FY 2010 WaterSMART Research Grants to Develop Climate Analysis Tools

Climate Central, Inc., A Historical Climate Data Set and Comprehensive Suite of Downscaled Climate Projections for the Western U.S.
Reclamation Funding: $200,000 Total Project Cost: $400,000

A nonprofit, collaborative group of scientists will create a comprehensive, new, historical climate data set for the Western U.S. The project will also create an associated set of downscaled projections of future climate for the region in a complementary manner to temperature and precipitation projections currently in existence by including descriptions of solar radiation and wind speed, for example. This additional information is often critical to hydrologic tools utilized for water management. Project results will be freely distributed through the website interface used by the Program for Climate Model Diagnosis and Intercomparison (at Lawrence Livermore National Laboratory) to distributes General Circulation Model results. Information will benefit planning studies throughout the Western U.S. and will inform Reclamation climate change adaptation activities, including Basin Studies and West Wide Risk Assessments. The data developed will also support ongoing landscape scale conservation efforts through the Landscape Conservation Cooperatives.

The Regents of the University of Colorado, Enhancement and Integration of Tools to Assess Policy and Uncertainties for Adaptation
Reclamation Funding: $150,000 Total Project Cost: $372,418

The University of Colorado, through the Center for Advanced Decision Support for Water and Environmental Systems (CADSWES), will develop a set of tools to facilitate robust water management decision-making. The project will add new capabilities to RiverWare, an existing water management tool, so that adaptation strategies can be evaluated to reduce the risk and impacts associated with climate change to future water systems operations. The project will also improve on the Graphical Policy Analysis Tool, which assists the water management community to characterize and communicate uncertainties in assessment of climate change responses. RiverWare is a water management tool used by Reclamation in the Colorado, Yakima and Truckee River Basins, among others, and the Graphical Policy Analysis Tool is used to evaluate operating policies and quantify the risks and uncertainties of modeling results. The project will benefit from the synergistic activities of the NOAA Western Water Assessment Regional Integrated Science Assessment (RISA), and can inform the development of conservation strategies, including those supported by the Landscape Conservation Cooperatives. The research products will facilitate the evaluation of multiple management strategies to identify ones that will be most effective given the uncertainties associated with climate change. In areas where RiverWare is used, the work will benefit project specific planning, as well as Basin Studies and West Wide Risk Assessments

Oklahoma Water Resources Board, Practitioner Tools to Predict Runoff and Reservoir Yield Under Climate Change Conditions
Reclamation Funding: $84,647 Total Project Cost: $174,293

The Oklahoma Water Resources Board and the Oklahoma Climatological Survey will provide practical methodologies and tools to assist with the incorporation of climate change impacts into water resources planning efforts within the State of Oklahoma and beyond. Specifically, the project will explore multiple methods for translating climate projections into estimates of water supply availability through explicit and implicit hydrological modeling. Trends in evapotranspiration will be quantified across the State of Oklahoma, including agricultural demand projections for water supply planning. The techniques developed through this project will not only improve planning processes for Reclamation's activities within Oklahoma, but will be transferrable to additional areas within the Great Plains Region and beyond. This work will further inform future assessments of risk and impacts from climate change on Reclamation's operations, which will help inform adaptation strategies such as those developed through the Basin Studies.

Dr. Bridget R. Scanlon, The University of Texas at Austin-Bureau of Economic Geology, Impact of Droughts Related to Climate Change on Water Resources in the High Plains Aquifer
Reclamation Funding: $199,999 Total Project Cost: $399,999

The University of Texas will study the impacts of past droughts and potential future droughts within the geographic area of the High Plains aquifer. The High Plains aquifer extends from Nebraska to Texas and plays a significant role in that region's hydrology, in which agricultural demand strongly influences the water budget. The project will explore the relationship between the climate of the 20th century, the High Plains aquifer, and the droughts of the 1930's and 1950's. The information gained through this portion of the project will then be used to evaluate the interaction between, climate, the High Plains aquifer, and agricultural demand to identify potential future drought dynamics by utilizing the climate projections being produced in support of the Intergovernmental Panel on Climate Change (IPCC) Assessment Report 5. Information from the Gravity Recovery and Climate Experiment (GRACE) being conducted by NASA will also be used. The project will ultimately lead to more robust planning in the region of the High Plains aquifer by improving estimates of agricultural requirements as affected by the climate. This improved knowledge will lead to better estimates of future demands on the water management system, including demands on the aquifer and surface water supplies, and can be incorporated into planning assumptions necessary for informed climate change adaptation.

Arizona Board of Regents, University of Arizona, Arid Cities in Changing Climates: Urban Land and Water Use in the Desert Southwest
Reclamation Funding: $138,837 Total Project Cost: $277,686

The University of Arizona will study the impacts of climate change and climate variability on the water demand of growing cities as demands are compounded by the "urban heat island" effect, which is an increase in temperatures relative to the surrounding environment resulting from the infrastructure in urban environments (e.g., asphalt, concrete and buildings). This project will provide physical and social science support for decision-making through the examination of urban island and heat island dynamics, vegetation canopy structure resulting from landscaping choices, irrigation technology and practices, and a range of source waters (potable water, reclaimed water, harvested rainwater, and graywater). The results of the project can be used to inform assumptions of future water demands within urban environments, based on the hydrologic needs of the broad urban community. These assumptions of demand can be used to inform broader water management questions within watersheds that include urban and agricultural environments, such as the assessment of demands at a watershed scale within the Basin Studies Program. Additionally, understanding of the impacts of different types of urban development may inform resource conservation within urban environments.