork Beaver Creek at site 34 (RM 11.2) is a fourth order stream located in Floyd County (Figure E.6). Its watershed consists of the Upper, Middle, and part of the Lower Right Fork Beaver Creek subwatersheds and extends from Knott into Floyd County. Information about Right Fork Beaver Creek at site 34, including sample site location, waterbody identification number (WBID), and MAF is shown in Table E.26. It has a catchment of 80,698 acres (126 square miles) with an 80% forested and 5.7 % developed land cover (Table E.27). There are several wildlife management areas and an elk release site in this subwatershed (Figure E.6). Portions of this watershed are sewered; especially in larger cities (see Figures 5.17 and 5.18). There are three stream water withdrawals in this subwatershed (Table E.28). Sampling data from site 34 is presented in Table E.29, and the TMDL allocations in Table E.30.

Classic	Stream		Gant	A	Square	Stars Only			
Stream	Segment	WBID#	County	Acres	Miles	Stream Order			
	Right								
	Fork								
Right	Beaver								
Fork	Creek								
Beaver	0.0 to								
Creek	17.4	501863_01	Floyd	80698.02	126.091	4th order			
			Sample	Sample			+ to	- from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
34	34	11.2	37.5129	-82.8362	169.3	11.2	0.35818	1.4312	168.227

Table E.26 Right Fork Beaver Creek Site 34 Information

Table E.27 Right Fork Beaver Creek Site 34 Subwatershed Land Cover

	Watershed	Watershed	% of Total	Future Growth
Land Cover	Acres	Square Miles	Area	WLA %
Open Water	74.66	0.12	0.09	
Developed	4630.09	7.23	5.74	1
Barren Land	1105.21	1.73	1.37	
Forest/Shrubland	64664.64	101.04	80.13	
Grassland/Herbaceous	8293.16	12.96	10.28	
Pasture/ Hay	1828.19	2.86	2.27	
Cultivated Crops	92.71	0.14	0.11	
Wetlands	9.36	0.01	0.01	
Totals	80698.02	126.09	100.00	

Table E.28 Right Fork Beaver Creek Site 34 Water Withdrawals

AI	Source	Withdrawal Facility	Withdrawal,	Facility	Facility
number	Description	Name	cfs	Latitude	Longitude
	RM 40.6				
	Right Fork				
	Beaver	ICG Knott Co LLC			
2528	Creek	(860-8012)	0.4100156	37.32166	-82.80366
	RM 31.0				
	Right Fork				
	Beaver	Deane Mining LLC			
2525	Creek	(860-5318)	0.01547229	37.41038	-82.78096
	RM42 of				
	Caney				
3502	Creek	ICG Knott Co LLC	1.005699	37.3884	-82.82856
2202		subtraction from	1.000077	27.2001	02.02000
		MAF	1.43118689		

			Instantaneous	
	<u>E</u> . <u>coli</u>		Load (billion	Unit Area Load
	(colonies/100	Flow	<u>E</u> . <u>coli</u>	(million <u>E</u> . <u>coli</u>
Collection Date	mls)	(cfs)	colonies/day)	colonies/day/acre)
05/15/07	80	18.505	36.22	0.45
05/30/07	290	24.19	171.63	2.13
06/13/07	390	18.952	180.83	2.24
06/27/07	5900	21.113	3047.62	37.77
07/10/07	300	9.207	67.58	0.84
07/26/07	5100	69.501	8672.01	107.46
08/17/07	150	7.962	29.22	0.36
08/31/07	130	N/A	N/A	N/A
09/14/07	210	3.97	20.40	0.25
09/28/07	100	1.933	4.73	0.06
10/12/07	120	3.6554	10.73	0.13
11/17/07 (outside PCR				
season)	3300	19.807	1599.16	19.82
11/17/07 (OA Sample)	2100	N/A	N/A	N/A

Table E.29 Right Fork Beaver Creek Site 34 Data

Table E.30 TMDLs for Right Fork Beaver Creek Site 34

5900

Greatest Concentration

	1	~	1	1		
					<u>E</u> . <u>coli</u>	
TMDL					(billion	
Table					colonies/day)	
						Existing
					24283.2262	Load
						Total
					987.7923	TMDL
					98.7792	MOS
						TMDL
					889.0130	Target
				Design		
AI		Discharger Facility		Capacity		
number	KPDES #	Name	Туре	(cfs)	96.34	% reduction
		KNOTT CO				
		WATER & SEWER	Sewerage			KPDES
2527	KY0042854	DIST	System	0.1547229	0.9085	WLA
		BEAVER CREEK				KPDES
33945	KY0077542	ELEM SCHOOL	School	0.0108306	0.0636	WLA
		GOLDEN YEARS	Intermediate			KPDES
2517	KY0083089	REST HOME	Care Facility	0.0154723	0.0908	WLA
		JONES FORK				KPDES
35359	KY0087076	ELEM SCHOOL	School	0.0092834	0.0545	WLA
			Bituminous			
		CONSOL OF KY	Coal & Lig,			KPDES
2514	KY0094510	INC JONES FORK	Surface	0.0046417	0.0273	WLA

				Design	<u>E</u> . <u>coli</u>	
AI	VDDES #	Discharger Facility	Tuno	Capacity	(billion	
number	KIDLS#	Ivallic	Sewerage	(018)	colonies/day)	KPDES
35761	KY0105228	WAYLAND STP	System	0.1547229	0.9085	WLA
			Dwelling			
		GREEN	Other than			KPDES
1199	KYG400603	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
1202		PERKINS	Other than	0.000		KPDES
1293	KYG400836	RESIDENCE	Apartment	0.0007736	0.0045	WLA
		CHEDHEDD	Dwelling Other ther			VDDES
1314	KVG400844	RESIDENCE	A partment	0.0007736	0.0045	WI A
1314	K10400044	RESIDENCE	Dwelling	0.0007730	0.0045	WLA
		KESTER	Other than			KPDES
1243	KYG400915	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		CASTLE	Other than			KPDES
4350	KYG401113	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		CRUM	Other than			KPDES
4336	KYG401125	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling Other ther			VDDEC
15655	KVG401206	WEBB RESIDENCE	A partment	0.0007736	0.0045	WI A
15055	K10401290	WEDD RESIDENCE	Dwelling	0.0007730	0.0045	WLA
			Other than			KPDES
74185	KYG401475	HALL RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		WALLACE	Other than			KPDES
43120	KYG401540	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
16147	WWG 401 602	CHILDERS	Other than	0.0007726	0.0045	KPDES
46147	KYG401603	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Other than			KDDES
50950	KYG401730	KIDD RESIDENCE	Apartment	0.0007736	0.0045	WLA
50750	R10 701750		riputition	0.0007750	0.0010	Total
						KPDES
					2.1032	WLA
			Addition to			
			MAF (sum			
			of cfs)	0.3581835	886.9099	remainder
						Future
					0.0/01	Growth
					8.8091	WLA
					10.9723	Total WLA
					878.0408	LA



Right Fork Beaver Creek Site 35

Figure E.7 Right Fork Beaver Creek Site 35

Note: Due to map resolution, some sites are masked by symbols for other sites. 27 is under site 35, site 20 is under site 31, site 32 is under site 33, site 37 is under site 45, and site 40 is under site 47.

Right Fork Beaver Creek at site 35 (RM 5.7) is a fourth order stream located in Floyd County (Figure E.7). Its watershed consists of the Upper, Middle, and part of the Lower Right Fork Beaver Creek subwatersheds and extends from Knott into Floyd County. Information about Right Fork Beaver Creek at site 35, including sample site location, waterbody identification number (WBID), and MAF is shown in Table E.31. It has a catchment of 90,610 acres (142 square miles) with a 79% forested and 5.8% developed land cover (Table E.32). There are several wildlife management areas and an elk release site in this subwatershed (Figure E.7). Portions of this watershed are sewered; especially in larger cities (see Figures 5.17 and 5.18). There are three stream water withdrawals in this subwatershed (Table E.33). Sampling data from site 35 is presented in Table E.34, and the TMDL allocations in Table E.35.

