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Hydrology of the Texas Blackland Prairie: Riesel Watershed Data and Published Hydrologic Relationships

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INTRODUCTION

Hydrological data have been collected since 1937 at the USDA-ARS Grassland Soil and Water Research Laboratory. This site, which was originally named the Blacklands Experimental Watershed, is located in the heart of the Texas Blackland Prairie near Riesel, TX, in Falls and McLennan Counties. The Riesel watershed laboratory is one of the most intensively monitored hydrological research sites in the country. Small watersheds under pasture and cropland management range in size from 0.25 to 174 ac. Currently in operation are 17 runoff stations, 15 rain gauges, 1 weather station, 1 lateral flow station, and 7 shallow groundwater wells. However, data have been collected from a total of 40 watersheds (ranging in size from 0.25 to 5800 ac) and 57 rain gauges in the past.

All of the measured data and resulting publications are free and publicly available, and the enclosed CD was produced to aid in the dissemination of this information. Our specific objectives in producing this CD were to:

I.   present the measured historical data record for the USDA-ARS Grassland Soil and Water Research Center, located near Riesel, TX,

II.   provide supporting information such as GIS data, maps, and photographs, and

III.   present four recently-published hydrologic studies of the Texas Blackland Prairie.

I. Historical data record for the USDA-ARS Grassland Soil and Water Research Center, Riesel, TX

During the last 10 years, the historical data have been organized, compiled, quality-controlled to limit errors, and placed into an electronic format. The entire record of precipitation, runoff, sediment loss, management practices, and limited meteorological information is presented on this CD and is also publicly available at **http://www.ars.usda.gov/spa/hydro-data**. Riesel data have been used for numerous purposes such as water quality studies, farming practice evaluations, and watershed model development and evaluation. The relatively long data records (in excess of 60 years) make the data particularly valuable for studies designed to identify trends or changes caused by climate change or other factors.

****It is important to consider that all of the data collected at Riesel were collected for research purposes. In such an extensive data set, errors are inevitable. Therefore, data should be carefully inspected prior to subsequent application and analysis.****

II. Supporting information

Spatial information such as watershed boundaries, soil type, topography, and site locations are important supplements to the measured precipitation, runoff, sediment loss, management practice, and weather data. These data are provided in GIS format. In addition, maps and site photographs are provided to aid in data analysis and site visualization.

III. Hydrologic studies of the Texas Blackland Prairie.

The compilation of the long-term hydrologic data set for Riesel into an electronic format facilitated the analysis of regional hydrologic relationships and trends. Four publications, based largely on the Riesel data, resulted from these analyses.

Harmel, R.D., C.W. Richardson, K.W. King, and P.M. Allen. 2006. Runoff and soil loss relationships for the Texas Blackland Prairies Ecoregion. *Journal of Hydrology* (in press) - available online.

Allen, P.M., R.D. Harmel, J.G. Arnold, B. Plant, J. Yeldermann, and K.W. King. 2005. Field data and flow system response in clay (Vertisol) shale terrain, north central Texas, USA. *Hydrological Processes* 19:2719-2736.

Arnold, J.G., K.N. Potter, K.W. King, and P.M. Allen. 2005. Estimation of soil cracking and the effect on surface runoff in a Texas Blackland Prairie watershed. *Hydrological Processe*s 19:589-603.

Harmel, R.D., K.W. King, C.W. Richardson, and J.R. Williams. 2003. Long-term precipitation analyses for the central Texas Blackland Prairie. *Transactions of ASAE* 46(5):1381-1388.

**** Because of the possibility errors in the extensive Riesel hydrologic data record and in the resulting analyses, design and decision-making should not be based solely on these publications. We suggest that conclusions and decisions be evaluated against external sources and professional experience, especially for projects with appreciable safety or economic implications. ****

It is hoped that these publications, along with the supporting measured data, and related publications such as Asquith (1998), Raines (1998), and Lanning-Rush (2000), will be valuable for water resource design, management, and planning specific to the Texas Blackland Prairie.

Asquith, W. H. 1998. Depth-duration frequency of precipitation for Texas. USGS Water-Resources Investigations Report 98-4044, 107 pp., USGS, Austin, TX.

Lanning-Rush, J. 2000. Regional equations for estimating mean annual and mean seasonal runoff for natural basins in Texas, base period 1961-90, USGS Water-Resources Investigations Report 00-4064, 27 pp., USGS, Austin, TX.

Raines, T.H. 1998. Peak-discharge frequency and potential extreme peak discharge for natural streams in the Brazos River basin, Texas. USGS Water-Resources Investigations Report 98-4178. 42 pp., USGS, Austin, TX.
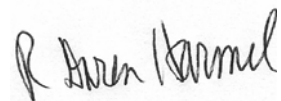
CONTACT
For questions about the data and/or publications on this CD, please feel free to contact us. Also, we would appreciate knowing if you find these data and/or publications useful in your work.

Thank you,

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