

Bandelier

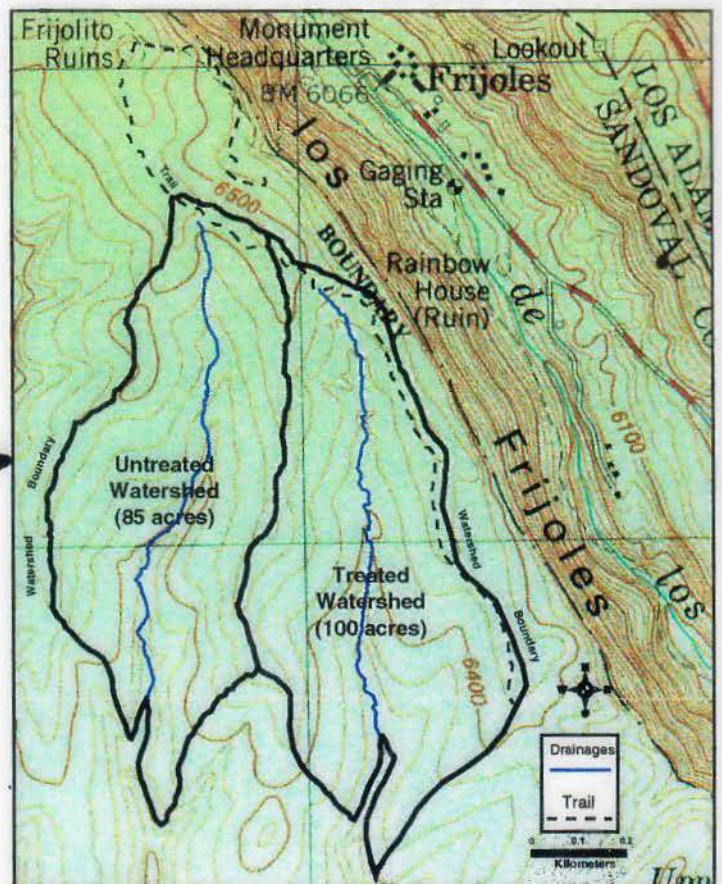
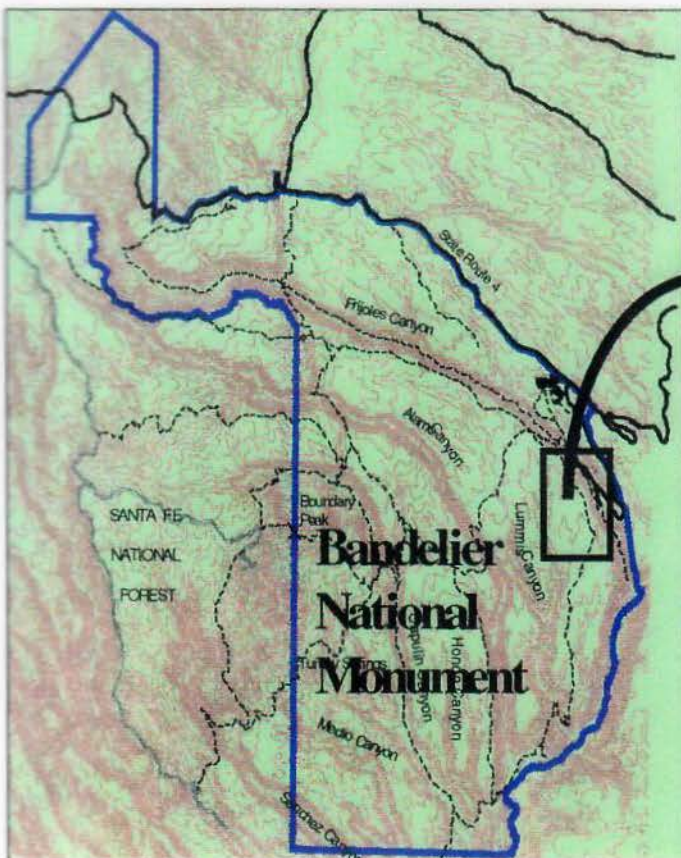
National Monument
National Park Service
U.S. Department of Interior

Watershed Restoration Project



Background: Bandelier National Monument was established for the protection and preservation of prehistoric cultural resources. Today the greatest threat to these resources is the accelerated soil erosion in the Piñon-Juniper woodlands. Large numbers of archeological sites have already been damaged by erosion and many sites could be completely lost without efforts to restore this degrading cultural landscape. Restoration studies are underway at Bandelier to address these critical resource issues.

Location of restoration studies



Rationale: The casual visitor to Bandelier might assume that sparse grass cover, high tree densities and eroded soils are the natural state of semi-arid woodland areas. However, historical accounts reveal that Bandelier's piñon-juniper landscape was heavily grazed by livestock beginning around 1880. Land survey records and age-class studies suggest trees were more widely spaced with the interspaces supporting a healthy grass cover prior to heavy grazing. Tree densities were lower pre-grazing because frequent fires thinned out woody seedlings and maintained a vigorous grass cover. Continued heavy grazing eventually removed the grassy fuels, and with fire no longer able to propagate through these woodlands, tree densities increased. As the woodlands closed, grasses and forbs became sparse and no longer provided an effective ground cover.

Without a protective ground cover violent thunderstorms erode exposed soils, while intense summer sun evaporates soil moisture and bakes soil surfaces. Environmental conditions on bare soil areas are extremely harsh making it difficult for seeds to germinate and establish. Competition with trees for limited soil moisture and harsh soil surface conditions are some of the reasons that an effective ground cover has not re-established since livestock grazing ended in the 1930's. Soil erosion rates as high as one inch every ten years have been measured at Bandelier, where shallow soils depths mean we could risk losing much of our soil and with it, many of the embedded prehistoric cultural resources.

Management Action: As park managers, do we allow these unnatural rates of soil erosion to continue and risk losing significant numbers of the cultural resources the park was established to protect? Is there something we can do to increase native ground cover, reduce erosion, and restore the ecological balance in degraded woodlands? To answer these questions researchers at Bandelier began small plot studies in 1994 to see if the grass and forb ground cover could be re-established by simply reducing the density of trees and using the cut trees to blanket exposed soils. Results from these early studies are very promising: grass and forb cover increased seven fold in two years on the treated sites. To be sure that this technique would work at a larger scale, this promising restoration treatment is now being evaluated on a 100 acre watershed. Changes in cover and productivity of grasses and forbs, rates of soil erosion, levels of soil moisture, abundance of insects and birds, and effects on ungulate populations are being monitored in the treated watershed relative to an untreated, control watershed. The information obtained from these studies will be used to better manage and hopefully restore Bandelier's degrading cultural landscape.

More detailed information on this project is available for review at the Visitors Center.