



Painted Cove Trail

You are invited to examine the geologic resources of the monument firsthand on the short interpretive trail. Because of the fragile nature of these ancient hills we ask that you remain on the established route.

STOP 1 - RUST-COLORED HILLS

Twenty to thirty million years ago ash from volcanoes settled in deep deposits over Eastern Oregon. Natural processes transformed the ash into bentonite, a type of clay which expands as it absorbs water. When dry, the clay contracts leaving numerous small cracks which give the hills their "popcorn-like" appearance. The rusty-red color of the hills results from the presence of iron oxides similar to those which give rust its familiar color.

STOP 2 - EROSION

Sudden summer thunderstorms release torrential downpours which wash large quantities of clay downslope. The half-buried dead sagebrush across the wash in front of you are victims of this encroaching hillside. Thru the years the saturated clay has been slowly advancing toward the plants which were established many years ago.

STOP 3 - RHYOLITE FLOW

The purple layer you see is the highly weathered remains of a rhyolite lava flow. Rhyolite results from slow moving viscous lava which does not flow far from its source before hardening. It is generally a fine-grained rock.

STOP 4 - DESERT RAINBOW

Take a moment to look back along the trail. Notice the colors and layering in the area you have just come through. Differing temperatures, weathering and mineral content combined to produce a striking show of color.

STOP 5 - COLOR CHANGES

The colors of the Painted Hills change with the weather. On very wet days, the clay absorbs water and seals the surface of the hills. This causes more light to be reflected and changes the red to pastel pink and the buff to gold. When the hills dry out, the clay contracts producing surface cracks which diffuse light and deepens the coloration.

STOP 6 - WHY DOESN'T ANYTHING GROW ON THESE HILLS?

Several factors conspire to make the painted hills inhospitable to plants. When it rains, the clay particles absorb water sealing the surface so moisture cannot penetrate more than a few inches. Any water that does get into the clay is held so tightly by the tiny clay particles that the plants cannot use it. Beneath the surface from 2-12 inches, there is a clay hardpan which is impenetrable to plant roots. The loose surface clay also provides a poor foothold for roots, and washes away during heavy rains. All this combined with poor nutrient conditions and hot dry summers keep the Painted Hills barren and beautiful.

STOP 7 - SINKHOLE

This sinkhole is an example of "PIPING." Water finds weak spots in the clay of the hills. Gravity pulls it downward, carrying with it the loosely consolidated clay particles. As the "pipes" become larger they collapse, forming sinkholes, which may become quite large.

STOP 8 - ROCK LEFTOVERS

The rock before you is a remnant of the Columbia River Basalt which covers the ash-clay hills of the John Day Formation. You can see many layers of this dark red basalt across the valley. These layers were formed 12-20 million years ago when large quantities of lava issued from cracks in the earth and flowed across thousands of square miles of Eastern Oregon and Washington. Man has never witnessed lava flows of this magnitude.

STOP 9 - THE RED CANYON

The Mars-like terrain before you is a fragile landscape. Without the benefit of soil-binding plants these hills can be quickly scarred by footprints and vehicle tracks. The marks accelerate water erosion, creating deepening channels and eventually destroying the scenic qualities of this unique geologic feature. Help us to continue to preserve the scene by remaining on established trails and roads throughout the monument.

STOP 10 - WATERSHED IN MINIATURE

This little drainage provides a perfect small scale model of how natural erosion on a surface of uniform hardness produces what geologists call a dendritic (tree-like) drainage pattern. Think of the main channel as a river with the feeder streams, creeks and rills flowing into and producing a pattern which looks like the branching of tree limbs.

STOP 11 - AN EXPERIMENT

The buff-colored layer you have just entered is thought to be the original color of the ash. If you have some water with you, you can pick up a piece of the clay, wet it and watch it expand. Making pottery from this type of clay is usually unsuccessful because of its expansive-contractive nature.

As you leave the Painted Cove look for other examples of the geologic processes identified here. Soon you can begin to tell the land's geologic story yourself.

JOHN DAY FOSSIL BEDS NATIONAL MONUMENT

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