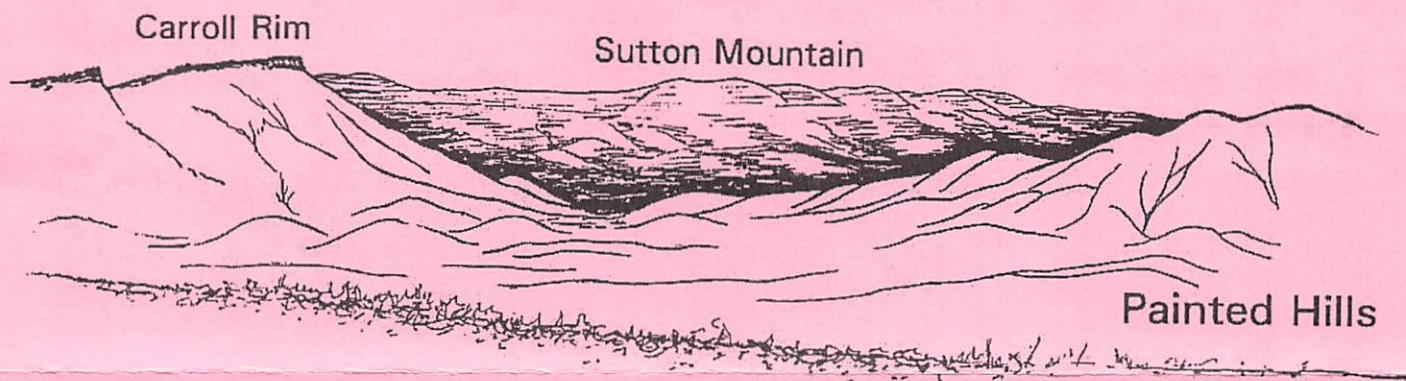


Painted Hills Overlook

National Park Service
U.S. Department of the Interior

John Day Fossil Beds
National Monument



You are witness to a still photo of a land that is, even now, in continual change. For millions of years extensive volcanic deposits covered and built up this land. Erosion then carved into these ancient deposits, resulting in the Painted Hills. The splendor of these hills provoke many questions from visitors.

Please remember that collecting fossils in the park is prohibited.

What are the Painted Hills made of?

The Painted Hills are made of layers of hard claystones, of many types, which include ancient soils (paleosols) and lake beds. In recent years the surface of the hills has weathered into softer clay.

The claystones were formed by several events and processes. About 33 million years ago, volcanoes from the ancestral Cascade Mountains, 100 miles to the west, slowly deposited layer after layer of cooled ash. Plants and animals churned and tilled the surface, and air oxidized the ash. Ground water flowed, leaching and redistributing minerals. Over time, the ashfall became soil. Under hundreds of feet of later deposits, compaction, cementation, and recrystallization processes occurred. The original ashfalls were changed structurally and chemically, resulting in the colorful claystones and clays before you. Some of these claystones are classified as zeolitized claystones.

What causes the colors in the Painted Hills?

Aluminum (Al), Silicon (Si), Iron (Fe), Magnesium (Mg), Manganese (Mn),
Sodium (Na), Calcium (Ca), Phosphorous (P), Titanium (Ti), Potassium (K),
Oxygen (O), Hydrogen (H)

The answer is complex. Just like ingredients in a recipe, the above principle elements, plus traces of seventeen others, have been mixed in a variety of ways. The varied combinations produced minerals of different colors that make up the hills. Sometimes the color of one mineral dominates, such as the rust colored layers, rich in iron oxide (Fe & O). A blend of minerals may create a color different from the originals. The yellows are a blend of iron and magnesium oxides. The black "hash-marks" are primarily colored by manganese oxide.

Also, depending on the amount of moisture in and on the hills, light is reflected and absorbed differently. This causes ever-changing tints of the reds, buffs, yellows and other colors.

Are there fossils in the Painted Hills?

Fossils are rarely found in the Painted Hills, although fossil leaves are occasionally found in ancient lake deposits interspersed in the hills. The original ashfalls creating the gold and red hills were infrequent and shallow. Many plant and animal remains scattered about were devoured or decayed before being covered by subsequent layers of ash, covered deep enough to be buried away from the many destructive agents associated with the first few feet of soil events and processes. In comparison, the buff and green claystones exposed at the base of Sutton Mountain typify rapid and deep accumulations of ash, which quickly buried plant and animal remains deeply.

