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*An Analysis of Compositional Characteristics of Two Distinct Fossil Butte Member Localities*

The Green River Formation is one of the world's most productive fossil sites, with its Fossil Butte Member (FBM) preserving millions of individual freshwater fish from the Eocene epoch with immaculate quality. Two localities in particular, the 18-inch layer and the split-fish layer, contribute most of the formation's specimens; the latter represents near-shore deposits, while the former preserves strata from the center of the lake. Materials from the two localities can be distinguished by color, texture, and matrix composition; this experiment sought to observe the exact compositional differences responsible for the two groups' dissimilarities. 18-inch layer fossil material was hypothesized to contain elevated levels of organic and calcareous compounds, while split-fish layer strata was hypothesized to display higher concentrations of silicates and other non-calcareous inorganics. Experimental groups representing 18-inch layer (18L) and split-fish layer (SFL) materials were further divided into sub-groups of fossil (F) and matrix (M) material. Material was gathered from three samples from each locality, totaling twelve samples overall. Samples were tested by way of x-ray diffractometry (XRD), infrared spectroscopy (IR), and energy-dispersive x-ray spectroscopy (EDS) to determine crystalline content profile, organic molecule profile in fossil materials, and elemental proportion and distribution, respectively. Qualitative analysis of data yielded the following observations: 1. XRD patterns showed no discernible differences in trends between 18L and SFL-group materials, though showed low homogeneity within group 18L-F. 2. EDS indicated no distinct differences in elemental distribution or concentration. 3. IR spectroscopy indicated elevated presence of saturated hydrocarbons in 18L-F materials.