River Formation, Fossil Butte National Monument.

Lithology and formation [edit]

The formation of intermontane basin / lake environments during the Eocene resulted from mountain building and uplift of the Rocky Mountains (late Cretaceous Sevier orogeny and the Paleogene Laramide orogeny). Tectonic highlands supplied the Eocene sedimentary basins with sediment from all directions: the Uinta Mountains in the center; the Wind River Mountains to the north; the Front Range, Park Range and Sawatch Range of the Colorado Rockies to the east; the Uncompahgre Plateau and the San Juan Mountains to the south and finally, the Wasatch Mountains of Utah and the ranges of eastern Idaho to the west.

The lithology of the lake sediments is varied and includes sandstones, mudstones, siltstones, oil shales, coal beds, saline evaporite beds, and a variety of lacustrine limestones and dolomites. Volcanic ash layers within the various sediments from the then active Absaroka Volcanic field to the north in the vicinity of Yellowstone and the San Juan volcanic field to the southeast provide dateable horizons within the sediments.

The trona (hydrated sodium bicarbonate carbonate) beds of Sweetwater County, Wyoming are noted for a variety of rare evaporite minerals. The Green River Formation, is the type locality for eight rare minerals: bradleyite, ewaldite, loughlinite, mckelveyite-(Y), norsethite, paralabuntsovite-Mg, shortite and wegscheiderite. It also has a natural occurrence of moissanite (SiC) and 23 other valid mineral species.[2]

Cyclicity [edit]

The beds display a pronounced cyclicity, with the precession, obliquity, and eccentricity orbital components all clearly detectable. This enables the beds to be internally dated with a high degree of accuracy, and astrochronological dates agree very well with radiometric dates.[3]

Unnamed middle member, Green River

Unnamed upper member, saline facies,

Transition facies, unnamed upper member

Tranisition facies exposed in road cut