Quick and deep burial is the first step in the preservation of remains as fossils. If burial is not deep enough, destructive agents such as water and oxygen, digging scavengers, plant roots, and micro-organisms could still get to the remains and destroy them.

Where can we see fossils?

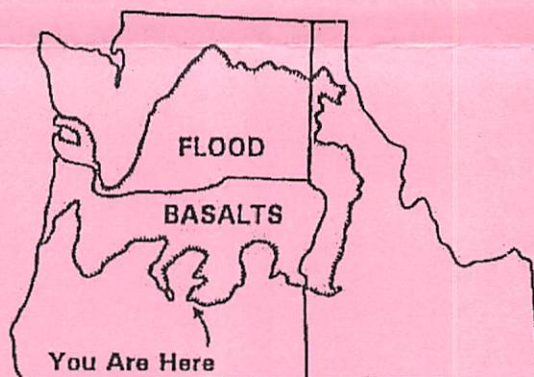
In general, the fossil throughout the fossil beds are still buried, and if they have surfaced and been discovered, they would be removed from the destructive elements of nature, and the careless hand or foot, and processed into the park collection. A few fossils common to this area have been put on display at the Leaf Hill Trail (see below).

At the Clarno Unit of the monument, a 75 mile drive north of here, is the Trail of the Fossils. This trail features hundreds of plant fossils in boulders and rocks along its path, dating back over 40 million years.

The primary place in the monument to see hundreds of diverse fossils on display is the Thomas Condon Paleontology Center & Visitor Center. The center is located in the Sheep Rock Unit of the monument, a one hour drive to the east along Route 26, and is generally open daily from 9:00 am until 4:00 pm, and closed winter Federal holidays.

What are the layers on the distant ridgeline?

The Sutton Mountain ridgeline is capped with layers of "flood" basalt. Basalt is a type of lava. About 16 million years ago, in dozens of events, basalt flowed from cracks in the earth, covering and incinerating the land. The many layers are part of the massive Columbia River Plateau that extends across much of Oregon, Washington, and Idaho.



The rock layer atop Carroll Rim is not basalt but an ignimbrite, or welded tuff. It was formed almost 29 million years ago when a volcano to the west erupted, hurling hot gases, ash, and debris high into the air. This fiery column then fell to earth and flowed across the surface of the land at high speed, for great distances. The hot materials settled, welding into a glassy rock layer that was fairly level. Later movements in the earth have tilted the ignimbrite and adjacent layers.

Why aren't plants growing on the Painted Hills?

The clay of the Painted Hills has an ability to absorb water and swell. It retains water so well that most plants are not able to draw the water from the ground. The clay is also dense, making it difficult for most plants to take root. Some plants succeed. In the spring the crevices and gullies of the red hills are filled with the bright yellow blossoms of Chaenactis and Bee-Plant.

Can I get much closer to the red hills?

Just over one mile away is the Painted Cove Trail. This 1/4 mile, self-guiding trail allows you to walk amidst colorful hills. A third of the trail is made of a boardwalk for easy access. Make a left as you leave the viewpoint/overlook road and follow the signs. Ample turn-arounds and parking are provided at all trailheads.

Are there other nearby trails?

From the viewpoint, the 1/4 mile (one way) Overlook Trail gently ascends the ridgeline, providing scenic views of the Painted Hills. Two benches have been provided along the way.

For a birds-eye view of this area, try the 3/4 mile (one way) Carroll Rim Trail, which begins where you entered the overlook road. The ascent to the top is moderate to strenuous.

Two miles from the viewpoint is a small, buff-colored hill that has been the site of recent scientific study. The gentle, 1/4 mile Leaf Hill Trail will take you to this site. To reach this trail, make a left as you leave the overlook road. A few fossils are on display along this trail

There seem to be trails on the colorful exposures!

Hiking on the clay exposures is definitely prohibited. We yield to the deer and pronghorn, which have created these trails in their journeys across their homeland.



Thank you for visiting John Day Fossil Beds National Monument.
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