

**IMPACT OF URBANIZATION ON LOCAL PRECIPITATION PATTERNS
AROUND THE CITY OF ORLANDO, FLORIDA**

A Proposal of a Thesis
Presented to the
Department of Geography
Western Illinois University

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

by

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August, 2014

ABSTRACT

The city of Orlando and surrounding communities are in danger of water scarcity. One of their main sources of fresh water, the Floridian Aquifer, is nearing maximum output. With population expected to increase in the area, local water management officials are exploring alternative sources to obtain fresh water. One possible way is through surficial aquifers which are highly dependent on rainfall. Being able to identify the spatial distribution of maximum precipitation can assist in efforts to replenish the local water management.

This thesis examines the change in urban land cover in Orlando and surrounding areas from 1988 to 2010 to measure the corresponding impact of the urban heat island (UHI) on summertime precipitation distribution. Previous studies on the impact urbanization has on precipitation indicates that maximum amounts tend to be found downwind or around the periphery of the UHI. At large scale, locations with maximum precipitation were identified base on the following criteria: (1) mean monthly precipitation value has a z-score > 1.5 ; (2) satisfy directional distribution requirements; and (3) mean center point location in relation to the maximum precipitation zones.

A total of 81 maximum precipitation points were generated from monthly summer precipitation between 1985 and 2011. Out of this dataset, 52 of the maximums were found to be located in the periphery of the UHI (from the edge to 10 km outside). Chi-Square analysis with one degree of freedom revealed a 99.99 percent confidence that a pattern exists. Based on results, maximum precipitation is mainly located in the periphery of the UHI with a bifurcated pattern. Present and future efforts can be directed toward these locations of maximum rainfall to mitigate water scarcity.