Fleming Creek Watershed Fecal Coliform TMDL REVISION
Fleming and Nicholas Counties, Kentucky
TMDL ID# 442
August 5, 2011

A. TMDL Background:

The Fleming Creek Watershed pathogen TMDL ("the TMDL") was originally approved on March 19, 2001. At the time the TMDL was finalized, the document addressed a single 303(d) listed segment of Fleming Creek from River Mile (RM) 0.0 to 39.2, which was impaired for the Primary Contact Recreation (PCR) Designated Use due to pathogens. For this TMDL, the loading capacity was determined by multiplying the Water Quality Criterion (WQC) for fecal coliform by the streamflow estimation as discussed in the 'Load Estimates' section of the document on page 20. Original TMDL allocations are presented in Table 1.

Table 1 Original TMDL Allocations

Fleming Creek near the mouth (river mile 1.3)

Observed = 8,303,800 E8 cols/day		Target (TMDL) = 33,200 E8 cols/day	
0 E8	point sources	0 E8	point sources
4,200 E8	background	4,200 E8	background
8,299,600 E8	nonpoint source	2,100 E8	margin of safety
		26,900 E8	for nonpoint source

B. Purpose of Proposed Revision:

The Fleming Creek Watershed Pathogen TMDL was finalized for Fleming Creek from RM 0.0 to 39.4, as indicated on the 1998 and 2002 303(d) Lists. As part of the 2004 303(d) List, Kentucky divided Fleming Creek into four segments after biological and chemical samples were collected to assess the aquatic life designated use; the entire length of Fleming Creek remains impaired for the PCR designated use. Kentucky Division of Water (KDOW) is revising the TMDL to provide allocations for the four segments of Fleming Creek, as indicated on Kentucky's current Integrated Report: RM 0.0 to 12.8 (GNIS ID: KY492236_01); RM 12.8 to 16 (GNIS ID: KY492236_02); RM 16 to 20.8 (GNIS ID: KY492236_03); and RM 20.8 to 39.4 (GNIS ID: KY492236_04).

C. Justification for Revision:

The original Fleming Creek Watershed TMDL document provided TMDL, WLA, LA, MOS and background values for two sites along the mainstem at RMs 1.3 and 22.1. These loads are derived by multiplying the WQC for fecal coliform by the streamflow estimated at those points. Runoff and baseflow conditions were monitored at several locations along the mainstem – the TMDL document states that the site near RM 22.1 had the highest exceedance of the WQC during baseflow conditions while the site near RM 1.3 had the highest exceedance during runoff conditions. The original TMDL calculated for the entire segment was thus associated with the runoff condition for the RM 1.3 monitoring site. These sites and the original TMDL segment are shown in Figure 1.

