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**Seasonal changes in stratification and oxygen content of a eutrophic lake,
Wilgreen Lake, Madison County, Kentucky**

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Wilgreen Lake (Madison County, Kentucky) is listed by the Environmental Protection Agency as nutrient-impaired. The overabundance of nutrients is likely linked to the land-use practices in this area. Cattle pasture, residential developments served by septic systems, and urban/industrial areas lie in the lake's watershed. We have studied the lake for two years to characterize its physical and chemical characteristics, and to identify nutrient sources.

The 2007 field season began in March and continued through October. We measured temperature and oxygen levels along with other parameters at 1-meter depth intervals at 19 stations distributed along the length of the lake and within its tributaries. Oxygen and temperature values were plotted on lake cross sections to show seasonal changes from March to October. The lake was essentially unstratified in March but was stratified by April. Stratification persisted to the end of the field season in October. The thermocline set up between 3 and 4 meters for the duration of summer with little variation. Peak anoxia occurred in July with anoxic waters spanning about 6 meters to bottom; disoxic waters (up to 2 mL/L oxygen) occurred from the thermocline downward to the anoxic boundary.

Wilgreen Lake is a typical eutrophic lake. Heating in the spring leads to stratification. Phytoplankton growth in the photic zone yields organic matter to the lake's lower layer and sediments. Here oxygen demand created by decomposition in both the water column and sediments of the lake causes disoxia and anoxia. Over the past two field seasons we have seen no increase in the amount of anoxic or disoxic waters. One of our aims in measuring the temperature and oxygenation of the lake so thoroughly is to detect any changes in the future. Continued nutrient loading may alter the characteristics of the lake and our study offers an effective comparison point.

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