

## What are petroglyphs?

**Petroglyphs**' (Grk. *Petro* – rock, *glyphein*—carve) are found on many desert rock surfaces. Early people, living in the desert at times of much wetter and cooler climates, cut them into the patina, exposing the lighter rock beneath. Their exact individual meaning is still debated. Older petroglyphs tend to be darker as the patina has had longer to build up again. Relative dating of the petroglyphs can be done by isolating the biological matter under the patina. The oldest petroglyphs in the Mojave region are thousands of years old.



## Where are petroglyphs?

Petroglyph sites are carefully protected. Some sites are documented, but many remain to be researched, so their preservation is very important.

Typically, petroglyph sites occur on relatively smooth, desert varnish covered surfaces that were large enough to provide early people with a 'canvas' upon which to work. It is usually the vertical surfaces that have been used for petroglyphs. Often they are prominently displayed on the sides of rock outcrops. Many kinds of rock develop desert varnish, though fine-grained rock material makes for the smoothest surfaces. The softer volcanic rocks, and the coarser granitic rocks provide less desirable working surfaces, though petroglyphs do occur on almost all useable surfaces. In these same places, one may also see '**pictographs**'. These are similar to petroglyphs, but are painted on the rock surfaces, often with a red dye.

BLM/CA/GI-2007-014+8270

## Your responsibility.

What is known of early people has been gathered by experts from the artifacts that remain, from historical records, ethnographic data and Native American tribes. Archaeological researchers assemble evidence, much like a detective. The desert is very large, every bit of evidence could be important. Enjoy petroglyph sites, wonder about their origins take photos, but it is your responsibility to preserve the heritage of these desert lands. Disturbing, removing or defacing heritage materials, such as petroglyphs, is a federal offense.

**Remember,  
Tread Lightly!**

Needles Field Office  
1303 S. Hwy U.S. 95  
Needles, CA 92363  
Phone (760) 326-7000  
Fax (760) 326-7099

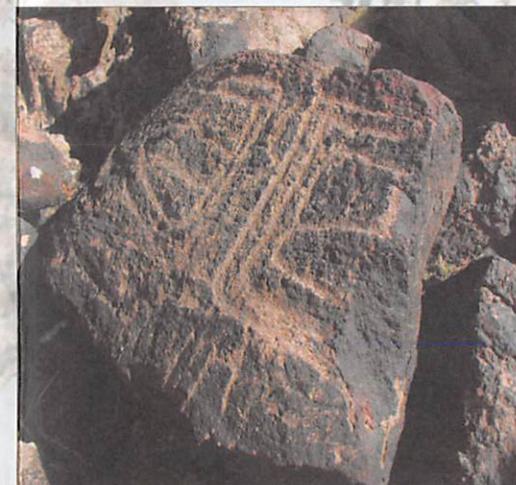
[www.blm.gov/ca/needles](http://www.blm.gov/ca/needles)

**Newsbytes**

Subscribe to News.bytes a FREE  
Weekly email Newsletter  
[www.blm.gov/ca](http://www.blm.gov/ca)

## CALIFORNIA

### WHITE ROCKS BLACK ROCKS AND PETROGLYPHS



In the desert, you may have noticed some areas on which all the surface rocks are black and shiny. There are also rocks, that are coated white.

Why is that? *Let's explore!*

U.S. Department of the Interior  
Bureau of Land Management



## White Rocks

Many rocks, particularly along the washes, are partly coated with a white substance. Is there a phantom whitewasher in the desert? No, it is a form of what is called '**caliche**' or '**calcrete**'.

These general terms cover any secondary deposition of calcium carbonate ( $\text{CaCO}_3$ ) that forms in sediments, in crevices or on rocks just below the surface in semi-arid regions. It results from evaporation of ground water.



Where rain dissolves the calcium or magnesium carbonate content of local rock material, such as

volcanic ash, the water seeps through the ground and runs down the washes briefly. When the water dries up, the dissolved carbonates are then precipitated, forming the white coating on rocks or layers of 'calcrete' just below the loose desert surface.

Another general term for these layers is '**hardpan**'. Caliche can act as a barrier to downward percolation of water, retaining the seasonal moisture near the plant root zone. It can prevent deeper soil moisture from rising to the surface. The surface is hard enough for vehicles to drive on and very difficult to dig in. In areas that are now arid, the presence of caliche indicates that a much wetter climate existed in the past.

## Black Rocks

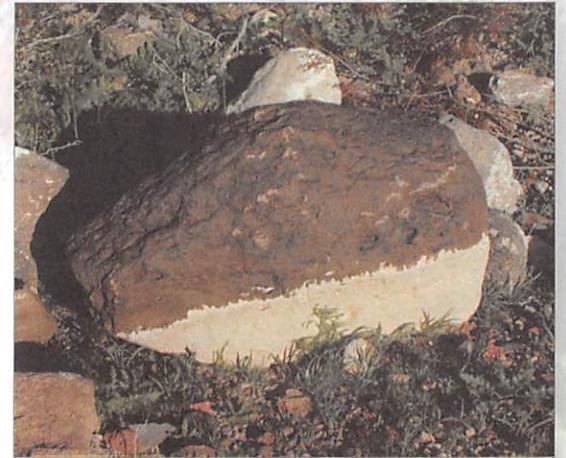
Exposed desert rocks are often coated with a black or reddish brown substance usually termed '**desert varnish**'. The thin coating, or '**patina**', is made mostly

of clay minerals (70%) combined with oxides of iron and manganese, and is often thinner than a coat of paint. Patina forms over long periods of time, gradually becoming thicker and darker with age. Remarkably, the origin of desert varnish has been found to be '**biogeochemical**'. (Grk. *Bios*—life, *geo*—earth)



The ingredients are cemented to the rocks by microscopic bacteria living within and beneath the patina. The bacteria absorb trace amounts of manganese and iron from the desert air and precipitate it onto the rock surface.

The clay minerals shield the bacteria from extreme heat and drying, and the manganese oxide blocks intense ultraviolet radiation. Amazingly, the tiny bacteria appear to be creating desert varnish in order to protect their own living environment. The varnish coating of the exposed rocks in the deserts of the southwestern U.S.A. may have taken well over 10,000 years to form where undisturbed.



Because the process is progressive, desert varnish is of great importance in dating the landforms and early human artifacts of desert regions.