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PRELIMINARY RESULTS OF A FECAL MICROBE SURVEY IN AN EUTROPHIC LAKE, WILGREEN LAKE, MADISON COUNTY, KENTUCKY

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Wilgreen Lake is a small (~14 mi²), eutrophic lake formed by damming several tributary streams to Silver Creek, Madison County, Kentucky. The lake receives runoff from industrial and urban areas (Richmond) that comprise ~10% of the total watershed area; most runoff is from cattle pasture or human developments encircling the lake. Present and past developments are on septic systems, and effluent from these systems is known qualitatively to seep into lake waters.

Our research group is currently conducting a study of the lake in order to identify major nutrient sources, and one possible tracer method is to quantitatively assay species-specific microbes in lake waters. In preparation for this effort in the 2007 field season, we sampled lake waters in July and August 2006 to characterize the spatial distribution and abundance of fecal microbes. Sampling stations (15 in number) encompass the lake's breadth and include samples from not only the trunk of the lake system (where deeper water occurs) but also from 3 tributaries – two of which have possible inputs from septic systems. We use the *Colisure* method from IDEXX Laboratories to determine the most probable number (MPN) of total coliform and *Escherichia coli* bacteria.

Higher numbers of fecal microbes occur in the two most densely populated tributaries, and we note 14 cases (at 8 sites) where assays exceed maximum standards of the EPA for bathing exposure (200 cfu per 100 mL for total coliform, TC; 235 cfu per 100 mL for *E. coli*, *EC*). The trunk locations show low numbers of fecal microbes (TC generally <150 cfu per 100 mL; *EC* generally <20 cfu per 50 mL) whereas the upper reaches of both Taylor's Fork and Old Town Branch show higher microbial abundance (TC generally >300 cfu per 100 mL; *EC* cfu generally >100 per 100 mL). Another tributary stream with no apparent human effluent at present shows much lower fecal microbe abundance. From the data, we infer there is significant input from septic systems into these specific regions of the lake. There are several other sources that must be eliminated as possibilities, but it is likely that the source of these fecal microbes is from septic systems encircling the lake. Substantial residential development is underway around Wilgreen Lake at present, and we intend that 2007 field results inform development practices.

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