RELATING LAND COVER CHANGE TO FLOOD RUNOFF DISTRIBUTION USING NASA EARTH OBSERVATIONS IN KANSAS

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Riley County, Kansas, has observed increased levels of flooding, potentially due to changes in land use/land cover (LULC) and seasonal vegetation variation. To identify areas of concern, the authors worked with stakeholders including the City of Manhattan, Riley County Department of Planning and Development, Riley County Conservation District, the Kansas Forest Service, and the Kansas Department of Health and Environment. The study contrasts two methods of modeling runoff curve numbers (CN) from 2006-2020. (1) The traditional Soil Conservation Service CN calculation method uses a look-up table and tracked LULC to determine runoff changes. These tables allow for CN values specific to various land and crop cover types and account for various farming best practices but lack flexibility in calculations for various seasons or plant health. (2) A dynamic method employs normalized difference vegetation index (NDVI) compiled over the rainy season each year to calculate CN using seasonal vegetation. This method allows for a more precise analysis of runoff variability within and between rainy seasons because it can be updated for regular monitoring with greater temporal detail and it captures higher spatial resolutions by using NDVI as a proxy for LULC. This study further uses inputs from the United States Geologic Survey (USGS) National Land Cover Database (NLCD), the United States Department of Agriculture (USDA) Cropland Data Layer, and Landsat imagery to create more precise LULC raster datasets including both urban cover and crop-specific land use and curve number maps of the area. Results were communicated through an interactive ArcGIS StoryMap to guide the public and decision makers toward informed decisions on resiliency strategies to address future flooding.

PRESENTER BIO: Trista Brophy is a doctoral student of Interdisciplinary Ecology. She has extensive experience with sustainability and resilience planning and coordination with city, county, regional, and federal government agencies. She has also collaborated with NASA on several projects to build capacity for Earth observation use for stormwater management.