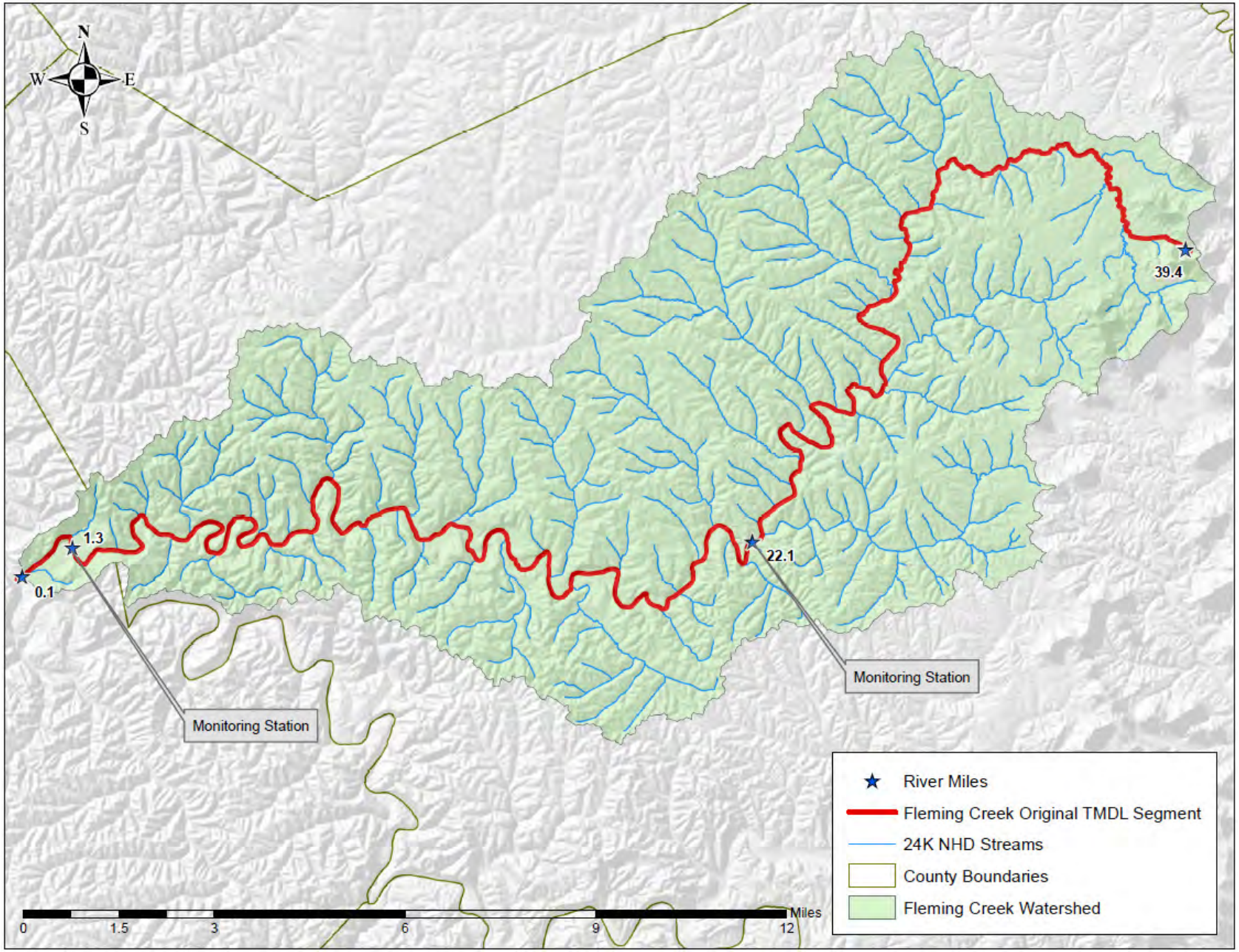

Figure 1 Fleming Creek Mainstem Monitoring Stations and Original TMDL Segment

D. **Revised TMDL Allocations:**

Additional QAPP approved bacteria monitoring has not taken place in the Fleming Creek watershed since TMDL development. TMDLs and associated loadings were calculated at two sites along the mainstem and included in the original document, as mentioned above.

The TMDL and allocations associated with the baseflow condition for the upstream site at RM 22.1 was used to apply the TMDL to the headwater segment of Fleming Creek from RM 20.8 to 39.4 (GNIS ID: KY492236_04). The baseflow condition was chosen to set the TMDL for the headwater segment since this was the critical condition, or period of time when pollutant conditions were at their worst. The original document states on page 37 that most of the fecal contamination at RM 22.1 could be attributed to farm animals accessing the creek, leaking manure holding ponds or wastewater treatment plants discharging above their permit limits. The document also states that the other monitoring sites downstream on Fleming Creek did not exceed the WQC during baseflow conditions.

The original TMDL calculated for the runoff condition near the mouth of Fleming Creek was used to extrapolate incremental TMDLs to the three segments of lower Fleming Creek: RM 0.0 to 12.8 (GNIS ID: KY492236_01); RM 12.8 to 16 (GNIS ID: KY492236_02); and RM 16 to 20.8 (GNIS ID: KY492236_03). In order to apply incremental loads to these segments, the watershed area ratio approach was used to extrapolate the critical flow and loadings from RM 1.3 to the upstream segments at RMs 12.8 and 16. Watershed areas were determined in a Geographic Information System and their difference used to determine the area ratio; the area ratio was then used to divide and allocate the cumulative TMDL to the three segments. Revised TMDLs for the Fleming Creek watershed are provided in Table 2 and depicted in Figure 2.

Table 2 Revised TMDL Allocations

Fleming Creek Segment	Watershed Area (acres)	Area Ratio	Flow Rate (cfs)	TMDL (E8 colonies/day)	MOS & Background (E8 colonies/day)	WLA (E8 colonies/day)	LA (E8 colonies/day)	Existing Load (E8 colonies/day)
Incremental TMDL for RM 0.0 to 12.8	12,513	2.05	165.77	16,187	3,072	0	13,115	4,048,527
Incremental TMDL for RM 12.8 to 16	4,621	5.55	61.22	5,978	1,134	0	4,843	1,495,104
Incremental TMDL for RM 16 to 20.8	8,531	3.01	113.02	11,035	2,094	0	8,942	2,760,168
Cumulative TMDL for RMs 0.0 to 20.8	25,665	-	340	33,200	6,300	0	26,900	8,303,800
RM 20.8 to 39.4	36,090	-	1.4	136.8	11.9	0	124.9	581

