

# White Rocks - Niwot's Unique Geological and Ecological Treasure

## How the White Rocks Formed

77 million years ago the Niwot area looked radically different than it does today. The Rocky Mountains we know today did not yet exist. In fact, all of what would become Colorado lay beneath a broad, shallow inland seaway that stretched from Utah to western Missouri and from the Arctic Ocean to the Gulf of Mexico. But titanic tectonic forces were about to change everything. About 75 million years ago these forces began the uplift that would create the Rocky Mountains. As the mountains slowly rose, the western shore of the seaway began to retreat to the east. About 67 million years ago this shoreline lay across the Niwot area. Sandy beaches and near-shore deposits were being laid down over the former seabed as the coastline migrated eastward. After millions of years of being later buried by the Laramie and Denver formations, these sands would become the Fox Hills Sandstone. Subsequent erosion over the last two million years or so has removed the overlying younger formations and exposed the Fox Hills here at Niwot White Rocks. The fossils observed in the rocks confirm a near-shore marine environment.



Colorado 77 million years ago

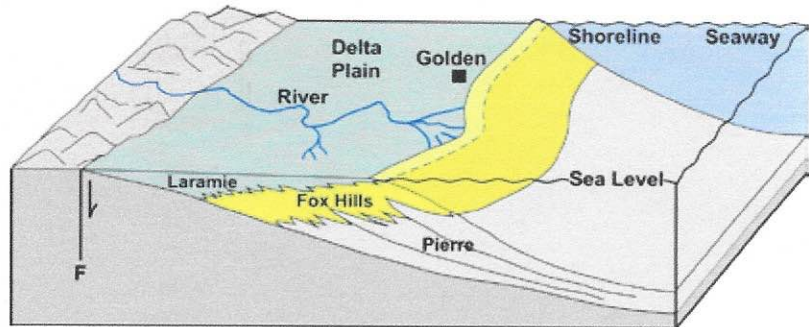


Diagram illustrating how the Fox Hills was deposited over time as the shoreline retreated to the east.

## What Makes White Rocks So Special

While the Fox Hills was deposited over a large portion of the mid-continent, only in a few locations were the environmental conditions just right to produce the unique characteristics we observe here at White Rocks. Also, the Fox Hills is poorly cemented and easily eroded, so exposures are ephemeral and easily erased over time.

Only in a very few locations, such as here at White Rocks, has the Fox Hills exhibited a peculiar polygonal jointing pattern. The mechanism for this joint formation is still a matter of conjecture. Some believe that active volcanism to the west as the Rockies rose, mixed volcanic ash into the sands of the Fox Hills in some locations. This ash later broke down chemically to form clay which expands and contracts upon wetting and drying, leading to the polygonal jointing.

Whatever the special composition of the Fox Hills at White Rocks, it has been found to provide rare and essential habitat for certain animals and plants that are only found on these unusual and special rocks. Indeed, the White Rocks formations have been of special interest to the local scientific community for nearly 50 years now.

- There are 40 species of lichens found at Niwot, many of which are not found elsewhere in Boulder County. These lichens represent reservoirs of biodiversity.



Miner bee on a cactus blossom

- There is a population of miner bees (*Macrotera opuntiae*) that historically has only been found on these special White Rocks exposures of the Fox Hills Sandstone. They are quite small (~ 1/4-inch) and feed exclusively on cactus flower nectar. While not particularly rare, these miner bees are dependent on this specialized habitat for nesting.



Polygonal jointing seen at White Rocks

## An Urgent Need to Protect and Preserve the White Rocks

I hope by the end of today's walk you will understand how special your Niwot White Rocks are and the immediate need to better protect and preserve this fragile treasure. In a 1970 paper on "White Rocks Natural Study Area" Helen Louise Young perhaps said it best. "White Rocks is unique geologically and biologically and its loss as an accessible study area would be a tragedy... White Rocks' physical uniqueness is irreplaceable. Its importance stems from its having been relatively isolated and its having become a haven for seldom-seen plants and animals."