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Fleming County Conservation District

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Table of Contents

Executive Summary

The overall goal of the Fleming Creek Clean Water Action Plan was to reduce non-point source pollution in the Fleming Creek Watershed and improve the bacterial and biological integrity of the streams within the project area. The primary focus of this project was and is to restore and remove the impaired use designation of streams within the Fleming Creek watershed. This is being accomplished by implementing demonstration Best Management Practices (BMPs) on agricultural operations and implementing the whole-farm planning process in two sub-watersheds within the Fleming Creek watershed. Water quality issues addressed in this project were bacteria, nutrients, and sediment, as well as other pollutants from non-point sources including livestock operations and cropland. The whole-farm planning process was used to identify and evaluate the implementation of agricultural BMPs that when fully implemented will permit sustained use of the natural resources and meet specific quality criteria. BMPs installed with cost-share assistance through this project included livestock exclusion fencing, rotational grazing establishment, including pasture division fencing, alternative livestock watering facilities, and pasture and hayland seeding for improved forage quality, stream crossings, critical area plantings, heavy use areas, stream crossings, and grassed waterways. During the on-farm planning phase all resource concerns were addressed to reduce the maximum amount of non-point source pollution as possible from entering Fleming Creek.

To assess the improvement of stream health within the Fleming Creek watershed bacteriological and biological monitoring were conducted in 2004 and 2005 by Redwing Ecological, an independent contractor. After collected data was compiled and analyzed it was determined there was a slight improvement in water quality compared to the Fleming Creek Watershed Non-Point Source Demonstration Project – Final Report May 2000 on a majority of the samples sites.

A project oversight committee facilitated, directed, reviewed and approved progress of the project as it was implemented. The Oversight committee consisted of representatives from local, state, and national organizations.

Through educational outreach cooperators and landusers were introduced to proven technologies that produced sustaining economic viability while improving water quality within their watershed. Technology demonstrations of implemented BMPs were presented to producers at field days and public meetings in the area to encourage implementation and adoption of the practices displayed, while showcasing the needed operation and maintenance required to fully gain the benefits of the installed BMPs.

Introduction & Background

The overall goal of the Fleming Creek Clean Water Action Plan (CWAP) is to reduce nonpoint source pollution in Kentucky's waterways and improve the biological and chemical integrity of streams within the Fleming Creek project area. The Fleming Creek Watershed is contained almost entirely within Fleming County, which is located in northeastern Kentucky. Drainage from Fleming Creek generally flows east to west and enters the Licking River in northeastern Nicholas County. The Fleming Creek Hydrologic Unit Code (HUC) is 05100101200. A wastewater treatment plant for Flemingsburg, the county seat, is located on Town Branch, a tributary draining into Fleming Creek; this is the only permitted discharge into Fleming Creek or any of its tributaries. Implementation of BMPs on agricultural operations and implementing the whole-farm planning process addressed the resource concerns applicable to water quality within the Fleming Creek project area. Application and installation of appropriate conservation practices were expected to reduce the nonpoint source pollution from agricultural operations.

Fleming Creek is impaired by pathogens (bacteria), nutrients, and organic enrichment/ low dissolved oxygen. A Total Maximum Daily Load (TMDL) for pathogens has been developed and approved by the Environmental Protection Agency (EPA). (KDOW 2000). Water quality issues that were addressed in the Fleming Creek Project area include bacteria, nutrients, solids transported via runoff (organic matter, nutrient-laden sediments), and other pollutants from non-point sources including livestock operations and cropland. Bacteria was the primary water quality parameter to be addressed through the implementation of the Fleming Creek Clean Water Action Plan. Dairy and beef cattle operations comprise the majority of agricultural livestock operations within the 61,670 acre watershed. The project area is located entirely in Fleming County.

The Kentucky Division of Water (KDOW) has been gathering physiochemical, bacteriological, and biological data to establish water quality conditions in the Fleming Creek watershed. KDOW efforts began in 1992 and continued semi-annually. Bacterial results indicated high fecal coliform and fecal counts, with fecal coliform levels exceeding six times the state criteria for primary contact recreation on two small tributaries in the watershed (KDOW, 1994). Fleming Creek had a Total Maximum Daily Load (TMDL) developed and published in April 2001.

Water quality findings published in the March 1996 "Fleming Creek Demonstration Project: Pre-BMP Report" by the KDOW indicate that water quality is somewhat degraded within the study area. Several stream reaches have been listed as use impaired (KDOW) 1994): Primary Contact Recreation – Fleming Creek mainstem, Allison Creek, Craintown Branch, Sleepy Run, Wilson Run; Primary Contact Recreation (partial support) – Flat Run, Poplar Creek, Cassidy Creek, Logan Run; Warmwater Aquatic Habitat – Allison Creek; Warmwater Aquatic Habitat (partial support) – Craintown Branch (KDOW Report 1996 Fleming Creek Demonstration Project).

The Kentucky Division of Conservation served as the lead agency for this project, administering the project. Other cooperating agencies and entities were: USDA-NRCS, KDOW, KDOC, Fleming County Conservation District, Kentucky Farm Bureau, University of Kentucky Cooperative Extension Services, and Community Farm Alliance.

Bacteria was the primary parameter targeted for improvement of water quality. Bacteriological sampling was conducted to document changes in water quality. Biological monitoring assessment, specifically macroinvertebrate data, was also conducted in the Fleming Creek watershed during this project. KDOW conducted previous biological assessment in the Fleming Creek Watershed. Sampling site location, timing, and assessment protocols were determined by KDOW and are outlined in the approved QA/QC plan for this project (Appendix B). Grab samples for fecal coliform monitoring and flow data were collected on the second Wednesday of each month during the primary contact recreation season (May – October) at each of 28 sites throughout the watershed. These samples were transported to Morehead State University's water testing lab for analysis. Redwing Ecological Services provided interpretation of the collected data.

The primary focus of the Fleming Creek CWAP was to restore the 303d listed streams to meet state water quality standards. Accomplishing this for the use impaired streams listed above required whole-farm planning. BMPs that addressed resource concerns of the landuser, watershed concerns and specifically impacted water quality were implemented in two sub-watersheds of the Fleming Creek watershed. The two sub-watersheds that were targeted showed very high fecal amounts according the Fleming Creek TMDL (KDOW, 2001). The Fleming Creek Oversight Committee realized early in the implementation phase of this project the financial constraints of implementing the whole-farm planning process in the entire watershed, they then made the decision based on the TMDL to target Allison Creek and Wilson Run sub-watersheds for BMP implementation.

BMP implementation began in the spring of 2002 with nine farms being approved for cost-share assistance. A ranking worksheet (Appendix D) was developed to determine eligibility for the CWAP cost-share program. Cost-share assistance was provided for BMPs that improved water quality and were included in the BMP Implementation Plan (Appendix C). CWAP was used to subsidize existing cost-share programs such as the Conservation Reserve Program (CRP), Environmental Quality Improvement Program (EQIP), and Kentucky's state cost-share program. Cost-share assistance was provided only to the producers that agreed to exclude livestock from all blue-line streams on their farm. Other BMPs eligible for cost share assistance were: alternative watering systems, including pipeline and tanks installed from municipal water sources or existing ponds, pond construction and spring development; internal fencing for rotational grazing development; grassed waterways; critical area plantings; pasture or hayland seeding; stream crossings; and heavy use areas. All BMPs installed were required to meet NRCS Standards and Specifications as outlined in the Field Office Technical Guide. Before implementation of BMP's could begin all approved landowner's were required to read and sign the Fleming Creek Clean Water Action Plan Standards and Specifications for

Best Management Practice Installation, the Fleming Creek Clean Water Action Plan (CWAP) Administrative Regulations, and the Operation & Maintenance Agreement (Appendix D).

Results & Discussion

BMP Implementation

The Fleming Creek CWAP project has been able to installed cost-shared BMPs on 4 farms in the Wilson Run watershed and 5 farms in the Allison Creek watershed. Livestock exclusion fence was installed all blue-line streams on these farms to exclude livestock from the streams, a total of 27,914 feet of fence were installed during this project. Critical area plantings were established to reduce sediment laden run-off from entering waterways on actively eroding land, 4.9 acres of critical area plantings were addressed during this project. A total of 11,730 square feet of heavy use area consisting of filter fabric and rock were installed to eliminate massive erosion from animal feeding areas. Four ponds were constructed and 12 livestock watering tanks installed during this project to allow adequate water distribution for rotational grazing systems, after the cattle were excluded from the streams. A total of 612 acres of pasture or hayland was also seeded to a grass legume mixture after eradicating the previously established fescue. This was done to improve forage quality for livestock and also to provide better forage for wildlife species. Four stream crossing were also installed to facilitate cattle and equipment movement from one side of the stream to other for day-to-day farming operations. These stream crossings were installed using filter fabric and gravel to stabilize and prevent erosion of the stream banks. One animal waste system improvement project was installed consisting of 3000 feet of permently installed underground pipe for manure transfer from an existing lagoon to the crop fields were it was to be applied for crop uptake as nutrients. A total of $210,880.43 was spent to address 1900 acres using the whole-farm planning technique to address all of the resource concerns on these acres. See Appendix F for BMP breakdown.

Training & Education

The first public education meeting under this project was held at the Fleming-Mason Energy auditorium and approximately 75 people were in attendance. Invitations were mailed to all landowners in the Allison Branch and Wilson Run watersheds and was announced on the local radio station and published in the Flemingsburg Shopper. During the meeting several water quality issues were discussed and available cost-share programs explained.

The second public meeting was also held at the Fleming-Mason Energy Auditorium and about 80 landowners were addressed. Available cost-share programs were the topic. The Kentucky Soil Erosion & Water Quality Cost-Share program, the Phase I & II Tobacco Settlement Programs, the Environmental Quality Improvement Program, the Conservation Reserve Program, and the Fleming Creek Clean Water Action Plan were all explained as to the available cost-share incentives, available BMPs and qualifications and criteria for each program. The meeting ended with Redwing Ecological Services giving a brief overview of the water quality monitoring that was completed in 2004.

The first farm field day hosted during this project discussed noxious weeds, foot and mouth disease, native warm season grasses, rotational grazing, riparian buffers, responsible logging, wildlife management, and vegetable production. The farm field day was held on four adjoining farms in the Craintown Branch watershed where several BMPs had previously been installed through several different programs from different agencies.

The second field day was held on the Spencer Rapp & Family farm in the Allison Creek watershed. Topics of discussion were herd health, intensive grazing, riparian area protection, fencing, sink hole protection, forage quality, and hay storage. This farm demonstrated many of the BMPs that are available through the CWAP program, but were installed through either the CRP program or EQIP. All of the waterways on this farm were fencing utilizing CRP monies and a spring was developed, ponds fenced, and livestock watering facilities were installed with EQIP monies.

Education and training is done on a daily basis in the Fleming County Conservation District. Everyday we are faced with the challenge of educating the farmers of this community on water quality, the importance of BMP implementation, and good farm management. These are the issues we try to communicate to every landowner and landuser that enter our door requesting assistance. Many times we cannot offer monetary assistance, but we can always offer our knowledge and expertise in improving water quality to enable agriculture to become a sustainable endeavor.

Water Quality Monitoring

The Water Quality Report is found in attached separately as it was prepared by Redwing Ecological Services, the independent contractor hired to complete this portion of the project.

Conclusions

The Fleming Creek Clean Water Action Plan has been and continues to be a work in progress. The Fleming Creek watershed has shown many improvements from the time when the first interest was taken 12 years ago, however there is still much work to be done. The hardest challenge is to change how we think about landuse and how it will affect water quality in the future. Fleming Creek watershed is a large diverse watershed that is ever changing. Agriculture as a whole in this area is radically changing with the changes in the tobacco program, and everyone is faced with the challenge of adapting to these changes. Farming is very uncertain at this time and no one knows what tomorrow might bring, but we as the educators must learn to face and address these changes as they evolve. By being adaptable we will be able to assist the landowners and landusers in using their land in an environmentally friendly way to allow for sustainable agriculture to become a reality.

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Summary Report - 2004 and 2005

Redwing Ecological Services, Inc. is pleased to submit the following Results and Discussion and Summary sections for 2004 and 2005 Water Quality and Biological Monitoring services as part of the Fleming Creek Water Action Plan Watershed Restoration Project (CWAP) - Water Quality Monitoring Component in Fleming County, Kentucky.

RESULTS AND DISCUSSION

Bacteriological Survey

Water samples were collected at 30 sampling locations on the second Wednesday of each month during the Primary Contact Recreation (PCR) season (May through October) in 2004 and 2005 for fecal coliform (FC) analysis (Appendix A). Sampling locations for stream discharge data were the same locations utilized for FC monitoring by the KDOW during the Phase I sampling for the Fleming Creek Watershed Non-point Source Demonstration Project- Final Report May 2000.

All data is presented as FC load (colonies/day) and compared against the Water Quality Standard (WQS) designated for the PCR. The maximum allowable FC concentration during the PCR is 400 colonies/100mL. Loads were determined from in-situ stream discharge measurements taken at the time of each bacteriological water sample. Sites that were inaccessible or dry at the time of the sampling event were included in the analysis.

In any given month during 2004, greater than 73% of the sites did not support PCR designated uses with the exception of the August sample. In August 2004, only 38% (9 out of 24) of the sites exceeded the WQS. In comparison, only four of the 27 sites sampled in July met WQS. The 2005 sampling season was dramatically drier than 2004; especially during the second half of the PCR season. During the first three months, greater than 55% of the sites each month did not support PCR designated uses. During the last three months, less than 29% of the sites did not support PCR designated uses. During the driest period of the year, only one site in September 2005 and two sites in October 2005 exceeded the WQS.

Overall, the majority of sites sampled over the two year period contained significantly higher FC concentrations than are designated for use during the PCR. There is a noticeable drop in FC load during dry periods of the year as shown in the August 2004 data as well as data from August, September and October 2005. This illustrates the necessity to ensure proper installation of Best Management Practices (BMP's) during wet periods of the year.

Biological Monitoring

Macroinvertebrate samples were collected the first week of May 2004 and 2005 at Allison Creek (05029020), Craintown Branch (05029015) and Fleming Creek (05029031). A 200-organism subsample was identified for each site and sampling event (Appendix B). The modified Hilsenhoff Biotic Index (mHBI), Macroinvertebrate Bioassessment Index (MBI), taxa richness, Ephemeroptera-Plecoptera-Trichoptera (EPT) taxa richness, percentage of EPT abundance (%EPT), percent contribution of the five dominant taxa (PCD-5), percent Chironomidae and Oligochaeta (%Chir+%Olig), and the percent primary clingers (%Clingers) metrics were used to evaluate the macroinvertebrate community. The 2004 and 2005 data are presented below and compared to pre-BMP samples taken in 1992, 1993 and 1994 as well as the post-BMP sample in 1998 (KDOW 2000).

Modified Hilsenhoff Biotic Index

The mHBI scores for all three sites are shown in Figure 1. Classifications are derived from research conducted in the Midwest and originally presented by Hilsenhoff 1987. Allison Creek

scores show an increase from poor/very significant organic pollution in 1998 to fair/fairly significant organic pollution in 2004 and 2005, similar to pre-BMP scores. Craintown Branch mHBI scores show improvement from fairly poor/significant organic pollution since 1993 to good/some organic pollution in 2005. Fleming Creek mHBI scores are fairly consistent throughout with scores fluctuating between good and fair. The mHBI scores from Allison Creek and Craintown Branch suggest that organic pollution is being reduced; possibly as a result of successful BMP implementation.

Macroinvertebrate Bioassessment Index

The MBI scores (Figure 2) for 2004 and 2005 were derived using the Kentucky Macroinvertebrate Bioassessment Index as described in KDOW 2003 whereas scores from 1993 to 1998 were derived following KDOW's Methods for Assessing Biological Integrity of Surface Waters 1993. As a result, the index scores at first glance appear higher in 2004 and 2005; however, the corresponding classification for each score is comparable, as shown in Figure 2. A slight improvement in Allison Creek from poor/very poor to poor/fair is shown in 2004 and 2005 after following a downward trend since 1993. Craintown Branch and Fleming Creek remain fairly consistent with poor to fair classifications. These results are consistent with the mHBI scores indicating a possible reduction in the amount of organic pollution.

Richness Metrics

Taxa richness and EPT richness (Figure 3) show slight long-term downward trends at all three sites. Decreasing richness metric scores suggests an increase in perturbations. However, these metrics are also influenced significantly by timing of larval emergence events, field conditions during sampling events and sampling bias. Long-term post-BMP monitoring of macroinvertebrates will be necessary to capture trends in community responses to BMP efforts and improved water quality.

