James River Basin Phosphorus Vulnerability Assessment--Winter 2000/2001 Update--*Terry Barney,Elizabeth Cook and Clif Baumer - NRCS*

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NRCS, in cooperation with the Southwest Missouri RC&D Council, the James River Basin Partnership, the United States Forest Service and MoRAP, recently completed the first phase of a GIS-based study of non-point phosphorus export from the basin's 932,000 acre land area to Table Rock Lake. The project was initiated in response to concerns raised by the James River Partnership about increasing eutrophication in Table Rock Lake and the relationship of the eutrophication process to non-point sourced phosphorus. The primary objective of the Phase I study was to identify those sub-watersheds within the basin that are most at risk for contributing to phosphorus loading in Table Rock Lake. This study is part of a much broader assessment of the watershed that will include all major resources.

An additive model was developed to meet the primary study objective. The model was designed and implemented around two critical parameters: 1) Analysis was restricted to existing data sets and 2) NRCS field staff would have the responsibility for selecting the model variables and weighting the values derived from analysis of the variables.

The spatial model used six key data layers identified as critical in the sourcing and transport of phosphorus: soil type-hydrologic group, land cover, slope, grazing animal density, septic tank density, and soil type-septic absorption field limitations. GIS analyses of the six data layers generated 27 values, each assigned a weight by experienced NRCS field staff working in the watershed. The model tabulated a score for each acre, based on the weighted values calculated for each variable. Map products showing the spatial distribution of the scores are complemented with spreading zone boundaries around permitted confined poultry and dairy operations, 100 ft. and 500 ft. stream buffer boundaries, and 300 ft. sinkhole buffer boundaries.

Phase II of the study will include updated and improved spatial inputs, separate models for source and transport variables and linkage of the spatial model outputs to a mass balance model that predicts actual amounts of phosphorus import/export for a subwatershed under various management/time scenarios.