

THE IMPORTANCE OF CONSIDERING GROUNDWATER QUALITY IN DEFINING SUSTAINABLE USE: A CASE STUDY USING 3-D FLOW AND TRANSPORT MODELS TO ASSESS WATER RESOURCES IN NORTHERN NEW MEXICO

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ABSTRACT

The Espaola Basin in northern New Mexico comprises the principal aquifer for drinking water supplies in the region. Both natural and anthropogenic sources of groundwater contamination exist in the basin and there is concern that water quality will deteriorate in the future due to rapid population growth in the region and declining water levels in the aquifer. We are using 3-D basin-scale flow and transport models to predict possible changes in the concentration of naturally-occurring major elements such as sodium and chloride and trace elements such as arsenic and uranium that will occur as water levels decline and deeper, more saline waters are drawn towards the surface. Our results indicate that for some locations in the basin, current rates of pumping will not significantly effect either groundwater quality or quantity; however, for some locations deterioration in groundwater quality may occur relatively soon if current rates of pumping continue. We find that because the relationship between groundwater extraction rates and water quality is very strong in some locations groundwater management strategies that do not account for changing water quality may overestimate sustainable use.