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CLIMATE CHANGE: USING A SEMI-DISTRIBUTED LAND USE BASED RUNOFF PROCESS MODEL

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ABSTRACT: The Rio Grande Basin (RGB) 75% snow fed begins in the San Juan Mountains of southern Colorado Rockies and travels south through NM finally to the southern border of Mexico. The Rio Grande is the third longest river in the U.S. and the second most important river in the West. In addition to the river's length, rapid economic development and population growth have placed tremendous stress upon the region's limited water supply. Two of the major hydrologic risks to the region of the RGB are drought and quantity of water. The key response to climate change risk is the acquisition of adequate knowledge to allow proper planning. For the past years NMSU has been using a semi-distributed land use based runoff process (SLURP) model to simulate the hydrological cycle from precipitation to runoff including the effects of reservoirs, dams, regulators, water extractions and irrigation schemes. SLURP can be used to examine the effects of proposed changes in water management within a basin or to see what effects external factors such as climate change or changing land cover might have on various water users. The model may use locally-available climate data or may be run using only public domain data sets available on the internet. Satellite images may be used in the model for land cover mapping, calculation of vegetation indices, cloud cover, and snow extent.At the current time, SLURP uses data from 1980 to 2005 and covers the RGB from Colorado to the Texas border at El Paso. An IPCC 2008 report stated that many studies have found no trends or have been unable to separate out the effects of human interventions in the catchment coupled with climate change (Bates, 2008). No evidence has been found that change in climate will alter river mechanics. The SLURP model is used to separate the climate change effect on water supply from effects resulting from land use change. Because climate change can impact the amount of snow melt run-off SLURP will be used to assess the impacts rising temperatures may have on surface water amounts in the RGB.

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