Composition Metrics

Percentage of EPT taxa (Figure 4) are similarly erratic at all three sites. Dramatic fluctuations in %EPT are evident across all three sites. Years with extremely low %EPT values may relate to instances of localized perturbation, whereas higher %EPT would relate to recovery events. The PCD-5 metric has been consistently high during all sampling events. In 2004, Allison Creek and Craintown Branch were dominated by tolerant Asellidae and Chironomidae taxa whereas Fleming Creek was dominated by moderately tolerant Perlidae and Elmidae taxa. In 2005, Craintown Branch was dominated by moderately tolerant Perlidae and Elmidae taxa. Allison Creek and Fleming Creek were dominated by Perlidae and Elmidae in 2004 as well, but were also dominated by tolerant taxa of Chironomidae and Asellidae. Often communities dominated by few taxa reflect degraded communities.

The table below presents two additional composition metrics that were scored in 2004 and 2005 that were not used in KDOW 2000. These two metrics, %Chir+%Olig and %Clingers, will give more insight into community evolution and are also included in the MBI calculation. The %Chir+%Olig increased at all three sites, most prominently in Allison creek (12% to 36%), from 2004 to 2005; an expected response to increased perturbations. In contrast, Allison Creek and Craintown Branch showed increases in %Clingers (25% to 33% and 12% to 56% respectively), a metric indicating availability of substrate stability. Fleming Creek %Clingers decreased from 56% in 2004 to 25% in 2005. Many of these contrasting shifts in composition metric scores from year to year may be indicative of a dynamic community, influenced in part by changes in water quality and habitat availability.

	2004			2005		
Metric	**05029020**	**05089015**	**05029031**	**05029020**	**05089015**	**05029031**
%Chir+%Olig	12	16	12	36	18	16
%Clingers	25	12	56	33	56	25

SUMMARY

It is evident that continued, and increased BMP implementation is necessary to effect water quality improvements in the Fleming Creek Watershed. Significant and stable trends in macroinvertebrate indices and metric scores will become evident as the watershed adjusts and matures in response to long-term BMP use. Long-term monitoring will be necessary in order to confidently identify trends in biological communities in response to BMP implementation.

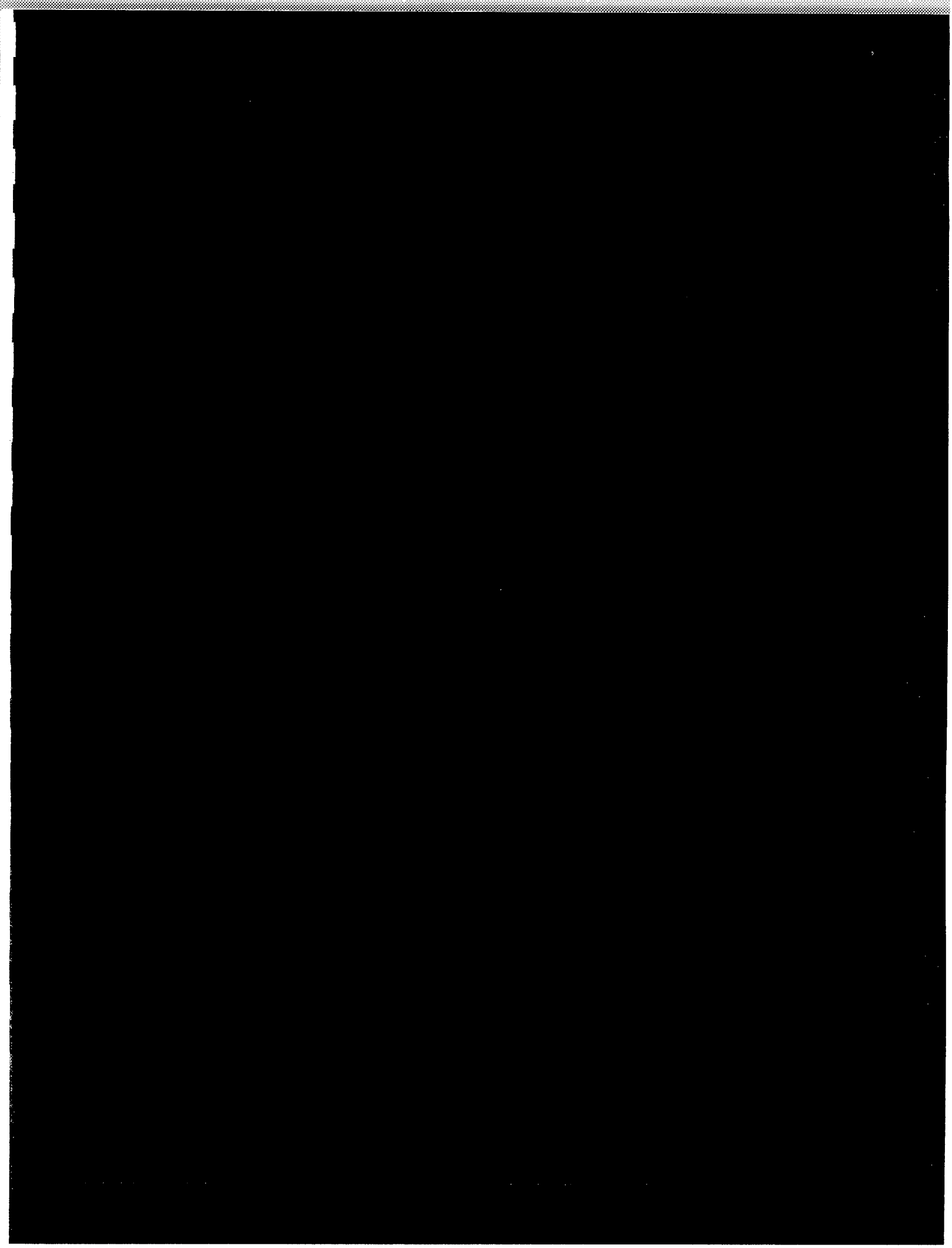

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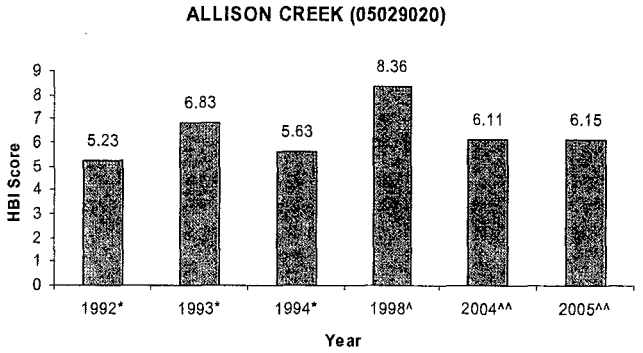
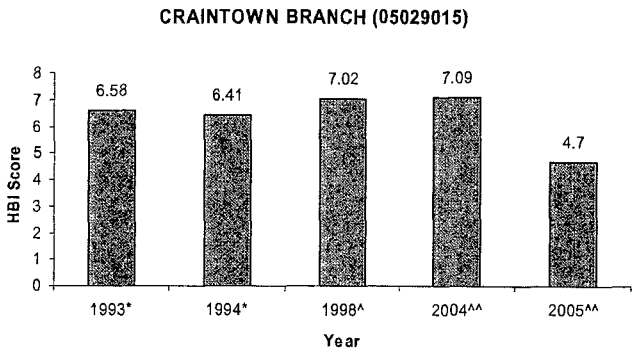
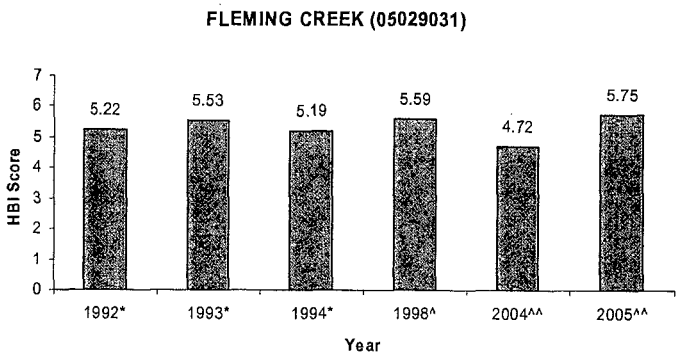
Figure 1. Comparison of mHBI scores for macroinvertebrate samples. Pre-BMP years indicated by an asterisk (*) from KDOW 1996, Post-BMP years indicated by (^) from KDOW 2000 and (^^) from the Fleming County Conservation District.



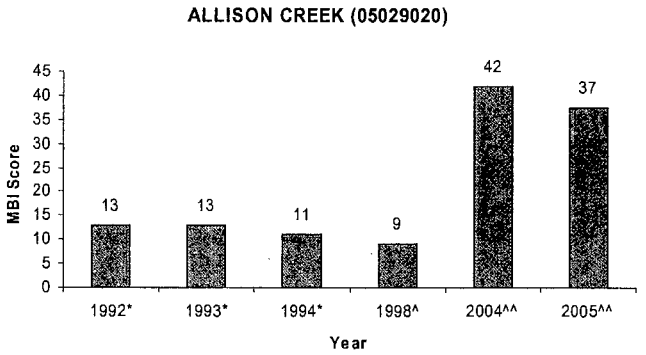


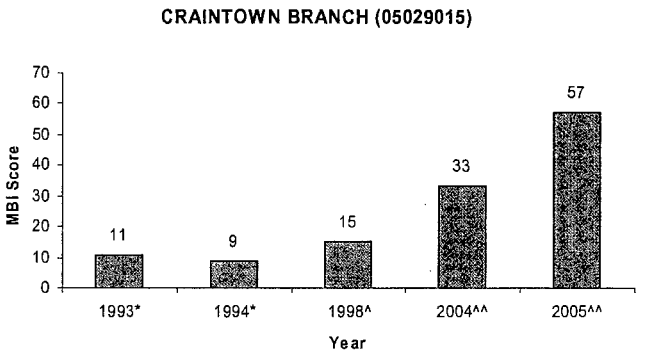


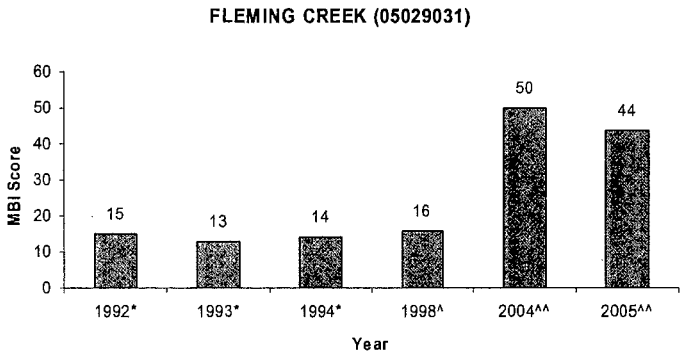
Notes: mHBI scores and classifications

Score	Water Quality	Degree of Organic Pollution
0.00-3.50	Excellent	No apparent organic pollution
3.51-4.50	Very good	Possible slight organic pollution
4.51-5.50	Good	Some organic pollution
5.51-6.50	Fair	Fairly significant organic pollution
6.51-7.50	Fairly poor	Significant organic pollution
7.51-8.50	Poor	Very significant organic pollution
8.51-10.00	Very poor	Severe organic pollution

Figure 2. Comparison of MBI scores for macroinvertebrate samples. Pre-BMP years indicated by an asterisk (*) from KDOW 1996, Post-BMP years indicated by (^) from KDOW 2000 and (^^) from the Fleming County Conservation District.



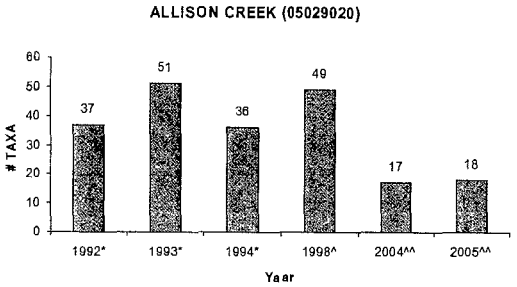


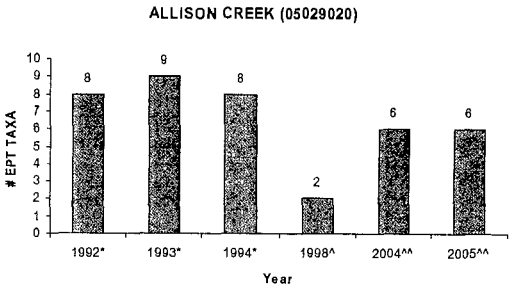


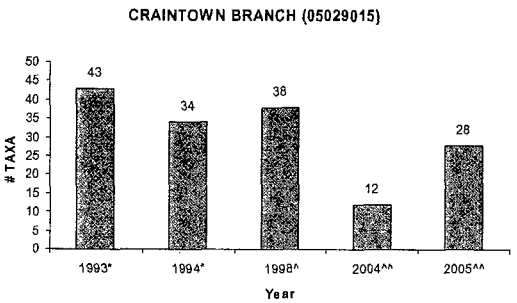
Notes: MBI scores and classifications

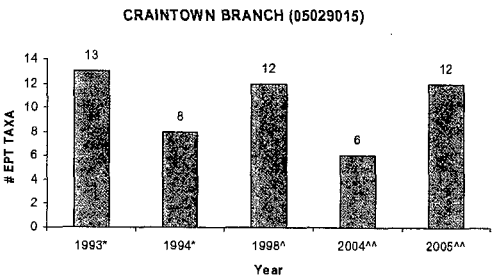
KDOW 2000	KDOW 2003	Classification
21-25	≥70	**Excellent**
17-20	61-69	**Good**
14-16	41-60	**Fair**
13-10	21-40	**Poor**
≤9	0-20	**Very Poor**

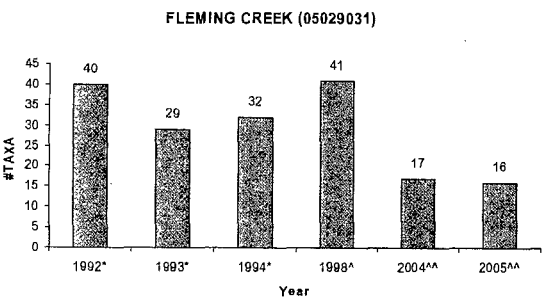
Figure 3. Comparison of richness metrics for macroinvertebrate samples. Pre-BMP years indicated by an asterisk (*) from KDOW 1996, Post-BMP years indicated by (^) from KDOW 2000 and (^^) from the Fleming County Conservation District.











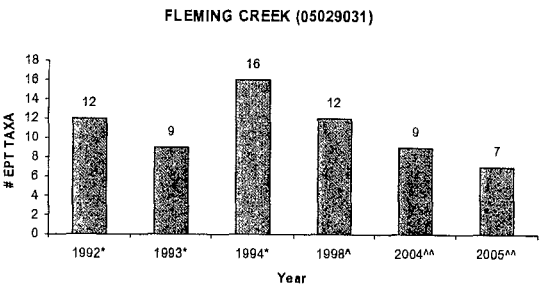
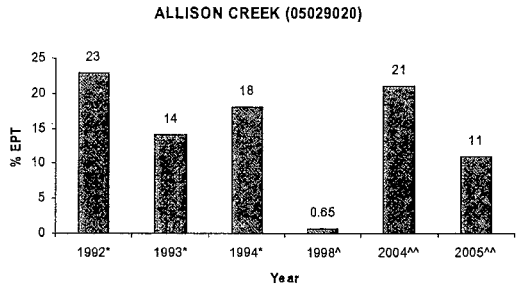
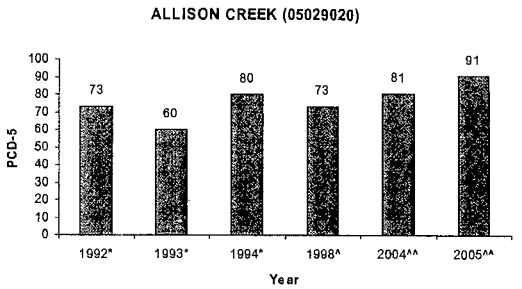
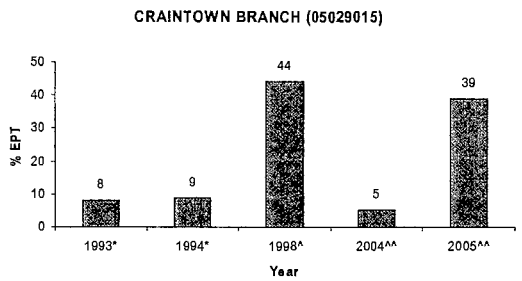
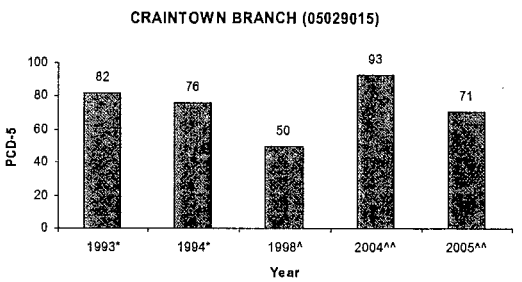


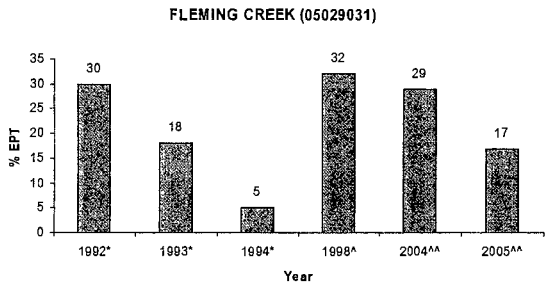
Figure 4. Comparison of composition metrics for macroinvertebrate samples. Pre-BMP years indicated by an asterisk (*) from KDOW 1996, Post-BMP years indicated by (^) from KDOW 2000 and (^^) from the Fleming County Conservation District.

