

Written in Stone

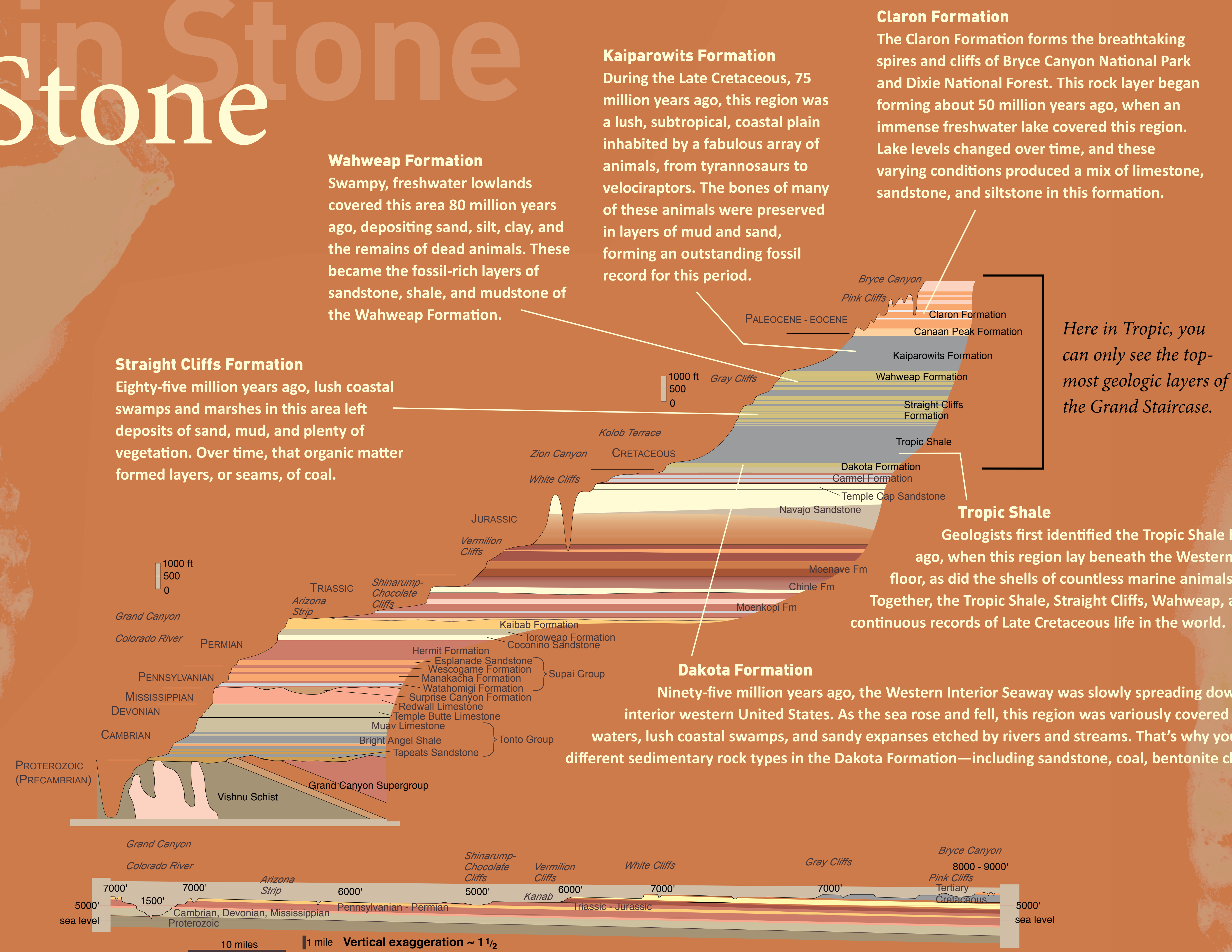
Constant Change

The landscape surrounding Tropic hasn't always looked like it does today. Though the rocky cliffs and canyons around you may seem fixed and unchanging, that's only because their transformation is so slow. Imagine that you could watch the last few billion years of this land's history condensed into a few hours. You'd see a dizzying rush of change—oceans overspreading the land, then receding. Desert sand dunes advancing, then giving way to lush tropical forests. Vast freshwater lakes forming and drying up. Land uplifting and eroding.