Stracm	Stream	WDID #	Country	A amag	Square	Stacom Orden			
Stream	Segment	W DID #	County	Acres	whies	Stream Order			
	Right								
	Fork								
Right	Beaver								
Fork	Creek								
Beaver	0.0 to								
Creek	17.4	501863_01	Floyd	90610.36	141.579	4th order			
			Sample	Sample			+ to	- from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
35	35	5.7	37.52986	-82.79064	189.1	5.7	0.4355	1.4312	188.104

Table E.31 Right Fork Beaver Creek Site 35 Information

Table E.32 Right Fork Beaver Creek Site 35 Subwatershed Land Cover

	Watershed	Watershed	% of Total	Future Growth
Land Cover	Acres	Square Miles	Area	WLA %
Open Water	75.30	0.12	0.08	
Developed	5288.83	8.26	5.84	1
Barren Land	1164.43	1.82	1.29	
Forest/Shrubland	71603.88	111.88	79.02	
Grassland/Herbaceous	9868.36	15.42	10.89	
Pasture/ Hay	2472.33	3.86	2.73	
Cultivated Crops	124.98	0.20	0.14	
Wetlands	12.25	0.02	0.01	
Totals	90610.36	141.58	100.00	

Table E.33 Right Fork Beaver Creek Site 35 Water Withdrawals

AI	Source	Withdrawal Facility	Withdrawal,	Facility	Facility
number	Description	Name	cfs	Latitude	Longitude
	RM 40.6				
	Right Fork				
	Beaver	ICG Knott Co LLC (860-			
2528	Creek	8012)	0.4100156	37.32166	-82.80366
	RM 31.0 Right Fork				
	Beaver	Deane Mining LLC (860-			
2525	Creek	5318)	0.01547229	37.41038	-82.78096
	RM 4.2 of Caney				
3502	Creek	ICG Knott Co LLC	1.005699	37.3884	-82.82856
		subtraction from MAF	1.43118689		

	<u>E</u> . <u>coli</u> (colonies/100	Flow	Instantaneous Load (billion E.	Unit Area Load (million E. coli
Collection Date	mls)	(cfs)	<u>coli</u> colonies/day)	colonies/day/acre)
05/16/07	140	N/A	N/A	N/A
05/30/07	190	27.832	129.38	1.43
06/13/07	340	N/A	N/A	N/A
06/27/07	3500	N/A	N/A	N/A
6/27/07 (QA Sample)	2400	N/A	N/A	N/A
07/10/07	50	N/A	N/A	N/A
07/26/07	6700	N/A	N/A	N/A
7/26/07 (QA Sample)	1100	N/A	N/A	N/A
08/17/07	170	6.893	28.67	0.32
08/31/07	70	N/A	N/A	N/A
09/14/07	310	N/A	N/A	N/A
09/28/07	640	N/A	N/A	N/A
10/12/07	310	2.925	22.18	0.24
11/17/07 (outside PCR				
season)	2600	N/A	N/A	N/A
Greatest Concentration	6700			

Table E.34 Right Fork Beaver Creek Site 35 Data

Table E.35 TMDLs for Right Fork Beaver Creek Site 35

TMDL					<u>E</u> . <u>coli</u> (billion		
Table					colonies/day)		
					30834.1757	Existing Load	
					1104.5078	Total TMDL	
					110.4508	MOS	
					994.0570	TMDL Target	
				Design			
AI		Discharger		Capacity			
number	KPDES #	Facility Name	Туре	(cfs)	96.78	% reduction	
		KNOTT CO					
		WATER &	Sewerage			KPDES	
2527	KY0042854	SEWER DIST	System	0.154723	0.9085	WLA	
		BEAVER					
		CREEK ELEM				KPDES	
33945	KY0077542	SCHOOL	School	0.010831	0.0636	WLA	
		ALLEN					
		CENTRAL HIGH				KPDES	
35254	KY0079430	SCHOOL	School	0.01702	0.0999	WLA	
		GOLDEN					
		YEARS REST	Intermediate			KPDES	
2517	KY0083089	HOME	Care facility	0.015472	0.0908	WLA	
		JONES FORK				KPDES	
35359	KY0087076	ELEM SCHOOL	School	0.009283	0.0545	WLA	
		JAMES A DUFF				KPDES	
35258	KY0093017	ELEM SCHOOL	School	0.012378	0.0727	WLA	
					Design		
---	--------	-------------	---------------	-------------	-----------	---------------------------------	-------------
	AI		Discharger		Capacity	<u>E</u> . <u>coli</u> (billion	
	number	KPDES #	Facility Name	Туре	(cfs)	colonies/day)	
			CONSOL OF KY	Bituminous			
			INC JONES	Coal & Lig,			KPDES
	2514	KY0094510	FORK	Surface	0.004642	0.0273	WLA
				Sewerage			KPDES
	35761	KY0105228	WAYLAND STP	System	0.154723	0.9085	WLA
				Sewerage			KPDES
	35260	KY0107051	EASTERN STP	System	0.038681	0.2271	WLA
				Dwelling			
			GOBLE	Other than			KPDES
	1196	KYG400590	RESIDENCE	Apartment	0.000774	0.0045	WLA
				Dwelling			
			GREEN	Other than			KPDES
	1199	KYG400603	RESIDENCE	Apartment	0.000774	0.0045	WLA
				Dwelling			
			MITCHELL	Other than			KPDES
	1270	KYG400666	RESIDENCE	Apartment	0.000774	0.0045	WLA
				Dwelling			
			HOOVER	Other than			KPDES
	1222	KYG400730	RESIDENCE	Apartment	0.000774	0.0045	WLA
				Dwelling			
			PERKINS	Other than			KPDES
	1293	KYG400836	RESIDENCE	Apartment	0.000774	0.0045	WLA
				Dwelling			
			SHEPHERD	Other than			KPDES
	1314	KYG400844	RESIDENCE	Apartment	0.000774	0.0045	WLA
				Dwelling			
			KESTER	Other than			KPDES
	1243	KYG400915	RESIDENCE	Apartment	0.000774	0.0045	WLA
				Dwelling			
			MAY	Other than			KPDES
	4327	KYG401073	RESIDENCE	Apartment	0.000774	0.0045	WLA
				Dwelling			
	10.00		CASTLE	Other than			KPDES
	4350	KYG401113	RESIDENCE	Apartment	0.000774	0.0045	WLA
				Dwelling			
	1011	XXXC 401101	FRASURE	Other than	0.000774	0.0045	KPDES
ļ	4344	KYG401121	RESIDENCE	Apartment	0.000774	0.0045	WLA
ļ			CDUDA	Dwelling			KDDEG
ļ	1220	VVC 401125	CKUM	Other than	0.000774	0.0045	KPDES WI
ļ	4330	K10401125	KESIDENCE	Apartment	0.000774	0.0045	WLA
ļ			CLIEDDADD	Other there			KDDEG
ļ	10052	KVC401219	DESIDENCE	A portmont	0.000774	0.0045	MI A
ļ	12233	K10401218	RESIDENCE	Duciling	0.000774	0.0045	WLA
ļ			WEBB	Other than			KDDFS
ļ	15655	KYG401206	RESIDENCE		0.000774	0.0045	WI A
ļ	15055	K10401290	RESIDENCE	Dwolling	0.000774	0.0045	WLA
ļ			EVERIDGE	Other than			KDDES
ļ	15807	KYG401352	RESIDENCE	Apartment	0.000774	0.0045	WI A
ļ	13007	A10401552	RESIDENCE	Dwelling	0.000774	0.0043	WLA
ļ			WILLIAMSON	Other than			KPDFS
ļ	33378	KYG401353	RESIDENCE	Apartment	0.000774	0.0045	WLA
	22210				0.000////		

				Design		
Al	VDDES #	Discharger	Tuna	Capacity	<u>E</u> . <u>coli</u> (billion	
number	KIDES #	Facility Name	Dwelling	(CIS)	colonies/day)	
		ΗΔΙΙ	Other than			KPDES
74185	KYG401475	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		WALLACE	Other than			KPDES
43120	KYG401540	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		PRATER	Other than			KPDES
43224	KYG401548	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		CHILDERS	Other than			KPDES
46147	KYG401603	RESIDENCE	Apartment	0.000774	0.0045	WLA
		WIDD	Dwelling			WDDDG
50050	XXC 401720	KIDD	Other than	0.000774	0.0045	KPDES
50950	KYG401730	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			VDDEC
75556	VVC401957	HUWAKD	A portmont	0.000774	0.0045	KPDES WLA
75550	K10401037	RESIDENCE	Dwolling	0.000774	0.0045	WLA
		BII ITEP	Other than			KPDFS
76078	KYG401876	RESIDENCE	Apartment	0.000774	0.0045	WLA
10010	in chororo	REDERICE	Dwelling	0.000771	0.0012	
		PRATER	Other than			KPDES
97291	KYG402063	RESIDENCE	Apartment	0.000774	0.0045	WLA
			•			Total
						KPDES
					2.5574	WLA
			Addition to			
			MAF (sum			
			of cfs)	0.435545	991.4996	remainder
						Future
					0.0150	Growth
					9.9150	WLA
					12.4724	Total WLA
					981.5846	LA

Frasure Creek Site 41



Figure E.8 Frasure Creek Site 41

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 47 is under site 40.