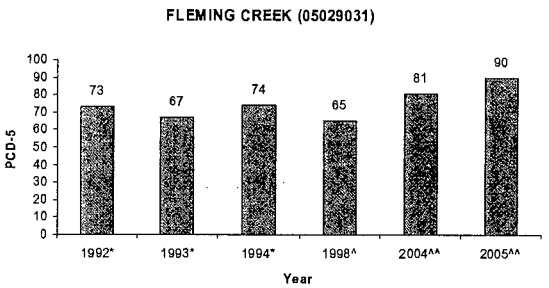


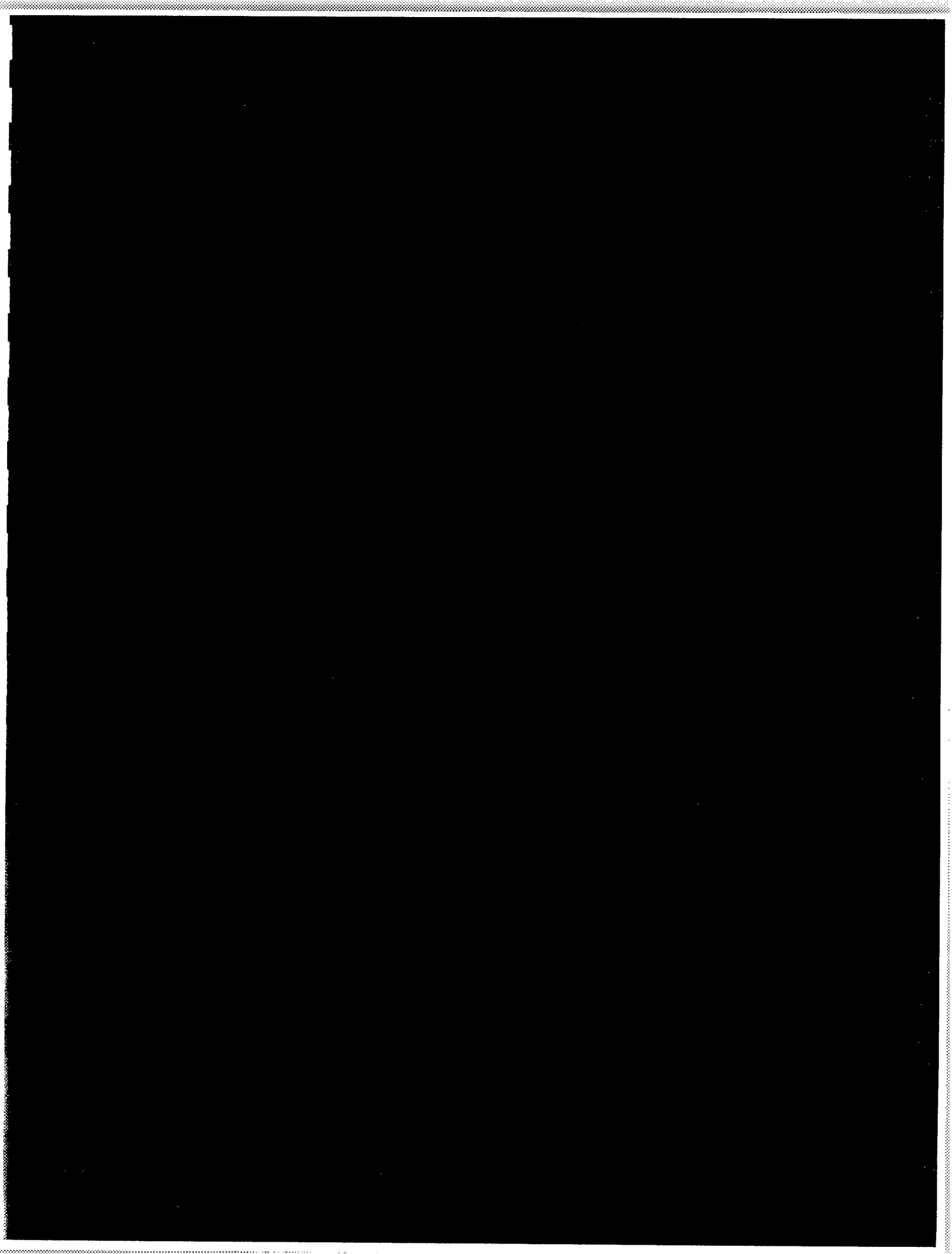












2004 Bacteriological sampling results for the Fleming Creek Water Action Plan Watershed Restoration Project.

	MAY		JUNE		JULY		AUGUST		SEPTEMBER		OCTOBER	
Station	LOAD (colonies/ day)	WQS (colonies/ day)	LOAD (colonies/ day)	WQS (colonies/ day)	LOAD (colonies/ day)	WQS (colonies/ day)	LOAD (colonies/ day)	WQS (colonies/ day)	LOAD (colonies/ day)	WQS (colonies/ day)	LOAD (colonies/ day)	WQS (colonies/ day)
3	1817.18	2137.86	967.36	2149.69	*1043.06*	632.16	320.62	493.25	*665.96*	46.73	*279.54*	174.71
4	*3734.52*	1778.34	*2407.49*	1925.99	*659.25*	488.33	290.87	430.92	43.97	109.93	*262.23*	131.11
5	*21.95*	0.78	*336.04*	58.44	*210.52*	11.70	0.90	0.29	*93.03*	5.17	*514.51*	28.58
6	*4960.76*	1871.99	1448.61	1931.48	*1095.70*	547.85	255.02	463.67	36.28	76.37	92.76	142.70
7	*692.07*	115.35	*526.88*	122.53	*4.95*	2.41	3.43	17.17	*693.66*	28.90	*38.31*	23.94
8	1425.54	1583.93	*2155.68*	1539.77	*5685.38*	473.78	1.15	2.69	*753.08*	161.95	*369.26*	199.60
9	13.26	53.03	33.26	47.52	NA	NA	*523.66*	322.25	*4.84*	2.55	0.10	0.96
10	932.03	1096.51	*1611.74*	1074.49	*16875.97*	703.17	*684.52*	365.08	*435.50*	248.86	*291.79*	194.53
11	*2084.20*	1302.62	909.57	1070.08	*6218.34*	248.73	193.35	193.35	*623.43*	211.33	*1176.87*	294.22
12	NA	NA	*1518.49*	1012.32	*13762.43*	327.68	107.09	237.98	*213.48*	185.64	*679.56*	289.17
13	*1569.56*	784.78	*1857.90*	1032.16	*1542.58*	335.34	99.88	266.34	*752.23*	206.09	*414.53*	207.27
14	34.83	34.83	NA	NA	*523.92*	16.90	12.96	13.64	*139.32*	7.74	*385.48*	32.12
15	3.48	9.93	*48.36*	42.06	*87.30*	10.91	NA	NA	NA	NA	*343.60*	42.95
16	*6035.74*	804.77	*9545.86*	734.30	*816.81*	154.11	*243.16*	140.96	*37008.62*	1542.03	*6469.75*	634.29
17	*391.15*	88.90	*149.20*	36.84	*630.47*	5.25	NA	NA	*7.05*	0.39	NA	NA
18	NA	NA	NA	NA	*192.83*	74.17	*106.62*	73.53	*2058.84*	73.53	*404.42*	73.53
19	*3723.44*	372.34	97.22	216.03	98.32	218.48	40.91	125.87	*1438.27*	575.31	392.96	561.37
20	*153.10*	72.90	*178.59*	74.41	*226.69*	22.67	*5.73*	4.58	*2924.04*	411.84	*820.34*	136.72
21	NA	NA	*1684.27*	88.65	15.51	77.56	0	94.19	100.30	143.28	11.14	74.24
22	*1204.25*	283.35	*1557.74*	314.70	*269.82*	14.99	*15.61*	14.87	*5482.52*	761.46	*790.07*	32.92
23	*3756.94*	187.85	81.44	101.80	222.77	52.42	14.13	31.40	*3248.45*	270.70	*2676.18*	148.68
24	*1218.56*	338.49	*704.93*	327.87	*1939.04*	372.89	*14.55*	10.21	*2472.38*	727.17	*27.78*	15.43
25	NA	NA	NA	NA	NA	NA	NA	NA	*1851.04*	264.43	NA	NA
26	*1597.19*	133.10	*572.72*	279.38	*11.02*	1.76	*43.73*	38.03	*833.14*	308.57	*32.57*	7.24
27	*41.24*	23.56	*346.98*	39.66	0.78	0.87	NA	NA	*156.55*	53.98	*1.94*	0.97
28	*147.97*	33.63	*796.44*	144.81	*23.92*	7.97	27.18	36.24	*658.94*	470.67	16.22	54.08
29	5.84	19.47	*152.70*	27.76	*0.59*	0.29	NA	NA	*381.46*	45.41	*60.48*	16.13
30	*116.59*	93.27	*324.29*	115.82	NA	NA	NA	NA	*6840.80*	285.03	3.71	5.71
31	*2027.86*	1039.93	293.71	1487.16	*11896.10*	457.54	*1021.39*	400.55	81.20	101.50	*663.45*	189.56
32	*570.07*	47.51	*246.38*	46.93	*169.47*	13.56	5.18	5.18	*8822.44*	367.60	*368.47*	167.49

NA: Not applicable; creek dry or inaccessible at time of sampling

WQS: Water Quality Standards based on upper limit of 400 colonies/100mL

Number of colonies = 1 x 100,000,000

Fields in *italics* indicate WQS exceedence

2005 bacteriological sampling results for the Fleming Creek Water Action Plan Watershed Restoration Project.

	MAY		JUNE		JULY		AUGUST		SEPTEMBER		OCTOBER	
Station	LOAD (colonies/ day)	WQS (colonies/ day)	LOAD (colonies/ day)	WQS (colonies/ day)	LOAD (colonies/ day)	WQS (colonies/ day)	LOAD (colonies/ day)	WQS (colonies/ day)	LOAD (colonies/ day)	WQS (colonies/ day)	LOAD (colonies/ day)	WQS (colonies/ day)
3	1183.22	1972.04	*523.58*	402.75	*528.36*	110.07	3.67	14.70	11.76	29.39	NA	NA
4	648.19	1440.43	30.53	67.85	13.99	39.97	0.48	2.40	2.16	14.40	0.98	6.56
5	*156.13*	53.84	*119.04*	9.92	*85.97*	2.87	NA	NA	NA	NA	NA	NA
6	*2445.38*	1630.25	*294.92*	268.11	*53.75*	8.08	3.73	24.84	1.29	2.35	NA	NA
7	*4.61*	2.42	14.84	19.79	*42.52*	6.07	0.002	0.05	NA	NA	NA	NA
8	691.56	1383.11	*367.79*	193.57	*30.16*	12.57	4.10	41.00	0.76	2.55	3.08	61.68
9	7.09	47.27	*8.11*	4.51	*2.94*	0.49	NA	NA	NA	NA	NA	NA
10	1320.83	1886.90	55.49	138.73	*65.47*	39.68	19.99	39.97	NA	NA	146.59	418.84
11	1312.47	1312.47	*452.00*	188.33	*58.59*	29.29	37.80	63.00	2.78	18.54	29.01	82.89
12	*2237.18*	1177.46	119.29	149.12	*63.99*	30.47	15.32	38.31	0.81	8.06	36.98	52.83
13	111.96	746.37	*131.09*	113.99	*99.35*	24.84	9.43	47.17	4.59	15.31	15.53	31.06
14	42.53	70.88	*0.21*	0.05	NA	NA	NA	NA	NA	NA	NA	NA
15	13.79	39.41	*0.16*	0.05	NA	NA	NA	NA	NA	NA	NA	NA
16	*8334.25*	947.07	113.22	133.20	*7762.55*	258.75	*776.02*	180.47	*202.31*	30.89	*122.74*	51.14
17	*1905.82*	49.50	*0.18*	0.05	NA	NA	NA	NA	NA	NA	NA	NA
18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
19	188.03	470.08	*1389.14*	396.90	*1334.94*	513.44	23.90	79.65	3.16	31.62	1.52	30.35
20	*95.67*	31.89	NA	NA	*639.58*	13.32	NA	NA	NA	NA	NA	NA
21	41.51	63.87	31.80	90.86	*5200.53*	173.35	3.38	67.59	11.70	78.03	26.70	88.98
22	*1910.69*	393.96	*2673.54*	222.79	*11473.64*	318.71	*46.51*	19.79	13.32	15.68	*135.35*	15.04
23	*151.10*	143.90	*2042.48*	170.21	*18235.08*	379.90	*650.55*	65.06	16.77	55.89	8.87	19.72
24	*1569.32*	326.94	*487.56*	168.12	*61.04*	8.72	*91.70*	10.19	NA	NA	NA	NA
25	*258.07*	21.51	*18.22*	1.52	*151.37*	25.23	NA	NA	NA	NA	NA	NA
26	*452.09*	361.67	*519.33*	207.73	*4.46*	2.55	NA	NA	NA	NA	NA	NA
27	*35.13*	16.34	*216.62*	39.39	*177.54*	37.38	NA	NA	NA	NA	NA	NA
28	*2012.64*	271.98	*108.22*	63.66	*26.18*	11.63	*0.14*	0.10	NA	NA	NA	NA
29	26.42	31.08	*1.76*	0.05	NA	NA	NA	NA	NA	NA	NA	NA
30	128.12	142.36	*62.30*	28.98	NA	NA	NA	NA	NA	NA	NA	NA
31	*1539.61*	1466.29	*8047.07*	223.53	*34.24*	11.41	4.09	81.76	1.79	8.94	5.23	52.29
32	*440.18*	81.52	NA	NA	*164.60*	2.74	NA	NA	NA	NA	NA	NA

NA: Not applicable; creek dry or inaccessible at time of sampling

WQS: Water Quality Standards based on upper limit of 400 colonies/100mL

Number of colonies = 1 x 100,000,000

Fields in *italics* indicate WQS exceedence

2004 Macroinvertebrate Sampling Results

SPECIES	T.V.	F.F.G.	Clinger	FC-1 5029020 Riffle	FC-2 5089015 Riffle	FC-3 5029031 Riffle
PLATYHELMINTHES						
Turbellaria						
Tricladida						
Planariidae	**5**	**CG**				
Dugesia tigrina	**5**	**CG**		5	4	
ARTHROPODA						
Crustacea						
Isopoda						
Asellidae						
Lirceus sp.	**7.9**	**CG**		25	25	4
Amphipoda						
Crangonyctidae						
Crangonyx sp.	**8**	**SH**		8	25	
Insecta						
Ephemeroptera						
Baetidae	**5**	**CG**				
Baetis c.f. flavistriga	**6.6**	**CG**				
Baetis intercalaris	**5**	**CG**				
Baetis sp.	**5.4**	**CG**			4	11
Paracloeodes sp.	**8.3**	**SC**				2
Procloen sp.	**5**	**CG**		7		
Caenidae	**7.6**	**CG**				
Caenis sp.	**7.4**	**CG**		4		1
Ephemerellidae	**1**					
Ephemerella sp.	**2**	**CG**	**CL**			
Heptageniidae	**3.2**	**SC**				
Maccaffertium (Stenonema) femoratum	**7.2**	**SC**	**CL**	3		
Stenacron interpunctatum	**6.9**	**CG**	**CL**			
Isonychiidae						
Isonychia sp.	**3.5**	**CF**				4
Leptophlebiidae	**3**	**CG**			2	
Plecoptera						
Perlidae						
Attaneuria ruralis	**3**	**PR**	**CL**			2
Perlesta sp.	**4.7**	**PR**		18	2	25

Prepared by Brian O'Neill 11/14/2005

2004 Macroinvertebrate Sampling Results

SPECIES	T.V.	F.F.G.	Clinger	FC-1	FC-2	FC-3
				5029020 Riffle	5089015 Riffle	5029031 Riffle
Perlesta placida sp. gp.	4.7	PR				
Perlodidae						
Isoperla sp.	1.8	PR	CL		1	
Taeniopterygidae						
Taeniopteryx	2			1		
Trichoptera						
Helicopsychidae						
Helicopsyche sp.	5	SC	CL		1	
Hydropsychidae	4					
Ceratopsyche morosa	3.2	CF	CL			
Cheumatopsyche sp.	6.2	CF	CL	6		1
Hdropsyche sp.	4	CF	CL			4
Hydroptilidae						
Hydroptila sp.	6.2	PH	CL		1	
Philopotamidae						
Chimarra obscurus	2.8	CF	CL			8
Coleoptera						
Elmidae						
Stenelmis sp.	5.1	SC	CL	16	23	25
Stenelmis sexlineatus	5.1	SC	CL			
Haliplidae						
Peltodytes sp.	8.7	PH				
Hydrophilidae						
Berosus sp.	8.4	PH		1		
Psephenidae						
Psephenus herricki	2.4	SC				6
Diptera						
Ceratopogonidae						
Bezzia/Palpomyia gp.	6.9					
Chaoboridae	9	PR		1		
Empididae	8	PR		1		
Chironomidae						
Cardiocladius sp.	5.9	PR	CL	18		
Conchapelopia sp.	8.7	PR			25	
Cricotopus sp.	7	SH			7	
Cricotopus (Isocladius) sp.						