The land's geologic history lies before you like an open book—a book that is still being written. Each rock layer tells a different chapter of that dynamic story. Here on the Colorado Plateau, the rock layers didn't get jumbled as the plateau uplifted, the way they have in many other uplifted regions. That makes it far easier to read a sequential story from the rock layers, since you can be fairly sure that the older layers lie beneath the younger ones.



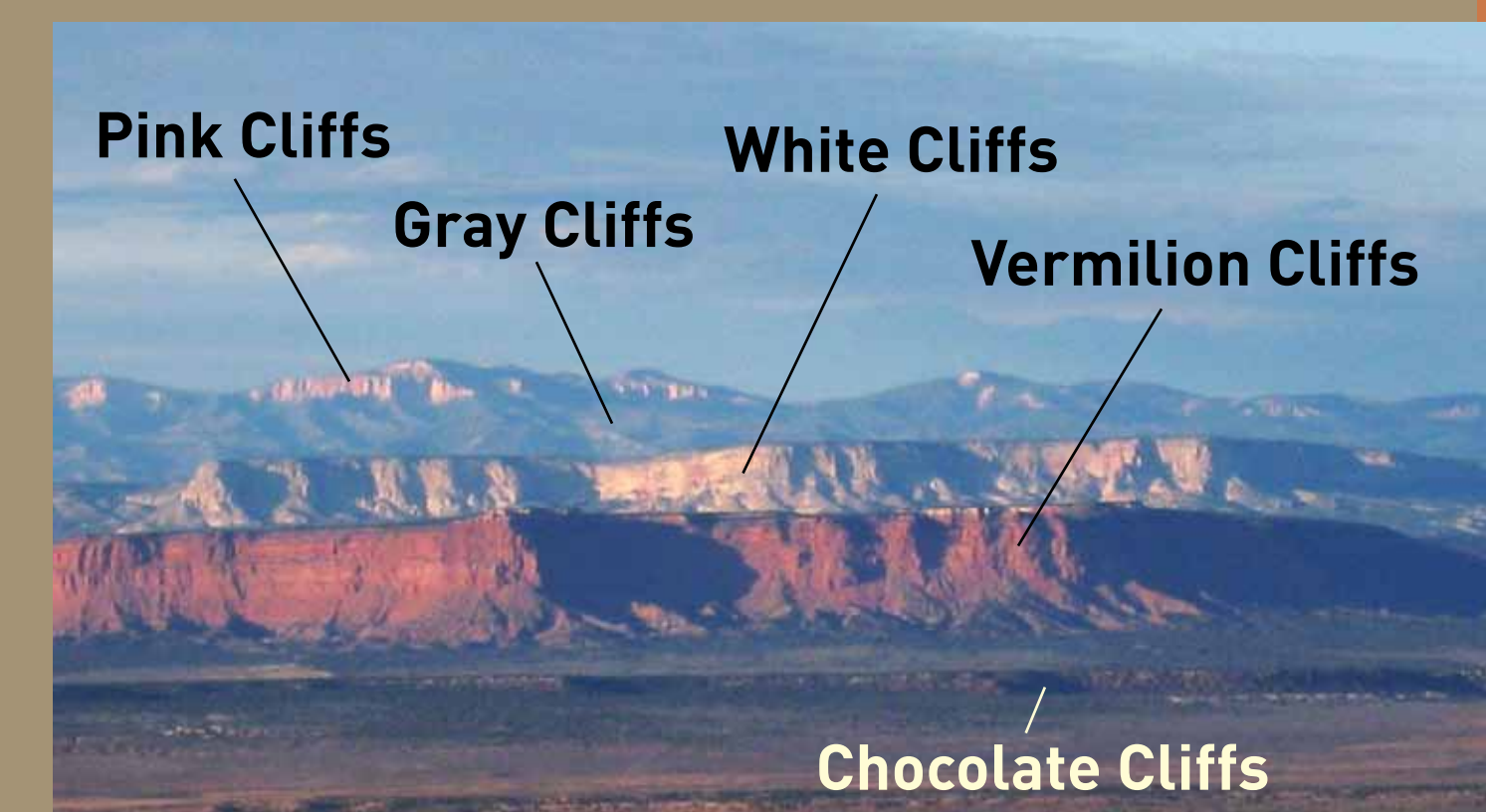
View from Highway 12 in Tropic.



