FIELD TRIP 26-01

Gateway to the Rockies: The I-70 Roadcut



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COLORADO GEOLOGICAL SURVEY
COLORADO SCHOOL OF MINES

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DISCLAIMER AND ACKNOWLEDGEMENTS

The information presented herein is intended solely for general informational purposes. The views, interpretations, and conclusions expressed in this publication are those of the authors and do not constitute an official policy, position, or enforcement action by any employing agency, company, or affiliated entity.

We are grateful for insights on roadcut geology from L. LeRoy, R. Weimer, and reviewers Matt Morgan and Bob Raynolds. Funding was provided from the Federal Highway Administration's Transportation Alternatives Program (TAP), Jefferson County Open Space, and the Colorado Department of Transportation (CDOT) Region 1. Special acknowledgement to Emily Mesa (Goodbee & Associates) who helped champion new sign content design. Thanks to Adam Warren for photographs of historic signage. We're also grateful to members of the Colorado Scientific Society and many other colleagues who invested time in catalyzing the renovation of this trailside treasure. Finally, we acknowledge the generations of geologists and other colleagues before us, who have shepherded this site and upon whose shoulders we stand.

ABSTRACT

The I-70 roadcut, with its colorful stripes and metropolitan proximity, has exposed millions of people to Colorado's underground deep-time archive. For more than half a century, visitors to the adjacent park-and-ride lots have been able to walk along the highway and examine these rocks, guided by interpretive signs that explain their geology and paleontology. Over time the signage and trails deteriorated, and the site experienced drainage and slope failure issues. Much like the grass-roots effort that originally helped make this landform accessible and understandable, a diverse group of community partners recently collaborated to help guide rehabilitation and improvement of the site. As part of that effort, 13 new interpretive graphics were designed to make the roadcut relevant and comprehensible to visitors. These graphics are presented digitally here and onsite as sloped display signs. Here we provide additional context for this suite of educational materials, while also archiving and making them freely available electronically for public benefit.

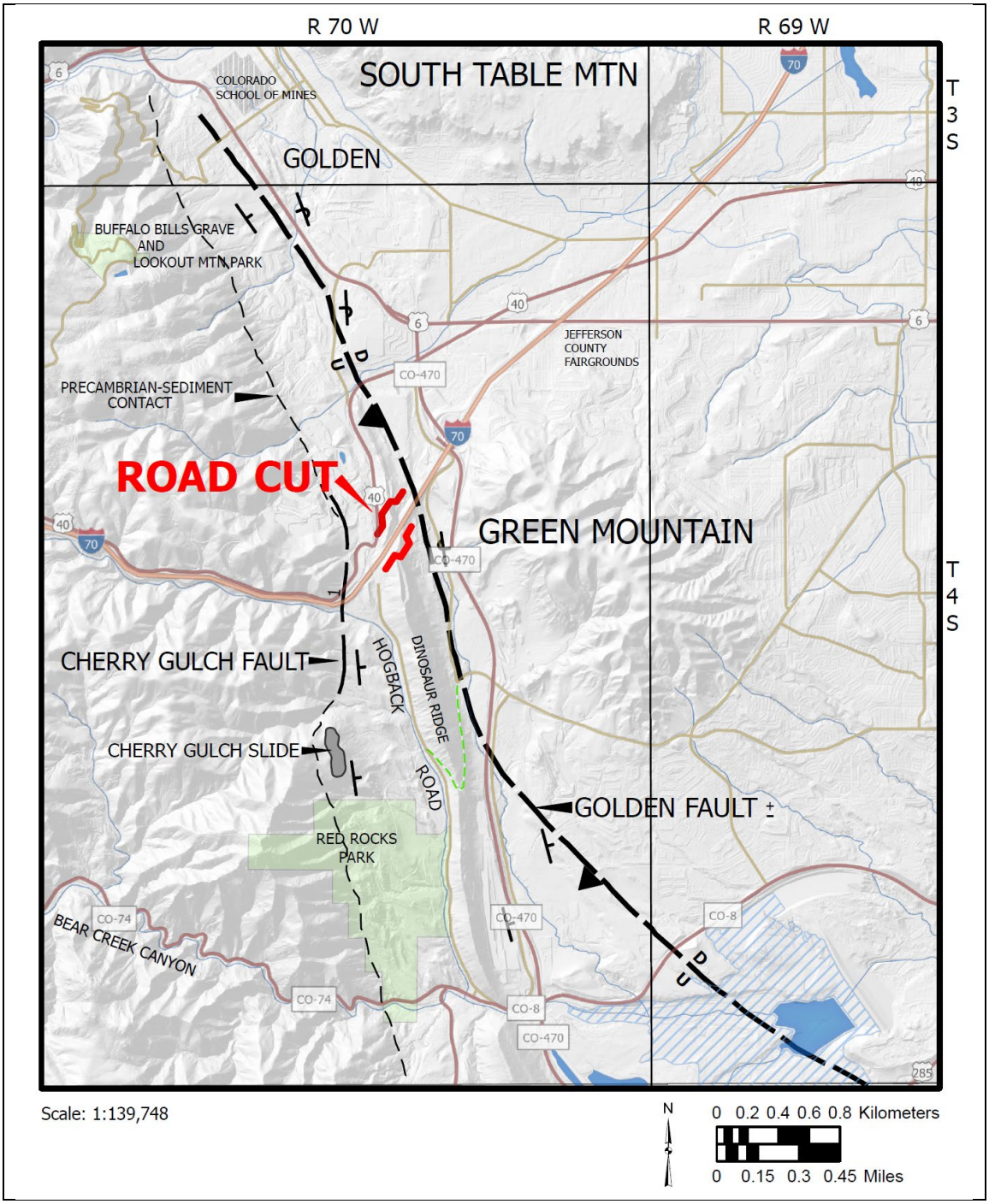
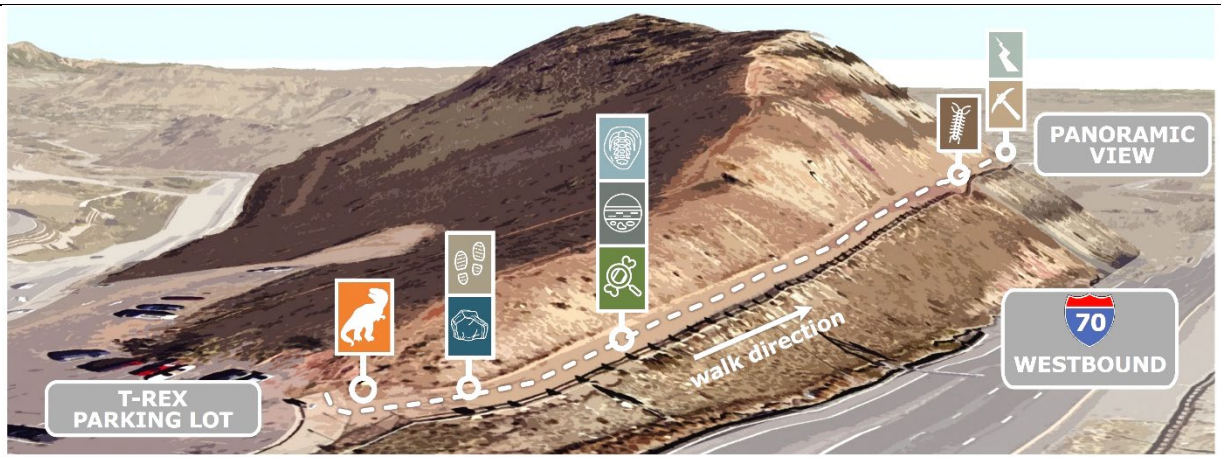


Figure 1. Location map showing the I-70 roadcut (bold red line) across the Dakota Hogback. Cultural features, parks, primary roadways, and key geologic features are overlain on a hillshaded lidar elevation model. Denver Basin to the east, Front Range uplift to the west. For more detailed geologic context, see LeRoy and Weimer (1971).



a) northern road cut Point of Geological Interest



(b) southern road cut Point of Geological Interest

Figure 2. North (a) and south (b) views of the Point of Geological Interest (POGI) with location of the interpretive signs (Figures 6-23 in this text). Adapted from original images drafted by Goodbee & Associates (2026).

INTRODUCTION AND HISTORICAL CONTEXT

The I-70 roadcut is one of the world's most iconic man-made exposures of rock strata (Fig. 1). Excavated in 1967-1969 to allow Interstate 70 to pass through the Front Range hogback that flanks metropolitan Denver's western edge, it is passed by tens of millions of travelers every year. With its stair-stepped design and adjacent park-and-ride lots (Fig. 2), it is a gateway not only to the mountains but to the neighboring communities of Morrison and Golden, and to the geology underfoot. This is the gateway from the flat lying plains of the Denver basin to the east as you travel west to the uplifted Front Range.

Over the years, this site has had a variety of names, from the Geological Hogback to the I-70 Geologic Point of Interest. It is also known as a "POGI" or Point of Geological Interest by the Colorado Geological Survey. Names aside, this site is well known to geologists because it exposes the core of the Dakota Hogback, a regionally extensive feature that runs north-south along the foothills of the Front Range. That structure formed as the Rocky Mountains rose up, lifting the formerly flat-lying underlying rocks and tilting them upward toward the east.

In 1971 the Colorado Scientific Society and the U.S. Geological Survey partnered with the Colorado Department of Highways to adorn the roadcut with signage and trail markers (Fig. 3). Over time, these signs, and the trail itself, deteriorated in condition, in part due to natural processes, in part from vandalism, and in part from lack of support for maintenance and restoration. In 1996, the Colorado Department of Transportation (CDOT), with assistance from the Colorado School of Mines, updated the trail signage. Over the subsequent 30 years, the signs again deteriorated to a point requiring repair and updating (Fig. 3).



Figure 3. Photographs of the entrance to the trail along the north side of Interstate 70 (upper left and right), illustrating how slope collapse and erosion undercut some of the bollards and railings, and covered the trail in rock debris and sediment. Two of the circa 1996 signs along the trail (lower left and right), illustrating long-term impacts of weathering and vandalism. Images: A. Warren.

