

## Investigating the covariance-preserving features of k-Nearest Neighbors estimation

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**Abstract.** One of the frequently noted advantageous features of the non-parametric, multivariate k-Nearest Neighbors technique is that it preserves the covariance structure among multiple variables when they are predicted simultaneously using a small k-value. Although this advantage is frequently noted, there have been few, if any, published reports of studies that have investigated the degree to which the k-value affects this phenomenon. This study reports an investigation of a comparison of the observed covariance structure and covariances among predictions obtained using several k-values for four forest attributes: proportion forest area, volume per unit area, basal area per unit area, and trees per unit area. In addition, comparisons were made between the observed spatial covariance for a single variable and the spatial covariance of predictions obtained using several k-values.