



**National Science Foundation Coupled Natural and Human Systems Program**

**The New 100th Meridian: Urban Water Resiliency in a Climatic and Demographic Hot Spot**

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**Abstract**

John Wesley Powell, famed American explorer and first U.S. Geological Survey director, popularized the 100<sup>th</sup> Meridian as the climatic boundary between the humid east and the semi-arid west – the geographic origin of the western United States (Powell 1879). There is good agreement among climate models indicating a warmer and probable drier future for central Texas. As such, the transitional boundary between the humid east and semiarid west is shifting eastward from the 100th Meridian. The major cities of San Antonio, Austin, Dallas, Fort Worth, and the Rio Grande Valley are located just east of the 100<sup>th</sup> Meridian, and rank among the fastest growing regions in the U.S. The state is projected to double in population by the year 2065. The central Texas corridor's position near the climatic boundary makes it particularly sensitive to changes in temperature and precipitation. Couple climate change with rapid population and economic growth, and man-made forces become an important driver of future water scarcity in times of drought. It is because of these twin drivers of climate change and population/economic growth that the central Texas corridor can be viewed as a “sentinel community”; that is, the changes that are currently underway in the region may predict trends for other parts of the U.S. Thus, research will be conducted on climate, population, urbanization and water resources in this region, as it is a valuable proving ground for new techniques and strategies to address water scarcity.

The research comprises: 1) Identifying the Grand Challenges for understanding Texas water resiliency; 2) comparison of 21<sup>st</sup> century climate model projections at high spatial resolution and improving our understanding of the mechanisms that drive drought in Texas; 3) development of scenarios of demographic changes and regional development for the 21<sup>st</sup> century in Texas; and 4) integration of the above into a regional evaluation of future water resiliency for the state. New research activities will bring together researchers from complementary disciplines to 1) initiate collaborations, 2) synthesize research, and 3) leverage resources from ongoing and future research activities. The overarching goal is to build knowledge regarding the factors that will impact future water resiliency in the rapidly changing human and natural systems of Texas, which will have applicability to other regions for which significant population growth and changing water availability are projected.