PRESENT WORK

In 2025, interested parties from a diverse array of Front Range scientific communities began collaborating with CDOT to renovate the site, focused on helping improve the safety, accessibility, and interpretative scope of the roadcut. These efforts involved CDOT partnering with contractor Rodriguez Construction to make improvements to the slope stability, hogback drainage, and trail stability. The project, at milepost (MP) 259.21, included restoration of historic pyramidal pylons and railings, improved physical accessibility, enhanced pedestrian safety, and new drainage (Fig. 4). This work also included the installation of 21 interpretive signs to guide visitors along the new roadcut trails (Figure 2). In total, over 2,000 feet of trail across both the north and south sides of the I-70 roadcut (known to CDOT as the "Hogback Geological Point of Interest") was restored. This work was supported by a grant of $1.8M from the Federal Highway Administration's Transportation Alternatives Program (TAP) as well as additional funds from Jefferson County Open Space and CDOT Region 1. Andrew Malewski, CDOT Region 1 Professional Engineer, served as the Project Manager and Jamie Shapiro, CDOT Region 1 Senior Historian, served as the Environmental Project Manager.



Figure 4. Photographs during construction showing drilling of micropiles (left) and newly poured concrete sidewalk, curb and gutter at the T-Rex parking lot (right). Photos from CDOT, July 2026.

The scientific data and interpretations of the hogback were updated and conveyed with new visuals and a broader contextual framework—including illustrating how these rocks and adjacent terrain were and continue to be relevant to residents and visitors. These new illustrations built upon the historic graphics generated by our predecessors, and were principally drawn by Mariko Tominaga, based on contributions from many of the authors listed on this publication as well as other colleagues in the regional earth science community.

In tandem with these renovation efforts, there was a desire to make the educational materials (i.e., signage, graphics) freely available to a broader segment of the community by publishing them in an open-access publication that is available online, and by archiving them in an accessible database. The goal is to ensure that these materials remain available to future educators in the broadest sense, and to preserve them for those who undertake similar renovations and interpretive efforts in the years ahead.

WANT TO LEARN MORE?

To extend your knowledge further and learn about the geology and resources relevant to the I-70 roadcut, we suggest starting with Matthews et al. (2009) and Abbott and Cook (2012) for accessible insights into our regional geology. Anderson and Haseman (2021) provides insights into the mining history and geology of nearby Golden, and Johnson and Raynolds (2006) fosters visualization of what the environments look like that produced this region's strata. To learn more about the historic and ongoing paleontology of this and other sites in the region, you might start with reviews in Lockley and Hunt (1995), Honda and Simmons (2009) or Hagadorn (2022). A key reference on the stratigraphy of the Dakota Hogback is Raynolds (2024), who revised the stratigraphy of the same units exposed at the I-70 roadcut, but with a focus on outcrops at nearby Dinosaur Ridge. These citations are but a fraction of the available literature that relates to the I-70 roadcut, but they provide excellent overviews and an introduction to the science related to this exposure. Additional resources are available at coloradostratigraphy.org and on the Colorado Geological Survey (coloradogeologicalsurvey.org) and Dinosaur Ridge (dinoridge.org) websites.

The geology of the roadcut was first characterized in detail in a hard-to-find poster-style publication by LeRoy and Weimer (1971). A key element of this publication is the inclusion of graphic logs of the strata on both sides of the roadcut, which were logged when the exposure was freshly excavated. To facilitate usage of these measured sections, we digitized the original sections, redrafted them with the help of Larry Scott at the Colorado Geological Survey, and updated them with modern stratigraphic context and geochronology (Fig. 5).

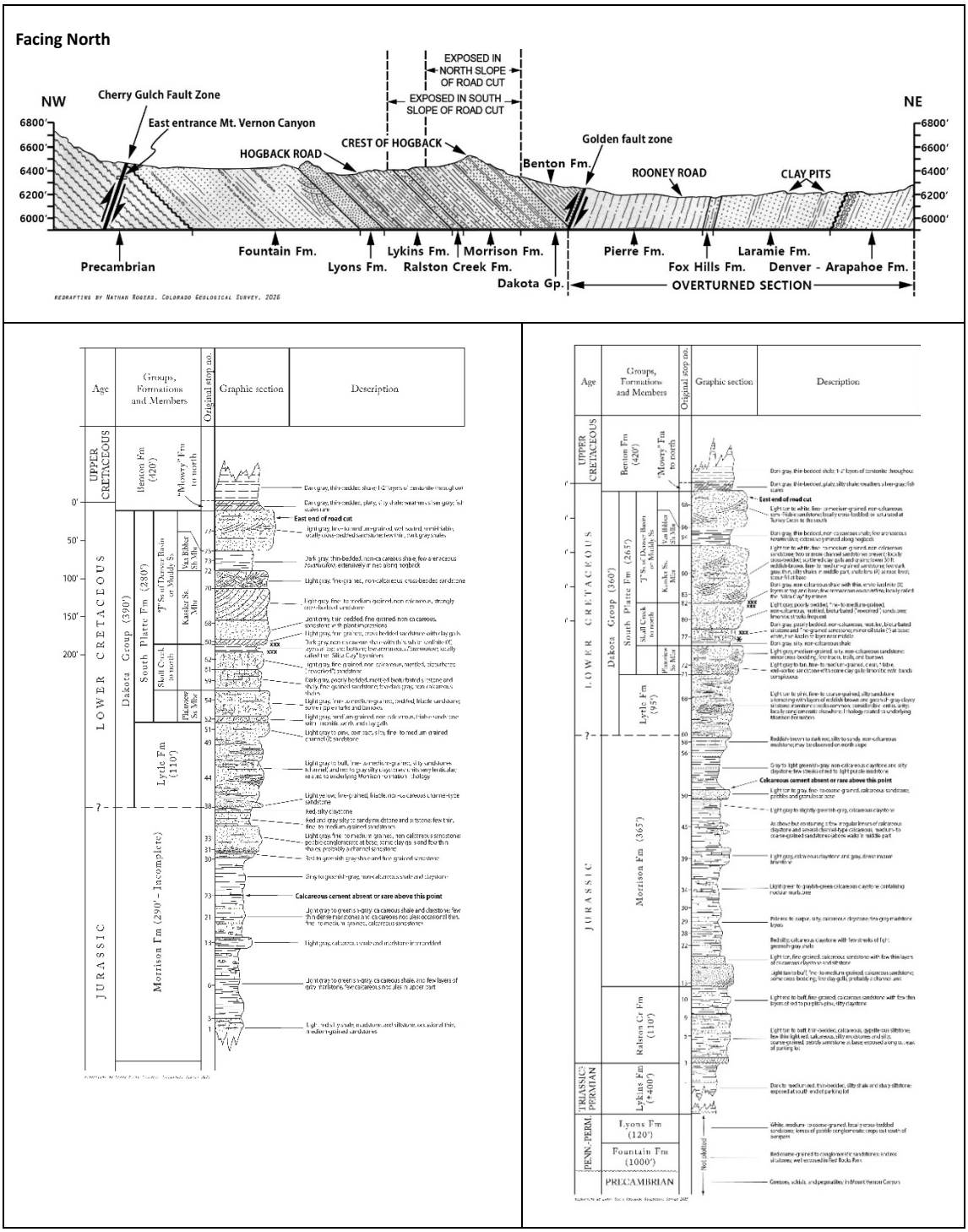


Figure 5. Geologic sketch (top) of stratigraphy of the Dakota Hogback, providing context for the strata exposed along the north and south walls of the I-70 roadcut. Detailed graphic logs of the north (left) and south (right) sides of the roadcut. Figures redrafted from LeRoy and Weimer (1971). High-resolution scans of these figures and high-resolution versions of the trail signs are available in Malewski et al. (2026).

Below are small-scale graphic inset previews (Figures 6 through 23) of the interpretive signage installed along the I-70 roadcut in 2026. Fully editable, layered, high-resolution digital versions of these graphics are archived with the Colorado Geological Survey, the Colorado Department of Transportation, and online in Malewski et al. (2026). Duplicate signage is installed on both sides of the roadcut. Slight variations between the two sets of signage highlight the geologic variability as shown in Figure 5.

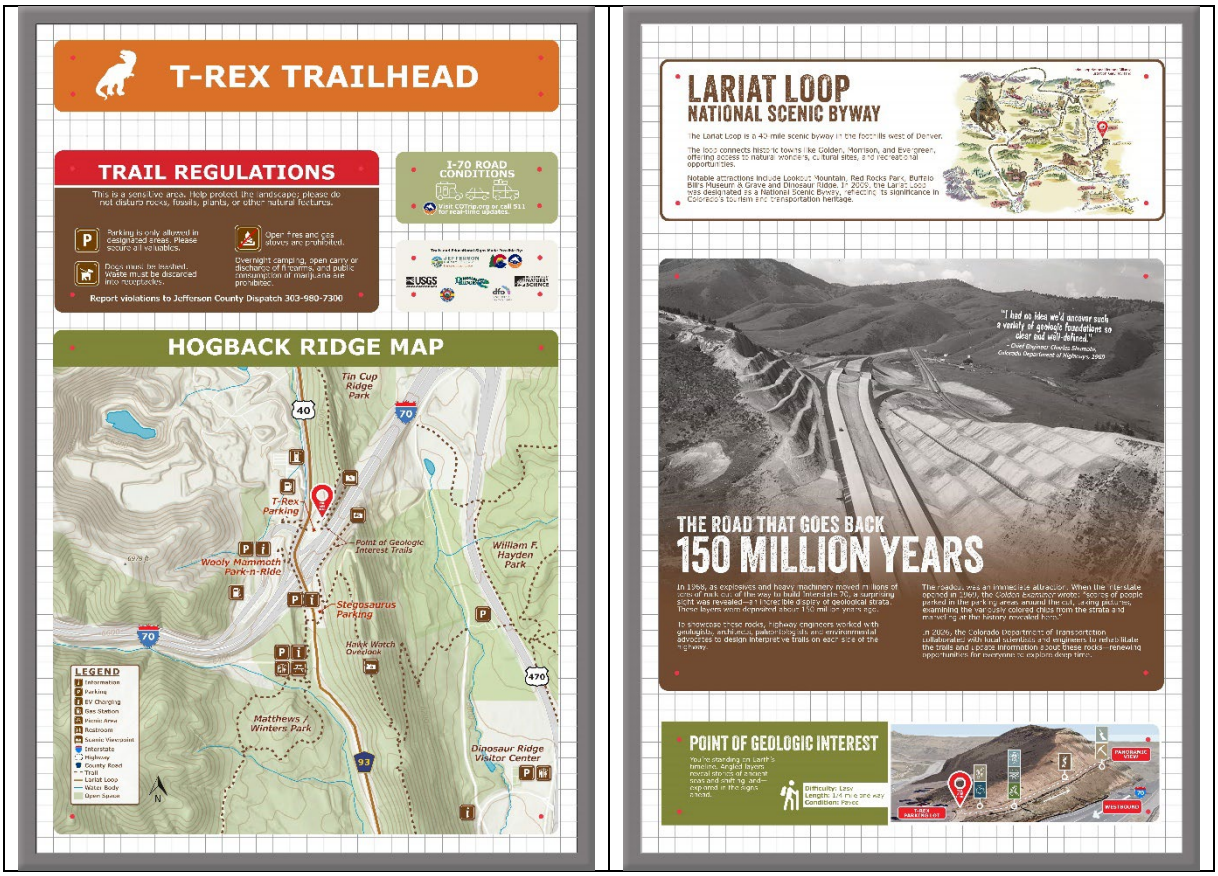


Figure 6. "T-Rex Trailhead." Introductory signage at the parking lot for the north side of the roadcut providing geographic context and travel information to visitors as well as an overview of the historic context for development of the site.