2004 Macroinvertebrate Sampling Results

SPECIES	T.V.	F.F.G.	Clinger	FC-1 5029020 Riffle	FC-2 5089015 Riffle	FC-3 5029031 Riffle
Cricotopus trifascia	2.8	SH				
Eukiefferiella claripennis gp.	5.6	CG				
Lopescladius sp.	1.7	CG		2		
Microtendipes pedellus gp.	5.5	CF				
Nilotanypus sp.	3.9	PR				12
Parametriocnemus sp.	3.7	CG				
Polypedilum flavum (convictum)	5.3	SH				
Pseudochironomus sp.	5.4	CG				4
Tanytarsus sp.	6.7	CF				
Tribelos sp.	6.3	CG		2		
Zavrelinyia sp.	5.3	CG				9
Simulidae						
Simulium sp.	4	CF	CL	2		1
Tipulidae						
Tipula sp.	7.3	SH				1
TOTAL NO. OF ORGANISMS				120	120	120
TOTAL NO. OF TAXA				17	12	17
EPT				6	6	9
mHBI				6.11	7.09	4.72
mEPT%				21.55	5.07	29.21
% Ephemeroptera				7.73	2.76	8.91
PCD-5				80.66	93.09	81.19
%Chir+%Olig				12.15	16.13	12.38
% Clingers				24.86	11.52	56.44

Kentucky Tolerance Values range from 0 for organisms very intolerant of organic wastes to 10 for organisms very tolerant of organic wastes

Tolerance Values and F.F.G.-Functional Feeding Groups taken from KDOW Biological Assessment Methods, June 2002.

Prepared by Brian O'Neill 11/14/2005

2005 Macroinvertebrate Sampling Results

SPECIES	T.V.	F.F.G.	Clinger	FC-1 5029020 Riffle	FC-2 5089015 Riffle	FC-3 5029031 Riffle
PLATYHELMINTHES						
Turbellaria						
Tricladida						
Planariidae	**5**	**CG**				
Dugesia tigrina	**5**	**CG**		1		
ANNELIDA						
Oligochaeta						
Tubificida						
Lumbricidae	**5**	**CG**		2	4	
Naididae	**9.1**	**CG**			1	
Lumbriculida						
Lumbriculidae	**7.3**	**CG**		2	1	
ARTHROPODA						
Crustacea						
Isopoda						
Asellidae						
Lirceus sp.	**7.9**	**CG**		25	3	25
Amphipoda						
Crangonyctidae						
Crangonyx sp.	**8**	**SH**		9		1
Insecta						
Ephemeroptera						
Baetidae	**5**	**CG**				
Baetis c.f. flavistriga	**6.6**	**CG**		3	2	2
Baetis intercalaris	**5**	**CG**			5	2
Baetis sp.	**5.4**	**CG**				2
Caenidae	**7.6**	**CG**				
Caenis sp.	**7.4**	**CG**			1	
Ephemerellidae	**1**					
Ephemerella sp.	**2**	**CG**	CL		5	
Heptageniidae	**3.2**	**SC**				

2005 Macroinvertebrate Sampling Results

SPECIES	T.V.	F.F.G.	Clinger	FC-1 5029020 Riffle	FC-2 5089015 Riffle	FC-3 5029031 Riffle
Conchapelopia sp.	8.7	PR			7	
Cricotopus sp.	7	SH		25	2	1
Cricotopus (Isocladius) sp.				2		
Cricotopus trifascia	2.8	SH		1	1	4
Eukiefferiella claripennis gp.	5.6	CG			1	
Microtendipes pedellus gp.	5.5	CF			2	
Parametriocnemus sp.	3.7	CG		1		
Polypedilum flavum (convictum)	5.3	SH			5	
Pseudochironomus sp.	5.4	CG				11
Tanytarsus sp.	6.7	CF		1		
TOTAL NO. OF ORGANISMS				121	176	120
TOTAL NO. OF TAXA				18	28	16
EPT				6	12	7
mHBI				6.15	4.70	5.75
mEPT%				11.31	38.62	17.30
% Ephemeroptera				2.26	10.98	3.78
PCD-5				90.95	70.73	90.27
%Chir+%Olig				36.02	18.02	16.00
% Clingers				32.58	55.69	24.86

Kentucky Tolerance Values range from 0 for organisms very intolerant of organic wastes to 10 for organisms very tolerant of organic wastes

Tolerance Values and F.F.G.-Functional Feeding Groups taken from KDOW Biological Assessment Methods, June 2002.

Macroinvertebrate samples enumerated and identified by Pennington & Associates

Prepared by Brian O'Neill 11/14/2005

Appendix A

Fleming Creek Clean Water Action Plan Milestones

Milestones	Expected Begin Date	Expected End Date	Actual Begin Date	Actual End Date
1. Finalize Workplan	12/99	08/00	12/99	09/00
2. Project Oversight Committee Establishes meeting schedule		11/00	12/00	12/00
3. Execute MOA		11/00	11/00	11/00
4. QA/QC Plan Development/ Approval	02/01	06/01	01/01	05/01
5. BMP Implementation Plan Development/Approval	02/01	06/01	01/01	05/01
6. Establish Project Committee	02/01	03/02	12/00	12/00
7. Hire Ag Conservationist	02/01	03/01	01/01	01/01
8. Hire Project Coordinator	02/01	03/01	07/01	07/01
9. Prepare Annual Report	02/01	02/02	10/01	09/02
10. Submit Annual Report		03/02		09/02
11. Prepare BMP Inventory	04/01	04/02	07/01	10/05
12. Submit agendas, articles, and radio scripts to DOW for prior approval	04/01	03/04	07/01	10/05
13. Photographic Documentation	04/01	03/04	07/01	10/05
14. Public Affairs Promotion	04/01	04/04	07/01	10/05
15. Conduct 4 Public Meetings	04/01	04/03	02/02	10/05
16. Implement AWAP Program	04/01	03/05	07/01	
17. Implement BMP Projects	04/01	03/05	11/00	10/05
18. Prepare Annual Report	02/02	02/03	09/03	10/04

19. Implement AWAP Program	04/02	03/05	04/02	
20. Conduct 3 Field Days	04/02	03/05	07/01	08/05
21. Submit Annual Report to DOW		03/03		11/03
22. Prepare Annual Report	02/03	02/04	10/03	10/04
23. Implement AWAP Program	04/03	04/05		
24. Conduct Bacteriological Monitoring	05/04	10/04	05/03	10/03
25. Conduct Biological Monitoring	06/03	08/03	07/03	07/03
26. Submit Annual Report to DOW		03/04		
27. Implement AWAP Program	04/04	10/04		
28. Conduct Bacteriological Monitoring	05/05	10/05	05/05	10/05
29. Conduct Biological Monitoring	06/05	08/05	05/05	06/05
30. Prepare Monitoring Final Report	08/05	10/05		12/05
31. Submit Monitoring Final Report		10/05		02/06
32. Prepare Annual Report	02/04	02/05		02/06
33. Submit Annual Report to DOW		03/05		02/06
34. Request current Final/Closeout Report guidelines from DOW	06/05	08/05		10/05
35. Prepare Final and Close-Out Reports		10/05	10/05	02/06
36. Submit Final and Close-Out Reports to DOW		10/05		02/06

STATUS OF FLEMING CREEK CWAP MILESTONES

1. Workplan has been approved by DOC, DOW, and EPA.

2. The Project Oversight Committee meets on an as needed basis. As of October 31, 2005 the Committee has met 7 times.

3. The MOA for the Fleming Creek CWAP Project was signed by the Fleming County Conservation District at the November 2000 regular monthly board meeting.

4. The QA/QC submitted by TetraTech EM Inc. has been approved by all cooperating parties.

5. The BMP implementation plan has been approved by all cooperating parties.

6. All Oversight Committee members have been selected and all cooperating agencies are represented.

7. Michael B. Burnett was hired January 1, 2001 through a contract with USDA-NRCS as the Agricultural Conservationist for the Fleming Creek CWAP Project.

8. Emily Crain was hired July 1, 2001 as the Project Coordinator for the Fleming Creek CWAP Project through the Fleming County Conservation District. Note: Emily Crain is now Emily Crain Anderson due to change in marital status.

9. Annual Report completed, submitted and approved.

10. The Annual Report was presented at the 2002 Annual Water Quality Symposium as a PowerPoint Presentation and an abstract was submitted for publication prior to the presentation.

11. An inventory of all cost-share BMP's installed in the Fleming Creek Watershed prior to CWAP is being updated. An inventory of all State Cost-Share BMP's installed since the beginning of CWAP is complete. We are also working on an inventory of all other BMP's installed in the Fleming Creek watershed before and after. See attached for list of BMP's installed with CWAP funds.

12. All types of media have been submitted for approval prior to publication.

13. Photographic documentation of all CWAP activities is on file at the Fleming County Conservation District Office located at 25 Meadow Lane Flemingsburg, KY 41041.

14. Newspaper article was run in the Fleming Shopper and announced on the local radio station asking for applicants for the Fleming Creek CWAP Project. See attached for copy of the article.

15. A public meeting was held at the Fleming-Mason Energy Building Auditorium for all producers in the Fleming Creek Watershed on February 20, 2002 to discuss available cost-share programs. See attached agenda. A second public meeting was

held January 19, 2005, at Fleming-Mason Energy Auditorium to promote available cost-share programs. See attached agenda.

16. AWAP water testing began in August 2001 and was conducted monthly through the primary contact months of 2001.

17. State Cost-Share, EQIP, CRP and CWAP BMP's are currently being installed in the Fleming Creek watershed. See attached list of all BMP's installed with CWAP funds.

18. 2003 Annual Report completed and submitted.

19. AWAP is a stand still due to lack of participation from school system and local producers.

20. The Semi-Annual Farm Field Day for 2001 was held at the farms of Tribby Vice, Chris Hickerson, and Pat Story. All farms adjoin on the waters of Fleming Creek. Several BMP's were demonstrated and water quality issues addressed at the field day. See Attached agenda and documentation.

A second Farm Field Day was held June 9, 2005 at the farm of Spencer Rapp located within the Fleming Creek Watershed. Several BMPs were demonstrated that were installed with cost-share assistance and water quality issues were addressed. See attached agenda.

21. Annual report was submitted to KY Division of Conservation November, 2003.

22. No Progress.

23. No progress.

24. Bacteriological monitoring has been completed for the primary contact months of May, June, July, August, and September of 2003 by American Enviro-Services, Inc.

25. Biological monitoring has been completed for 2003 by American Enviro-Services, Inc.

26. No Progress.

27. The AWAP program has no participation.

28. Bacteriological monitoring has been completed for 2004 by Redwing Ecological Services. See attached report for results.

29. Biological monitoring has been completed for 2004 by Redwing Ecological Services. See attached for results.

30. Finances have allowed for monitoring to continue for one additional year (2005).

31. Submit final monitoring report with closeout report.

32. No Progress.

33. No Progress.

34. Requested Final / Closeout Report Guidelines from KDOC.

35. Prepared and submitted final closeout report.

36. Submitted Final and Close-Out Reports to KDOW.

ATTACHMENT A

Section 319(h) Nonpoint Source Project Final Report

Reporting Period: 01/01/04–03/31/04 **Grant Number:** C9994861-99 **State:** Kentucky

Project Name: Fleming Creek Clean Water Action Plan

Contractor: Fleming County Conservation District

Budget Period Start Date: October 1, 2000 **End Date:** October 30, 2005

Total Project Cost: $845,331.00

Expended This Period: $ 0.00 **Total Expenditures to Date:** $874,343.00

Watershed Identification: Fleming Creek **11-Digit HUC:** 05100101200

NPS Category: Remediation

Purpose Statement: The overall goal of the Fleming Creek Watershed project is to reduce nonpoint source pollution of Kentucky's waterways and improve the bacterial and biological integrity of streams within the project area. The primary focus of this project is to restore and remove the impaired use designation of streams within the Fleming Creek watershed.

Budget Revision
MOA 99-29

Fleming Creek Clean Water Action Plan Detailed Budget:

Budget Categories	Section 319(h)	Non-Federal Match	Total	Final Expenditures
Personnel	$281,833.00		$281,833.00	$264,807.90
Supplies				
Equipment	$1,500.00		$1,500.00	$1,770.45
Travel				
Contractual	$209,733.00	$338,132.00	$547,865.00	$603,970.18
Operating Cost	$14,133.00		$14,133.00	$3,794.47
Other				
TOTAL	$507,199.00	$338,132.00	$845,331.00	$874,343.00
Cost Share %	60%	40%	100%	

This budget was revised to add $96,666.00 in re-ob funds from the Little River project that were not being utilized. This revision also reflects that all in-kind match activities by the Fleming County Conservation District will be in the form of BMP's installed through the Kentucky Soil Erosion and Water Quality Cost-Share Program. This budget revision was approved by KDOW.

The Fleming County Conservation District was reimbursed $507,199.00. All dollars were spent; there were no excess project funds to reallocate. This project did generate overmatch by the Fleming County Conservation District. This overmatch was not posted to the grant.

Equipment Summary

One Dell computer was purchased for the use of the Fleming Creek CWAP Coordinator and is located in the Fleming County Conservation District Office. This computer will continue to be used by the coordinator for the remaining two MOA's for the Fleming Creek Project. The purchase price of this computer was $1,770.45.

Special Grant Conditions

There were no special grant conditions placed on this project.

Appendix B

QUALITY ASSURANCE / QUALITY CONTROL PLAN
FOR THE
FLEMING CREEK CLEAN WATER ACTION PLAN
WATERSHED RESTORATION PROJECT

WATER QUALITY MONITORING COMPONENT

Prepared For:

Fleming County Conservation District
Rt. 2 Box 27B
Flemingsburg, Kentucky 41041
Phone: 606-845-9387
Fax: 606-845-6716

Prepared By:

Tetra Tech EM Inc.
1815 Brownsboro Road
Suite 200
Louisville, Kentucky 40206
Phone: 502-568-6688
Fax: 502-568-6222

September 2001

FORWARD

On July 10, 2001, the Fleming County Conservation District contracted Tetra Tech EM Inc (Tetra Tech) to develop a Quality Assurance / Quality Control (QA/QC) plan for the water quality monitoring component for the Fleming Creek Clean Water Action Plan Watershed Restoration Project (CWAP). Tetra Tech developed the QA/QC plan using the guidance of Chapter 7, Quality Assurance / Quality Control Plan for Projects Involving Water Quality Monitoring, as referenced in the *Guidelines for Developing A Competitive Nonpoint Source Project, FFY 2001 Section 319(h) Nonpoint Source Implementation Grant.*

The plan provides an outline of procedures to maximize the quality of data collected during the implementation of the CWAP. The quality assurance plan assures that all generated data are 'technically sound, of known quality, and thoroughly documented.' "Quality control (QC) refers to the routine procedures followed in the field and in the laboratory to produce data of predetermined standards; while quality assurance (QA) refers to the integrated program, including quality control activities, that allows the production of valid and reliable data" (KDOW 2000).

CONTENTS

Figures

Appendices

1.0 PROJECT ORGANIZATION

This section outlines the key people involved and their roles with any/all water quality monitoring activities and efforts in this project.

ROLE	NAME	AGENCY
Project Management	Ms. Emily Crain	Fleming County Conservation District
	Mr. James K. Sundys	Tetra Tech
Quality Assurance Officer	Mr. James K. Sundys	Tetra Tech
Laboratory Manager	Mrs. Rita Wright	Morehead State University Water Testing Laboratory

Contact information for these individuals is located in Appendix 1.