Frasure Creek at site 41 (RM 3.25) is a third order stream located in the Lower Left Fork Beaver Creek subwatershed in Floyd County (Figure E.8). Information about Frasure Creek at site 41, including sample site location, waterbody identification number (WBID), and MAF is shown in Table E.36. It has a catchment of 3,494 acres (5.5 square miles) with an 82% forested and 3.2 % developed land cover (Table E.37). This watershed is un-sewered. There are no water withdrawals in this subwatershed. Sampling data from site 41 is presented in Table E.38, and the TMDL allocations in Table E.39.

~	Stream		~		Square	~ ~ .			
Stream	Segment	WBID #	County	Acres	Miles	Stream Order			
	Frasure								
	Creek								
Frasure	0.0 to								
Creek	5.2	492466_01	Floyd	3494.33	5.46	3rd order			
								-	
			Sample	Sample			+ to	from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
41	41	3.25	37.42650	-82.70880	7.6	3.25	0.00077	0	7.6008

Table E.36 Frasure Creek Site 41 Information

Table E.37 Frasure Creek Site 41 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	0.00	0.00	0.00	11 22 2 70
Developed	119.59	0.19	3.42	0.5
Barren Land	93.09	0.15	2.66	
Forest/Shrubland	2853.19	4.46	81.65	
Grassland/Herbaceous	411.10	0.64	11.76	
Pasture/ Hay	16.70	0.03	0.48	
Cultivated Crops	0.67	0.00	0.02	
Wetlands	0.00	0.00	0.00	
Totals	3494.33	5.46	100.00	

Table E.38 Frasure Creek Site 41 Data

			Instantaneous	
	<u>E</u> . <u>coli</u>		Load (billion	Unit Area Load
	(colonies/100	Flow	<u>E</u> . <u>coli</u>	(million <u>E</u> . <u>coli</u>
Collection Date	mls)	(cfs)	colonies/day)	colonies/day/acre)
05/16/08	2000	N/A	N/A	N/A
05/30/08	1600	0.9202	36.02	10.31
06/13/08	170	0.3155	1.31	0.38
06/27/08	450	0.29	3.19	0.91
07/31/08	71000	18.8592	32759.73	9375.11
08/08/08	1700	0.474	19.71	5.64
8/8/08 (QA Sample)	360	N/A	N/A	N/A
09/12/08	13000	0.7636	242.87	69.50
09/20/08	1000	0.391	9.57	2.74
Greatest				
Concentration	71000			

					<u>E</u> . <u>coli</u>	
TMDL					(billion	
Table					colonies/day)	
						Existing
Site 41					13203.0671	Load
						Total
					44.6301	TMDL
					4.4630	MOS
						TMDL
					40.1671	Target
				Design		
ΔT		Discharger		Capacity		%
number	KPDES #	Facility Name	Type	(cfs)	99 70	reduction
number			Dwelling	(015)	<i></i>	reduction
		RI ANKENSHIP	Other than			KPDFS
50021	KYG401692	RESIDENCE	Apartment	0.0007736	0 0045	WLA
50021	R10 1010/2	REDIDENCE	Addition	0.0007750	0.0042	
			to MAE			
			(sum of			
			cfs)	0.0007736	40.1625	remainder
						T (
						Future
					0 2000	Growth
					0.2008	WLA
						Total
					0.2053	WLA
					39.9617	LA



Frasure Creek Site 42

Figure E.9 Frasure Creek Site 42

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 47 is under site 40.

Frasure Creek at site 42 (RM 0.25) is a third order stream located in the Lower Left Fork Beaver Creek subwatershed in Floyd County (Figure E.9). Information about Frasure Creek at site 42, including sample site location, waterbody identification number (WBID), and MAF is shown in Table E.40. It has a catchment of 7,360 acres (11.5 square miles) with an 83% forested and 5.1% developed land cover (Table E.41). This watershed is un-sewered. There are no water withdrawals in this subwatershed. Sampling data from site 42 is presented in Table E.42, and the TMDL allocations in Table E.43.

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Stream	Frasure		county	110105	1011105	birduin order			
	Creek								
Frasure	0.0 to								
Creek	5.2	492466_01	Floyd	7360.17	11.5	3rd order			
CICCR	5.2	172100_01	11094	1500.11	11.0				
								-	
			Sample	Sample			+ to	from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
42	42	0.25	37.45560	-82.73680	15.6	0	0.03249	0	15.6325

Table E.40 Frasure Creek Site 42 Information

Table E.41 Frasure Creek Site 42 Subwatershed Land Cover

	Watershed	Watershed	% of Total	Future Growth
Land Cover	Acres	Square Miles	Area	WLA %
Open Water	0.00	0.00	0.00	
Developed	376.21	0.59	5.11	1.0
Barren Land	115.46	0.18	1.57	
Forest/Shrubland	6099.62	9.53	82.87	
Grassland/Herbaceous	611.81	0.96	8.31	
Pasture/ Hay	151.51	0.24	2.06	
Cultivated Crops	5.56	0.01	0.08	
Wetlands	0.00	0.00	0.00	
Totals	7360.17	11.50	100.00	

Table E.42 Frasure Creek Site 42 Data

	<u>E</u> . <u>coli</u>		Instantaneous	Unit Area Load
	(colonies/100		Load (billion <u>E</u> .	(million <u>E</u> . <u>coli</u>
Collection Date	mls)	Flow (cfs)	<u>coli</u> colonies/day)	colonies/day/acre)
05/16/08	160	N/A	N/A	N/A
05/30/08	400	1.3342	13.06	1.77
06/13/08	570	6.321	88.15	11.98
06/27/08	560	0.8631	11.83	1.61
07/31/08	43000	N/A	N/A	N/A
08/08/08	440	0.588	6.33	0.86
08/22/08	900	0.116	2.55	0.35
8/22/08 (QA Sample)	1100	N/A	N/A	N/A
09/12/08	3300	0.709	57.24	7.78
9/12/08 (QA Sample)	3600	N/A	N/A	N/A
09/20/08	1900	0.256	11.90	1.62
10/17/08	3200	0.476	37.27	5.06
10/24/08	760	0.211	3.92	0.53
Greatest Concentration	43000			

Table E.43 TMDLs for Frasure Creek Site 42

					<u>E</u> . <u>coli</u> (billion	· ·
TMDL Table					colonies/day)	
					16445.8130	Existing Load
					91.7906	Total TMDL
					9.1791	MOS
					82.6115	TMDL Target
				Design		
ALaumhaa	VDDES #	Discharger	Tuno	Capacity	00.50	0/ modulation
Al liulibei	KIDES #	Facility Name	Туре	(CIS)	99.30	% reduction
		MCDOWELL				KPDES
35252	KY0079421	ELEM SCHOOL	School	0.0232084	0.0045	WLA
		MITCHELL	Dwelling Other			KPDES
1269	KYG400478	RESIDENCE	than Apartment	0.0007736	0.0045	WLA
		STUMBO	Dwelling Other			KPDES
1327	KYG400601	RESIDENCE	than Apartment	0.0007736	0.0045	WLA
		DYE	Dwelling Other			KPDES
1182	KYG400614	RESIDENCE	than Apartment	0.0007736	0.0045	WLA
		HALL	Dwelling Other			KPDES
1202	KYG400969	RESIDENCE	than Apartment	0.0007736	0.0045	WLA
		HOWELL	Dwelling Other			KPDES
4356	KYG401040	RESIDENCE	than Apartment	0.0007736	0.0045	WLA
35887	KVG401533	RESIDENCE	than Apartment	0.0007736	0.0045	WI A
55887	K10401555	RLANKENSHIP	Dwelling Other	0.0007730	0.0045	KPDFS
50021	KYG401692	RESIDENCE	than Apartment	0.0007736	0.0045	WLA
		NEWMAN	Dwelling Other			KPDES
71436	KYG401809	RESIDENCE	than Apartment	0.0007736	0.0045	WLA
		COMBS	Dwelling Other			KPDES
74243	KYG401821	RESIDENCE	than Apartment	0.0007736	0.0045	WLA
70525	KVC401021	HARVEL	Dwelling Other	0.0007726	0.0045	KPDES WLA
19323	K10401951	MARTIN	Dwelling Other	0.0007730	0.0045	KPDFS
81193	KYG401970	RESIDENCE	than Apartment	0.0007736	0.0045	WLA
		LITTLE	Dwelling Other			KPDES
103052	KYG402117	RESIDENCE	than Apartment	0.0007736	0.1363	WLA
						Total
					0 1000	KPDES
			Addition to		0.1908	WLA
			MAE (sum of			
			cfs)	0.0324918	82.4207	remainder
						Future
						Growth
					0.8242	WLA
					1.0150	Total WLA
					81.5965	LA



Left Fork Beaver Creek Site 45

Figure E.10 Left Fork Beaver Creek Site 45

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 37 is under site 45.