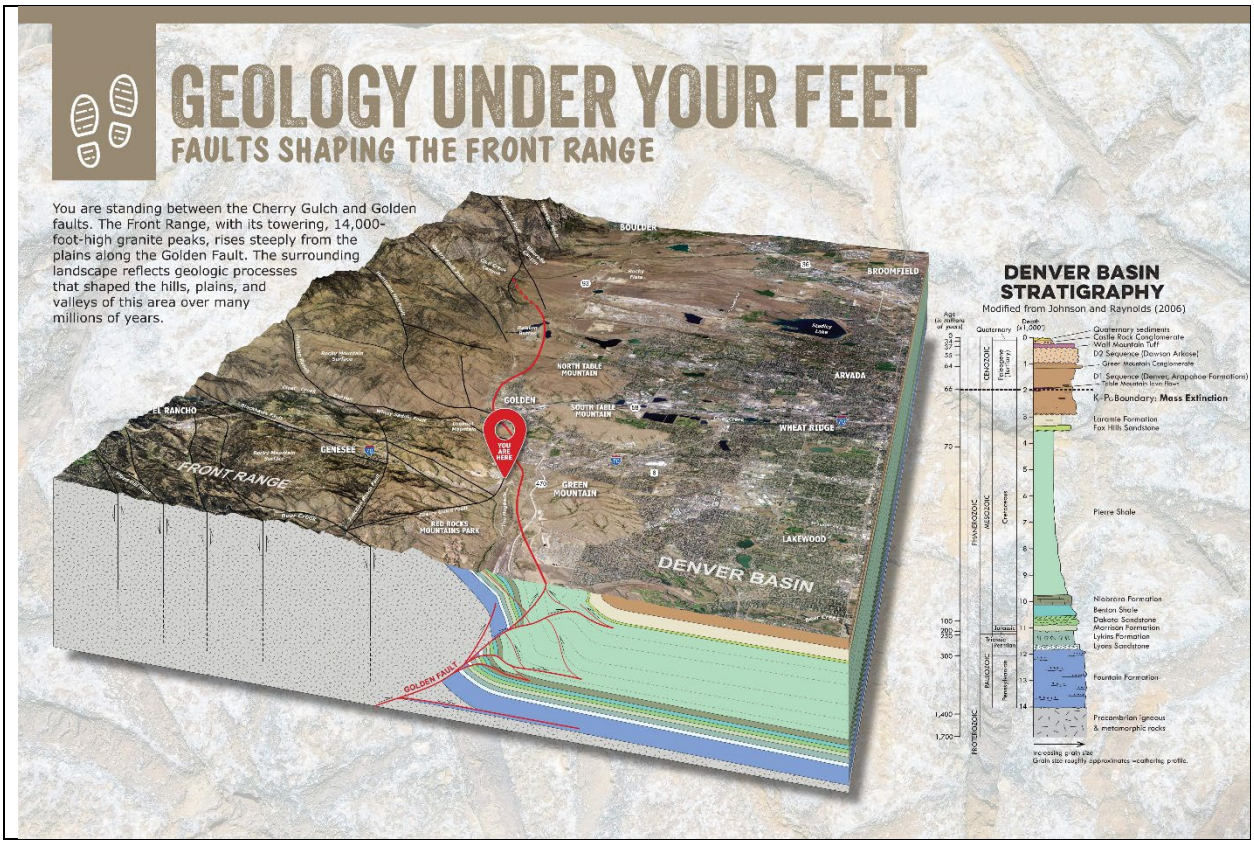


Figure 7. "Geology under your feet – faults shaping the Front Range." Block-model illustration of how the faults, strata, metamorphic and igneous rocks underfoot relate to the region's topography, including the roadcut.

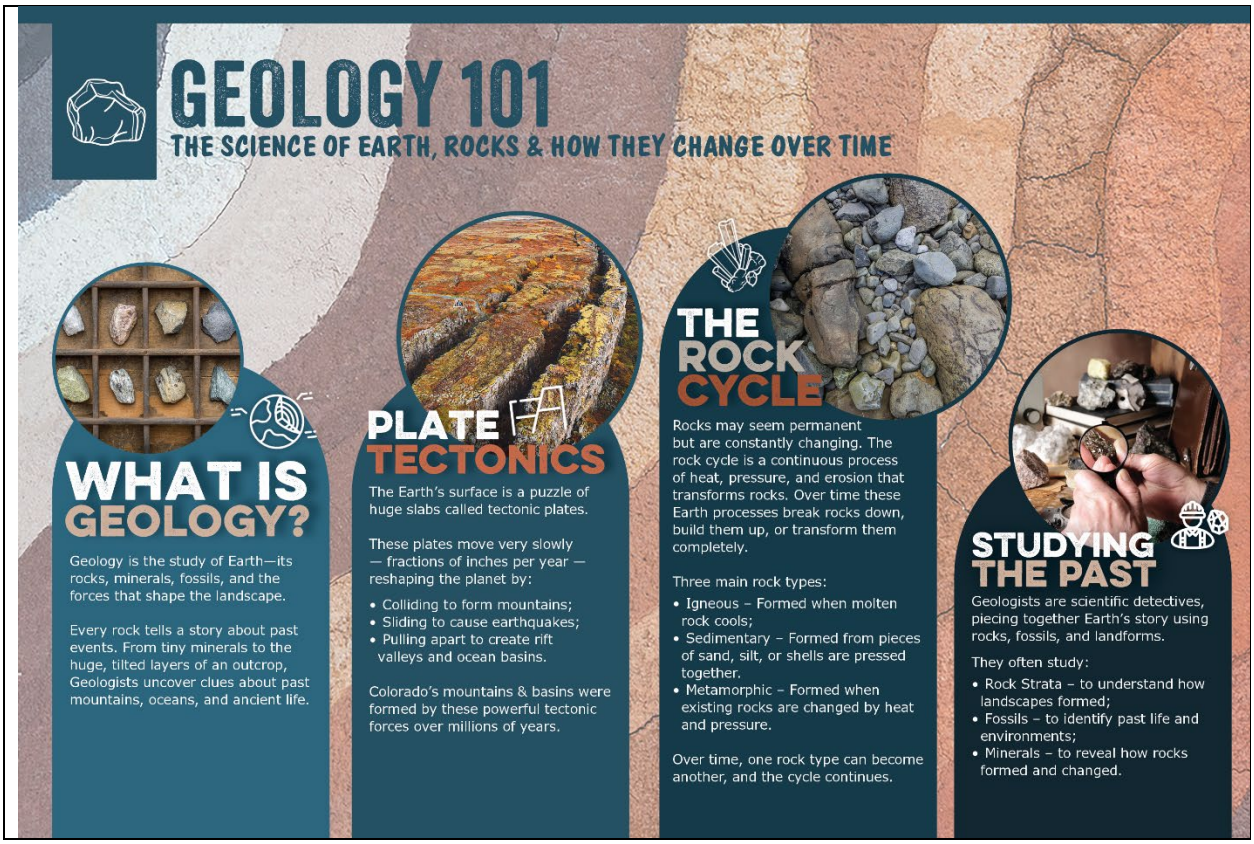


Figure 8. "Geology 101 – the science of earth, rocks and how they change over time." Illustration defining geology, plate tectonics, the rock cycle, and deep time.