2.0 WATERSHED INFORMATION

The plan addresses water quality monitoring activities in the Fleming Creek watershed to be conducted in the spring of 2003 and 2004 (Figure 1). Fleming Creek is a watershed in the Licking River Basin (United States Geological Survey (USGS) hydrologic unit code (HUC) is 05100101. The Geographic Names Information System (GNIS) number for the Fleming Creek watershed is 492-236. Fleming Creek flows into the Licking River at river kilometer 172.02 (KDOW 2000), which is in Nicholas County, Kentucky. With the exception of less than 300 acres, the drainage area for Fleming Creek lies exclusively in Fleming County, Kentucky (KDOW 1993).

The Fleming Creek watershed lies within seven USGS 7.5-minute topographic quadrangle maps. The topographic quadrangle maps covering the watershed include: Burtonville, Flemingsburg, Elizaville, Hillsboro, Moorefield, Cowan, and Sherburne.

3.0 MONITORING OBJECTIVES

The QA/QC plan has been developed to identify sampling criteria and practices during the 2003 and 2004 water quality sampling. The sampling to be conducted includes:

1. Analysis of water samples for bacterialogical (ie. fecal coliforms) concentrations at the 27 Phase I sampling locations (KDOW 2000) on Fleming Creek and subwatersheds. The 27 locations have been identified by the Kentucky Division of Water (KDOW) and location descriptions provided to Tetra Tech. A description of the 27 sampling locations are located in Appendix 2. The 27 locations are shown on Figure 2.
2. Identification of macroinvertebrates within the Fleming Creek watershed at the 3 monitoring locations identified by Kentucky Division of Water (KDOW 2000).

3.1 Timelines

This section outlines the identified schedule for sampling efforts to be conducted.

3.1.1 Bacterialogical Monitoring

Beginning in 2003, Tetra Tech will perform sampling of water for bacterialogical monitoring. The sampling will be conducted on the 2nd Wednesday of each month during the Primary Contact Recreation (PCR) season. PCR season begins in May and continues through October.

Bacterialogical monitoring will consist of collecting water samples for fecal coliform analysis from the 27 Phase I sampling locations (KDOW 2000). This cycle of bacterialogical monitoring will be repeated during the same months in 2004.

3.1.2 Macroinvertebrate Monitoring

Begninning in 2003, Tetra Tech will conduct macroinvertebrate monitoring at the 3 KDOW identified monitoring locations (Figure 2) within the Fleming Creek watershed. The sampling will be conducted on the 1st Wednesday of May in 2003. The sampling will be repeated on the 1st Wednesday of May 2004 (Figure 2).

3.2 Project Milestones

Project milestones are the criteria to be used in assessing the success or failure of the monitoring objectives.

3.2.1 Bacterialogical Monitoring Milestones

The milestones to be measured for the bacterialogical monitoring will be:

1. Collection and analysis of water samples at the identified sampling locations monthly during the PCR season during 2003.
2. Collection and analysis of water samples at the identified sampling locations monthly during the PCR season during 2004.

The success of the bacterialogical monitoring will be determined at the completion of the PCR season by the Tetra Tech Project Manager.

3.2.2 Macroinvertebrate Monitoring Milestones

The milestones to be measured for the macroinvertebrate monitoring will be:

1. Collect macroinvertebrates at each of the three sampling locations (KDOW 2000) on the 1st Wednesday in May of 2003.
2. Collect macroinvertebrates at each of the three sampling location (KDOW 2000) on the 1st Wednesday in May of 2004.

The success of the macroinvertebrate monitoring will be determined at the completion of each macroinvertebrate monitoring scheduled event.

4.0 STUDY AREA DESCRIPTION

The description outlines components of the watershed that are crucial to understanding the various influences on the water quality. The Fleming Creek watershed is a dynamic system, where influences from a variety of sources can individually or collectively skew the interpretation of generated data.

4.1 Location of Watershed

The Fleming Creek watershed is located in Fleming County in northeastern Kentucky (Figure 3); however, a short reach at the mouth flows into Nicholas County, Kentucky. Flemingsburg, the largest town within Fleming County, is situated in the eastern portion of the watershed, approximately 30 miles northwest of Morehead, Kentucky. Sampling locations are located in various areas (Appendix 2) adjacent to Flemingsburg.

4.1.1 Topography and Physiographic Regions

The Fleming Creek watershed lies primarily within the Bluegrass and Outer Bluegrass physiographic regions. The landscape is characterized by gently sloping ridgetops to steep and moderately steep hillsides. Elevations within the watershed range from 176.8 meters (m) above sea level at the mouth to 243.8 m above sea level in the headwaters (KDOW 2000).

4.1.2 Soils

Most of the soils on the ridgetops and hillsides within the study area were formed from residual limestones, siltstones, and shales, and overlying clay subsoils . Soil types found in these areas include the Lowell, Beasley, Faywood, and Shrouts. Some ridgetop soils were formed with a silty mantle of loess over clay weathered from residual limestones, siltstones, and shales. Associated soil types at such locations are the Sandview, Nicholason, and Crider. In addition, soils on some steep hillsides were weathered from interbedded limestones, siltstones, and shales (Eden, Faywood, and Cynthiana soil types). These steep hillside soils tend to be shallower than other soils in the watershed (KDOW 2000).

4.1.3 Geology

The geology of the watershed is unique in that it varies dramatically within a short distance. The uppermost headwaters of Fleming Creek transect the Upper Devonian and Lower and Middle Silurian systems. The Upper Devonian system is characterized by a dark gray to black, highly carbonaceous stratum known as the Ohio Shale. The Lower and Middle Silurian systems are comprised by limestone. These are karst areas within the Fleming Creek watershed were sinkholes are common (KDOW 2000).

4.2 Watershed Description

The Fleming Creek watershed has a drainage area of approximately 61,670 acres. The watershed is made up of 8 subwatersheds (14 digit HUC). These 8 subwatersheds are Logan Run, Wilson Run, Sleepy Run, Town Branch, Allison Creek, Cassidy Creek, Craintown Branch, and Flat Run. Each of these 8 subwatersheds drain into the mainstem of Fleming Creek, which flows generally east to west. Fleming Creek drains into the Licking River in Nicholas County, Kentucky, up river from the community of Myers Station (Figure 1).

4.3 Land Uses

The predominant land use within the Fleming Creek watershed is agriculture, and 31 percent of the watershed area is used for cropland, with corn and tobacco as the principal row crops. Other land in the watershed is managed for hayland and pastureland, primarily to support dairy operations . Fleming County was ranked one of the top three counties in total number of dairy cows statewide (KDOW 2000).

The total dairy cow population in Fleming County exceeded 10,000 head in 1991, with an average herd size of 50 cows. The number of dairy cows dropped to 6,400 for the 1997-1998 year. The total number has also dropped from approximately 48,500 in 1991-1992 to 46,000 during the 1997-1998 year. In 1992, an estimated 518,160 cubic meters of animal waste had the potential to be washed into area streams annually from dairies alone. In 1997, it was estimated that 60 percent of all dairies in the Fleming Creek watershed were located within 100 feet of a blue line stream. A blue line stream is a stream denoted on a USGS 7.5-minute topographic map. Nine percent of the remaining land within the watershed is wooded, and only one percent is urban. The majority of the county's population resides in Flemingsburg, with a population of approximately 2,800 people. Flemingsburg uses Town Branch as a municipal water supply (KDOW 2000).

5.0 MONITORING PROGRAM

The monitoring program has a variety of components that provide an overall description of how, where and when field efforts for sample collection will be conducted.

5.1 Sampling Design and Strategies To Be Used

The monitoring scheme to be used for this monitoring effort will be based on the Phase I monitoring locations described in the *Fleming Creek Watershed Nonpoint Source Demonstration Project – Final Report May 2000* (KDOW 2000) for fecal coliform. The three biological monitoring stations described in Phase III will be used for the macroinvertebrate sampling locations. Tetra Tech has outlined a schedule for the sampling.

1. Routine monthly monitoring of water samples with analysis for fecal coliform will be executed on the 2nd Wednesday of each month during the PCR season (May to October) for years 2003 and 2004.
2. Macroinvertebrate field sampling will be executed on the 1st Wednesday of May in 2003 and 2004

5.2 Sampling Locations

The sampling locations within the Fleming Creek watershed are broken into two categories for identification: (1) Bacteriological Monitoring Stations and (2) Macroinvertebrate Monitoring Stations.

5.2.1 Bacteriological Monitoring Stations

Sampling locations for water samples to be collected for fecal coliform analysis will be the same sampling locations utilized by the KDOW during the Phase I sampling for the Demonstration Project. These sampling locations are identified Figure 2 and descriptions are outlined for each location in Appendix 2.

5.2.2 Macroinvertebrate Monitoring Stations

Sampling locations for macroinvertebrate monitoring will be the same sampling locations utilized by the KDOW during Phase III for the Demonstration Project. The sampling locations are identified on Figure 2 and descriptions are outlined for each location in Appendix 2.

5.2 Sampling Frequency

Two schedules have been developed for sampling Bacteria 1 event per month for 6 months of the PCR season and the Macroinvertebrate monitoring will be conducted in one event each year.

5.2.1 Bacteriological Sampling Frequency

Routine monthly monitoring for fecal coliform will commence on the 2nd Wednesday of each month during the PCR season. Each sampling event should begin and conclude on the same day. However, if sampling efforts require more than one day, field activities will continue on consecutive days following the 2nd Wednesday to promote consistency in the data generated from sampling activities.

5.2.2 Macroinvertebrate Sampling Frequency

Macroinvertebrate monitoring will begin on the 1st Wednesday of May in 2003 and 2004. These field activities should begin and conclude on the same day. However, if sampling efforts require more than one day, field activities will continue on consecutive days following the 1st Wednesday of May.

5.2 Types of Data To Be Collected

The matrix below shows the parameters to be analyzed for collected samples, containers to be used, preservative, holding times for samples, and analytical methods to be conducted on the collected samples.

Sample Parameter	Volume	Container	Preservative	Holding Time	Method of Transport	Method of Analysis
Fecal Coliforms	250 mL	Plastic, Sterile	NONE	6 Hours + 2 Hours	Courier	Membrane Filtration *
Macroinvertebrates	Unspecified	Glass	95% ethanol (field), 70% ethanol (laboratory)	Indefinite	Courier	Taxa Richness, EPT, Jaccard's Similarity Index, Hilsenhoff, PCD 5, Proportional Similarity Index

* Membrane Filtration method will be used according to the latest edition of Standard Methods for the Examination of Water and Wastewater (Standard Methods) (KDOW 1993)

6.0 CHAIN-OF-CUSTODY PROCEDURES

This section describes standard custody procedures for samples collected for fecal coliform analysis and macroinvertebrates for this project. These procedures include maintaining field notes, sample identification, and labeling. A sample chain-of-custody to be used in this monitoring effort is located in Appendix 3.

6.1 Procedures and Forms

The two sampling efforts will require procedures specific to bacteriological and macroinvertebrate events. The sampling procedures for bacteriological and macroinvertebrate sampling are described in the following subsections.

6.1.1 Procedure for Bacteriological Monitoring Location

Tetra Tech will collect water samples at bacteriological monitoring locations using the following procedures:

1. A water sample will be collected below the surface water. The sample will be collected directly into a sterile 250 milliliter (mL) nalgene
2. The sample will be labeled with the monitoring location identification number, date and time, chain-of-custody form completed, and the sample immediately placed in an iced cooler.
3. The samples will be delivered to the Morehead State University Water Testing Laboratory within the identified 6-hour holding time (KDOW 1993).
4. Morehead State University Water Testing Laboratory will analyze the samples for fecal coliform content by membrane filter analysis of water samples for fecal coliform, as described in the latest edition of *Standard Methods for the Examination of Water and Wastewater*, within 8-hours of sample collection (KDOW 1993).

6.1.1.1 Field Notes and Logbooks

Sampling information will be recorded in a field logbook on consecutively numbered pages. The information will be entered into the field logbook at the time of sampling. At a minimum, the logbook will contain the following information:

Background Information

Date and time of sampling activities

Personnel on site

Weather conditions

Purpose of sampling

Chronology of Sampling

Description of sampling points

Number and volume of samples collected

Date and time of collection

Sample identification number

Field observations about any problems encountered and deviations from QA/QC

Each page will be dated and signed by the person making the entries. Logbooks are accountable field documents and serve as a chronological representation of the sampling program. Sufficient detail will be included in the logbook to provide summary of sampling activities.

6.1.1.2 Sample Identification

Each sample location will be located with maps (Figure 2) and descriptions (Appendix 2) to each site. Each sampling location will be labeled accordingly. Sample identification will be the same as the sampling locations identification. Sampling site location identification system will be the same as the Kentucky Division of Water system, outlined in the *Fleming Creek Watershed Nonpoint Source Demonstration Project – Final Report May 2000*. Along with the sampling location identification number, it will have the date of collection. For example, the last sampling location downstream is "05029003". All samples collected at this location will be labeled "05029003-(DATE)".

Each person collecting samples will fill out the appropriate sections of the Chain-of-Custody form (Appendix 3) when a sample is collected. The chain-of-custody form will be signed by both the deliverer and the recipient, when samples are transferred from sampler to courier and from courier to laboratory.

6.1.1.3 Sample Labeling

Samples will be labeled prior to shipment to the laboratory. The sample label will be affixed to the sample containers, covered with clear tape, and will provide the following information:

- Project name
- Sample identification
- Date and time of sample collection
- Composite or Grab
- Analysis required

6.1.2 Procedure for Macroinvertebrate Sample Collection

Tetra Tech will collect macroinvertebrate samples at the macroinvertebrate sampling locations using the following procedures:

1. Using the Traveling Kicknet Method (TKM), collect macroinvertebrates at each location of the riffle features (downstream, in riffle, and upstream of riffle).
2. Place the collected macroinvertebrates in a glass container with 95 percent ethanol preservative.
3. Upon return to lab, replace 95 percent ethanol solution with a 70 percent ethanol solution (KDOW 1993).
4. Sort the collected macroinvertebrate specimens and identify to the lowest available taxonomic level.

A chain-of-custody form will not be necessary for macroinvertebrate samples. However, the sample identification will be similar as the fecal coliform system. Sample identification will be the same as the sampling location's identification number and date of collection. Sampling site location identification system will be the same as the Kentucky Division of Water's system, outlined in the *Fleming Creek Watershed Nonpoint Source Demonstration Project – Final Report May 2000*. The sample location identification numbers for the three macroinvertebrate sampling locations will be 05029015, 05029020, and 05029031 (Figure 2).

6.1.2.1 Field Notes and Logbook

Sampling information will be recorded in a field logbook on consecutively numbered pages. The information will be entered into the field logbook at the time of sampling. At a minimum, the logbook will contain the following information:

Background Information

Date and time of sampling activities

Personnel on-site

Weather conditions

Purpose of sampling

Chronology of Sampling

Description of sampling points

Number and volume of samples collected

Date and time of sample collection

Sample identification number

Field observations about any problems encountered and deviations from the QA/QC

Each page will be dated and signed by the person making entries. Logbooks are accountable field documents and serve as a chronological representation of the sampling program. Sufficient detail will be included in the logbook to provide summary of sampling activities.

6.1.2.2 Sample Identification

Each sample location will be located with maps (Figure 2) and location descriptions (Appendix 2) to each site. Each sampling location will be labeled accordingly. Sample identification will be the same as the sampling location's identification. Sampling site location identification system will be the same as the Kentucky Division of Water's system, outlined in the *Fleming Creek Watershed Nonpoint Source Demonstration Project – Final Report May 2000*. For example, the last sampling location downstream is "05029031". All samples collected at this location will be labeled "05029031-(DATE)".

6.1.1.1 Sample Labeling

Samples will be labeled prior to leaving the sampling location. The sample label will be affixed to the sample containers, covered with clear tape, and will provide the following information:

- Project name
- Sample identification
- Date and time of sample collection

6.2 Documentation of Specific Sample Preservation Methods

The analysis of some parameters require a preservative to be used at the time of sample collection. The purpose of a preservative is to maintain the sample in a desired state or condition until time of analysis.

6.2.1 Bacteriological Sample Preservation

No preservative will be used during sample collection for fecal coliform bacteria during this sampling effort.

6.2.2 Macroinvertebrates Sample Preservation

Macroinvertebrates will be preserved in a 95 percent solution of ethanol at the time of collection in the field. The specimens will be transported to a location for sorting and identification to the lowest taxonomic level available. The specimens will be placed in a fresh 70 percent solution of ethanol at that time, as outlined in *Methods for Assessing Biological Integrity of Surface Water*, October 1993 (KDOW 1993).

6.3 Standardized Field Tracking and Reporting Forms

Standardized forms will be used to maintain consistency in field efforts, analysis and reporting purposes. The standardized forms to be used in this project will be a chain-of-custody form and a field tracking form.

