

Maintenance techniques utilized by the Central Arizona Project to optimize recharge

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ABSTRACT

The Central Arizona Project (CAP) operates six recharge projects in Maricopa and Pima Counties, Arizona totaling approximately 430 acres of basins with the capability of recharging over 250,000 AF/year. CAP began recharge operations in 1996 with the latest project coming on-line in 2006. Operation of the facilities includes basin maintenance to rejuvenate infiltration rates, remote data acquisition and project operations, weed control, and repairing storm and vandalism damage. Techniques have varied over the years as CAP has gained experience operating the individual projects.

The Central Arizona Project canal transports water from the Colorado River at Lake Havasu through the Phoenix area terminating south of Tucson, a distance of 336 miles and 14 pumping plants. Sediment from the river settles out quickly and is generally not a factor at the recharge projects. Algae and minor amounts of wind blown silt and clay are the main contributors for reducing infiltration rates in the recharge projects. Previous investigations have identified the algae as primarily diatoms, blue-green algae, unicellular green algae, filamentous algae, and recently Chara.

In the past, techniques to rejuvenate infiltration rates included disking or ripping the basins. These techniques work in the short term but because they churn the fine-grained material deeper into the soil, in the long term they reduce the infiltration rate. Today, CAP utilizes a series of techniques that begin at the least costly method and progresses to the more time consuming and higher cost options.

The simplest way to restore infiltration rates is to dry the basin and allow the fine-grained material to form desiccation cracks. When drying the basins is no longer effective, the basins are scarified using a spring-tooth harrow that breaks up the soil in an upward motion rather than churning it deeper into the soil layer. Finally the basins are scraped using a paddle wheel scraper taking off the top 6 to 12 inches of soil. After scraping, the basin bottom is ripped 12 to 24 inches deep to loosen the soil that is compacted during scraping.

All of the projects are equipped with remote data acquisition systems that monitor flow and basin water levels. The data is relayed in real time to the CAP Headquarters, and is used to make operational decisions. The newest project, Tonopah Desert Recharge Project, was built with full remote operational capabilities.

Other maintenance activities include weed control and damage repair. In the past, weeds and tamarisks were sprayed with Rodeo. The Rodeo was expensive on such a large scale and ineffective against the tamarisk. Today, the weed and tamarisk growth are controlled using

goats that are brought in twice a year to eat all the plant growth. Damage to the projects is generally small-scale except in July 2006 when storm damage severely affected the Lower Santa Cruz Recharge Project.