

**A Calibration Experiment in a Longitudinal Survey with Errors-in-Variables**

by

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**ABSTRACT**

The National Resources Inventory (NRI) is a large-scale longitudinal survey conducted to assess trends and conditions of nonfederal land. A key NRI estimate is year-to-year change in acres of developed land, where developed land includes roads and urban areas. In 2003, a digital data collection procedure was implemented replacing a map overlay. Data from an NRI calibration experiment are used to estimate the relationship between data collected under the old and new protocols. A measurement error model is postulated for the relationship, where duplicate measurements are used to estimate one of the error variances. If any significant discrepancy is detected between new and old measures, some parameters that govern the algorithm under new protocol can be changed to alter the relationship. Parameters were calibrated so overall averages nearly match for the new and old protocols. Analyses on the data after initial parameter calibration suggest that the relationship is a line with an intercept of zero and a slope of one, therefore the parameters currently used are acceptable. The paper also provides models of the measurement error variances as functions of the proportion of developed land, which is essential for estimating the effect of measurement error for the whole NRI data.