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## **Mapping potentially useable strata for underground water disposal, Uinta Basin, Utah**

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Disposal of saline production water in Utah's Uinta Basin is a critical part of most oil and gas operations. State and federal regulations allow waste water to be injected only into saline aquifers with greater than 10,000 mg/l total dissolved solids (TDS). Mapping the approximate boundary in the subsurface between saline and non-saline aquifers has been completed using three datasets. The first dataset consists of over 2600 individual water analyses collected from a wide variety of sources, including oil and gas operators, government files, and published reports. These data were compiled into a database, quality checked, and then integrated into the mapping process. The second dataset consists of geophysical log analysis estimates of TDS compiled from an earlier study (Howells and others, 1987). These geophysical logs were analyzed to produce a proxy for TDS by estimating resistivity of the formation water ( $R_w$ ). The third dataset consists of an additional 264 wells with similar log calculations as used in the second dataset. Constructed cross sections including both geology and saline and non-saline formation waters aided mapping and visualizing of subsurface complexities of the non-saline/saline boundary conditions. Recharge from the Uinta Mountains and Book Cliffs, hydrocarbon generation and expulsion, stratal heterogeneity and geochemistry, as well as regional fracture patterns, all influence the complex distribution of TDS in the subsurface of the basin. The northern portion of the basin exhibits complex groundwater mixing while the southern portion is more likely to contain one distinct non-saline/saline boundary. In addition, a northwest to southeast trend to the boundary contours correlates with the basin's dominant fracture trend.