Data Processing of the Middle Rio Grande – Elephant Butte Reach, New Mexico

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Abstract. This study of the Elephant Butte Reach focuses on the temporal changes of the Elephant Butte Reach of the Middle Rio Grande in the past five decades. Anthropogenic activities triggered major changes to the Rio Grande over the past century. Large structures for flood control combined with water supply to living communities and irrigation districts drastically changed the flow pattern in the Elephant Butte Reach of the Middle Rio Grande. This analysis extracted valuable fluvial information from aerial photographs and gathered data collected by the USGS, NOAA, and the United States Bureau of Reclamation. The analysis of aerial photographs delineates the changes in planform geometry and sinuosity over several decades. HEC-RAS cross-section geometries were generated for computer modeling. An aggradation and degradation analysis of the Elephant Butte Reach of the Middle Rio Grande also showed the temporal changes in longitudinal profiles of the river using thalweg measurements from cross-sectional field data. Sediment and discharge data from USGS, as well as precipitation and climatology data from NOAA, were analyzed. It is concluded that the reach has experienced narrowing, reduced flow discharges, and severe aggradation which may result in sediment plug formation.