6.3.1 Tracking of Water Samples for Fecal Coliform Analysis

Each sample will be added to a chain-of-custody, at time of collection by the person collecting the sample. Chain-of-custody procedures will be followed as outlined in Section 6.1.1.2.

6.3.2 Macroinvertebrates Tracking

A standardized form (Appendix 4) will be completed at time of collection by the collection team at the sampling location.

6.4 Laboratory Sample Custodian

An identified responsible person(s) is needed to ensure correct transfer and handling of collected sample upon delivery for analysis.

6.4.1 Water Samples for Fecal Coliform Analysis Laboratory Sample Custodian

The authorized laboratory agent and sample custodian for this project will be the Laboratory Manager at the Morehead State University. The laboratory is located at 150 4th Avenue and Ashland Avenue in Morehead, Kentucky 40351. The telephone number for the Morehead State University Water Testing Laboratory is 606-783-2961. The Laboratory Manager is the authorized agent for the laboratory to sign the chain-of-custody forms for receipt of samples to be analyzed.

6.4.2 Macroinvertebrates Sample Custodian

The sample custodian for all collected macroinvertebrate specimens will be the Tetra Tech Project Manager.

7.0 QUALITY CONTROL PROCEDURES

The overall QA objective for this monitoring effort is to produce well-documented data of known quality.

7.1 Container and Equipment Decontamination

Each type of sampling requires a different type of sample container. Water samples for fecal coliform analysis require a nalgene bottle, while the macroinvertebrate specimens will be stored in a glass container.

7.1.1 Water Samples for Fecal Coliform Analysis Container and Equipment Decontamination

A laboratory sterilized plastic 250 mL bottle will be used to collect a grab water sample for each of the identified bacteriological sampling locations. The laboratory will be responsible for decontaminating the bottles after analysis is completed.

7.1.2 Macroinvertebrates Container and Equipment Decontamination

Glass containers will be used only one time. After use, the glass containers will be properly disposed.

7.2 Equipment Calibration

There will be no field equipment requiring calibration used for this monitoring effort.

7.3 Sample Contamination Prevention

To prevent sample contamination, the laboratory will provide sterilized bottles for sample collection. Each sampler will utilize latex or nitrile disposable gloves. The gloves will be properly disposed of after each sample collection to prevent cross contamination for previous sampling locations and other outside sources.

7.4 Quality Control Samples

Quality control samples for this project ensure that each sample is collected and analyzed in a manner that ensures maximum representativeness.

7.4.1 Field Duplicates

Three field duplicates will be collected during each sampling event. Sample location 05029003, 05029015, and 05029030 will have duplicate samples collected and labeled 05029050, 05029051, and 05029052.

7.4.2 Laboratory Duplicates

In the laboratory, two samples will be duplicated. The laboratory duplicates will be 05029007 and 05029027.

7.5 Acceptable Levels of Variance for Duplicate Results

This section presents the specific calculations that will be used to describe the following data quality indicator precision. Precision will be estimated by analyzing duplicate samples. The reportable precision of duplicates (RPD) between samples measured in the original sample and the duplicate sample will be calculated using the following equation:

$$RPD = \{[C_O-C_D]/[C_O+C_D]\}*100$$

Where:

C_O = the original sample concentration
C_D = the duplicate sample concentration

The RPD for duplicate samples is an indication of the reproducibility of the sampling method. No QC limits will be established for this calculation.

7.6 Laboratory SOP

A copy of the laboratory's SOP is available upon request.

7.7 Corrective Actions

Each member of the Tetra Tech project team is responsible for noting whenever routine assessments reveal that any field or laboratory measurement activity is (1) not in compliance with the Kentucky Division of Water endorsed QA/QC or (2) demonstrate a potential data quality issue. Each team member is further responsible for initiating a nonconformance communication to the Tetra Tech Project Manager or the Laboratory Manager, as appropriate. The

nonconformance communication should document the problem, the probable impact on the quality of the associated data, and the immediate corrective actions implemented. To ensure that appropriate corrective action is implemented, copies of all nonconformance communications initiated by the Tetra Tech field personnel shall be forwarded to the Tetra Tech Project Manager, a Fleming County Conservation District representative and an appropriate member of the Kentucky Division of Water. All nonconformance communications initiated by laboratory personnel will be forwarded to the Laboratory Manager, who will determine whether the nonconformance has been corrected appropriately and whether consultation with the Tetra Tech Project Manager is needed (the Tetra Tech Project Manager should be consulted for all nonconformance actions that could significantly impact project data). The Tetra Tech Project Manager will then consult with a representative of the Fleming County Conservation District and appropriate personnel from the Kentucky Division of Water to develop an appropriate plan of corrective action.

Once the corrective action has been identified, a corrective action memorandum or other appropriate documentation will be initiated by the Tetra Tech Project Manager or the Laboratory Manager, as appropriate. The corrective action memorandum will document the corrective action, the personnel involved in the decision-making, the personnel responsible for implementing the corrective action.

The Tetra Tech Project Manager will retain a copy of all nonconformance and corrective action memoranda generated by Tetra Tech project staff. Copies of all laboratory nonconformance memoranda and corrective action memoranda will be retained by the Laboratory Manager and then included in the laboratory reports.

For field nonconformances, the Tetra Tech Project Manager is directly responsible for ensuring that appropriate corrective action has been taken. For laboratory nonconformances, the Laboratory Manager is responsible for ensuring that appropriate corrective action has been implemented and for keeping the Tetra Tech Project Manager informed of the status of laboratory corrective actions.

8.0 DATA REPORTING STANDARDS

All raw data generated from the sampling efforts of this project will be presented in a spreadsheet format consistent with the KDOW data generated from previous sampling efforts.

9.0 DATA MANAGEMENT

For this project a variety of media and locations will be used to store generated data. Identified individuals will be the responsible parties for updating and maintaining data as it becomes available as the project proceeds.

9.1 Data Storage

All data and generated reports from this project will be stored in four different forms of media at two different locations. The four different forms of media will be (1) hard copy, (2) floppy disk, (3) Tetra Tech EM Inc.'s server, and (4) tape back-up of Tetra Tech EM Inc.'s server. The two different locations will be Tetra Tech EM Inc.'s Louisville office and the Fleming County Conservation District. All four forms of media will be maintained at the Tetra Tech EM Inc.'s Louisville office located at 1815 Brownsboro Road Louisville, Kentucky 40206.

The Fleming County Conservation District office will maintain this data and generated reports in electronic format either on a personal computer, floppy disk, or both, in addition to hard copies that will also be maintained. The address for the Fleming County Conservation District office is Rt. 2 Box 27B Flemingsburg, Kentucky 41041.

9.2 Points of Contact

The Fleming County Conservation District point of contact for the Fleming Creek Watershed Project is Ms. Emily Crain, Watershed Coordinator. Ms. Crain's telephone number is 606-845-9387. The Tetra Tech EM Inc. point of contact for the Fleming Creek Watershed Project is Mr. James K. Sundys, Project Manager. Mr. Sundys' telephone number is 502-357-9351.

10.0 OTHER

This QA/QC plan addresses all major areas of sample collection, transport, and analysis of all monitoring activities. It addresses possible contingencies that may later need to be addressed. There are no other foreseeable contingencies that need to be addressed.

REFERENCES

Kentucky Division of Water (KDOW). 2000. *Fleming Creek Watershed Nonpoint Source Demonstration Project – Final Report.* Technical Report No. 5. Kentucky Division of Water, Nonpoint Source Secion. May.

Kentucky Division of Water (KDOW). 1993. *Methods for Assessing Biological Integrity of Surface Waters.* Kentucky Division of Water, Water Quality Branch, Ecological Support Section. October.

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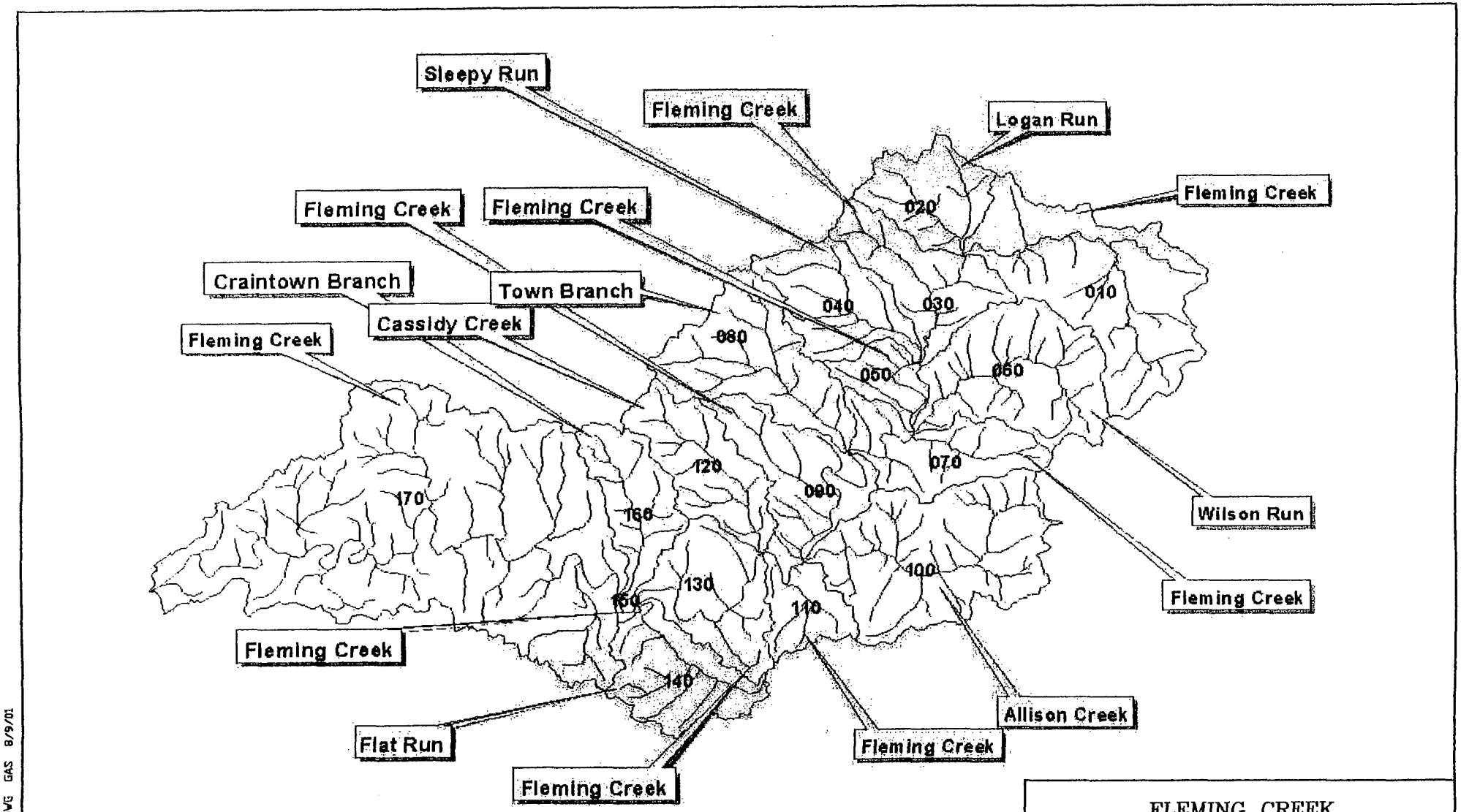
FIGURES



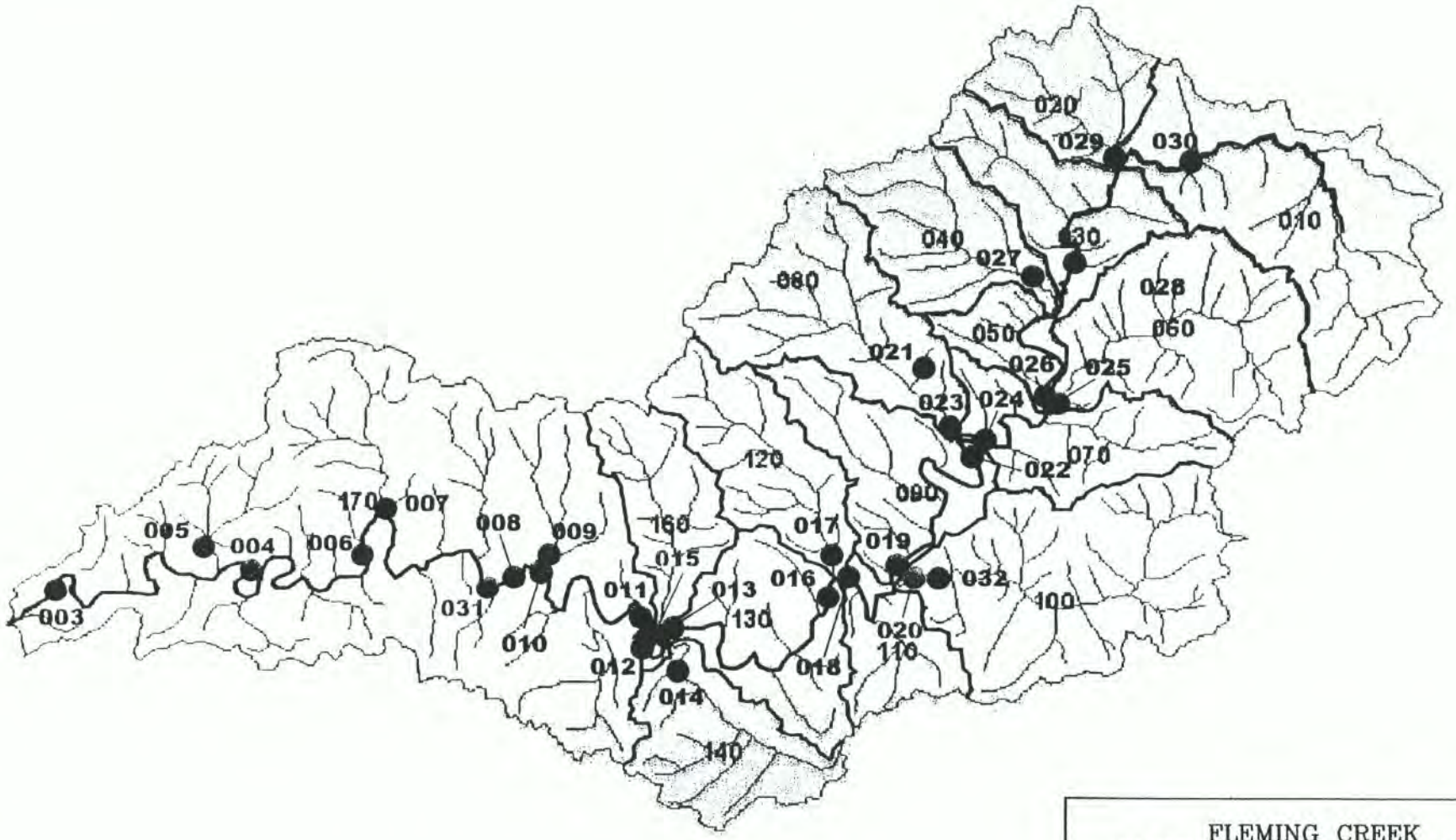
SOURCE: KENTUCKY DIVISION OF CONSERVATION

FLEMING CREEK
FLEMING COUNTY, KENTUCKY

FIGURE 1
FLEMING CREEK WATERSHED

Tetra Tech EM Inc.

