

# **Report as of FY2006 for 2006KY61B: "Identification of Potential Bacterial Sources and Levels, Red Duck Creek, Mayfield, Kentucky"**

## **Publications**

- Conference Proceedings:
  - Vorbeck, Brooke, Travis Martin, and Mike Kemp, 2007, Identification of Potential Bacterial Sources and Levels, Red Duck Creek, Mayfield, Kentucky, in Proceedings of the Kentucky Water Resources Annual Symposium, Kentucky Water Resources Research Institute, Lexington, Kentucky, p 57-58.

## **Report Follows**

## **Problem and Research Objectives**

Red Duck Creek is an urban stream running through Mayfield, Kentucky. Land use along the stream includes a farm chemical manufacturer, apartments, single family dwellings, and light commercial development. Several municipal sewer lines run adjacent to the creek or cross it. Much of the creek is easily accessible by the public, and high levels of coliform bacteria have been previously documented.

Sources of the fecal coliforms and problematic reaches along the stream must be identified to protect public health. We proposed two intensive sampling periods, one in late spring when the stream flow is typically higher, and one in early fall during low flow. Unfortunately, funding was delayed, and the spring sampling could not be conducted. Sampling was initiated in September and continued through December in an attempt to obtain results representing both high and low flow conditions.

## **Methodology**

Twelve potential sampling locations were identified. Originally, samples were to be collected biweekly. Because of the delay and subsequent weather and stream flow conditions, samples were collected twice in September, twice in October, once in November and once in December.

The samples were analyzed for *Escherichia coli* and total coliform, using the IDEXX Coli-ert system (Standard Method 9223). Field chemistry was measured at each station during sample collection (pH, conductivity, dissolved oxygen, turbidity, and temperature). Data were statistically evaluated based on sample location. Geometric means of the coliform data were used in some of the statistical evaluations. Stream flows were too low and inconsistent to obtain meaningful flow results.

## **Findings and Significance**

Because of the typical low flow conditions in the fall, samples could not be collected from all sites during each sampling event. Also, field measurements were not obtained during the second sampling event in September because the trip resulted from a spur of the moment decision to catch runoff following a storm event.

Correlations among the field parameters and the fecal and total coliform analyses were weak, and no trends could be identified in the individual parameters. Statistically, the coliform results among locations upstream, within, and downstream of the city of Mayfield could not be differentiated as significantly different. Therefore, specific potential point sources of bacterial contamination could not be identified. Bacterial contamination during this sampling period appeared to be due to widely dispersed sources. Additional work to identify the origins of the fecal bacteria could be useful.