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Digital soil mapping of agricultural fields with perennial vegetation strips on contours

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Diversified, perennial vegetation strips running along the contours of row crop fields are a recent innovation in conservation practices being implemented in the corn belt of the USA. The juxtaposition of these strips and the potential impact of the prairie vegetation on the distribution of soil properties on hillslopes raises questions about how those impacts will be spatially distributed. To examine these questions, soil samples were taken in three paired catchments, where two have had prairie strips installed for ten years and the third was the control. Surface samples (0-10 cm) were taken along transects crossing the prairie strip, following isolines of planform curvature to control for convergent/divergent water flow. These samples were examined for inorganic nitrogen, phosphorus, water content, percent stable aggregates, particle size distribution, and organic matter. Soil cores to a depth of 50-80 cm from select locations were also examined. Digital soil maps for each catchment were generated using machine learning algorithms with digital terrain analysis and remote sensing as covariates. The resulting models were evaluated to help identify the interactions between the hillslope environment and the vegetative strips producing the spatial distribution of the respective soil properties.