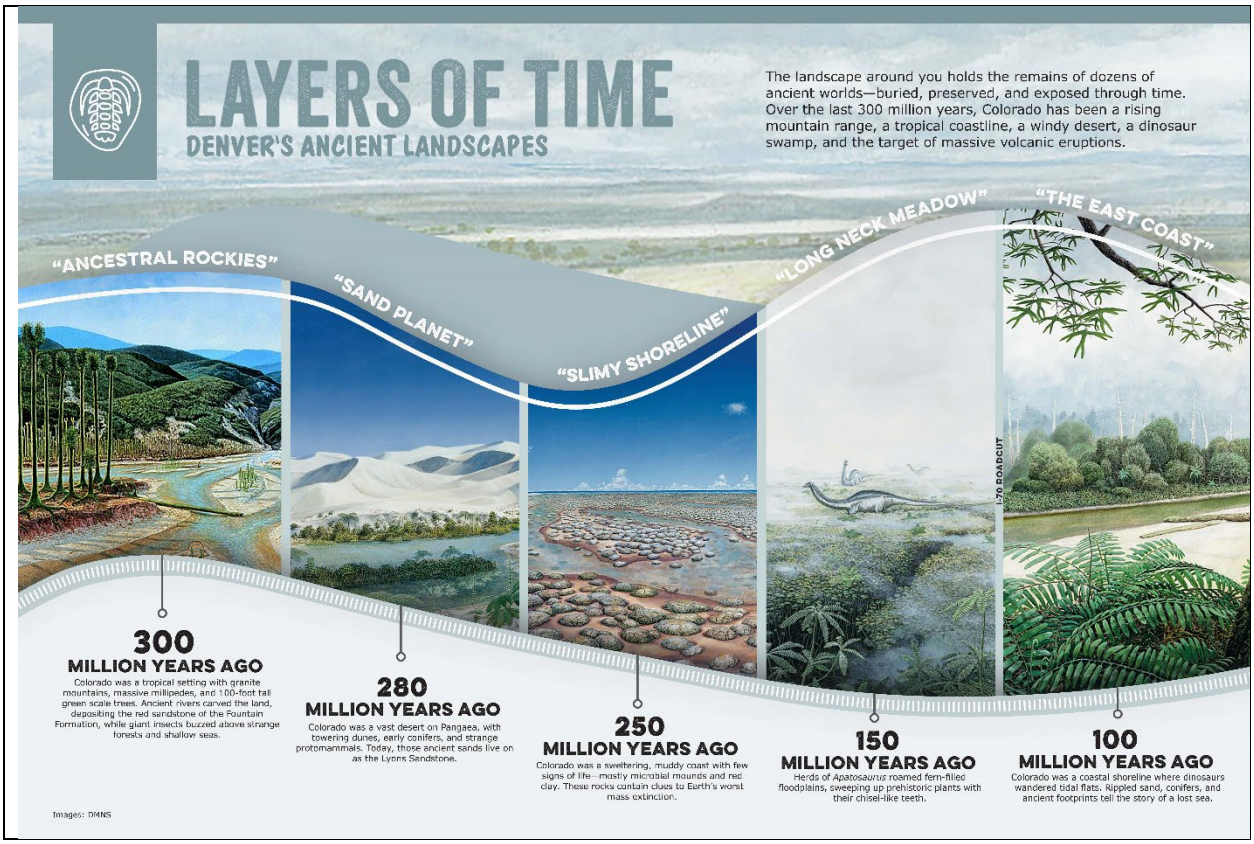


Figure 9. "Layers of time – Denver's Ancient Landscapes (left sign)." Illustration of the tapestry of geologic time and changing environments represented by strata exposed in the oldest (mountainward) portion of the roadcut. Illustrations by Jan Vriesen.

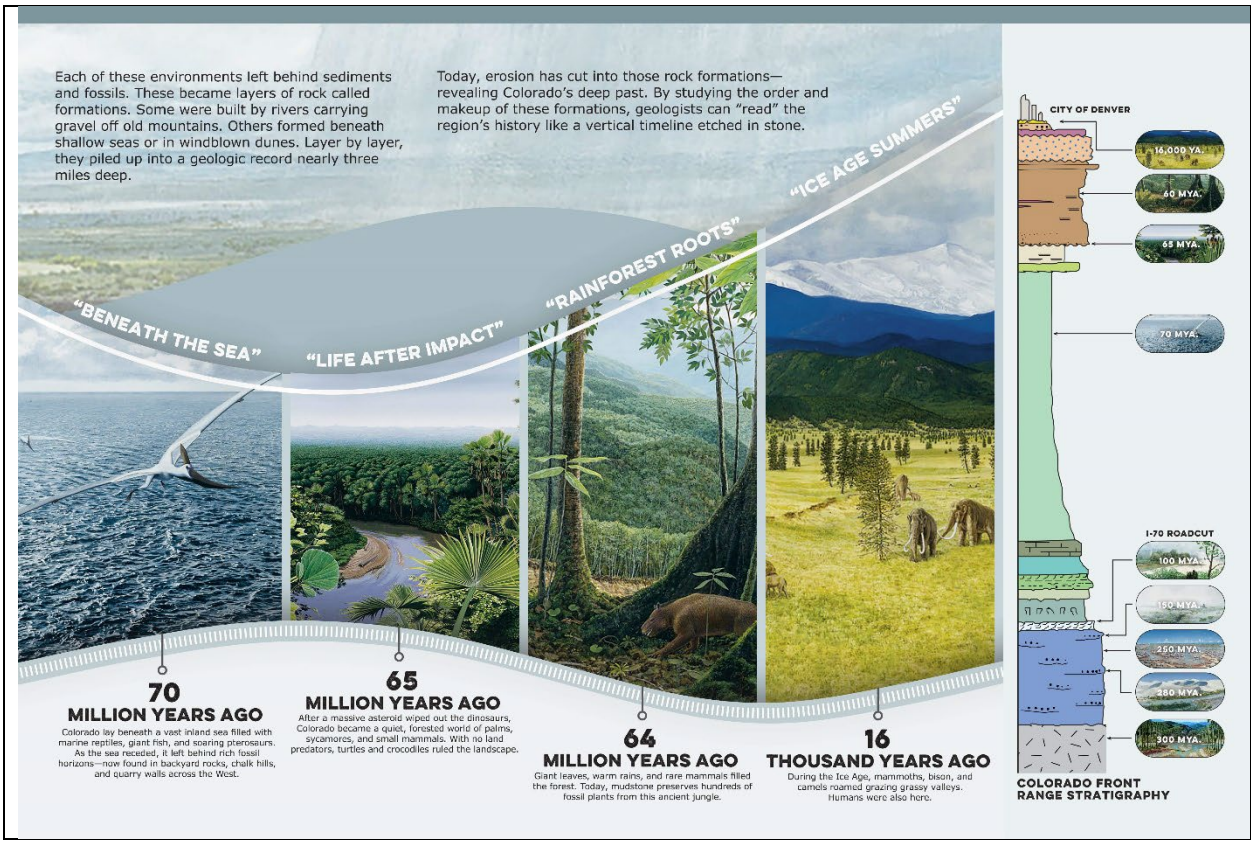


Figure 10. "Layers of time – Denver's Ancient Landscapes – continued (right sign)." Illustration of the tapestry of time and environments represented by strata exposed in the younger (eastward) portion of the roadcut. Illustrations by Jan Vriesen and Donna Braginetz.

Facing South

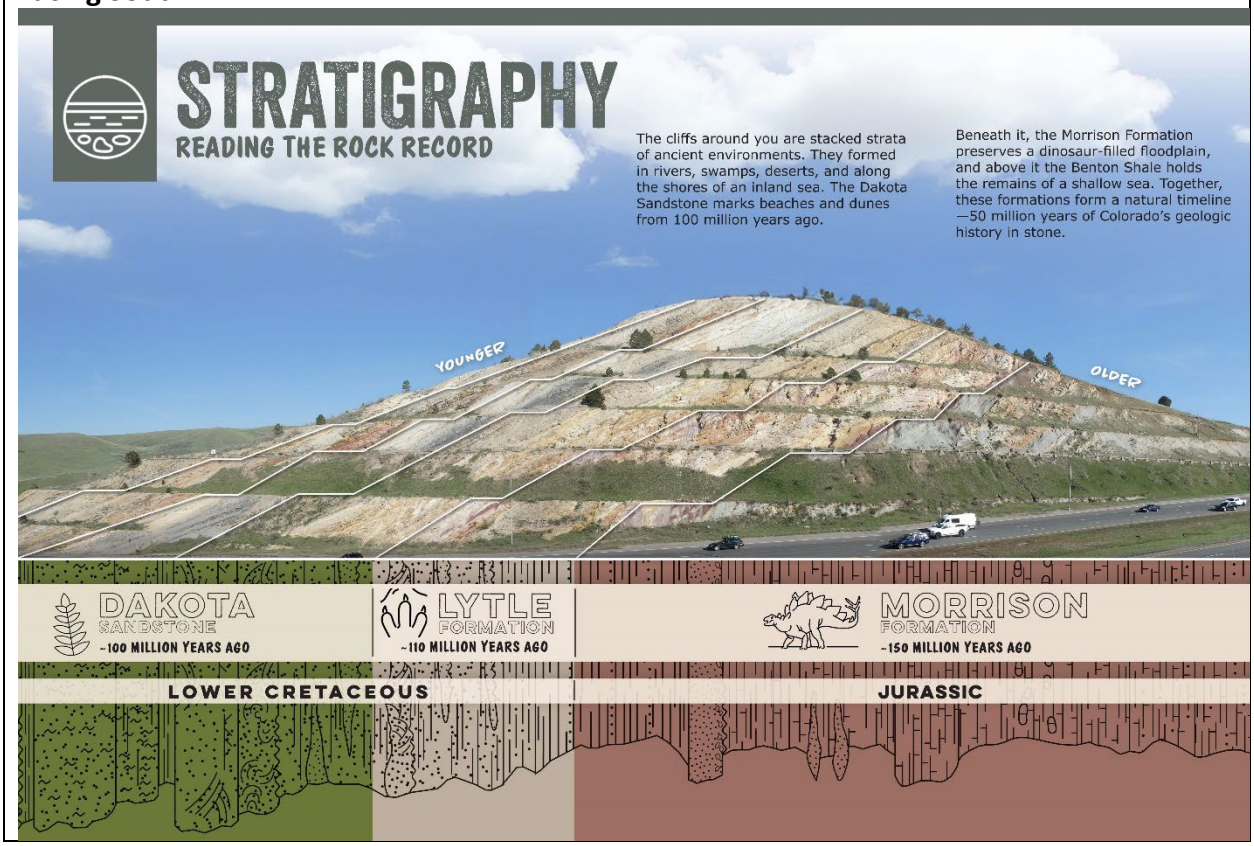


Figure 11. "Stratigraphy – reading the rock record (view of south roadcut)." Illustration of how the strata of the southern portion of the roadcut have been divided into different geologic units, each representing deposition in different environments and during different intervals of time.