Left Fork Beaver Creek at site 45 (RM 23.4) is a fourth order stream located in the Upper Left Fork subwatershed in Floyd County (Figure E.10). Information about Left Fork Beaver Creek at site 45, including sample site location, waterbody identification number (WBID), and MAF is shown in Table E.44. It has a catchment of 7,019 acres (11 square miles) with an 87% forested and 6.9% developed land cover (Table E.45). Portions of this watershed around the city of Wheelwright are sewered (see Figure 5.16). There are no water withdrawals in this subwatershed. Sampling data from site 45 is presented in Table E.46, and the TMDL allocations in Table E.47.

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
	Left								
	Fork								
Left	Beaver								
Fork	Creek								
Beaver	18.7 to								
Creek	28.6	496194_04	Floyd	7019.46	10.97	4th order			
								-	
			Sample	Sample			+ to	from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
45	45	23.4	37.35390	-82.71630	15.4	23.4	0.00077	0	15.4008

Table E.44 Left Fork Beaver Creek Site 45 Information

Table E.45 Left Fork Beaver Creek Site 45 Subwatershed Land Cover

		Watershed	% of Total	Future Growth
Land Cover	Watershed Acres	Square Miles	Area	WLA %
Open Water	0.00	0.00	0.00	
Developed	482.05	0.75	6.87	1
Barren Land	59.62	0.09	0.85	
Forest/Shrubland	6114.97	9.55	87.11	
Grassland/Herbaceous	332.34	0.52	4.73	
Pasture/Hay	29.36	0.05	0.42	
Cultivated Crops	0.89	0.00	0.01	
Wetlands	0.22	0.00	0.00	
Totals	7019.46	10.97	100.00	

Table E.46 Left Fork Beaver Creek Site 45 Data

	<u>E</u> . <u>coli</u> (colonies/100	Flow	Instantaneous Load	Unit Area Load (million E_coli
Collection Date	mls)	(cfs)	colonies/day)	colonies/day/acre)
05/16/08	3900	4.395	419.36	59.74
05/30/08	1400	21.576	739.02	105.28
06/13/08	2500	0.138	8.44	1.20
06/27/08	580	1.103	15.65	2.23
07/11/08	310	0.555	4.21	0.60
07/31/08	>80000	5.316	10404.80	1482.28
08/08/08	740	0.689	12.47	1.78
08/22/08	600	0.508	7.46	1.06
09/12/08	30000	0.520	381.67	54.37
09/20/08	2000	0.158	7.73	1.10
10/17/08	6800	0.958	159.38	22.71
10/24/08	860	0.433	9.11	1.30
10/24/08 (QA Sample)	390	N/A	N/A	N/A
Greatest Concentration	80000			

Table E.47	TMDLs for	Left Fork	Beaver Cre	ek Site 45	
10010 2007	11/12 20 101		20000000000	•	

				<u>E</u> . <u>coli</u>	
				(billion	
				colonies/day)	
					Existing
				30143.3285	Load
					Total
				90.4300	TMDL
				9.0430	MOS
					TMDL
				81.3870	Target
	Discharger		Design		
	Facility		Capacity		0⁄0
KPDES #	Name	Type	(cfs)	99 73	reduction
	1 vanie	Турс	(013)	<i></i>	reduction
		Dwelling			
	TACKETT	Other than			KPDES
KYG401470	RESIDENCE	Apartment	0.000773615	0.0045	WLA
		Addition			
		to MAF			
		(sum of	0.000770.615	01 000 1	
		cts)	0.000773615	81.3824	remainder
					Future
					Growth
				0.8138	WLA
					Total
				0.8183	WLA
				80.5686	LA
	KPDES # KYG401470	Image: state s	Image: second	Image: series of the series	Image: series of the series



Left Fork Beaver Creek Site 49

Figure E.11 Left Fork Beaver Creek Site 49

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 32 is under site 33, site 37 is under site 45, and site 40 is under site 47.

Left Fork Beaver Creek at site 49 (RM 5.6) is a fourth order stream located in Floyd County (Figure E.11). Its watershed consists of the Upper and part of the Lower Left Fork Beaver Creek subwatersheds. Information about Left Fork Beaver Creek at site 49, including sample site location, waterbody identification number (WBID), and MAF is shown in Table E.48. It has a catchment of 40,027 acres (62.5 square miles) with an 83% forested and 6.6 % developed land cover (Table E.49). Portions of this watershed around the city of Wheelwright are sewered (see Figure 5.16). There is one water withdrawal in this subwatershed (Table E.50). Sampling data from site 49 is presented in Table E.51, and the TMDL allocations in Table E.52.

Stream	Stream	WRID #	County	Acres	Square Miles	Stream Order			
Sucam	Loft	W DID #	County	Acies	IVIIICS	Stream Order			
	Fork								
Laft	Boover								
Eorl	Creak								
FORK	Стеек								
Beaver	0.0 to								
Creek	11.4	496194_01	Floyd	40026.78	62.54	4th order			
			Sample	Sample			+ to	- from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
49	49	5.6	37.50640	-82.75550	84.5	5.6	0.50857	0.09283	84.9157

Table E.48 Left Fork Beaver Creek Site 49 Information

Table E.49 Left Fork Beaver Creek Site 49 Subwatershed Land Cover

	Watershed	Watershed	% of Total	Future Growth
Land Cover	Acres	Square Miles	Area	WLA %
Open Water	4.46	0.01	0.01	
Developed	2648.50	4.14	6.62	1
Barren Land	408.58	0.64	1.02	
Forest/Shrubland	33389.72	52.17	83.42	
Grassland/ Herbaceous	2646.27	4.13	6.61	
Pasture/Hay	872.21	1.36	2.18	
Cultivated Crops	53.72	0.08	0.13	
Wetlands	3.34	0.01	0.01	
Totals	40026.78	62.54	100.00	

Table E.50 Left Fork Beaver Creek Site 49 Water Withdrawals

AI number	Source Description	Withdrawal Facility Name	Withdrawal (cfs)	Facility Latitude	Facility Longitude
	RM 15.36 of				
1299	Beaver Creek	Elk Horn Coal Co LLC	0.09283372	37.40129	-82.74175
		subtraction from MAF	0.09283372		

Collection Date	<u>E</u> . <u>coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E</u> .	Unit Area Load (million <u>E</u> . <u>coli</u> colonies/day/acre)
05/16/08	170	N/A	N/A	N/A
05/30/08	30	11 975	8 79	0.22
5/30/08 (OA Sample)	20	N/A	N/A	N/A
06/13/08	60	7.4685	10.96	0.27
06/27/08	110	7.915	21.30	0.53
07/31/08	53000	37.108	48117.39	1202.13
08/08/08	70	8.333	14.27	0.36
08/22/08	<10	1.803	0.44	0.01
09/12/08	380	N/A	N/A	N/A
9/12/08 (QA Sample)	240	N/A	N/A	N/A
09/20/08	130	1.8648	5.93	0.15
10/17/08	100	3.999	9.78	0.24
10/24/08	170	3.356	13.96	0.35
Greatest Concentration	53000			

Table E.51 Left Fork Beaver Creek Site 49 Data

Table E.52 TMDLs for Left Fork Beaver Creek Site 49

TMDL Table					<u>E</u> . <u>coli</u> (billion colonies/day)	
					110108.9835	Existing Load
					498.6067	Total TMDL
					49.8607	MOS
					448.7460	TMDL Target
				Design		
AI		Discharger	_	Capacity		
number	KPDES #	Facility Name	Туре	(cfs)	99.59	% reduction
		WHEELWRIGHT	Sewerage			KPDES
40534	KY0028789	STP	System	0.3481265	2.0441	WLA
		MCDOWELL				KPDES
35252	KY0079421	ELEM SCHOOL	School	0.0232084	0.1363	WLA
		MCDOWELL				UDDDG
1124	XXX0005701	APPALACHIAN	TT 1/1	0.0200.116	0 1015	KPDES
1134	KY0085791	REG HOSP	Hospital	0.0309446	0.1817	WLA
		OSBORNE	~		0.0410	KPDES
35251	KY0089435	ELEM SCHOOL	School	0.0105212	0.0618	WLA
		SOUTH FLOYD				KPDES
35260	KY0093912	HIGH SCHOOL	School	0.0232084	0.1363	WLA
		LEFT BEAVER				
		CREEK	Apartment			KPDES
1255	KY0096342	TOWNHOUSES	Building	0.0278501	0.1635	WLA

