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APPLICATION OF HEC-HMS 3.4 IN ESTIMATING STREAMFLOW

Julie Coonrod*, Chi Bui

ABSTRACT: Originating from the San Juan Mountains of southern Colorado, the Rio Grande flows year-round south through the entire length of New Mexico. It has an approximate drainage area of 1.9 million acres in New Mexico, and provides habitat for diverse wildlife along the river. The river is characterized by a low flow during the winter months, a snow-induced peak in spring/early summer, and smaller peaks in July and August due to the effect of the monsoon season. In the recent five decades, the Rio Grande has experienced the averages as well as the extremes of the variability of the climate of the last one-thousand. To estimate future average streamflow of the Rio Grande, the Hydrologic Engineering Center - Hydrologic Modeling System (HEC-HMS), public-domain software developed by the US Army Corps of Engineers, was adopted to simulate streamflow for different climate change scenarios for the watershed. The historical monthly streamflow, precipitation, and temperature of the tributary areas to the stretch of the Rio Grande from Del Norte, Colorado, to Elephant Butte, New Mexico were collected to calibrate a continuous hydrologic model in HEC-HMS for the period of 1971-2000. With the projection for temperature and precipitation associated with future climate change scenarios generated by the climatic General Circulation Model (GCM), the calibrated hydrologic model for the Rio Grande was employed to generate six future climate change hydrographs. The results generated by the calibrated hydrologic model represented the amount of water New Mexico delivers to Texas. The projection of the streamflow under different scenarios of climate change at Elephant Butte outlet were used in conjunction with the projection for the Rio Grande at Otowi bridge to quantify how well New Mexico would meet its obligation to deliver water to Texas under the requirement from the Rio Grande Compact. The results of this study can be used as a source of references for regional long term water assessment.

* Associate Professor, University of New Mexico, MSC01 1070, Civil Engineering, Albuquerque, NM 87120 USA, Phone: 505-277-3233, Email: jcoonrod@unm.edu