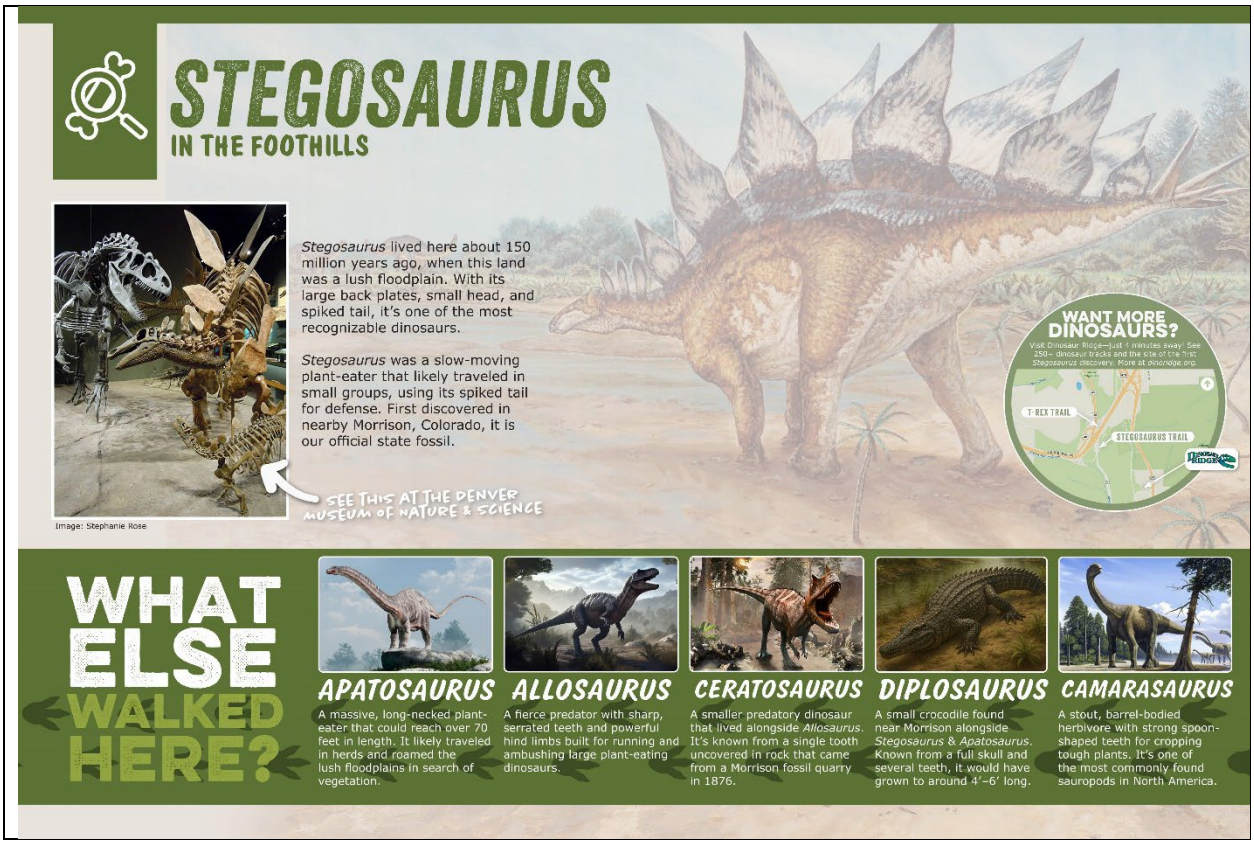


Figure 12. "*Stegosaurus* – in the foothills." Illustration of key dinosaurs known from bones and tracks along the Hogback andvicinity. Hadrosaurs, a group of duck-billed herbivorous dinosaurs, also made abundant tracks in the region, particularly at Dinosaur Ridge.

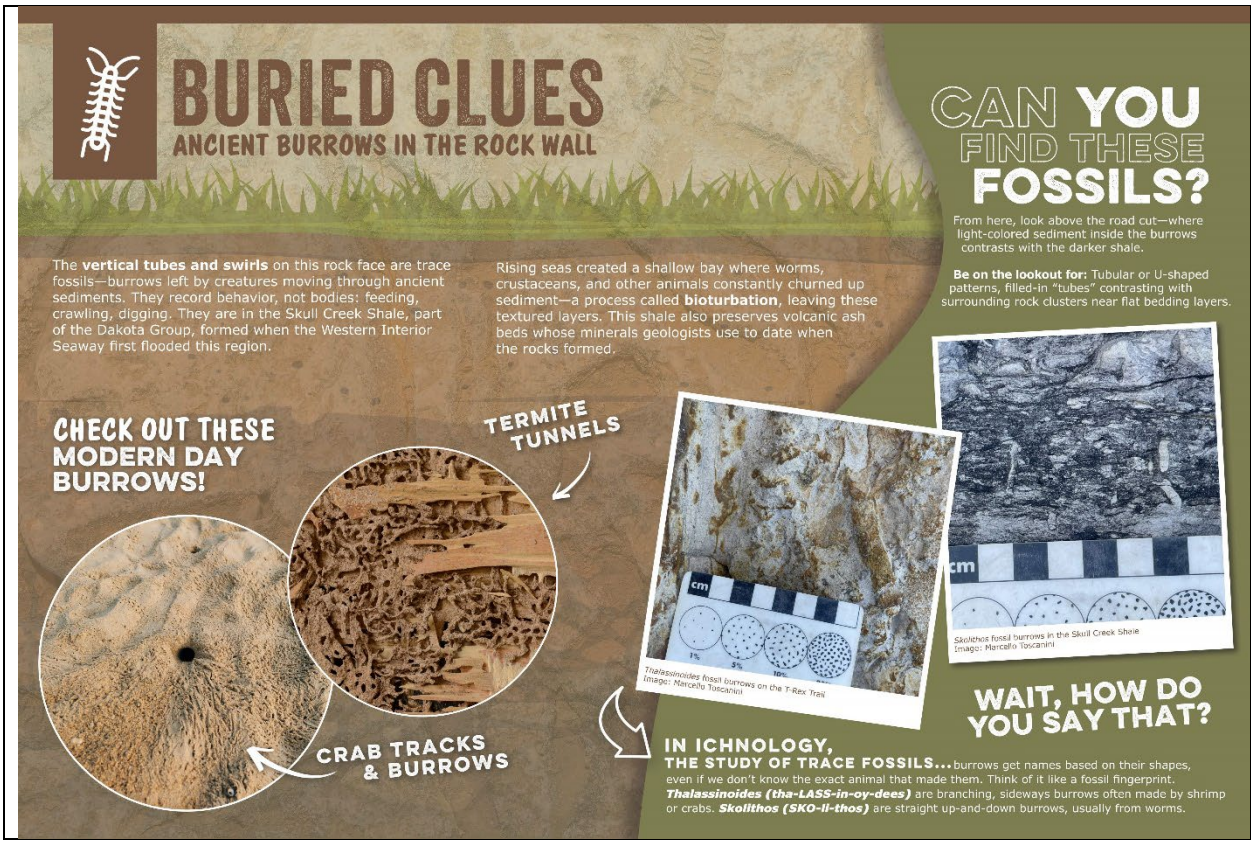


Figure 13. "Buried Clues – ancient burrows in the rock wall." Illustration highlighting the nature and diversity of trace fossils in this region.

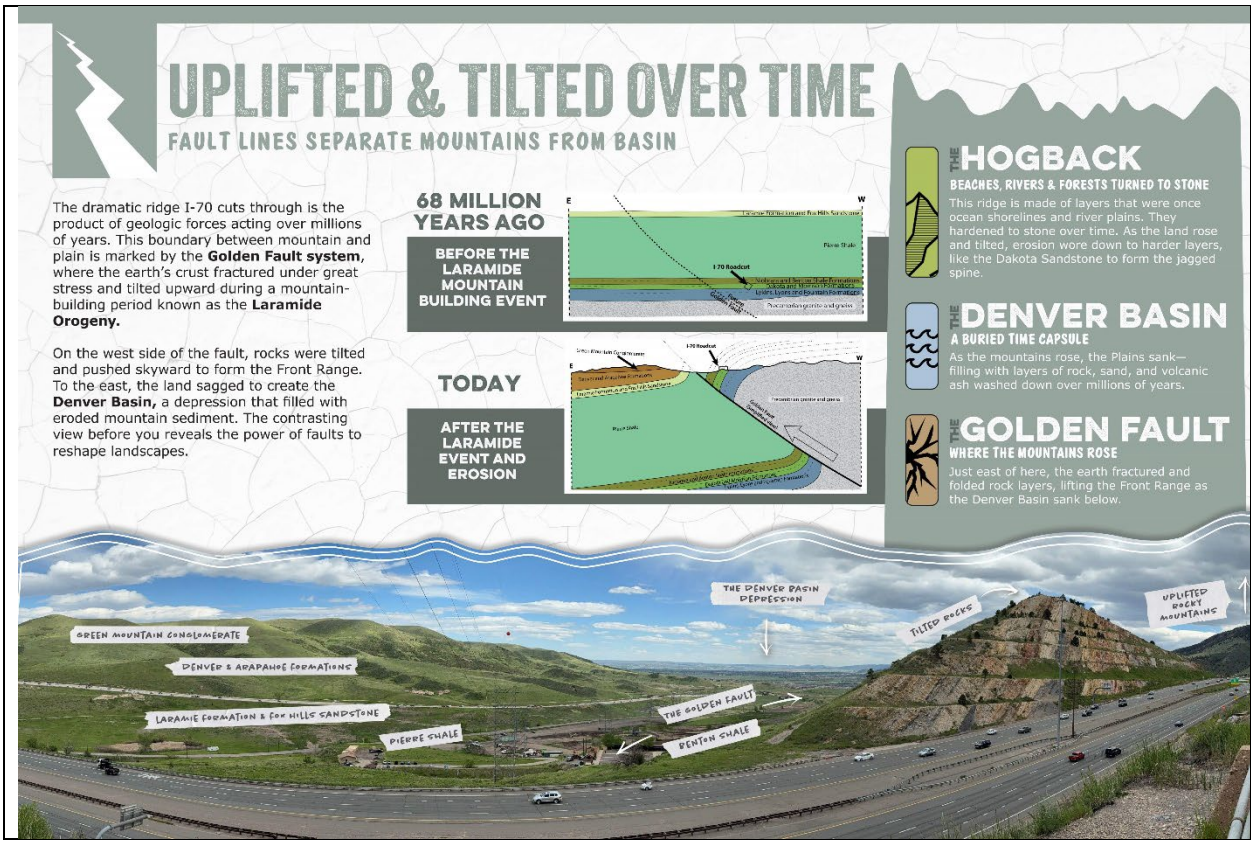


Figure 14. "Uplifted & tilted over time – fault lines separate mountains from basin." Illustration of how the roadcut formed and annotation of geologic features that are exposed in the adjacent valley.

