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Using Remote Sensing to Improve Input Parameters for Runoff Curve Number Determination for Urban Hydrologic Modeling

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Drainage design is a critical component for transportation infrastructure. Methodologies that would improve the input parameters for either the Rational Method “C” value or the Natural Resource Conservation Service (NRCS) CN method would be important for this aspect of transportation planning and engineering. This approach offers increased accuracy and speed in determining input parameters in urban areas. The objective of this study was to evaluate Normalized Difference Vegetation Index (NDVI) data derived from QuickBird (QB) satellite imagery to map impervious areas and open spaces for runoff curve number determination. The study area was the City of Sioux Falls, SD. This research employed the urban land cover classification scheme of the runoff curve number table in the TR-55 (NRCS 1986) publication. The research hypothesis is that high-resolution NDVI can improve the efficiency and effectiveness of urban land cover data extraction. The composite runoff index spatial model was applied to develop spatial modeling in GIS in order to generate runoff index based on the spatial data related to surface characteristics. Comparisons of the runoff index results from both designed methods were made to accepted values in order to assess the proposed research scheme of determining runoff index. Finally, the application of this proposed approach could benefit engineers involved in designing minor types of hydraulic structures including maintenance and improvement projects