

Retyped material from a nearly illegible trip report by Gary Rosenlieb and Bill Werrell to AZRU on June 25, 1987

The purpose of the trip to AZRU was, "to meet with a representative from DSC to review groundwater seepage problems at Aztec Ruins as a portion of their efforts in preparing a General Management Plan (GMP)."

Aztec Ruins: Groundwater seepage into the ruins and visitor center has been eliminated at this point in time. A major factor in the diminished water table below the ruins and visitors center appears to be related to a change in irrigation practices on private land north of the site. The present lessee has greatly reduced the amount of water utilized for flood irrigation of the land than was historically applied by previous irrigators. A return to excessive irrigation water application could resurrect the problem. Future control of the seepage problem will depend on controlling amounts of irrigation water applied to the land north of the site. For this reason it is recommended that the GMP being prepared by DSC consider an alternative of acquiring land to the north of Aztec Ruins for the purpose of retiring the water rights.

On June 25, we inspected drainlines and groundwater observation wells within the monument boundaries with Superintendent Barry Cooper, Rocky Beavers, DSC Natural Resource Specialist, and Sheldon Smith, retired NPS employee. Mr. Smith was employed at the Farmington field office where he was responsible for providing engineering assistance to several areas including Aztec Ruins. Aztec Ruins has a long history of groundwater seepage problems into the reconstructed ruins, and more recently into the Visitor Center's basement. Early attempts in 1959 to alleviate the problem included the installation of a drain line which traverses the northern boundary of the monument as a depth of about 30 feet. The problem continued however, and appeared to be related to excessive application of irrigation water to about 40 acres of land to the north of Aztec Ruins. This suspicion was mostly confirmed by the installation of shallow monitoring wells in 1979. As a result, drainlines were installed in 1983 by Sheldon Smith. The drainlines allowed for the interception of shallow groundwater flow, and the drainage of ponded water resulting from irrigation tailwater. The drainlines, coupled with a recent change in irrigation practices on the tract have appeared to eliminate the groundwater problems at the ruins and the Visitor Center. Our inspection of the site, and conversations with Mr. Cooper concerning records from the monitoring wells indicated that the water table has fallen about 18 feet. Sheldon Smith, however, feels that if excessive irrigation water is again applied to the north farmland, the existing drainage system will be incapable of removing the water. Installation of additional drainlines and ditches would most likely conflict with cultural resources at the site. In considering all possible options for alleviation of the irrigated water problem, we inquired about NPS plans that would be included in the Land Protection Plan (LPP). We were informed that the Park has no LPP. Several observation wells are monitored by the Park, with data being collected on a monthly basis. The wells, however, are vulnerable to vandalism as they are not capped.

Conclusions and Recommendations

Groundwater seepage into the ruins and Visitor Center have been greatly diminished at this point in time. However, a return to abusive irrigation practices on the privately owned irrigated land to the north of the monument may again saturate the soil underneath the ruins. Additional installation of drains would not insure drainage if irrigation tailwater is not controlled from the land to the north. Future control of seepage at Aztec Ruins will depend on the amount of water which is applied for irrigation. While it is perceived that the groundwater problem at the park is presently of no concern, it should be realized that our past investigations/concerns have been directed to the shallow groundwater levels only. Long term consequences of groundwater infiltration, from both the irrigated tract and the open irrigation ditch to the north of the private property, to the lower strata (formations) is unknown. Such consequences could possibly involve differential land subsidence or swelling in the Park over long periods of time. It is recommended that various benchmarks in the Park be resurveyed and elevations compared to past surveys to provide some present evaluation.

In considering the above discussed problems, both concerns of formational water and known impacts of shallow water from adjacent land, we recommend that the GMP now being prepared by DSC present an option to acquire the private land; and thus allow our ceasing of the present irrigation practice and some modification of the irrigation ditch to prevent seepage. This would provide full and permanent protection to the ruins from groundwater problems.

It is also recommended that the present network of monitoring wells be maintained. The collection of static water levels should be continued by Park personnel on a monthly basis. We recommend improvements for the wells by installation of locking caps to prevent the introduction of foreign objects into the well which could result in the collection of erroneous data.