

Taphonomy and Paleoecology of the Middle Miocene Grassy Mountain Paleoflora

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The Grassy Mountain Formation of southeastern Oregon includes middle-Miocene volcanoclastic and tuffaceous sediments, deposited in an intermontane basin circa 15 million years before the present. For over a century, permineralized remains of stumps, logs, and branches have been recovered from several localities near Grassy Mountain. These permineralized woods have been popular with rock-hounds for many years due to their unique preservation and color, but to date no scientific assessment of the taxonomy and paleoecology of this specific flora has been attempted.

Work undertaken in summer 2017 comprised two main parts; field collection and laboratory examination. Known wood-producing outcrops in Malheur County, Oregon were searched and any preserved wood found was brought back to the Orma J. Smith Museum, College of Idaho, for examination. Specimens were cleaned, polished and examined under a digital microscope. Permineralized wood specimens on display at the Orma J. Smith Museum from the Grassy Mountain Area were also analyzed in addition to field collections. Field collection and analysis was extended to the nearby Succor Creek paleoflora, for which an extensive taxonomic database already exists based on leaf morphologies. The microstructure of wood conductive tissue (xylotomy), observable over a magnification of 20X to 200X, permitted assignment of fossil wood tissue to the genus level; albeit with several problematic forms. On larger well-preserved specimens tree-ring data were also recorded including quantity and size of both the early and late-wood. The middle Miocene was a time when the northern hemisphere was cooling; as the Sierran and Cascade rain shadows took shape, aridity was becoming normal for the western interior. Our measurements of tree-ring patterns can assist in testing hypotheses of seasonality based on tree leaf morphology.

Over twenty taxa of trees were identified in the Grassy Mountain paleoflora, including a broad range of both dicotyledons and gymnosperms. These taxa included common genera such as *Quercus* and *Betula* and more exotic genera like *Taxus* and *Magnolia*. This flora indicates a wetter and more subtropical ecology than that of today.