				Design		
AI		Discharger		Capacity	<u>E</u> . <u>coli</u> (billion	
number	KPDES #	Facility Name	Туре	(cfs)	colonies/day)	
		MCDOWELL				
		DOLLAR				
		GENERAL	Department			KPDES
1263	KY0103136	STORE	Store	0.0007736	0.0045	WLA
			Mobile			KPDES
1305	KY0103233	S & V MHP	Home Site	0.0153176	0.0899	WLA
			Dwelling			
		MITCHELL	Other than			KPDES
1269	KYG400478	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		BLACKBURN	Other than			KPDES
1143	KYG400479	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		HICKS	Other than			KPDES
1218	KYG400567	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		STUMBO	Other than			KPDES
1327	KYG400601	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		DYE	Other than			KPDES
1182	KYG400614	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		MULLINS	Other than			KPDES
1274	KYG400714	RESIDENCE	Apartment	0.0007736	0.0045	WLA
		1000000	Dwelling	0.0007720		
		YOUMANS	Other than			KPDES
1369	KYG400724	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		BINGHAM	Other than			KPDES
1237	KYG400753	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		COOK	Other than			KPDES
1173	KYG400790	RESIDENCE	Apartment	0.0007736	0.0045	WLA
1170		TELSID LITEL	Dwelling	010007720		
		COLLINS	Other than			KPDES
1168	KYG400854	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		HALL	Other than			KPDES
1202	KYG400969	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		MEADE	Other than			KPDES
1266	KYG400970	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		HOWELL	Other than			KPDES
4356	KYG401040	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		JONES	Other than			KPDES
4349	KYG401133	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		DYE	Other than			KPDES
4333	KYG401140	RESIDENCE	Apartment	0.0007736	0.0045	WLA

				Design		
AI		Discharger		Capacity	<u>E</u> . <u>coli</u> (billion	
number	KPDES #	Facility Name	Туре	(cfs)	colonies/day)	
			Dwelling			
		TACKETT	Other than			KPDES
4332	KYG401142	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		BARTLEY	Other than			KPDES
4405	KYG401197	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		LAWSON	Other than			KPDES
15635	KYG401271	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		WILLIAMSON	Other than			KPDES
74022	KYG401406	RESIDENCE	Apartment	0.0007736	0.0045	WLA
71022	III O IOI IOO	ILLOID LIVEL	Dwelling	0.0007750	0100-12	
		STUMBO	Other than			KPDFS
74025	KYG401409	RESIDENCE	Apartment	0.0007736	0 0045	WLA
74025	N10 +01407	RESIDENCE	Dwelling	0.0007730	0.0040	WLA
		MULTING II	Other then			VDDES
74062	KVC401442	DESIDENCE		0.0007726	0.0045	WI A
74002	K10401442	RESIDENCE	Druglling	0.0007730	0.0045	WLA
			Dwelling			KDDEC
74101	V.V.C 401 470	IACKEII	Other than	0.0007726	0.0045	KPDES
74181	KYG401470	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		COLLINS	Other than			KPDES
1168	KYG401516	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		MOORE	Other than			KPDES
35887	KYG401533	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		CAUDILL	Other than			KPDES
44695	KYG401580	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		GEARHEART	Other than			KPDES
45396	KYG401587	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		HALL	Other than			KPDES
45070	KYG401590	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			
		DUFF	Other than			KPDES
48864	KYG401645	RESIDENCE	Apartment	0.0007736	0.0045	WLA
10001	110 101010		Dwelling	0.0007730		
		COCHRAN	Other than			KPDFS
48897	KYG401646	RESIDENCE	Anartment	0.0007736	0 0045	WIA
10077	110-010-0	RESIDENCE	Dwalling	0.0007730	0.0040	
		VORK	Other than			KDDES
10351	KVG401654	RESIDENCE	Apartmont	0.0007736	0.0045	WI A
+7334	K10401034	RESIDENCE	Dwalling	0.0007730	0.0043	WLA
		DI ANIZENGUID	Other there			KDDES
50021	KVC401602	DESIDENCE	A portmant	0.0007726	0.0045	NPDES WIA
30021	K10401092	RESIDENCE	Apartment	0.0007736	0.0045	WLA
			Dwelling			KDDEG
71.12.4	WWG (01000	NEWMAN	Other than	0.000772.4	0.0045	KPDES
/1436	KYG401809	RESIDENCE	Apartment	0.0007736	0.0045	WLA

AI		Discharger		Design Capacity	<u>E</u> . <u>coli</u> (billion	
number	KPDES #	Facility Name	Туре	(cfs)	colonies/day)	
74243	KYG401821	COMBS RESIDENCE	Dwelling Other than Apartment	0.0007736	0.0045	KPDES WLA
79525	KYG401931	HARVEL RESIDENCE	Dwelling Other than Apartment	0.0007736	0.0045	KPDES WLA
81193	KYG401970	MARTIN RESIDENCE	Dwelling Other than Apartment	0.0007736	0.0045	KPDES WLA
82471	KYG402002	HOPKINS RESIDENCE	Dwelling Other than Apartment	0.0007736	0.0045	KPDES WLA
103052	KYG402117	LITTLE RESIDENCE	Dwelling Other than Apartment	0.0007736	0.0045	KPDES WLA
					2.9862	Total KPDES WLA
			Addition to MAF (sum	0 5085742	445 7598	remainder
			01 013)	0.3063742	445.7598	Future Growth WLA
					7.4438	Total WLA
					441.3022	LA



Left Fork Beaver Creek Site 50

Figure E.12 Left Fork Beaver Creek Site 50

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 27 is under site 35, site 32 is under site 33, site 37 is under site 45, and site 40 is under site 47.

Left Fork Beaver Creek at site 50 (RM 0.3) is a fourth order stream located in Floyd County (Figure E.12). Its watershed consists of the Upper and Lower Left Fork Beaver Creek subwatersheds. Information about Left Fork Beaver Creek at site 50, including sample site location, waterbody identification number (WBID), and MAF is shown in Table E.53. It has a catchment of 46, 862 acres (73.2 square miles) with an 82% forested and 6.8 % developed land cover (Table E.54). Portions of this watershed around the city of Wheelwright are sewered (see Figure 5.16). There are two water withdrawals in this subwatershed (Table E.55). Sampling data from site 50 is presented in Table E.56, and the TMDL allocations in Table E.57.

Stream	Stream	WDID #	Country	Alamaa	Square	Stream Order			
Stream	Segment	W DID #	County	Acres	wines	Stream Order			
	Left								
	Fork								
Left	Beaver								
Fork	Creek								
Beaver	0.0 to								
Creek	11.4	496194_01	Floyd	46861.59	73.221	4th order			
			Sample	Sample			+ to	- from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
50	50	0.3	37.55640	-82.74970	98	0	0.51476	0.76124	97.7535

Table E.53 Left Fork Beaver Creek Site 50 Information

Table E.54 Left Fork Beaver Creek Site 50 Subwatershed Land Cover

	Watershed	Watershed	% of Total	Future Growth
Land Cover	Acres	Square Miles	Area	WLA %
Open Water	12.46	0.02	0.03	
Developed	3207.43	5.01	6.84	1.0
Barren Land	483.82	0.76	1.03	
Forest/Shrubland	38659.82	60.41	82.50	
Grassland/Herbaceous	3224.34	5.04	6.88	
Pasture/Hay	1178.07	1.84	2.51	
Cultivated Crops	90.31	0.14	0.19	
Wetlands	5.34	0.01	0.01	
Totals	46861.59	73.22	100.00	

Table E.55 Left Fork Beaver Creek Site 50 Water Withdrawals

AI		Withdrawal Facility	Withdrawal	Facility	Facility
number	Source Description	Name	(cfs)	Latitude	Longitude
	RM 15.36 of Left Fork	Elk Horn Coal Co			
1299	Beaver Creek	LLC	0.09283372	37.40129	-82.74175
	RM 2.4 of Left Fork	Black Diamond			
78571	Beaver Creek	Mining	0.6684028	37.53192	-82.74364
		subtraction from			
		MAF	0.76123652		