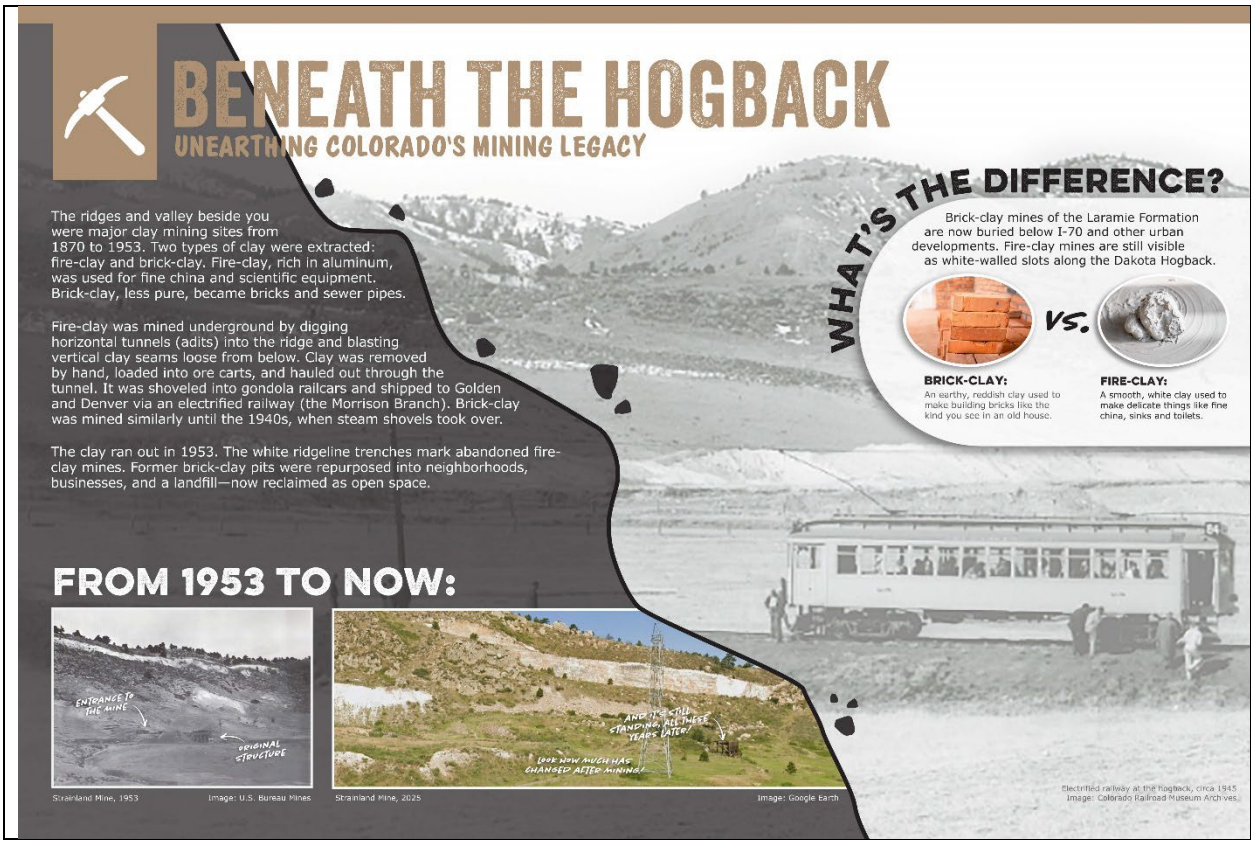


Figure 15. "Beneath the Hogback – unearthing Colorado's mining legacy." Illustration showcasing the importance of hogback geology to the economy and development of the region.

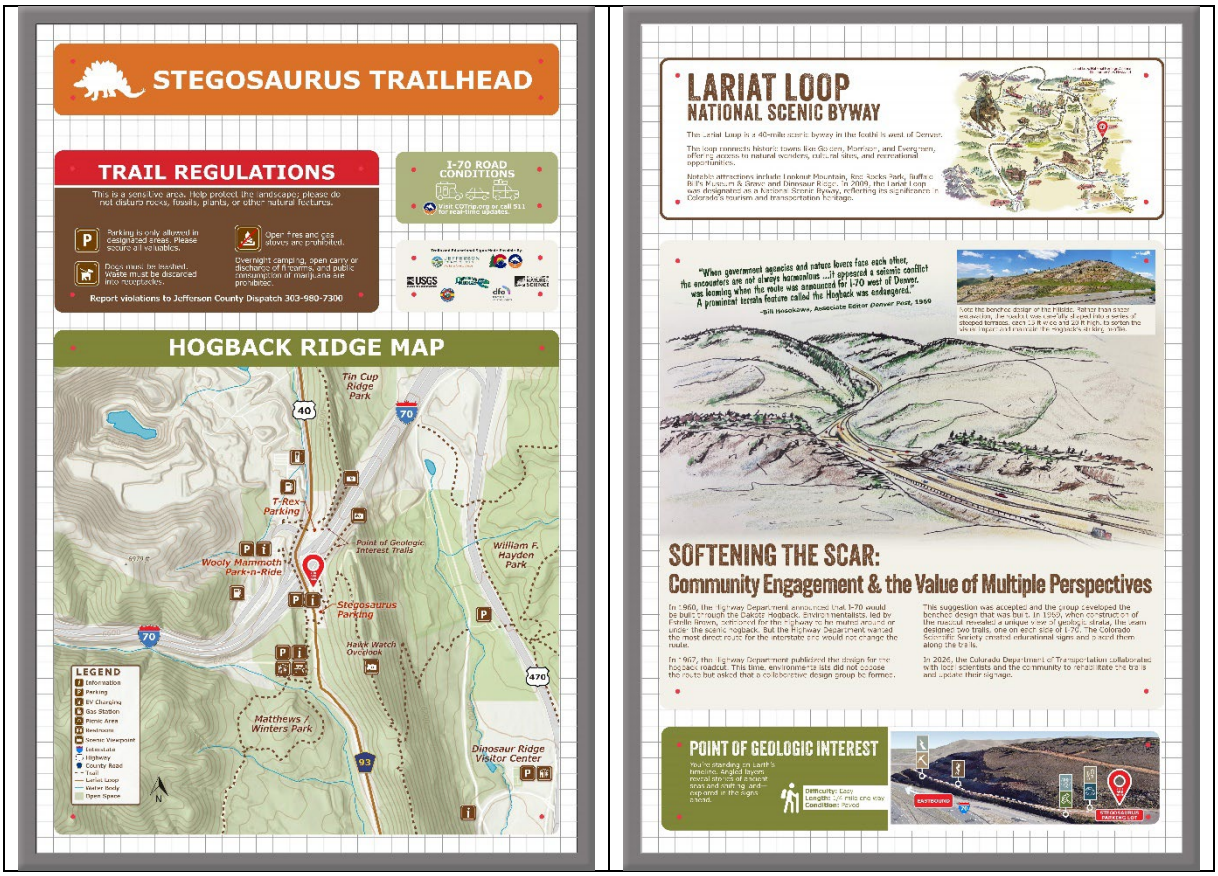


Figure 16. "*Stegosaurus* Trailhead." Introductory signage at the parking lot for the south side of the roadcut providing geographic context and travel information for visitors, as well as historic context for highlighting the geologic importance of the site.

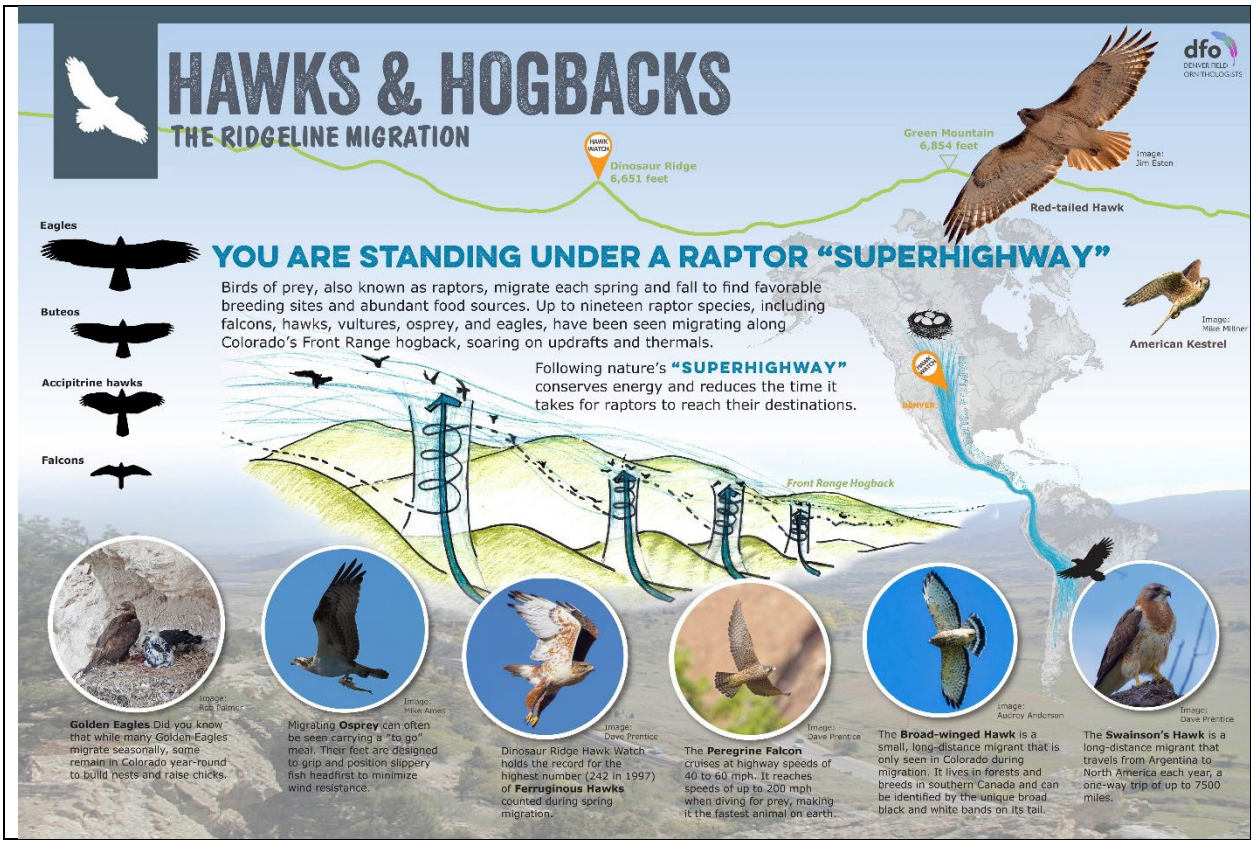


Figure 17. "Hawks & Hogbacks – the ridgeline migration." Illustration of the influence of the hogback on avian ecology and habitats.