S1143-01 FLEMINGCREEKWATERSHED.DWG GAS 8/9/01



● FLEMING CREEK BACTERIALOGICAL SAMPLING LOCATION

● MACROINVERTABRATE SAMPLING LOCATION

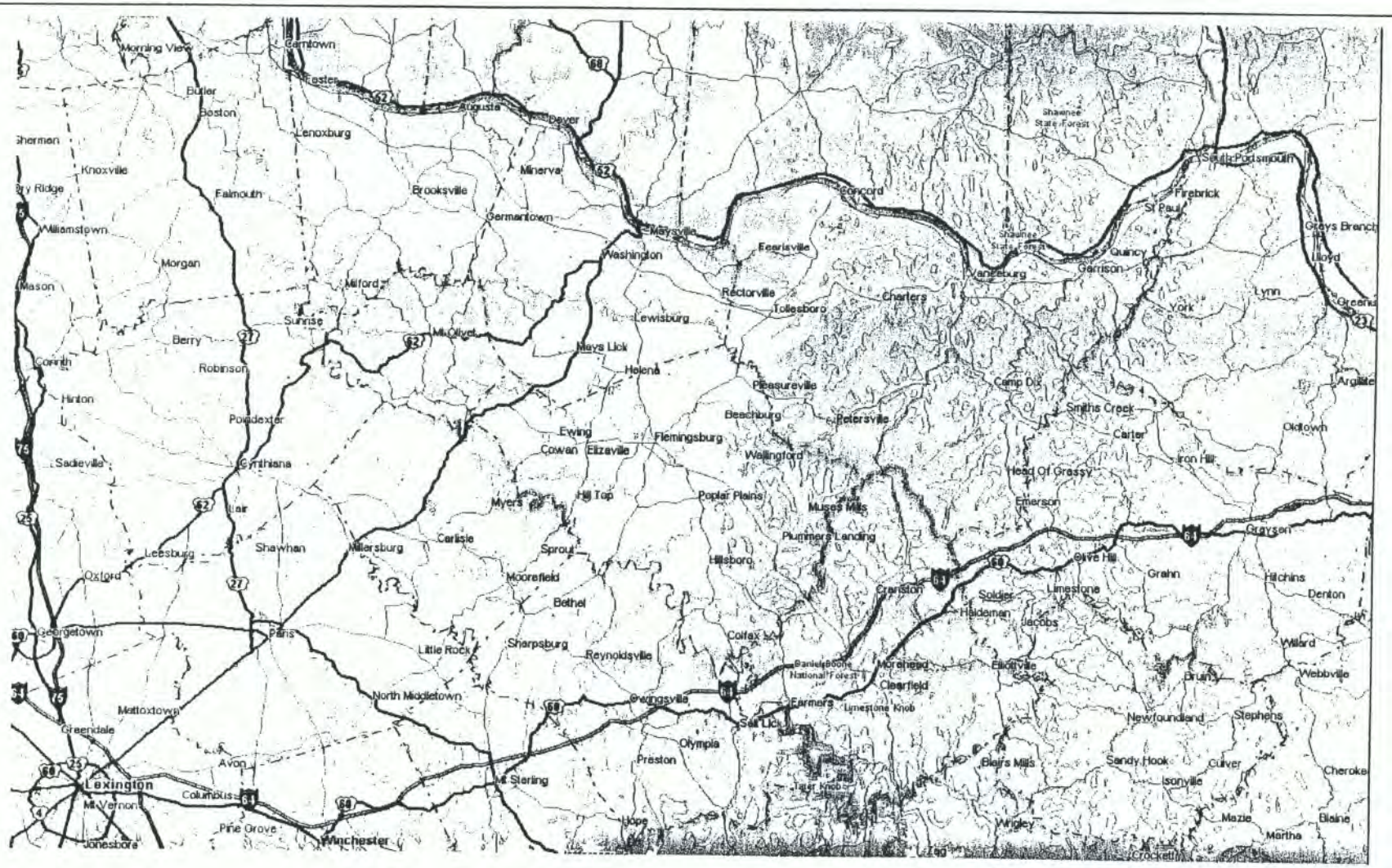
SOURCE: KENTUCKY DIVISION OF CONSERVATION

FLEMING CREEK
FLEMING COUNTY, KENTUCKY

FIGURE 2
SAMPLING LOCATIONS

Tetra Tech EM Inc.

S1143-01 FLEMINGCREEKSAMPLINGLOCATIONS.DWG GAS 8/10/01



SOURCE: TETRA TECH EM INC., 2001.

FLEMING CREEK
FLEMING COUNTY, KENTUCKY

FIGURE 3
AREA MAP

Tetra Tech EM Inc.

S1143-01 FLEMINGCREEKAREAMAP.DWG GAS 8/10/01

APPENDIX 1

Contact Information

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Tetra Tech EM Inc.
1815 Brownsboro Road
Louisville, Kentucky 40206
Phone 502-568-6688
e-mail: sundysj@ttemi.com

Ms. Emily Crain, Watershed Coordinator
Fleming County Conservation District
Rt. 2 Box 27B
Flemingsburg, Kentucky 41041
Phone: 606-845-9387
e-mail: ecrain@kystate.ky.nrcs.usda.gov

Mrs. Rita Wright, Laboratory Manager
Morehead State University
Water Testing Laboratory
150 4th Avenue and Ashland Avenue
Morehead, Kentucky 40351
Phone: 606-783-2961

APPENDIX 2

Sampling Location Descriptions

Site #	Site Locality	Type of Monitoring
05029003	Fleming Creek mainstem at Hwy 32 bridge, Nicholas County.	Bacteria (Phase I)
05029004	Fleming Creek mainstem adjacent to Yin Road, Fleming County.	Bacteria (Phase I)
05029005	Unnamed trib to Fleming Creek adjacent to Hammonds Road, Fleming County.	Bacteria (Phase I)
05029006	Fleming Creek mainstem adjacent to Pike Bluff Road, Fleming County.	Bacteria (Phase I)
05029007	Poplar Creek at mouth, Fleming County.	Bacteria (Phase I)
05029008	Fleming Creek mainstem just downstream of Doty Creek confluence, Fleming County.	Bacteria (Phase I)
05029009	Doty Creek at mouth, Fleming County.	Bacteria (Phase I)
05029010	Fleming Creek mainstem just upstream of Doty Creek confluence, Fleming County.	Bacteria (Phase I)
0502911	Fleming Creek mainstem just downstream of Craintown Branch confluence adjacent to Hwy 57, Fleming County.	Bacteria (Phase I)
05029012	Fleming Creek mainstem just upstream of Craintown Branch confluence at Hwy 57 bridge, Fleming County.	Bacteria (Phase I)
05029013	Fleming Creek mainstem just upstream of Flat Run confluence, Fleming County.	Bacteria (Phase I)
05029014	Flat Run near mouth, Fleming County.	Bacteria (Phase I)
05029015	Craintown Branch at mouth, Fleming County.	Bacteria (PhaseI) Physicochemical (Phase II) Biological (Phase III) X
05029016	Fleming Creek mainstem just downstream of Cassidy Creek confluence, Fleming County.	Bacteria (Phase I)
05029017	Cassidy Creek at Hwy 11 bridge, Fleming County.	Bacteria (Phase I)
05029018	Fleming Creek mainstem just upstream of Cassidy Creek confluence, Fleming County	Bacteria (Phase I)
05029019	Fleming Creek mainstem just upstream of Allison Creek confluence, Fleming County.	Bacteria (Phase I)

Site #	Site Locality	Type of Monitoring
05029020	Allison Creek just downstream of Smith's dairy near Hwy 697, in Fleming County.	Bacteria (Phase I) Physicochemical (Phase II) Biological (Phase III)
05029021	Flemingsburg Treatment Plant effluent on Town Branch, in Fleming County.	Bacteria (Phase I)
05029022	Fleming Creek mainstem just downstream of Town Branch confluence, in Fleming County.	Bacteria (Phase I)
05029023	Town Branch at mouth, in Fleming County.	Bacteria (Phase I)
05029024	Fleming Creek mainstem just upstream of Town Branch confluence at Hwy 32 bridge, in Fleming County.	Bacteria (Phase I)
05029025	Wilson Run near mouth, just downstream of Hwy 559 bridge, in Fleming County.	Bacteria (Phase I)
05029026	Fleming Creek mainstem at Hwy 559 bridge, just upstream of Wilson Run confluence.	Bacteria (Phase I)
05029027	Sleepy Run downstream of Hwy 57 bridge, in Fleming County.	Bacteria (Phase I)
05029028	Fleming Creek mainstem at Hwy 3301 bridge, in Fleming County.	Bacteria (Phase Physicochemical (Phase II)
05029029	Logan Run at mouth adjacent to Hwy 57, in Fleming County.	Bacteria (Phase I) Physicochemical (Phase II)
05029030	Fleming Creek mainstem just above Logan Run confluence near Hwy 57, in Fleming County.	Bacteria (Phase I)
05029031	Fleming Creek mainstem just downstream of Hwy 170, in Fleming County.	Physicochemical (Phase II), Biological (Phase III)
05029032	Allison Creek just upstream of Smith's dairy near Hwy 697, in Fleming County.	Physicochemical (Phase II)

APPENDIX 3

Chain-of-Custody

Morehead State University Water Testing Laboratory
150 4th and Ashland Avenue
Morehead, KY 40351
Phone: 606-783-2961

Client Name: Tetra Tech EM Inc.
Address: 1815 Brownsboro Road
City/State/Zip: Louisville, Kentucky 40206
Project Manager: James K. Sundys
Telephone Number: 502-568-6688 **Fax No.:** 502-568-6222
Sampler Name: (Print)
Sampler Signature:

Compliance Monitoring? Yes No
Enforcement Action? Yes No
Report To: J. Sundys
Invoice To: J. Sundys
TA Quote #:
Project ID: Fleming Creek Watershed
Project #: S1143.02

Sample ID / Description	Date Sampled	Time Sampled	No. of Containers Shipped	Grab	Composite	Field Filtered	Preservative: Ice	Preservative: HNO_3 (Red Label)	Preservative: HCl (Blue Label)	Preservative: NaOH (Orange Label)	Preservative: H_2SO_4 Plastic (Yellow Label)	Preservative: H_2SO_4 Glass(Yellow Label)	Preservative: None (White Label)	Preservative: Other (Specify)	Matrix: Groundwater	Matrix: Wastewater	Matrix: Drinking Water	Matrix: Sludge	Matrix: Soil	Matrix: Other (specify):	Analyze For: Fecal Coliform Method 9222D	Analyze For:	Analyze For:	Analyze For:	Analyze For:	Analyze For:	Analyze For:	Analyze For:	Analyze For:	Analyze For:	RUSH TAT (Pre-Schedule	Standard TAT	Fax Results	Send QC with report

Special Instructions:

Method of Shipment: Delivered by TTEMI

Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by TestAmerica:	Date	Time

Laboratory Comments:
Temperature Upon Receipt:
VOCs Free of Headspace? Y N

APPENDIX 4

Field Tracking Form for Macroinvertebrate Samples

FLEMING CREEK WATERSHED

County: Fleming
Stream: Fleming Creek and Tributaries

STATION ID	DATE OF COLLECTION	TIME SAMPLE WAS COLLECTED	COMMENTS

Appendix C

Fleming Creek Clean Water Action Plan
BMP Implementation Plan

List of Eligible BMPs:
A list of eligible BMPs and items eligible for CWAP funding follows:

Practice Name (NRCS)	Practice Code (NRCS)
Critical Area Planting	342
Diversion	362
Fence	382
Filter Strip	393
Grassed Waterway	412
Heavy Use Area Protection	561
Livestock Exclusion	472
Pipeline	516
Pond	378
Riparian Forest Buffer	391A
Roof Runoff Management	558
Sinkhole Protection	725
Spring Development	574
Streambank and Shoreline Protection	580
Stream Crossing	576
Tank	614
Tree/Shrub Establishment	612
Waste Management System	312
Waste Storage Facility	313
Waste Treatment Lagoon	359
Well	642

Other items eligible for funding;
Pumps; for transmission of water from ponds, wells, springs or streams to troughs or watering devices
Ponds; must be fenced with a trough, or fenced with limited access area
Chargers; for electrical fencing
Extension of electrical service; for water pumps
Replacement of temporary fencing with permanent fencing

Description of the BMP selection process:

The pollutants targeted by the Fleming Creek CWAP Project include bacteria, nutrients and sediment. The watershed has a high concentration of dairies and beef operations. Based on agricultural statistics and information from the Oversight Committee members (including various representatives of agricultural agencies and organizations), the trend in the Fleming Creek watershed is the enlargement of a few dairies and the conversion of smaller dairies to beef operations. Additionally, decreases in the tobacco base have resulted in farmers looking more closely at management of their livestock herds to compensate for the loss of income from tobacco.

One of the primary situations believed by the Oversight Committee to be contributing to the introduction of the pollutants into the surface waters of Fleming Creek watershed is centered around cattle having full access to streams. The Oversight Committee identified the following impediments to livestock exclusion in the streams:

- A cultural perspective exists among farmers in the watershed that streamside zones on a well-maintained farm are not allowed to revert to brush. The average age of a farmer in the watershed is greater than 50 years. Many of these same farmers have spent considerable effort over the years to "clean up" stream side areas, fence rows and other farm areas by removing brush and trees.
- Farmers have been directed toward using municipal water as an alternative water source for livestock via restrictions in the available cost share programs. Often times, municipal water can be made available at less cost than the construction of a pond or well and pump. However, farmers view municipal water as the most expensive option due to the monthly water bill. Ponds are preferred over connections to municipal water supplies due to the long-term cost to the farmer. Most farmers view the streams on their property as "free water" at no cost and are reluctant to switch to municipal water.
- Dependability of the alternative water supply is also an issue for local farmers. Kentucky has experienced recent severe droughts. Fleming County farmers were warned in 1998 by the municipal water supplier that use for livestock consumption would be among the first prohibited water uses if conservation measures were required. The resulting frustration of dependence and uncertainty was painful for farmers, and grated upon the more traditional value of independence within the agricultural community. Existing programs available to producers generally involve expansion of municipal water use, and have not been widely accepted by farmers.
- Farmers often perceive the streamside areas as among their most productive areas and are reluctant to relinquish these areas. Existing programs may require minimum buffer widths in excess to that which producers are willing to forfeit.

The Oversight Committee has identified an approach to overcoming the identified impediments to restricting livestock access to streams. The adoption of rotational grazing systems, including limited stream access, among the area beef and dairy producers would appear to satisfy the producers economic needs while accomplishing water quality goals. Such systems have not been adopted for several reasons, including restrictions on cost share programs, limited cost share percentages, and access to water supplies.

Best Management Practices (BMPs) and technologies selected for the watershed project are oriented around reducing pathogens, nutrients and sediment. The efforts will be centered primarily around encouraging the adoption of rotational grazing systems, the development of alternative water supplies or providing limited stream access to cattle, and the construction of well designed and sited animal feeding/waste storage areas. Other BMPs that address the target pollutants will be eligible for systems other than rotational grazing.

Although the total exclusion of livestock from the streams of Fleming Creek's watershed is the ideal, such an alternative has proven unacceptable to local producers as evidenced by the lack of participation in other funding programs available in the watershed. The concept of "flash grazing" of fenced streamside areas will be adopted in the project as the most viable option to reducing livestock access to the streams. While this approach will not include the stream shading benefits that a forested riparian buffer would provide, other nonpoint source reductions have been reported to be comparable to riparian buffers (Lyons, Weigel, Paine, and Undersander 2000). This approach reconciles the farmer's concern over loss of production area with the public

benefits of stream protection. The term "flash grazing" includes the fencing of a grassed streamside area with grazing/haying permitted for brief periods. For example, for cool season grasses, most common in the watershed, grazing would be permitted for a period of 5 days or less in the spring and again in the fall during the peak periods of forage growth. Permitted grazing periods will be based on the type of forage involved and will be approved by the Oversight Committee. Harmful or undesirable vegetative species present on the site will be controlled or eliminated as necessary. At no time will the height of forage be removed below the recommended minimum height per NRCS Prescribed Grazing standard (practice code 528A). The use of flash grazing in the project does not preclude total livestock exclusion associated with other practices funded under state and federal programs and, where possible, participation in programs that require total livestock exclusion from riparian areas will be encouraged by the technical staff associated with the project. Also, educational outreach on the benefits of forested riparian buffers will continue in the watershed in an effort to change producer attitudes over time.

Ponds will be eligible under the project as an alternative water supply. Livestock access to the ponds will be limited to livestock via fencing with limited access areas or the connection to watering trough or other watering devices.

Relative Treatment Efficiency of BMPs

The focus of this project is on the adoption of a management system by local producers rather than individual BMPs. The protection of streamside areas and the adoption of waste management systems are the focal points in the development of the strategy and will be tailored to the individual producer's operation.

Operation and Maintenance:
The project will compliment other state and federal funding programs in the watershed. Operation and maintenance agreements are required for both EQIP and State Cost Share funding. Operation and maintenance agreements for CWAP funded components that are not similarly addressed through EQIP or State Cost-Share operation and maintenance agreements will be developed as needed.

Description of BMP Targeting Process:
Selection of farms for BMP implementation will be selected based on the following priority factors (Item 1 is the highest priority. When request for funding exceeds available funding, prioritization of applicants within the priority TMDL creek watersheds will be based on items 2-5):

1. Operations on tributary creeks identified in the TMDL: Allison Creek, Craintown Branch, Doty Creek, Sleepy Run, Town Branch, Wilson Run, Cassidy Creek, Logan Run, Poplar Creek, unnamed tributary at river mile 4.28; Operations directly on Fleming Creek (highest selection priority)
2. Cost share contributions from other programs (EQIP, State Cost Share, CRP)
3. Length or percentage of stream protected from unrestricted livestock access (higher percentages and greater lengths are higher in priority)
4. Proximity of identified pollution problem to stream
5. Overall cost of BMPs for rotational grazing systems per stream mile protected.

This CWAP project compliments other federal funding programs under which specific BMP locations are protected under the Freedom of Information Act. Therefore, the specific location of

BMPs will be maintained by the Fleming County Conservation District. Specific location information for BMPs funded by CWAP, matching State Cost Share funds, and/or other funding programs (as appropriate) will be provided to the Division of Conservation and the Division of Water, at a minimum, by 14 digit HUC so that BMP locations can be correlated to water quality monitoring locations.