			Instantaneous	Unit Area Load
	<u>E</u> . <u>coli</u>	Flow	Load (billion <u>E</u> .	(million <u>E</u> . <u>coli</u>
Collection Date	(colonies/100 mls)	(cfs)	<u>coli</u> colonies/day)	colonies/day/acre)
05/16/08	390	N/A	N/A	N/A
05/30/08	600	N/A	N/A	N/A
06/13/08	220	N/A	N/A	N/A
6/13/08 (QA Sample)	190	N/A	N/A	N/A
06/27/08	70	N/A	N/A	N/A
07/11/08	390	12.956	123.62	2.64
07/31/08	27000	N/A	N/A	N/A
08/08/08	220	5.708	30.72	0.66
08/22/08	240	0.0144	0.08	0.00
09/12/08	16000	22.148	8669.88	185.01
09/20/08	170	3.596	14.96	0.32
10/17/08	180	3.155	13.89	0.30
10/24/08	10	3.413	0.84	0.02
Greatest Concentration	27000			

Table E.56 Left Fork Beaver Creek Site 50 Data

Table E.57 TMDLs for Left Fork Beaver Creek Site 50

TMDL					<u>E</u> . <u>coli</u> (billion	
Table					colonies/day)	
						Existing
					64573.5824	Load
						Total
					573.9874	TMDL
					57.3987	MOS
						TMDL
					516.5887	Target
				Design		
		Discharger Facility		Capacity		%
AI number	KPDES #	Name	Туре	(cfs)	99.20	reduction
		WHEELWRIGHT	Sewerage			KPDES
40534	KY0028789	STP	System	0.348127	2.0441	WLA
		MCDOWELL				KPDES
35252	KY0079421	ELEM SCHOOL	School	0.023208	0.1363	WLA
		MCDOWELL				
		APPALACHIAN				KPDES
1134	KY0085791	REG HOSP	Hospital	0.030945	0.1817	WLA
		OSBORNE ELEM				KPDES
35251	KY0089435	SCHOOL	School	0.010521	0.0618	WLA
		SOUTH FLOYD				KPDES
35260	KY0093912	HIGH SCHOOL	School	0.023208	0.1363	WLA
		LEFT BEAVER				
		CREEK	Apartment			KPDES
1255	KY0096342	TOWNHOUSES	Building	0.02785	0.1635	WLA
		MCDOWELL				
		DOLLAR	Department			KPDES
1263	KY0103136	GENERAL STORE	Store	0.000774	0.0045	WLA

				Design		
		Discharger Facility		Capacity	<u>E</u> . coli (billion	
AI number	KPDES #	Name	Туре	(cfs)	colonies/day)	
1005			Mobile	0.015010		KPDES
1305	KY0103233	S & V MHP	Home Site	0.015318	0.0899	WLA
			Dwelling			WDDDG
10.00		MITCHELL	Other than	0.000554	0.004	KPDES
1269	KYG400478	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			WDDDG
1142	NNG 400 470	BLACKBURN	Other than	0.000774		KPDES
1143	KYG400479	RESIDENCE	Apartment	0.000774	0.0045	WLA
		HICKO	Dwelling			KDDEC
1210		HICKS	Other than	0.000774	0.004	KPDES
1218	KYG400567	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		WRIGHT	Other than		• • • • -	KPDES
1367	KYG400579	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		STUMBO	Other than			KPDES
1327	KYG400601	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
			Other than			KPDES
1182	KYG400614	DYE RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		CURRENT	Other than			KPDES
4250	KYG400659	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		SHREWBERRY	Other than			KPDES
1315	KYG400677	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
11.00		CASTLE	Other than	0.000554	• • • • -	KPDES
1162	KYG400678	RESIDENCE	Apartment	0.000774	0.0045	WLA
		G 4 G 5	Dwelling			WDDDG
11.51		CASE	Other than	0.000554	0.004	KPDES
1161	KYG400692	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			WDDDG
1074		MULLINS	Other than	0.000774	0.0045	KPDES
1274	KYG400714	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			WDDDG
12.00	XXXC 400724	YOUMANS	Other than	0.000774	0.004	KPDES
1369	KYG400724	RESIDENCE	Apartment	0.000774	0.0045	WLA
		DDIGUAN	Dwelling			WDDDG
1005		BINGHAM	Other than	0.000	0.004	KPDES
1237	KYG400753	RESIDENCE	Apartment	0.000774	0.0045	WLA
		COOT	Dwelling			
1150		COOK	Other than	0.00077	0.004	KPDES
1173	KYG400790	RESIDENCE	Apartment	0.000774	0.0045	WLA
		COLUMN	Dwelling			UPPER
11.00	WWG 400054	COLLINS	Other than	0.00055.	0.0047	KPDES
1168	KYG400854	RESIDENCE	Apartment	0.000774	0.0045	WLA
		****	Dwelling			WDD DG
		HALL	Other than		0.05.55	KPDES
1202	KYG400969	RESIDENCE	Apartment	0.000774	0.0045	WLA

				Design		
AI number	KPDES #	Discharger Facility Name	Type	Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	
		Tume	Dwelling	(015)	coronnes, auy j	
		MEADE	Other than			KPDES
1266	KYG400970	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		HOWELL	Other than			KPDES
4356	KYG401040	RESIDENCE	Apartment	0.000774	0.0045	WLA
		LONIES	Dwelling Other there			VDDEC
4340	KVG401133	JUNES	A partmont	0.000774	0.0045	KPDES WLA
4349	K10401133	RESIDENCE	Dwelling	0.000774	0.0043	WLA
			Other than			KPDES
4333	KYG401140	DYE RESIDENCE	Apartment	0.000774	0.0045	WLA
-			Dwelling			
		TACKETT	Other than			KPDES
4332	KYG401142	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		BARTLEY	Other than			KPDES
4405	KYG401197	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			WDDDG
15625	KNC 401271	LAWSON	Other than	0.000774	0.0045	KPDES
15055	KIG4012/1	KESIDENCE	Dualling	0.000774	0.0045	WLA
		WILLIAMSON	Other than			KPDFS
74022	KYG401406	RESIDENCE	Apartment	0.000774	0.0045	WLA
71022	RIGIOTIO	RESIDENCE	Dwelling	0.000771	0.0012	
		STUMBO	Other than			KPDES
74025	KYG401409	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		MULLINS II	Other than			KPDES
74062	KYG401442	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			WDDDG
74101	XXC 401 470	TACKEIT	Other than	0.000774	0.0045	KPDES
/4181	KYG401470	RESIDENCE	Apartment	0.000774	0.0045	WLA
		COLUNS	Other than			KDDES
1168	KYG401516	RESIDENCE	Apartment	0.000774	0.0045	WLA
1100	110101010		Dwelling	0.000771		
		MOORE	Other than			KPDES
35887	KYG401533	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		CAUDILL	Other than			KPDES
44695	KYG401580	RESIDENCE	Apartment	0.000774	0.0045	WLA
		DINCUS	Dwelling			KDDEG
45072	KVG401592	DINGUS	A partment	0.000774	0.0045	WI A
43073	K10401382	RESIDENCE	Dwelling	0.000774	0.0045	VV LA
		GEARHEART	Other than			KPDES
45396	KYG401587	RESIDENCE	Apartment	0.000774	0.0045	WLA
			Dwelling			
		HALL	Other than			KPDES
45070	KYG401590	RESIDENCE	Apartment	0.000774	0.0045	WLA

		Discharger Facility		Design Capacity	E coli (billion	
AI number	KPDES #	Name	Type	(cfs)	colonies/day)	
46144	KYG401601	WILLIAMSON RESIDENCE	Dwelling Other than Apartment	0.000774	0.0045	KPDES WLA
48864	KYG401645	DUFF RESIDENCE	Dwelling Other than Apartment	0.000774	0.0045	KPDES WLA
48897	KYG401646	COCHRAN RESIDENCE	Dwelling Other than Apartment	0.000774	0.0045	KPDES WLA
49354	KYG401654	YORK RESIDENCE	Dwelling Other than Apartment	0.000774	0.0045	KPDES WLA
50021	KYG401692	BLANKENSHIP RESIDENCE	Other than Apartment	0.000774	0.0045	KPDES WLA
71436	KYG401809	NEWMAN RESIDENCE	Other than Apartment	0.000774	0.0045	KPDES WLA
74243	KYG401821	COMBS RESIDENCE	Other than Apartment	0.000774	0.0045	KPDES WLA
75141	KYG401851	LITTLE RESIDENCE	Other than Apartment	0.000774	0.0045	KPDES WLA
79525	KYG401931	HARVEL RESIDENCE	Dwelling Other than Apartment	0.000774	0.0045	KPDES WLA
81193	KYG401970	MARTIN RESIDENCE	Dwelling Other than Apartment	0.000774	0.0045	KPDES WLA
82471	KYG402002	HOPKINS RESIDENCE	Dwelling Other than Apartment	0.000774	0.0045	KPDES WLA
103052	KYG402117	LITTLE RESIDENCE	Dwelling Other than Apartment	0.000774	0.0045	KPDES WLA
					3.0226	Total KPDES WLA
			Addition to MAF (sum of cfs)	0.514763	513.5661	remainder
					5.1357	Future Growth WLA
					8.1582	Total WLA
					508,4304	LA

