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Estimating Stream Metabolism By Use of RStudio®

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Primary production and aerobic respiration are the major processes that dictate how organic matter is processed in streams and metabolic energy flow. Through the use of the Integrated Development Environment (IDE) RStudio®, daily observations of water temperature, stream depth, and dissolved oxygen concentrations can be used to estimate the daily gross primary production (GPP) and aerobic ecosystem respiration (ER). The above mentioned data will be collected from a freshwater body located in Swope Park, Kansas City, Missouri and compared to the data from a freshwater body in the Tri-State Mining District in Joplin, Missouri. Further, these observations will be compared to the data from a variety of sites throughout the United States available from the U.S. Geological Survey's (USGS) National Water Information System (NWIS) to determine the relative influence that land use has on stream metabolism. By observing these freshwater bodies over a long-term period of time, the influence of stream flow, precipitation, and other seasonal variations on stream metabolism rates will also be determined. By quantifying the metabolic energy flow in streams and rivers across the United States, this study seeks to improve the understanding of how stream metabolism rates relate to the overall health of the stream.