

## **ABSTRACT**

Mountain Home Air Force Base (AFB) is located in Elmore County, southwestern Idaho. A regional aquifer is the primary drinking water source for the base residents. While current groundwater quality meets regulatory drinking standards, data collected from the U.S. Geological Survey (USGS) and Mountain Home AFB indicates a significant degradation in quality, particularly nitrate contamination. The purpose of this study was to implement a groundwater model to spatially delineate areas by vulnerability to groundwater contamination risk. The model provides a basis for evaluating the vulnerability to pollution of groundwater resources based on hydro-geologic parameters, which can help develop management practices to prevent additional nitrate groundwater contamination in the region. Two Geographical Information System-based groundwater vulnerability models using the DRASTIC method were created using generic, available data and site-specific data. The models were compared to each other, as well as groundwater quality data gathered from 25 wells (16 monitoring wells and 9 base production wells) throughout the study site to validate the model. While the results indicate that the site-specific model is slightly more reliable (56% prediction accuracy), compared to the generic data model (48% prediction accuracy), neither set of model predictions seem good enough to inspire confidence and it is clear that the results produced with the two model runs are not interchangeable. The greatest cause is relative to the small sampling size (n=25) of the wells. The small sample size limits the opportunities to conduct statistical analysis to validate the model outcomes. Additional studies would need to be performed using the same approach, but with larger sample sizes so that the sample size reported here (n=25) would not negatively affect the results.