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Targeting Implementation of Best Management Practices in the Little Blue River Basin

The Little Blue River Basin is located in south central Nebraska and north central Kansas. The basin drains approximately 1300 square miles and is impaired by fecal coliform bacteria, nutrients, sediments, and atrazine herbicide. Total maximum daily loads have been set for those contaminants. Agriculture is the predominant land use in the basin, with 41% crop land and 54% range land, and is considered to be a major source of contaminants. The objectives of this study were to: 1) evaluate infield proven best management practices (bmps) for their effectiveness at reducing sediment, nutrient, and atrazine herbicide loadings to surface water, and 2) identify critical areas within the watershed where bmps would have greatest impact. Effectiveness of cropland bmps on a basin-wide level was evaluated using the SWAT model to assess BMP impacts on sediment, phosphorus, nitrogen, and atrazine herbicide loading into surface waters. Model results were verified by infield experiments in the watershed. Subwatersheds where cropland BMP implementation would have the greatest impact were identified. For sediments, SWAT modeling predicted a 75% basin-wide reduction with implementation of no-tillage or field buffers. Farming on the contour combined with installation of terraces on highly erodible land was predicted to reduce sediment runoff by 50%. For phosphorus, total P runoff from crop fields was predicted to decrease by 50% with implementation of no-till basin-wide. Installation of field buffers would reduce P losses by approximately 60% while installation of terraces and contour farming would reduce P losses by approximately 50%. Nitrogen runoff losses would be reduced by 60% with implementation of no-till, 70% with installation of field buffers, and 50% with installation of terraces and farming on the contour. The greatest reduction for all pollutants occurred with adoption of multiple bmps.

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