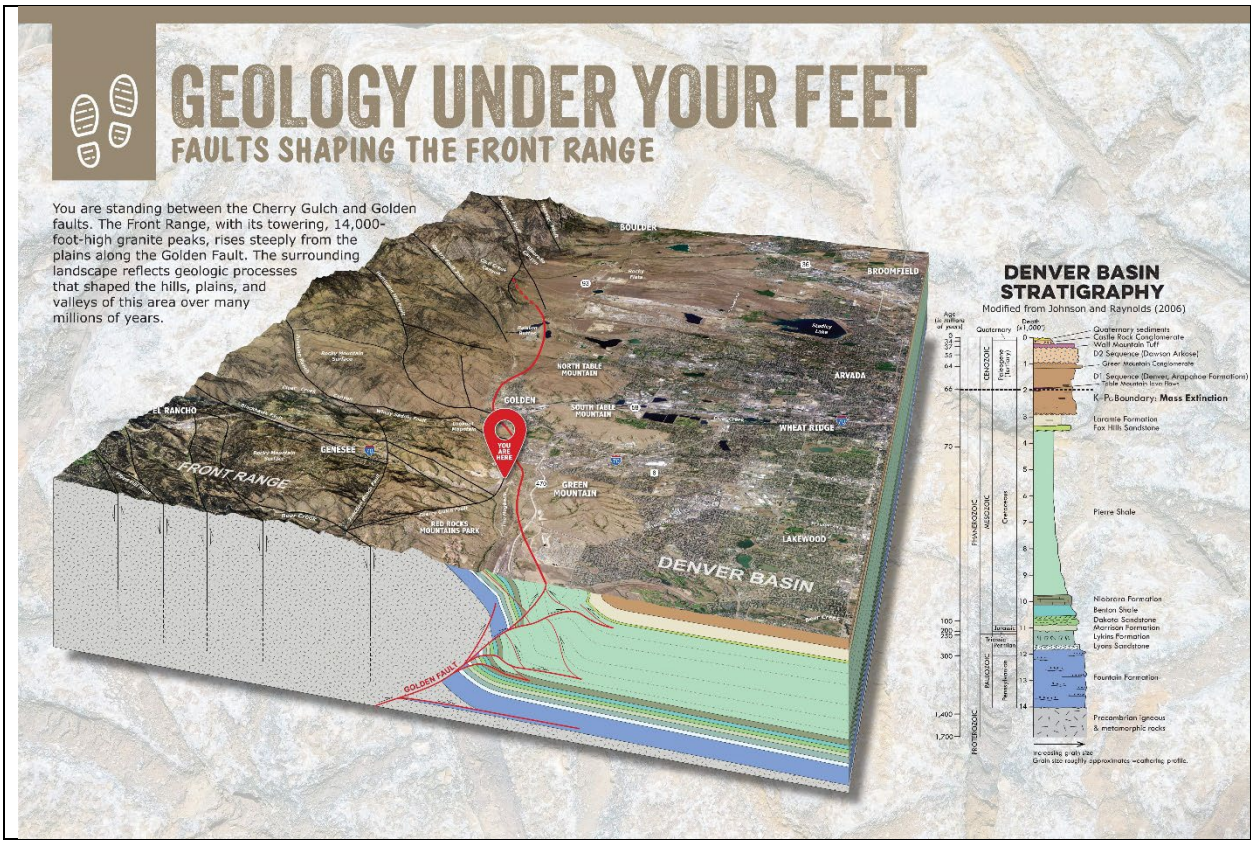


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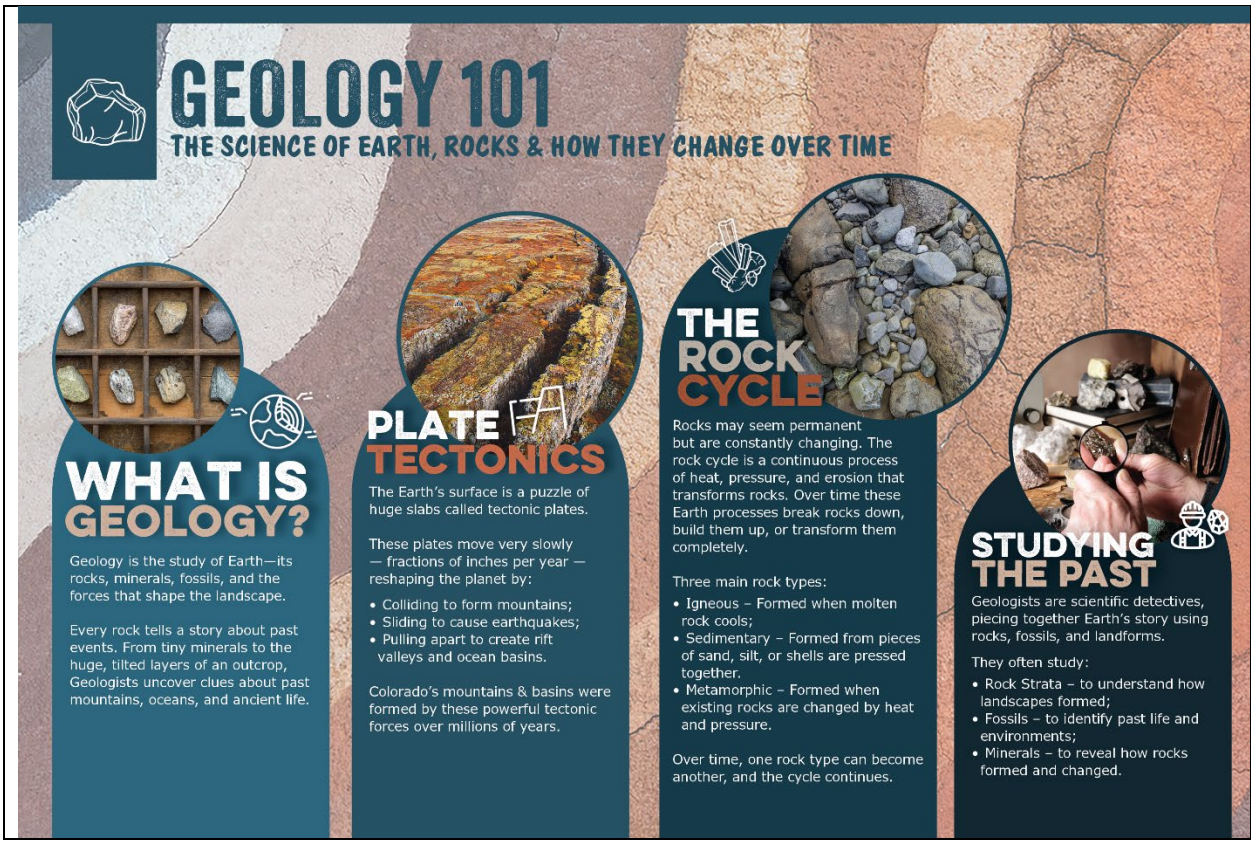


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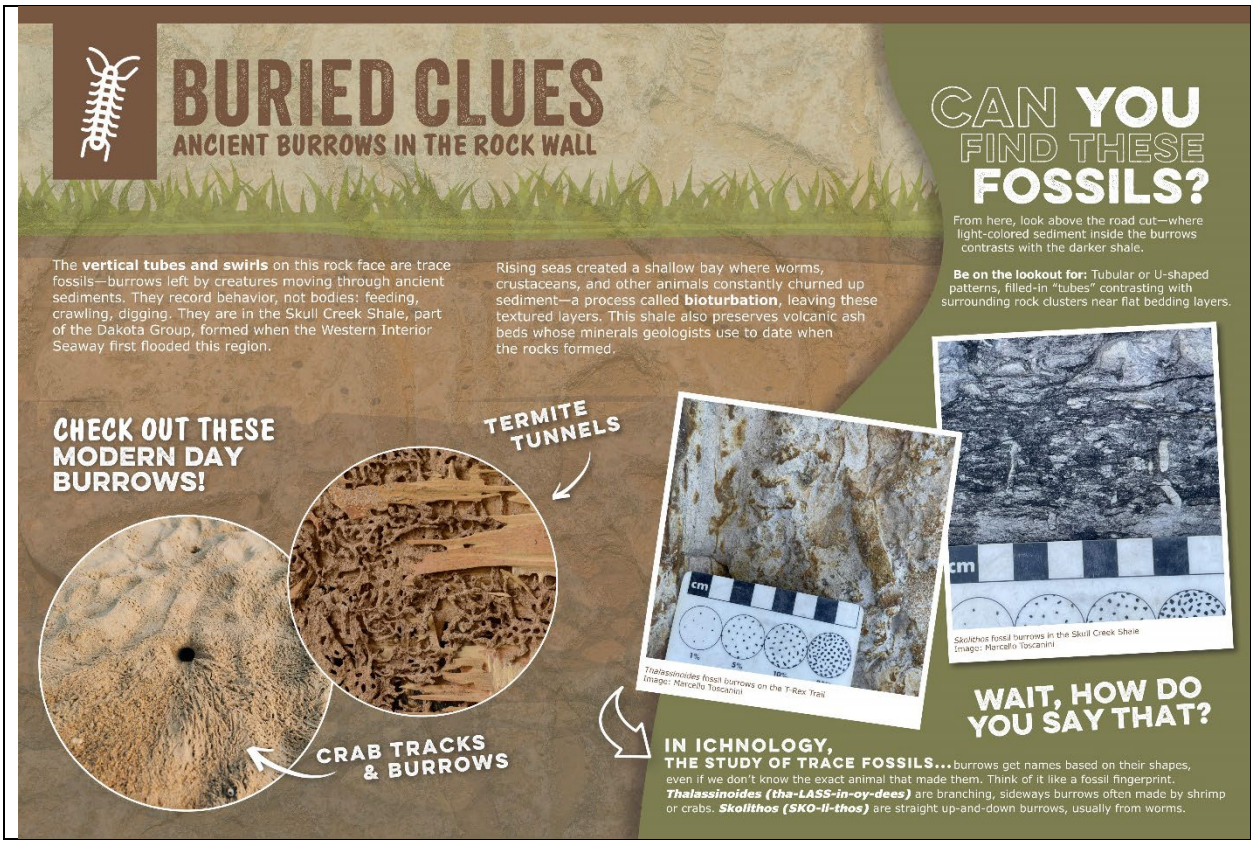


Figure 20. Duplicate example of Figure 13, "Buried Clues – ancient burrows in the rock wall." Illustration highlighting the nature and diversity of trace fossils in this region.

