

11.1 **Detailed geologic characterization of the Upper Green River Formation, Uinta Basin, Utah: Implications for potential oil shale development**

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Understanding the temporal and paleogeographic evolution of Utah's ancient Lake Uinta is essential to evaluating and predicting the Green River Formation's oil shale characteristics in the Uinta Basin. A detailed sedimentologic, stratigraphic, and geochemical assessment of four >1000 foot thick cores through the Parachute Creek Member, covering a ~24 mile E-W transect through the basin's depocenter, reveals systematic stacking patterns and mineralogical changes that can be used as a predictive model for vertical (stratigraphic) and lateral variations across the basin. Variations in the mineralogy of the oil shale in rich and lean zones could have significant impacts on the rock's geomechanical properties and pyrolysis products, impacting both in-situ and ex-situ extraction technologies. The mineralogical variations of oil shale zones behave predictably, which suggests basin-wide extrapolation of these patterns is plausible. The succession exhibits long term changes in lake water chemistry from normal to hypersaline conditions. Shorter term variations in siliciclastic sediment supply controlled the deposition of oil shale rich (low sediment supply) and lean (high sediment supply) zones. Rich and lean zones can be correlated regionally, suggesting these high and low sediment supply events were driven externally by climatic or tectonic mechanisms.