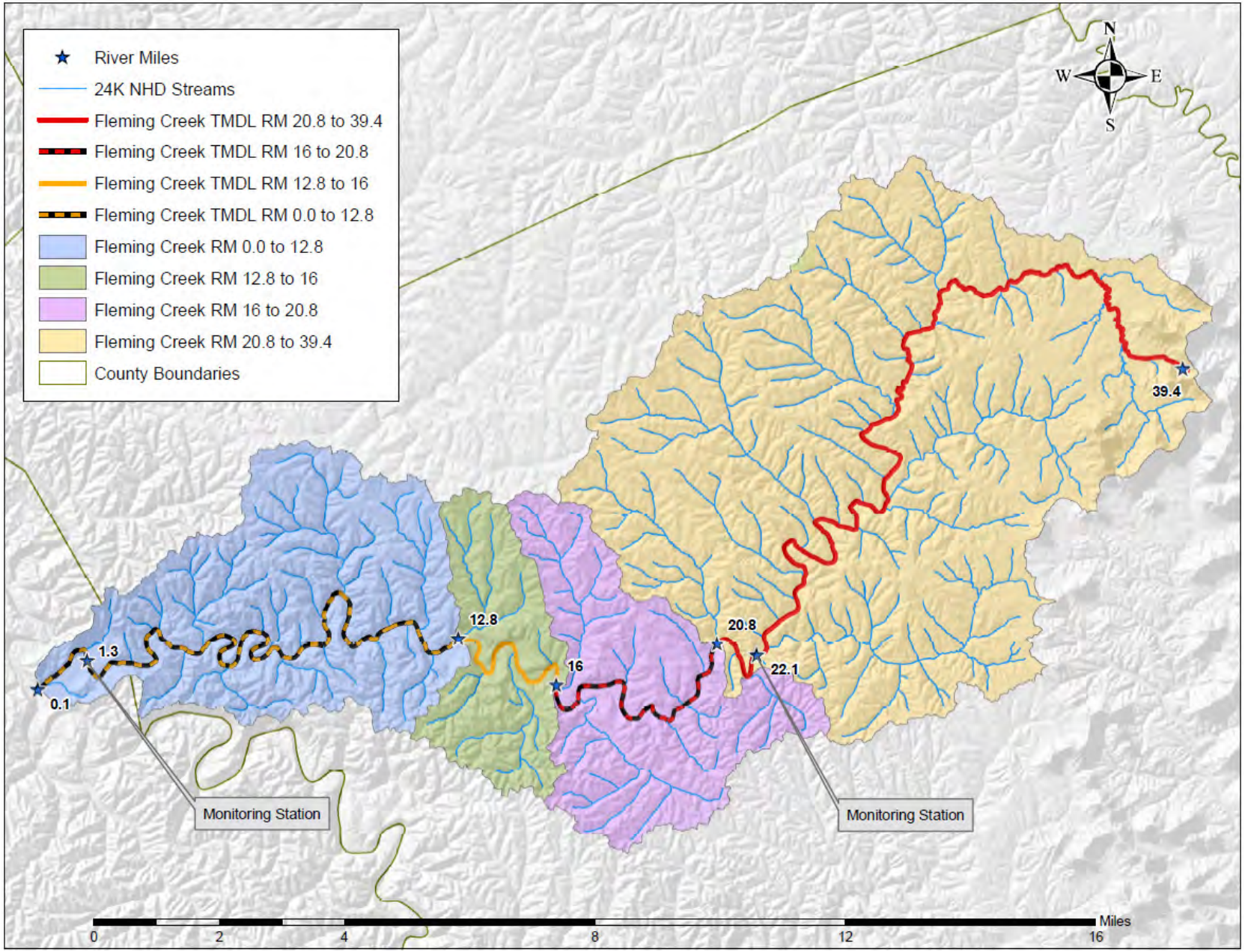

Figure 2 Fleming Creek Mainstem Monitoring Stations and New TMDL Segments

E. Other Considerations

The Fleming Creek pathogen TMDL was developed with consideration given to the entire watershed. Although the intent of this Revision is to document allocations for each TMDL segment of Fleming Creek, implementation efforts should remain consistent with the spirit of the watershed approach. The 'Implementation Plan' section of the document (pages 44-46) describes the approach to be used by both KPDES-permitted and non-KPDES-permitted sources. Examples of Best Management Practices and sources for more information are also provided; the 'Remediation Activities' section describes BMPs that have been funded or implemented in the watershed through 1999.

F. Public Participation:

The Fleming Creek Watershed pathogen TMDL was placed on Public Notice on November 15, 2000. Fleming Creek was re-segmented as part of the 2004 303(d) List, which was placed on Public Notice on March 5, 2004. This revision does not present any new information that has not been provided to the public for comment; therefore, further public notice is not necessary.