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Climate change poses unique and significant challenges for Georgia's large and growing cities. Ranked as the second-best city in the United States for millennials, the city of Atlanta and the surrounding region is expected gain 2.5 million people in the next twenty years. Sustainable development strategies to accommodate the combination of changing climate and substantial population growth requires planning beyond simply finding open space. Planners must look to more detailed solutions to mitigate long-term impacts of rapid urbanization within a non-stationary climate. Regions within the city of Atlanta are already prone to flooding during heavy rain events, the Downtown Connector being one site that routinely floods after receiving several inches of rain. As the changing global climate is expected to produce heavy rain events across the southeastern United States, determining which areas of the city are prone to flooding will be even more important.

The goal of this research is to predict which regions of the Metro Statistical Area (MSA) of Atlanta will be at higher risk of flash flooding in the year 2050, based on land cover change, precipitation models, and elevation. Predicted land use for year 2050 is produced with a cellular automata Markov chain, based on change in the National Land Cover Database from years 2001 to 2016. Predicted rainfall based on current conditions is derived using a ten-year average of Georgia Automated Environmental Monitoring Network (GAEMN) precipitation observations and inverse distance weighting interpolation across the study area. An Intergovernmental Panel on Climate Change (IPCC) estimate of future precipitation is also obtained to examine flood risk based on predicted climate change. These models are used to generate flood vulnerability maps for the MSA of Atlanta in year 2050.

Keywords: spatial analysis, flood, Atlanta, cellular automata