ABSTRACT

TITLE:	Shallow Seismic Analysis of Bedrock Beneath Alluvium and Glacial Outwash: La Plata River Terraces, Southwestern Colorado
AUTHOR(S):	Palmer, Randy; Gianniny, Dr. Gary L.; Whiting, Finn
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ABSTRACT: A shallow seismic analysis was conducted to image bedrock depth and geomorphology beneath Neogene alluvium and glacial outwash deposits along the La Plata River in southwestern Colorado. A main objective was to constrain terrace thickness to assist in aquifer assessments and to constrain the geomorphic evolution of the area. Refraction analysis techniques were used to image the unconsolidated sediment to bedrock interface by examining the velocity contrast in regards to a two layer model. Sources of error examined include the effects of ground roll, air-coupled waves, data collection pitfalls, ground saturation, spatial and temporal aliasing, and processing error. In addition to defining the base of the terrace sediments, deeper anomalies were detected that could represent bedrock structures or buried fluvial channels. These anomalies occur over short horizontal distances (10-50m) indicating significant variability at the base of the terrace sediments. Regional well data constraints suggest unconsolidated sediment thickness of 6-20 meters which varies with this study's 3-13 meters projected thickness. Sediment thickness was applied to determine aquifer potential estimates, revealing 400-1000 acre feet of obtainable water within the glacial outwash terrace. The applied methods of this study demonstrate the utility of shallow seismic techniques to improve our understanding of terrace morphology and provide constraints for modeling shallow unconfined aquifers.