Application of Partial Least Squares (PLS) Regression to Determine Landscape-Scale Aquatic Resource Vulnerability in the Ozark Mountains

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Partial least squares (PLS) analysis offers a number of advantages over the more traditionally used regression analyses applied in landscape ecology to study the associations among constituents of surface water and landscapes. Common data problems in ecological studies include: small sample size, missing values, a large number of predictors, correlated variables, and high noise-to-signal relationships. PLS regression accounts for the above problems when building the association model. We present here the application of PLS regression for predicting *in situ* surface water *Escherichia coli* counts from landscape metrics. The amount of variability in surface water constituents explained by each model reflects the composition of the contributing landscape metrics. The predicted values and their confidence intervals are used to explain how land cover type, configuration, and associated human activities may affect the abundance of *Escherichia coli* in surface waters of the Upper White River region of the Ozark Mountains.