Predicting Impacts of Climate Change on the Hydrology of the Red River Basin

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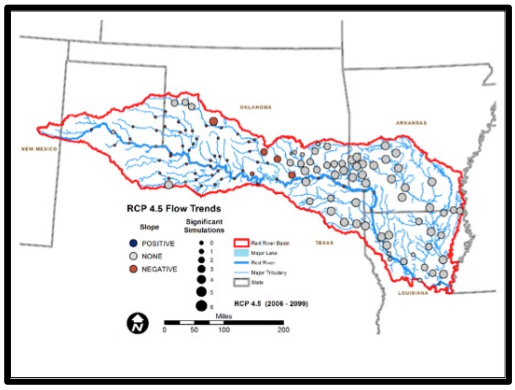

Researchers at the University of Oklahoma and the Choctaw and Chickasaw Nations have partnered to develop projections of water availability in the Red River Basin under future climate conditions. The Red River Basin has recently experienced both severe drought and exceptional flooding, both of which cause impacts to industry, agriculture and tourism, as well as other sectors including the environment. Scientists, water managers and other stakeholders are interested in knowing what is in store for the future of the Red River Basin.

Researchers and water managers recognize that climate change at the global scale does not necessarily represent changes that take place at the local or regional scale. Further uncertainty exists in defining future greenhouse gas emission scenarios, now termed Representative Concentration Pathways (RCP) for modeling purposes. Using temperature and precipitation performance metrics, three global climate models (GCMs) were selected, with three RCPs applied, and three downscaling techniques used, resulting in 27 climate simulations through the year 2099. These simulations were fed into a Variable Infiltration Capacity rainfall-runoff model developed specially for this project, the results of which were used as input into RiverWare Water for determining impact to flows, lake levels and water availability.

There is not a well-defined process and methodology for taking results from publicly available GCMs and applying them on a scale suitable for hydrologic models, and ultimately making the information useful to water managers and interested stakeholders. In addition to providing flow and lake level projections, the project researchers made recommendations on choice of GCMs and downscaling methods and reflected on the uncertainties involved in climate change research for hydrologic applications. The project will conclude at the end of 2015.

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For more information about this study and its results:

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