Appendix F. Information for Fully Supporting Segments



Rock Fork RM 0.0 to 7.0

Figure F.1 Rock Fork RM 0.0 to 7.0

Rock Fork is a second order stream located in the Lower Right Fork Beaver Creek subwatershed in Floyd County (Figure F.1). Information about Rock Fork, including sample site location, waterbody identification number (WBID), and MAF is shown in Table F.1. It has a catchment of 5,333 acres (8.3 square miles) with a 77% forested and 10.2% developed land cover (Table F.2). This subwatershed is un-sewered. There are no stream water withdrawals in this subwatershed. Sampling data from site 22 is presented in Table F.3 and KPDES-permitted sources of pathogen indicators are shown in Table F.4. Because this is a fully supporting segment, TMDLs are not calculated.

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
	Rock								
Rock	Fork 0.0								
Fork	to 7.0	502115_01	Floyd	5333.35	8.333	2nd order			
								-	
			Sample	Sample			+ to	from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
22	22	0.1	37.48001	-82.83621	11.1	0	0.00077	0.000	11.1077

Table F.1 Rock Fork RM 0.0 to 7.0 Information

Table F.2 Rock Fork RM 0.0 to 7.0 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area
Open Water	0.22	0.00	0.00
Developed	542.96	0.85	10.18
Barren Land	67.81	0.11	1.27
Forest/Shrubland	4082.22	6.38	76.54
Grassland/Herbaceous	466.92	0.73	8.75
Pasture/ Hay	163.64	0.26	3.07
Cultivated Crops	9.12	0.01	0.17
Wetlands	0.44	0.00	0.01
Totals	5333.35	8.33	100.00

Table F.3 Rock Fork RM 0.0 to 7.0 Data (site 22)

	<u>E</u> . <u>coli</u>	Flow	Instantaneous Load	Unit Area Load
Collection Date	mls)	(cfs)	colonies/day)	colonies/day/acre)
05/16/07	160	5.226	20.46	3.84
05/30/07	70	2.975	5.09	0.96
06/13/07	50	2.315	2.83	0.53
06/27/07	1600	2.025	79.27	14.86
07/10/07	80	1.705	3.34	0.63
07/26/07	1900	1.887	87.72	16.45
08/17/07	60	1.485	2.18	0.41
08/31/07	60	N/A	N/A	
09/14/07	200	1.924	9.41	1.77
09/28/07	110	0.955	2.57	0.48
10/12/07	100	1.023	2.50	0.47
10/12/07 (QA Sample)	90	N/A	N/A	N/A
11/16/07 (outside PCR season)	600	1.597	23.44	4.40

Table F.4 Rock Fork RM 0.0 to 7.0 Sources

AI number	KPDES #	Discharger Facility Name	Design Capacity (cfs)	Sic Code	Facility Latitude	Facility Longitude
15655	KYG401296	WEBB RESIDENCE	0.0007736	Dwelling Other than Apartment	37.474444	-82.845
		addition to MAF	0.0007736			



Right Fork Beaver Creek RM 23.3 to 30.3

Figure F.2 Right Fork Beaver Creek RM 23.3 to 30.3

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 32 is under site 33, site 37 is under site 45, and site 40 is under site 47.

Right Fork Beaver Creek at RM 23.3 is a fourth order stream located in the Upper Right Fork Beaver Creek subwatershed in Knott County (Figure F.2). Information about Right Fork Beaver Creek RM 23.3 to 30.3, including sample site location, waterbody identification number (WBID), and MAF is shown in Table F.5. It has a catchment of 27,178 acres (42.5 square miles) with an 83% forested and 5.3% developed land cover (Table F6). This subwatershed is unsewered. There are two stream water withdrawals in this subwatershed (Table F.7). Sampling data from site 33 is presented in Table F.8 and KPDES-permitted sources of pathogen indicators are shown in Table F.9. Because this is a fully supporting segment, TMDLs are not calculated.

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
	Right								
	Fork								
Right	Beaver								
Fork	Creek								
Beaver	23.3 to								
Creek	30.3	501863_03	Knott	27178.24	42.466	4th order			
			Sample	Sample			+ to	- from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
33	33	23.4	37.4173	-82.79682	58	23.3	0.01083	0.425488	57.5853

Table F.5 Right Fork Beaver Creek RM 23.3 to 30.3 Information

Table F.6 Right Fork Beaver Creek RM 23.3 to 30.3 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area
Open Water	11.56	0.02	0.04
Developed	1436.18	2.24	5.28
Barren Land	333.14	0.52	1.23
Forest/Shrubland	22586.82	35.29	83.11
Grassland/Herbaceous	2358.65	3.69	8.68
Pasture/ Hay	436.55	0.68	1.61
Cultivated Crops	14.46	0.02	0.05
Wetlands	0.89	0.00	0.00
Totals	27178.24	42.47	100.00

Table F.7 Right Fork Beaver Creek RM 23.3 to 30.3 Water Withdrawals

AI	Source	Withdrawal Facility	Withdrawal	Facility	Facility
number	Description	Name	(cfs)	Latitude	Longitude
	RM 40.6				
	Right Fork				
	Beaver	ICG Knott Co LLC (860-			
2528	Creek	8012)	0.410016	37.32166	-82.80366
	RM 31.0				
	Right Fork				
	Beaver	Deane Mining LLC (860-			
2525	Creek	5318)	0.015472	37.41038	-82.78096
		subtraction from MAF	0.425488		

September, 2010

	E. coli		Instantaneous Load	Unit Area Load
	(colonies/	Flow	(billion E. coli	(million E. coli
Collection Date	100 mls)	(cfs)	colonies/day)	colonies/day/acre)
05/15/07	150	431.7758	1584.56	58.30
05/30/07	<10	11.65	2.85	0.10
06/13/07	120	5.073	14.89	0.55
06/27/07	330	4.539	36.65	1.35
07/10/07	150	2.844	10.44	0.38
07/26/07	2500	20.381	1246.59	45.87
08/17/07	100	2.148	5.26	0.19
08/31/07	150	N/A	N/A	N/A
09/14/07	180	2.088	9.20	0.34
09/28/07	10	N/A	N/A	N/A
10/12/07	20	N/A	N/A	N/A
11/16/07 (outside PCR				
season)	290	2.4992	17.73	0.65
11/16/07 (QA Sample)	470	2.4992	N/A	N/A

Table F.8 Right Fork Beaver Creek RM 23.3 to 30.3 Data (Site 33)

Table F.9 Right Fork Beaver Creek RM 23.3 to 30.3 Sources

AI number	KPDES #	Discharger Facility Name	Design Capacity (cfs)	Sic Code	Facility Latitude	Facility Longitude
		BEAVER CREEK ELEM				
33945	KY0077542	SCHOOL	0.0108306	School	37.351111	-82.812222
		addition to MAF	0.0108306			

Left Fork Beaver Creek RM 13.55 to 18.7



Figure F.3 Left Fork Beaver Creek RM 13.55 to 18.7

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 37 is under site 45, and site 40 is under site 47.

Left Fork Beaver Creek at RM 13.55 is a fourth order stream located in the Upper Left Fork Beaver Creek subwatershed in Floyd County (Figure F.3). Information about Left Fork Beaver Creek RM 13.55 to 18.7, including sample site location, waterbody identification number (WBID), and MAF is shown in Table F.10. It has a catchment of 22,569 acres (35.3 square miles) with an 85% forested and 7% developed land cover (Table F.11). This subwatershed is sewered around the city of Wheelwright (Figure F.4). There is one stream water withdrawal in this subwatershed (Table F.12). Sampling data from site 33 is presented in Table F.13 and KPDES-permitted sources of pathogen indicators are shown in Table F.14. Because this is a fully supporting segment, TMDLs are not calculated.

