# Introduction to special issues: Paleontology and stratigraphy of Laramide strata in the Denver Basin

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***The Denver Basin*** is a Laramide foreland basin located east of the Front Range in Colorado. The basin contains a 4,000-meter sequence of Cambrian to Eocene rocks that includes synorogenic strata from both the Ancestral Rockies and Laramide orogenies. Laramide synorogenic strata in the basin reach a maximum thickness of nearly 1,000 meters. Upper Cretaceous and Paleogene rocks in the basin include the marine Pierre Shale, the Fox Hills and Laramie Formations, Arapahoe Conglomerate, Denver and Dawson Formations, Wall Mountain Tuff, and Castle Rock Conglomerate. Collectively, these strata record withdrawal of the Western Interior Seaway, initiation of the Laramide orogeny, the Cretaceous–Tertiary boundary, spread of early Paleocene rainforests, the Paleocene–Eocene Thermal Maximum, and development of the regionally extensive late Eocene erosional surface. From a resource point of view, these formations are the source of coal, building materials, and groundwater.

The Colorado Front Range urban corridor is home to more than 3.5 million people, nearly a million more than were living here in 1990. The population growth spurred a construction boom that, in turn, caused thousands of excavations into Denver Basin bedrock. Many of these construction sites contain fossils. While natural outcrops are not abundant in the Denver Basin, numerous water, oil, and gas wells presented the opportunity to use subsurface correlation of well logs to build a stratigraphic framework to link the isolated excavation sites. In addition, the expanding population caused major increase in exploitation of bedrock aquifers of the basin.

In 1998, the Denver Museum of Nature & Science launched the Denver Basin Project. It was designed to study the geological and paleontological history of the Denver Basin, to evaluate the bedrock aquifers in the center of the Basin, and to provide public education about Denver's geological history and hydrological future. The Museum coordinated the activities of researchers from more than a dozen institutions. Primary funding for the project was supplied by the National Science Foundation and the State of Colorado Department of Natural Resources.

After Armageddon: the Denver Basin 65 million years ago, by artist Donna Braginetz.

Central to the project was the 1999 drilling of a cored well in the center of the Denver Basin at the Elbert County Fairgrounds in Kiowa. Despite the fact that more than 20,000 oil/gas and water wells had been drilled previously in the Denver Basin, only one (the 1987 USGS Castle Pines well) had cored the interval of section that included the synorogenic strata of the Laramide orogeny. The Kiowa core provides a central-basin complement to the basin-margin Castle Pines core.

The first objective of the Denver Basin Project was to develop an integrated geological framework that used a network of electric well logs to correlate the two cored wells to fossil localities at isolated surface outcrops and construction sites. The second objective was to calibrate the framework using a multidisciplinary approach of paleontology (vertebrates, invertebrates, plant megafossils, and palynomorphs), magnetostratigraphy, isotopic dating, and lithostratigraphy. The third objective was to use the resulting data set to ask questions about the geological and paleontological evolution of the Denver Basin during a critical interval in Earth history. The papers in this and the following issue of *Rocky Mountain Geology* (volume 38, number 1) represent the first major attempt to synthesize results of the Denver Basin Project.