Financial Plan of Action:

Existing state and federal programs will be utilized to the maximum extent possible, with most of these paying 75% of the cost of a BMP. CWAP funds will primarily be used to provide cost share for practices not covered by existing programs, and will also provide a cost share rate of 75%.

Restrictions and exceptions include:

- Size of ponds will be based on reasonable livestock watering needs. Additional cost associated with larger pond capacity will be borne by the producer.
- Any BMP or system considered for funding under the CWAP must be reviewed for the potential to improve water quality. BMPs or systems that are primarily for improving production or efficiency of the producer's operation will not be eligible for CWAP funding.

Lyons, J., B.M. Weigel, L.K. Paine, and D.J. Undersander. 2000. Influence of Intensive Rotational Grazing on Bank Erosion, Fish Habitat Quality, and Fish Communities in Southwestern Wisconsin Trout Streams. Journal of Soil and Water Conservation. 55 (3):271-276.

Appendix D

Fleming Creek Clean Water Action Plan Standards and Specifications for Best Management Practice Installation

Fencing of Streams (382) (Permanent): All streams on a given tract of land must be fenced to be considered for funding under the CWAP program. A stream is defined as any defined channel where water runs. All fence built with funding from CWAP must be completed to NRCS Standards and Specifications, see Field Office Tech Guide (FOTG). The fence must also be established an average of 20 feet from the top of the stream bank. The lifespan for this practice is 20 years.

Filter Strip (393): All Filter Strips established under the CWAP program must be completed to NRCS Standards and Specifications (see FOTG). The lifespan for this practice is 10 years.

Grassed Waterways (412): All Grassed Waterways established under the CWAP program must be completed to NRCS Standards and Specifications (see FOTG). The lifespan for this practice is 10 years.

Critical Area Planting (342): All Critical Area Plantings established under the CWAP program must be completed to NRCS Standards and Specifications (see FOTG). The lifespan for this practice is 15 years.

Heavy Use Area (591): All Heavy Use Areas established under the CWAP program must be completed to NRCS Standards and Specifications (see FOTG). The lifespan for this practice is 10 years.

Spring Development (574): All Spring Developments established under the CWAP program must be completed to NRCS Standards and Specifications (see FOTG). The lifespan for this practice is 10 years.

Embankment Pond (378): All Embankment Ponds constructed under the CWAP program must be completed to NRCS Standards and Specifications (see FOTG). The lifespan of this practice is 20 years.

Trough or Tank (614): All Troughs or Tanks installed under the CWAP program must be completed to NRCS Standards and Specifications (see FOTG). The lifespan of this practice is 10 years.

Pipeline (516): All Pipeline installed under the CWAP program must be completed to NRCS Standards and Specifications (see FOTG). The lifespan of this practice is 20 years.

Pasture/Hayland Planting (512): All seeding completed under the CWAP program must be completed to NRCS Standards and Specifications (see FOTG). The lifespan of this practice is 5 years.

Stream Crossing (376): All Stream Crossings constructed under the CWAP program must be completed to NRCS Standards and Specifications (see FOTG). The lifespan of this practice is 20 years.

Animal Waste System Improvements: All Animal Waste System Improvements must be designed by a NRCS qualified person and be approved by the CWAP Oversight Committee, KY Division of Water (DOW), and KY Division of Conservation (DOC).

Alternative Water Systems: All Alternative Water System installations under the CWAP program must be designed by a NRCS qualified person and be approved by the CWAP Oversight Committee, DOW, and DOC.

Fleming Creek Clean Water Action Plan (CWAP) Administrative Regulations

The Fleming Creek Clean Water Action Plan (CWAP) cost-share program provides cost-share assistance to persons engaged in agriculture and silvicultural production for implementation of best management practices (BMP) for such purposes as providing cleaner water through the reduction in the loading of sediment, nutrients, and pesticides in the Fleming Creek Watershed. Reducing the loss of top soil vital to the sustained production of food and fiber, and preventing surface water and ground water pollution.

Section 1. Definitions.

1. Agricultural or Silvicultural Production. Any farm operation on a tract of land, including all income producing improvements and farm dwellings, together with other farm buildings and structures incident to the operation and maintenance of the farm buildings and structures incident to the operation and maintenance of the farm, used for the production of livestock, livestock products, poultry, poultry products, milk, milk products, or silviculture products or for the growing of crops such as, but not limited to tobacco, corn soybeans, small grains, fruit and vegetables, or devoted to and meeting the requirements and qualifications for payments to agriculture programs under an agreement with the state or federal government.

2. Agriculture Water Quality Plan. A document incorporating the conservation plan, compliance plan, or forest stewardship management plan as necessary to prevent ground water and surface water pollution from an agricultural or silvicultural production.

3. Best Management Practices (BMP). The most effective, practical, and economical means of reducing and preventing water pollution for agricultural or silvicultural production provided by the USDA NRCS and the CWAP Oversight Committee. BMPs shall establish a minimum level of acceptable quality for planning, designing, installing, operating, and maintaining these practices.

4. Case File. The collection of materials that are assembled and maintained for each application for cost-share assistance.

5. Compliance Plan. A conservation plan containing BMPs developed for persons engaged in agricultural production by the USDA NRCS in conjunction with local conservation districts as required for eligibility under the Federal Food Security Act.

6. Conservation District or District. A subdivision of state government organized pursuant to KRS 262 for the specific purpose of assisting persons engaged in agricultural or silvicultural production in solving soil and water resource problems, setting priorities for conservation work to be accomplished, and coordinating the federal, state, and local resources to carry out these programs.

7. Conservation Plan. A plan describing best land management practices, including an installation schedule and maintenance program which, when completely implemented, will improve and maintain soil, water, and related plant and animal resources of the land in accordance with the USDA NRCS Field Office Technical Guide or developed by others in accordance with the Technical Guide and in cooperation with a conservation district.

8. Cost-Share Assistance. Cost share funds awarded by the Fleming Creek CWAP program funded through a federal 319(h) grant.

9. Eligible Land. Land on which agricultural or silvicultural production is being conducted.

10. Eligible Person. A person eligible to apply for cost-share assistance.

11. Eligible Practices. Those BMPs that have been approved by KY Division of Water (DOW), KY Division of Conservation, and the CWAP Oversight Committee.

12. Groundwater. Subsurface water occurring in the zone of saturation beneath the water table and any perched water zones below the B soil horizon.

13. Performance and Maintenance Agreement. A written agreement between an eligible person and the district in which the eligible person agrees to implement and to maintain the BMPs for which cost-share assistance is being awarded.

14. Surface Water. Those waters having well defined banks and beds, both constantly or intermittently flowing in well defined channels and having a demonstrable hydrologic connection with the surface. Effluent ditches and lagoons used for waste treatment which are situated on property owned, leased, or under valid easement by a permitted discharger shall not be considered to be surface waters on the Commonwealth.

15. Watershed. All the area from which all drainage passes a given point.

Section 2. Eligibility of Persons.

1. Eligible Persons. Persons conducting agricultural or silvicultural production are eligible to receive cost-share assistance for BMPs if the following conditions are met:

    a. The person has had a prepared conservation plan, a compliance plan, a forest management or forest stewardship plan.
    b. The person has an Ag Water Quality Plan on file at the Fleming County Conservation District Office.
    c. The person agrees to perform and to maintain BMPs for the period of time specified in the NRCS FOTG.

2. Ineligible Person. A person engaged in agricultural or silvicultural production who has failed or refused to comply with agriculture water quality planning and has been deemed

a "bad actor" under KRS 224.71-130 shall lose eligibility for further cost-share assistance.

Section 3. Eligible Best Management Practices (BMPs)

1. Purposes of BMPs. The Fleming Creek CWAP cost-share funds shall be used to provide cost-share assistance for development and implementation of BMPs for the following purposes:

    a. Providing cleaner water through the reduction of sediment loading in the Fleming Creek Watershed.
    b. Reducing the loss of topsoil vital to sustain production of food and fiber.
    c. Preventing surface and groundwater pollution.

2. Approved Best Management Practices. Complete listings of eligible BMPs appear in the document Fleming Creek Clean Water Action Plan (CWAP) Standards and Specifications. Attached at the end of this document.

3. A landuser may request the CWAP Oversight Committee's approval of BMPs not included in the list of approved practices if the BMPs solve a problem unique to the requesting landuser and conform to one or more of the purposes listed in subsection 1. of this section. A request shall be filed in writing with the CWAP Oversight Committee in time for the Committee to review the request and to notify the landuser of its decision in a timely manner.

Section 4. Solicitation of Applications

The CWAP Oversight Committee shall establish a deadline for submittal of applications for cost-share assistance. The Fleming County Conservation District shall provide an opportunity for eligible persons within the target subwatershed to submit applications by advertising the availability of cost-share assistance in appropriate news media such as local newspapers, local radio stations, and any newsletters published by the district.

Section 5. Review of Applications.

The CWAP Oversight Committee shall review and determine the eligibility of all applications which were submitted to it by the established deadline. The Oversight Committee shall vote upon the eligibility of the applications.

Section7. Prioritization of Applications.

The CWAP Oversight Committee shall prioritize the applications of persons determined to be eligible for cost share assistance and shall make the final award of cost-share assistance based on the total points on the application. With the applications receiving the lowest points the higher priority for funding.

Section 8. Design of Best Management Practices.

Once an application has been approved a technician will develop a final design and layout for the approved BMPs following NRCS and Fleming Creek CWAP Standards and Specifications criteria.

Section 9. Execution of Performance and Maintenance Agreements.

After an applicant has been awarded cost-share assistance and before the applicant receives payment of the cost-share funds, the applicant and the Fleming County Conservation District shall execute a performance and maintenance agreement.

1. Requirements of performance and maintenance agreements. The performance and maintenance agreement shall require the applicant to meet the following requirements:

    a. The applicant shall agree to perform those BMPs approved in accordance with this administrative regulation.
    b. The applicant shall agree to maintain approved BMPs for the expected life on each practice agreed upon in the performance and maintenance agreement.
    c. Upon completion of the approved BMP, the applicant shall notify the District that the practice has been installed and shall provide to the district for its inspection all vouchers, bills, and receipts associated with the practice.
    d. The applicant shall agree that at the time of transfer of ownership of land where a BMP has been applied using cost-share assistance and the expected life assigned the practice has not expired, the applicant shall execute a contract with the transferee requiring continuation of those practices completed.
    e. The applicant shall agree that if the applicant destroys the BMP installed or voluntarily relinquishes control or title of the land on which the installed practice has been established, and the new owner, heir, or operator does not agree in writing to properly maintain the practice for the remainder of its specified lifespan, the applicant shall refund all or part of the cost-share assistance as determined by the Fleming County Conservation District.
    f. The applicant shall agree that if the applicant does not maintain the approved BMP on the schedule provided in the plan, the applicant shall forfeit the cost-share assistance and the District shall be authorize to recover the funds disbursed.

2. Effect of Performance and Maintenance Agreement. Requirements for performance and maintenance for BMPs applied using cost-share assistance shall be established in the performance and maintenance agreement and reviewed with the applicant at the time of application submittal and before completion of a certification of practices.

3. Refund of Funds Disbursed. The district may require a refund of cost-share when an approved BMP has not been performed or maintained in compliance with approved design standards and specifications for the practice during its expected life as agreed in the performance and maintenance agreement.

4. Application for Future Cost-Chare Assistance. BMPs that have been successfully completed and which later fail as the result of floods, drought, or other natural disasters, and not though any fault of the applicant, shall not prohibit the applicant from applying for additional cost-share assistance to restore the practices to their original design standards and specifications.

5. Certification. Upon notification by the applicant that the approved BMP has been completed and before disbursement of funds from the district, the appropriate technical agency shall certify to the district that the practice has been installed in accordance with all pertaining standards and specifications.

6. Limitations on Awards. Cost-share assistance awards to an applicant shall be limited to the Flat Rate established for that practice where flat rates have been established. All other practices installed shall be paid at a rate of 75% of actual cost incurred by the applicant, not to exceed set amount for the practice. Cost-share assistance shall not be awarded to BMPs in progress prior to cost-share approval or previously installed practices by the applicant.

Section 10. Reporting and Accounting.

1. The Fleming Creek CWAP Coordinator shall maintain all records pertaining to the Fleming Creek CWAP project at the Fleming County Conservation District. In addition the CWAP Coordinator will submit all documentation to the KY Division of Conservation as outlined in the Memorandum of Agreement between the KY Division of Conservation and the Fleming County Conservation District.

2. The Fleming County Conservation District's Administrative Secretary shall maintain all financial records pertaining to the Fleming Creek CWAP project and provide a copy to the Fleming Creek CWAP Coordinator to be forwarded to the KY Division of Conservation.

3. Case files for each approved application shall be kept in the Fleming County Conservation District office and shall contain the following:

    a. The approved application for allocated funds.
    b. Certification of practice completion.
    c. Applicant's vouchers, bills and/or receipts.
    d. Final designs for BMPs.
    e. The performance and maintenance agreement.
    f. Any amendments to the performance and maintenance agreement.
    g. A map locating the practices.
    h. A conservation plan map.
    i. A soils map of the farm.

Certification of Operation & Maintenance Agreement

I certify that I have read and agree to abide by all rules and regulations set forth in the Fleming Creek Clean Water Action Plan (CWAP) Administrative Regulations and the Fleming Creek Clean Water Action Plan (CWAP) Standards and Specifications for Best Management Practice Installation. I agree to maintain the practices set forth in my contract for the lifetime of the practice as outlined in the Fleming Creek Clean Water Action Plan Standards and Specifications for Best Management Practices. I agree to refund all or part of the cost share assistance paid to me as determined by the Fleming County Conservation District if, before the expiration of the practice's life span specified, I destroy the practice installed, cease to use the practice for the intended purpose, or voluntarily relinquish control or title the land on which the installed practice has been established and the new owner and/or operator of the land does not agree, in writing, to properly use and maintain the practice for the remainder of its specified life span.

_____ _____

Signature, Landowner Date

Appendix E

News and Press Release Announcing Fleming County Conservation District's Fleming Creek Clean Water Action Plan (CWAP)

The Fleming County Conservation District is now taking applications for the Fleming Creek Clean Water Action Plan (CWAP) cost-share program. Individuals farming in either the Allison Branch or Wilson Run Watersheds are eligible to receive 75% cost-share to install conservation practices , including but not limited to stream fencing, stream crossings, livestock watering systems, hayland planting, and many other conservation practices. Applications will be accepted January 2, 2002 through January 31, 2002. For more information contact Emily Crain Anderson at (606) 845-9387 or stop by the Fleming County Conservation District located on Mt. Sterling Road behind Mama's Kitchen between the hours of 8AM and 4:30PM.

Fleming County Conservation District &
Fleming County Cooperative Extension Service

Farm Field Day
July 12, 2001
5:00 PM - 9:00 PM

The Field Day will be held on the farms of Tribby Vice, Chris Hickerson & Pat Story. Meet at the Tribby Vice farm at 5:00 PM.

Agenda

5:30 PM - 6:45 PM	**First Tour**
6:45 PM - 7:45 PM	**Supper**
7:45 PM - 9:00 PM	**Second Tour**

Scheduled Topics and Speakers

Noxious Weeds - Dr. J.D. Greene
Foot and Mouth Disease - Dr. Patty Sharko
Burley Co Op -
Native Warm Season Grasses - Glenn Abney
Beef Management - Jim Akers
Rotational Grazing - Ralph Quillen
Forestry - Kevin Galloway and Dwayne Anderson
Wildlife - Wes Mattox
Vegetable Production - Bob Graven & Dr. Terry Jones

For more information contact Emily Crain (Conservation District) at 845-9387 or Mike Jackson (Extension Service) at 845-4641.

Public Information Meeting on Available Cost-Share Programs for Farmers

Date: January 19, 2005

Time: 11:30am

Place: Fleming Mason Energy Auditorium

Agenda

Kentucky Soil Erosion & Water Quality Cost-Share Program

Phase I Tobacco Settlement Programs

Environmental Quality Improvement Program (EQIP)

Conservation Reserve Program (CRP)

Fleming Creek Clean Water Action Plan

Fleming Creek Water Quality Overview

Sponsored By: The Fleming County Conservation Dist[illegible]t

Farm Field Day

When: June 9, 2005 at 5:00 pm

Where: Spencer Rapp Farm

Bald Hill, KY

Topics: Herd Health, Intensive Grazing, Riparian Area Protection, Fencing, Sink Hole Protection, Forage Quality, & Hay Storage

For Additional Information Contact:

Emily Crain Anderson at

606-845-9387

Hosted By: Fleming County Conservation District,

Fleming County Extension Services, & USDA-NRCS