							-		
Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
	Left Fork								
Left	Beaver								
Fork	Creek								
Beaver	13.55 to								
Creek	18.7	496194_03	Floyd	22568.84	35.264	4th order			
			Sample	Sample			+ to	- from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
47	47	13.55	37.42999	-82.73404	48.4	13.55	0.38959	0.09283	48.6967

Table F.10 Left Fork Beaver Creek RM 13.55 to 18.7 Information

Table F.11 Left Fork Beaver Creek RM 13.55 to 18.7 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area
Open Water	0.00	0.00	0.00
Developed	1572.82	2.46	6.97
Barren Land	205.39	0.32	0.91
Forest/Shrubland	19203.80	30.01	85.09
Grassland/Herbaceous	1277.08	2.00	5.66
Pasture/ Hay	282.39	0.44	1.25
Cultivated Crops	25.81	0.04	0.11
Wetlands	1.56	0.00	0.01
Totals	22568.84	35.26	100.00

Table F.12 Left Fork Beaver Creek RM 13.55 to 18.7 Water Withdrawals

AI number	Source Description	Withdrawal Facility Name	Withdrawal (cfs)	Facility Latitude	Facility Longitude
	RM 15.36 of Left Fork				
1299	Beaver Creek	Elk Horn Coal Co LLC	0.09283372	37.40129	-82.74175
		subtraction from MAF	0.09283372		



Figure F.4 Left Fork Beaver Creek RM 13.55 to 18.7 Sewer Lines

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 32 is under site 33, site 37 is under site 45, and site 40 is under site 47.

	E. coli		Instantaneous Load	Unit Area Load
	(colonies/100	Flow	(billion E. coli	(million E. coli
Collection Date	mls)	(cfs)	colonies/day)	colonies/day/acre)
05/16/08	90	N/A	N/A	N/A
05/30/08	300	7.0056	51.42	2.28
06/13/08	40	4.5576	4.46	0.20
06/27/08	40	2.8755	2.81	0.12
07/11/08	10	4.733	1.16	0.05
07/31/08	7500	26.059	4781.65	211.87
08/08/08	210	0.032	0.16	0.01
8/8/08 (QA Sample)	250	N/A	N/A	N/A
08/22/08	100	2.025	4.95	0.22
09/12/08	230	6.1594	34.66	1.54
09/20/08	30	3.2045	2.35	0.10
10/17/08	130	2.695	8.57	0.38
10/24/08	110	1.4958	4.03	0.18

Table F.13 Left Fork Beaver Creek RM 13.55 to 18.7 Data (site 47)

Table F.14 Left Fork Beaver	Creek RM 13.55 to 18.7 Sources
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			Design			
Al	KDDES #	Discharger Facility	Capacity	Tupe	Facility Latitude	Facility Longitude
number	KI DES #		(015)	Туре	Latitude	Longhude
40524	1/1/00/20/200	WHEEL-WRIGHT	0.0401065	Sewerage	27 240000	00 7175
40534	KY0028789	STP	0.3481265	System	37.348888	-82.7175
		OSBORNE ELEM				
35251	KY0089435	SCHOOL	0.0105212	School	37.363611	-82.73028
			0.000000			
2 7 2 5 0		SOUTH FLOYD	0.0232084			
35260	KY0093912	HIGH SCHOOL	4	School	37.385298	-82.73556
1074		MULLINS	0.000	Dwelling other		
1274	KYG400714	RESIDENCE	0.0007736	than Apartment	37.427777	-82.74389
1005		BINGHAM	0.000	Dwelling other		
1237	KYG400753	RESIDENCE	0.0007736	than Apartment	37.387777	-82.70639
		COOK		Dwelling other		
1173	KYG400790	RESIDENCE	0.0007736	than Apartment	37.377777	-82.68861
		MEADE		Dwelling other		
1266	KYG400970	RESIDENCE	0.0007736	than Apartment	37.372777	-82.67556
		JONES		Dwelling other		
4349	KYG401133	RESIDENCE	0.0007736	than Apartment	37.353611	-82.73556
				Dwelling other		
4333	KYG401140	DYE RESIDENCE	0.0007736	than Apartment	37.401388	-82.74
		MULLINS II		Dwelling other		
74062	KYG401442	RESIDENCE	0.0007736	than Apartment	37.3925	-82.73944
		TACKETT		Dwelling other		
74181	KYG401470	RESIDENCE	0.0007736	than Apartment	37.319444	-82.69833
		CAUDILL		Dwelling other		
44695	KYG401580	RESIDENCE	0.0007736	than Apartment	37.332777	-82.71639
		COCHRAN		Dwelling other		
48897	KYG401646	RESIDENCE	0.0007736	than Apartment	37.375833	-82.73361
		addition to MAF	0.3895923			



Spurlock Creek RM 0.6 to 4.0

Figure F.5 Spurlock Creek RM 0.6 to 4.0

Spurlock Creek at RM 0.6 is a third order stream located in the Lower Left Fork Beaver Creek subwatershed in Floyd County (Figure F.5). Information about Spurlock Creek RM 0.6 to 4.0, including sample site location, waterbody identification number (WBID), and MAF is shown in Table F.15. It has a catchment of 2,358 acres (3.7 square miles) with a 78% forested and 7.4% developed land cover (Table F.16). This subwatershed is un-sewerd. There are no stream water withdrawals in this subwatershed. Sampling data from site 52 is presented in Table F.17 and KPDES-permitted sources of pathogen indicators are shown in Table F.18. Because this is a fully supporting segment, TMDLs are not calculated.

Stream	Stream	WBID #	County	Acres	Square Miles	Stream Order			
Sitcain	Segment	WDID #	County	Acies	whics	Sucan Oluci			
	Spurlock								
	Creek								
Spurlock	0.6 to								
Creek	4.0	504191_02	Floyd	2357.79	3.68	3rd order			
			Sample	Sample			+ to	- from	Adjusted
EKU	MAP	Sample	Site	Site	MAF	RM of MAF	MAF	MAF	MAF
Site #	Site #	Point RM	Latitude	Longitude	(cfs)	Determination	(cfs)	(cfs)	(cfs)
52	52	0.6	37.527254	-82.73617	5	0.6	0.00309	0	5.00309

Table F.15 Spurlock Creek RM 0.6 to 4.0 Information

Table F.16 Spurlock Creek RM 0.6 to 4.0 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	
Open Water	5.16	0.01	0.22	
Developed	175.07	0.27	7.43	
Barren Land	67.47	0.11	2.86	
Forest/Shrubland	1848.93	2.89	78.42	
Grassland/Herbaceous	220.13	0.34	9.34	
Pasture/Hay	35.87	0.06	1.52	
Cultivated Crops	4.71	0.01	0.20	
Wetlands	0.45	0.00	0.02	
Totals	2357.79	3.68	100.00	

Table F.17 Spurlock Creek RM 0.6 to 4.0 Data (site 52)

	<u>E</u> . <u>coli</u>		Instantaneous Load	Unit Area Load	
	(colonies/100	Flow	(billion <u>E</u> . <u>coli</u>	(million <u>E</u> . <u>coli</u>	
Collection Date	mls)	(cfs)	colonies/day)	colonies/day/acre)	
05/16/08	10	2.113	0.52	0.22	
05/30/08	110	0.498	1.34	0.58	
06/13/08	30	0.538	0.39	0.17	
06/27/08	20	0.721	0.35	0.15	
07/11/08	110	0.832	2.24	0.96	
07/31/08	>80000	13.349	26127.47	11249.59	
08/08/08	60	0.1285	0.19	0.08	
8/8/08 (QA Sample)	40	N/A	N/A	N/A	
08/22/08	<10	0.072	0.02	0.01	
09/12/08	70	0.801	1.37	0.59	
09/20/08	20	0.601	0.29	0.13	
10/17/08	30	0.633	0.46	0.20	
10/24/08	<10	0.505	0.12	0.05	

Table F.18 Spurlock Creek RM 0.6 to 4.0 Sources

			Design			
AI		Discharger	Capacity		Facility	Facility
number	KPDES #	Facility Name	(cfs)	Туре	Latitude	Longitude
				Dwelling		
		SHREWBERRY		other than		
1315	KYG400677	RESIDENCE	0.0007736	Apartment	37.504444	-82.71611
				Dwelling		
		CASTLE		other than		
1162	KYG400678	RESIDENCE	0.0007736	Apartment	37.518611	-82.72167
				Dwelling		
		CASE		other than		
1161	KYG400692	RESIDENCE	0.0007736	Apartment	37.505833	-82.71194
				Dwelling		
		WILLIAMSON		other than		
46144	KYG401601	RESIDENCE	0.0007736	Apartment	37.502777	-82.72417
				<u> </u>		
		addition to MAF	0.0030945			