Facing North

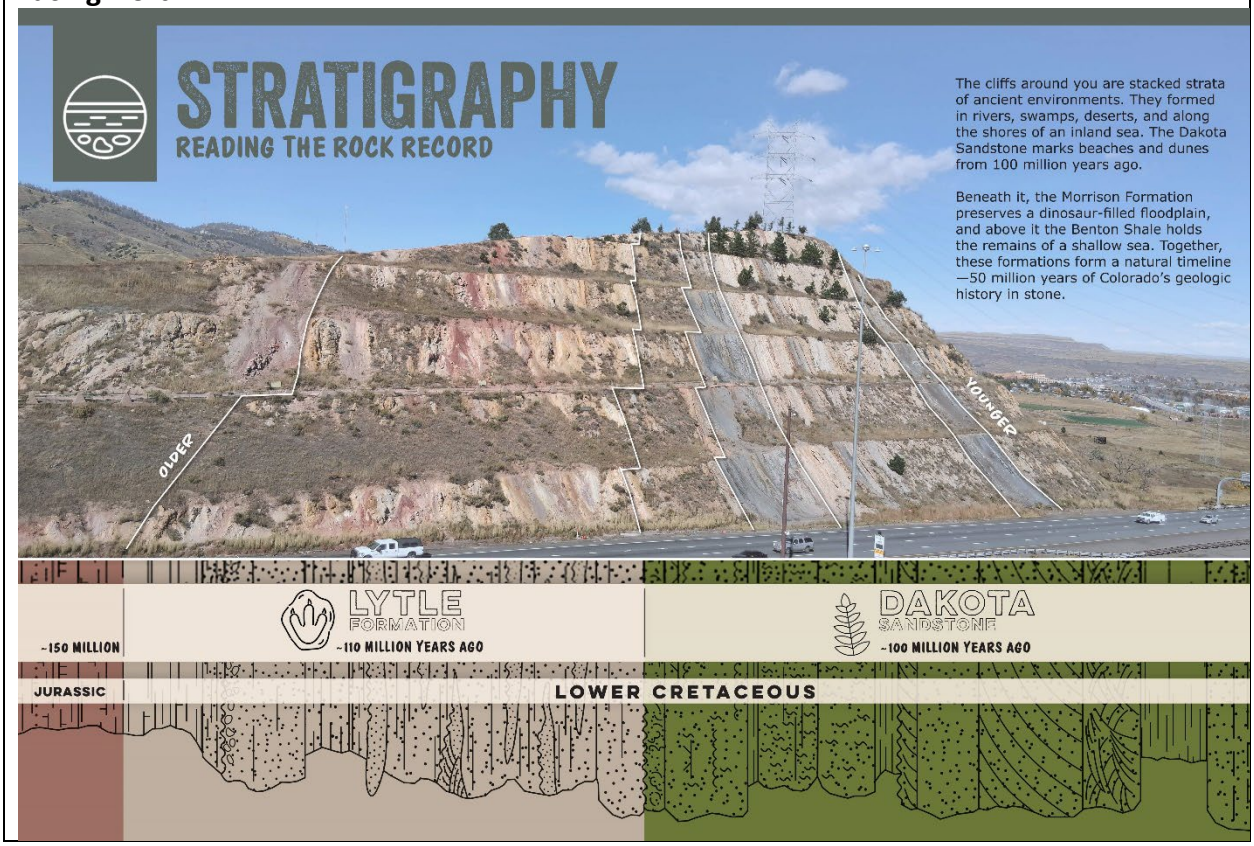


Figure 21. "Stratigraphy – reading the rock record (view of north roadcut)." Illustration of how the strata of the northern portion of the roadcut have been divided into different geologic units, each representing deposition in different environments, during different intervals of time.

Facing South

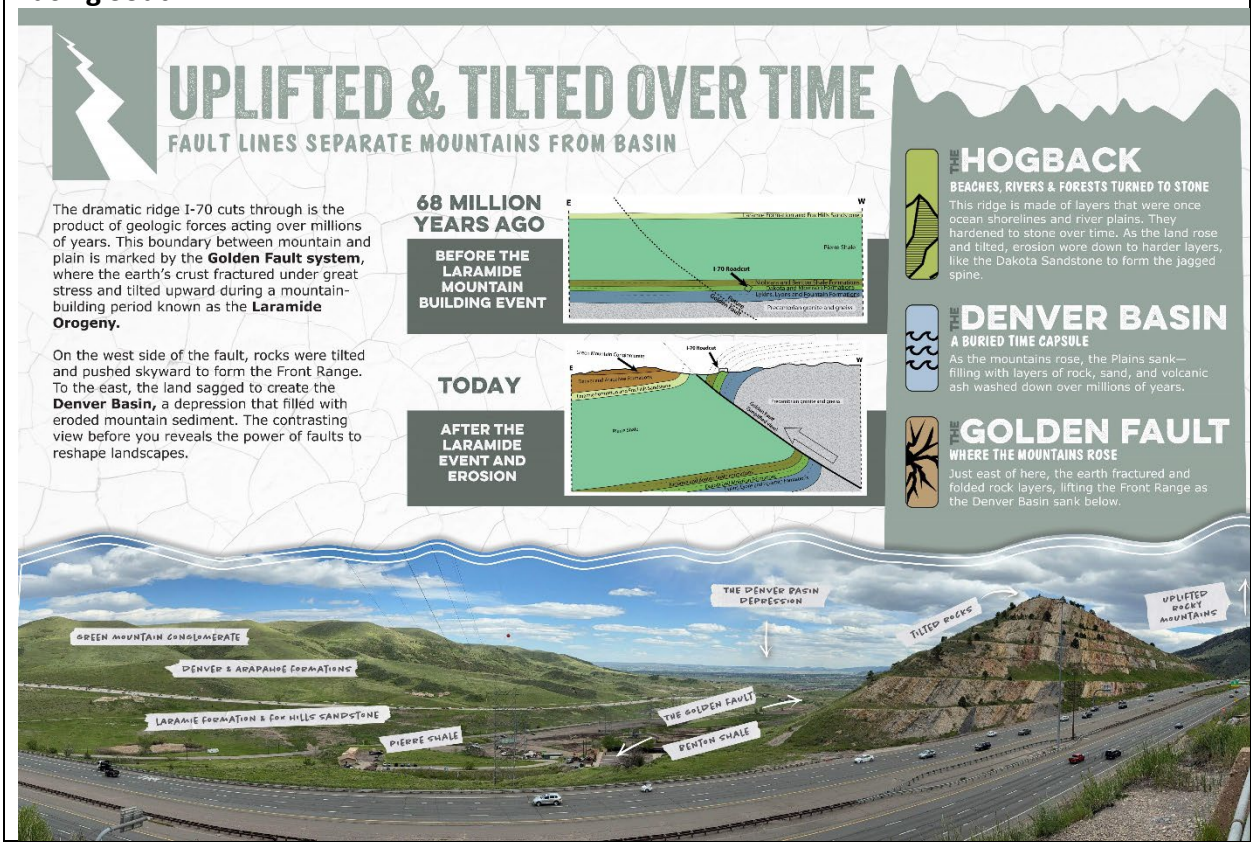


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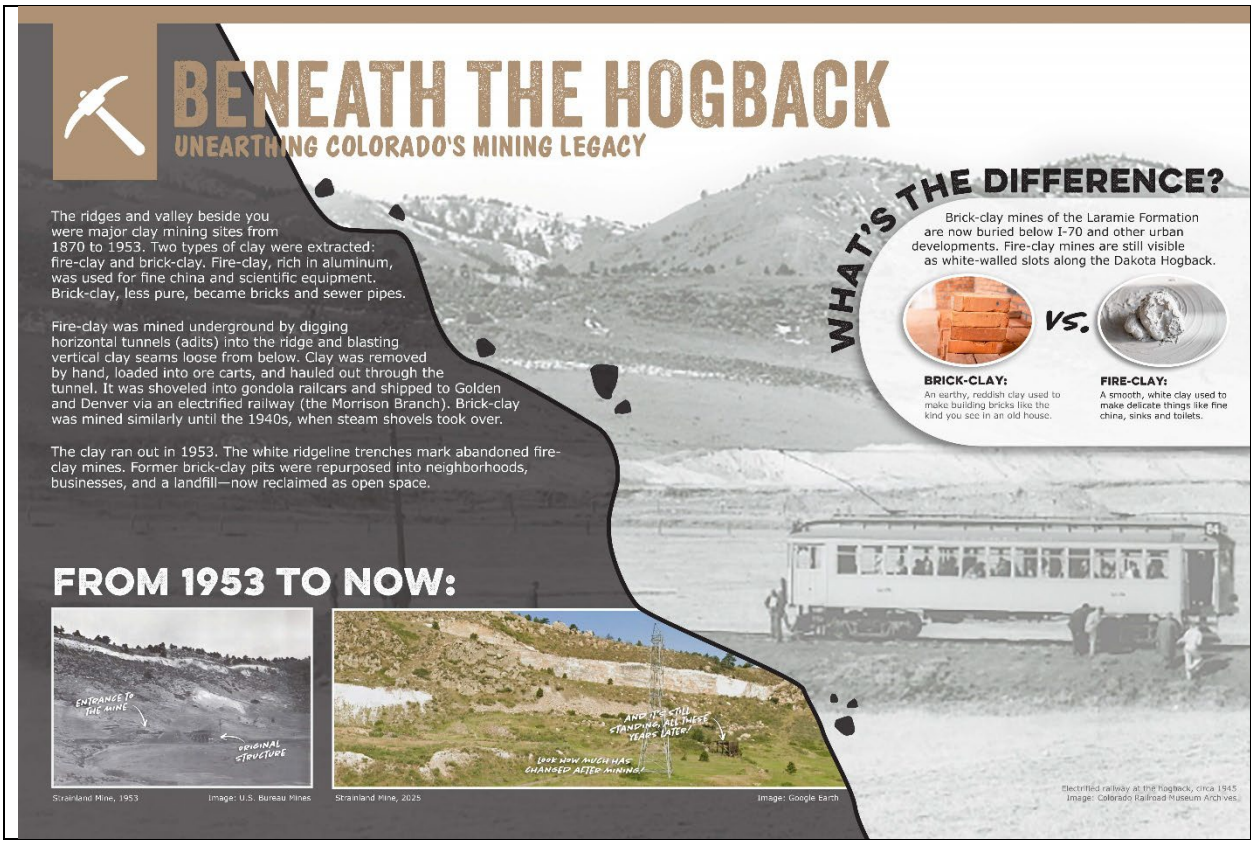


Figure 23. Duplicate example of Figure 15, "Beneath the Hogback – unearthing Colorado's mining legacy." Illustration showcasing the importance of hogback geology to the economy and development of the region.

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