Rock layers of the Grand Staircase, from the bottom of Grand Canyon (left) to the top of Bryce Canyon (right). The layers in the upper illustration are greatly stretched out to clearly show the strata. Illustration courtesy of Ron Blakey, Ancient Landscapes of the Colorado Plateau.

Icing on the Cake

While exploring the Colorado Plateau during the 1880s, geologist Clarence Dutton likened it to a “great stairway,” because of its remarkable sequence of cliffs and plateaus rising more than 6000 feet from the bottom of Grand Canyon to the top of Bryce Canyon. The Pink Cliffs, dramatically revealed in Bryce Canyon National Park and Powell Point, are the topmost step of this Grand Staircase—they're the icing on the layer cake of the Colorado Plateau.



Drawing from geologic evidence, this paleogeographic map depicts Utah some 50 million years ago, when the freshwater sediments of the Claron Formation were deposited. Credit: Ron Blakey, Ancient Landscapes of the Colorado Plateau.

Here in Tropic, you can only see the top-most geologic layers of the Grand Staircase.

Claron Formation
The Claron Formation forms the breathtaking spires and cliffs of Bryce Canyon National Park and Dixie National Forest. This rock layer began forming about 50 million years ago, when an immense freshwater lake covered this region. Lake levels changed over time, and these varying conditions produced a mix of limestone, sandstone, and siltstone in this formation.

Kaiparowits Formation
During the Late Cretaceous, 75 million years ago, this region was a lush, subtropical, coastal plain inhabited by a fabulous array of animals, from tyrannosaurs to velociraptors. The bones of many of these animals were preserved in layers of mud and sand, forming an outstanding fossil record for this period.

Wahweap Formation
Swampy, freshwater lowlands covered this area 80 million years ago, depositing sand, silt, clay, and the remains of dead animals. These became the fossil-rich layers of sandstone, shale, and mudstone of the Wahweap Formation.

Straight Cliffs Formation
Eighty-five million years ago, lush coastal swamps and marshes in this area left deposits of sand, mud, and plenty of vegetation. Over time, that organic matter formed layers, or seams, of coal.

Tropic Shale
Geologists first identified the Tropic Shale here in Tropic, Utah. This layer formed about 93 million years ago, when this region lay beneath the Western Interior Seaway. Silt and clay particles settled to the sea floor, as did the shells of countless marine animals. Over time, these sediments hardened into fossil-rich shale. Together, the Tropic Shale, Straight Cliffs, Wahweap, and Kaiparowits formations contain one of the best and most continuous records of Late Cretaceous life in the world.

Dakota Formation
Ninety-five million years ago, the Western Interior Seaway was slowly spreading down through the interior western United States. As the sea rose and fell, this region was variously covered with shallow salt waters, lush coastal swamps, and sandy expanses etched by rivers and streams. That's why you'll find several different sedimentary rock types in the Dakota Formation—including sandstone, coal, bentonite clay, and shale.



By carefully studying rock formations, geologists can “read” the land's history. The map above shows what geologists believe North America looked like about 92 million years ago, when the marine sediments of the Tropic Shale layer were deposited. Credit: Ron Blakey, Ancient Landscapes of the Colorado Plateau.

From the vantage point of Arizona's Kaibab Plateau, you can look north and see many of the “steps” of the Grand Staircase.