



# Prehistoric Rock Alignments for Water Manipulation in Saguaro National Park

## Introduction

For centuries, humans have attempted to control water for agricultural and erosion mitigation purposes, especially in the desert. These rock alignments generally fall into the categories of: terraces, check dams, and rock piles/fields. Each type of alignment has a different purpose that manipulates the limited, monsoon-type rainfall in the desert and allows it to be slowed, dispersed, and better controlled. This was especially important prehistorically to protect low elevation fields as well as when agriculture began to move to higher elevations. Rock alignments are also used in more modern contexts in order to decrease rates of erosion. These structures are seen throughout the world, especially in the American Southwest.

## Types of Rock Alignments

**Terraces** The first type of alignment is used as a planting surface. Rocks are embedded in the ground in a linear or slightly parabolic fashion. By breaking up steep slopes into terraced areas, flat, planting surfaces are created above the alignments. As high velocity runoff water races down the slope, it transports sediment.



**Figure 1. Rock alignment at site 83A-165. Further testing is needed to determine whether or not this was used as a terrace.**

This sediment is then collected on the planting surfaces, transforming the soil into a more fertile area for cultivation,

increasing water capacity and nutrients. As sediment accumulates, the soil becomes thicker, increasing soil depth and water retention. By slowing water and holding sediment, terraces also help protect downslope land from flooding and erosion.



**Figure 2. Rock Pile located next to a drainage at site 83A-165. May have been used as a roasting pit or for agave cultivation.**

**Rock Fields/Piles** This category is broader than terraces, and encompasses several types of rock alignments. Rock piles can vary greatly in size and can be used for many different purposes. One of the most common uses for high elevation rock piles were for the cultivation of agave. Fire cracked rock is present in some of these rock piles, indicating that they may have been used as roasting pits. Rock fields, collections of rocks in a grid like pattern, were used to hold sediment and had better temperature regulation than soil fields, which was especially important for protecting crops from freezes at higher elevations.

**Check Dams** These linear alignments used to reduce the slope on a hillside were constructed in a similar manner to terraces, but unlike terraces, they are not used for planting surfaces. Instead, check dams are used to decrease erosion in the land downslope. The dams served as a way to slow floodwater and sediment that was brought down during heavy rains. There are many examples of historic check

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dams as well, includes those built by the Civilian Conservation Corps (CCC).

## Sites in Saguaro National Park

While the agricultural sites in Saguaro National Park may not be as spectacular as in other areas of the American Southwest, much can be learned from them. Three significant sites are discussed below.

The first site, 83A-165 (AZ BB:14:48), produces some of the most photogenic examples of rock alignments in Saguaro National Park. The photos in this resource brief all come from this site. This site is one of the largest in the park, it also features one of the largest collections of consecutive check dams, with 11 in a row along a small drainage. In addition to containing agricultural features, there are also several artifact scatters, middens, and habitation areas within the site. While the agricultural features were over 100m from the habitation areas, it is still unusually close. Many times, agricultural rock alignments are not close to habitation sites.

For example, site 84A-273 (AZ BB:14:371) contains 151 reported agricultural features, but very few artifacts. The features reported at this large site include 67 terraces, 43 check dams, and 12 rock piles.

Lastly, the site with the most agricultural features is 84A-265 (AZ BB:14:32), with 327 features recorded. Even with the numerous examples of human construction, 158 terraces, 97 check dams, and 31 rock piles, only 12 artifacts were found on the site. This may signify that while cultivation and habitation were happening in two different places. This site featured two uncommon agricultural technologies: rock alignments parallel to drainages (to channelize water flow) and a lithic mulch field.

## Research Potential

There are many unknowns when it comes to how and when these structures were used, and more research is needed to try and answer these questions. Pollen samples from areas above rock alignments and in rock piles can show what (if anything) was cultivated in these alignments. Additionally, soil samples can be taken to examine the impacts that water modification had on the structure and nutrient composition of the soil.

In addition to find out more about the specific sites, there are bigger questions to answer, such as the long-term

impact of agriculture on the environment as well as the patterns and historical mitigators of erosion. These questions are being asked today in order to create sustainable forms of agricultural and prevent erosion. In this case, looking into the past may provide insight on how to create a conscious and environmentally responsible future.



**Figure 3. Rock alignment at site 83A-165**

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