Yellowstone

Yellowstone National Park
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Mammoth Hot Springs— Are They Drying Up?

Visitors who have seen Mammoth Hot Springs more than once often ask "Are the Mammoth Hot Springs drying up?" They have asked this question since the late 1890s, when visitors began making their second and third trips to Yellowstone. Today, returning visitors often ask the same question. They remember the active, colorful springs shown in their photos and postcards. They usually don't remember the expanses of bare sinter, which are as common here as in the geyser basins. So they often conclude that the springs are drying up—and they want to know why.

The simple answer is *No, they are not drying up*. These terraces change constantly—sometimes overnight—but the overall activity of the entire area and the volume of water discharge remain relatively constant.

The explanation is in terraces

The terraces are formed from the interaction of hot water, limestone (calcium carbonate), and heat. In the surrounding mountains, rain and snow percolate down through the ground. The water is heated by volcanic heat sources below the surface. As the hot water rises, it dissolves limestone rock beneath the Mammoth area. The limestone was deposited under a sea approximately 500–300 million years ago, during the Paleozoic Era.

When the mineral-rich water reaches the surface, it cools and its pressure decreases, gases are released, and the calcium carbonate is deposited as travertine. Travertine builds up rapidly here at Mammoth and causes the features to change quickly and constantly. Some vents will clog completely, new vents may form, and old vents may reopen. Sometimes the water is concentrated in a few springs while at other times it may spread across many outlets.

In every case, water follows the path of least resistance, which could be above ground or underground. Scientists estimate that, at any given time, about 10 percent of the water in the Mammoth Hot Springs system is on the surface; the other 90 percent is underground.

Life in the Water

Thermophiles (heat-loving microorganisms) thrive in the hydrothermal features here, as they do throughout the park. *Archaea* live in the hottest waters (above 165°F/74°C). Sulfur-oxidizing filamentous bacteria live in slightly cooler water. Below 131°F/55°C, cyanobacteria form dense mats containing millions of organisms. These living mats may change color according to changes in the water temperature, flow, and the amount of sunlight available both seasonally and daily. Scientists are studying Mammoth's thermophiles to find out if they affect the travertine deposition rate or the hot springs' activity.

Expect Change

The changes at Mammoth Hot Springs cannot be predicted, but you can be certain that change will occur between now and the next time you visit. If one of your favorite features at Mammoth is dormant today, look for a new feature or more rapid growth of an established one. Check your favorite spring on your next visit. It may very well be back!

At Mammoth Hot Springs, geology is happening before your eyes.

For More Information

www.nps.gov/yell
"Mammoth Area Trail Guide," updated annually, available at Mammoth area trailheads and visitor centers
Yellowstone Resources & Issues, revised annually
Life at High Temperatures, 1994 Thomas D. Brock
Yellowstone: Official National Park Handbook, 2001 David Rains Wallace

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