

Saguaro National Park

Rincon Creek Riparian Area

Potential for Groundwater Pumping to Impact Riparian Resources

Issue: The Rincon Water Company operates water supply wells on the former X-9 Ranch. Until now, these wells have been used to provide water to a small number (approximately 20) of homes on the former X-9 Ranch. In May 2001, the Rincon Water Company was approved by ADWR as a water supplier for the Mountain Creek Ranch Subdivision, a development of 64 homes a few miles south of Rincon Creek. Providing water to the Mountain Creek Ranch Subdivision will result in exporting up to 77 acre-feet (approximately 50 gpm) of water per year from the alluvial aquifer in the Rincon Creek riparian area. The export of water will likely impact riparian resources along Rincon Creek in the park's expansion area.

The Rincon Water Company received approval from ADWR as an assured water supply for 605 acre-feet per year (approximately 900 lots) in 1984. Currently the X-9 Ranch wells supply about 20 acre-feet/year to about 30 homes in the X-9 Ranch. Additional pumping to supply 64 lots with development of the Mountain Creek Ranch Subdivision will withdraw an additional 77 acre-feet/year. If the original water supply analysis stands, there is the potential for an additional 509 acre-feet/year to be pumped from the X-9 Ranch wells.

Background: The Rincon Creek watershed is located in Rincon Valley on the southwest side of the Rincon Mountains. It is formed by Tanque Verde Ridge and Mica Mountain to the north and Rincon Peak to the east. Rincon Creek drains a portion of the southwestern flank of the Rincon Mountains and borders the southern edge of Saguaro National Park. It flows almost due west through the Rincon Valley to its confluence with Pantano Wash. Short reaches of

Rincon, Madrona, and Chimenea Creeks flow from parkland, across private land, and reenter the park's expansion area. Within the expansion area, Rincon Creek is ephemeral or intermittent. However, the high groundwater table in portions of the expansion area supports good quality riparian habitat.

The portions of Chimenea, Madrona, and Rincon Creeks flowing through the X-9 Ranch and park's expansion areas support the finest and most extensive riparian habitat in Saguaro National Park (Baird, et.al., 2001). The creeks in this area are low-gradient alluvial streams. The channel widens slightly and the limited saturated alluvium supplies some groundwater storage capacity and allows development of Sonoran cottonwood-sycamore-willow association along the streambank. Current levels of groundwater pumping by Rincon Water Company causes stress to the hydrologic and riparian resources. Field investigations revealed signs of water stress in mature trees, as well as a general lack of seedling recruitment (Baird, et.al., 2001).

Water table declines have the potential to affect riparian resources along Rincon Creek. The balance between groundwater levels, dependent vegetation, and associated wildlife can be particularly sensitive to alteration. Even small water table declines or increased fluctuation can negatively impact riparian habitats, which are not adapted to repeated or prolonged stress. Pumping groundwater from sources that are interconnected with surface water in the creek is a serious potential threat to riparian resources.

While some development has occurred in the Rincon Valley area, most of the development (approximately 30 homes) is on larger tracts, such as 10-40 acres. Water use on these lots is primarily for domestic purposes. Much of the water is returned to the groundwater system via infiltration through the septic system. Consumptive use is relatively small.

Private Wells in the Rincon Valley

A search of ADWR's database was conducted to identify all wells in the vicinity of the riparian resources in the Rincon Valley. This search covered 12 square miles, including Sections 7-10 and 15-22, T15S, R17E. The area is 4 miles east-west and 3 miles north-south. Most of these sections contained only a few (less than 5) small volume domestic wells. Section 21 is subdivided into smaller lots and contains approximately 43 small volume domestic wells. All of the wells in section 21 are constructed into granitic rocks. Most of them are deep (greater than 500') and produce only small volumes of water (less than 10 gpm).

Section 16, the site of the old X-9 Ranch contains 5 small volume domestic wells and 3 large volume wells permitted for commercial sales. This area contains the thickest deposit of alluvium, which is recharged by infiltration of surface water from Rincon, Madrona, and Chimenea Creeks.

The Rincon Water Company, owner of the wells at the X-9 Ranch, has been approved as an "Assured Water Supply" for approximately 900 lots. Currently, Rincon Water Company supplies approximately 30 lots in the X-9 Ranch subdivision. These lots are located in the upper reaches of Rincon Creek between the park and the park's expansion area. Much of the water used at these homes is returned to the alluvium by infiltration through the septic leachfields.

Recently, the Rincon Water Company was approved as the water provider for an additional 64 lots in the Mountain Creek Ranch Subdivision. At full buildout of the Mountain Creek Ranch Subdivision, pumping from the X-9 wells will be about 3 times greater than now. Water provided to the homes in the Mountain Creek Ranch subdivision will be exported from the Rincon Valley riparian area. Infiltration from leachfields at the subdivision will not return to the alluvium of Rincon Creek.

Pumping groundwater from the X-9 Ranch for export to the Mountain Creek Ranch subdivision will almost certainly have an adverse impact on the riparian resources in the area. The extent of this impact is unknown.

There is a possibility that the Rincon Water Company could use new or existing wells along Rincon Creek to supply an additional 800 homes (in addition to the 30 homes in the X-9 subdivision and the 64 homes in the Mountain Creek Ranch subdivision). These homes would almost certainly be outside the area where return flows would percolate back to Rincon Creek. If this level of development does occur, the Rincon Creek riparian area will dry up and disappear.

Hydrogeology: The geology of the Rincon Valley is mapped and described by Drewes (1977). The Rincon Valley in the vicinity of the X-9 Ranch and the park's expansion area is essentially a bathtub of sand and gravel sediments trapped by surrounding low-permeability granitic rocks. Runoff from the surrounding mountains infiltrates into the sand and gravel alluvial sediments resulting in reaches of intermittent streamflow and high water table conditions sufficient to support riparian vegetation. The general bounds of the riparian area includes Rincon, Madrona, and Chimenea Creeks from the park boundary, through the X-9 Ranch, and through the park's expansion area to about ½ mile west of Sentinel Butte. Downstream from Sentinel Butte, the alluvial deposits pinch out and the creek flows across granitic rocks until it reaches the Tucson Basin just west of Loma Alta.

The geology of the area is shown in greatly simplified format on the map and cross-section accompanying this report.

Discussion: It appears that the Rincon Water Company's operation of wells on the X-9 Ranch are a threat to riparian resources of Rincon Creek in the park's expansion area. Future development would almost certainly involve exporting

water from the Rincon Creek basin, resulting in decreased water availability for riparian resources.

The reaches of Rincon, Madrona, and Chimenea Creeks within the old boundary of Saguaro National Park are not likely to be affected by groundwater pumping. These reaches of the creeks flow across granitic bedrock and are not hydrologically connected with groundwater in the alluvium of lower reaches of the streams.

The reach of Rincon Creek downstream from Sentinel Butte does not support riparian vegetation. There is less surface flow in this reach and the water table in the alluvium is too deep to support vegetation. Downstream, from Loma Alta, the underlying geologic formations change from granitic bedrock to sediments. Water easily percolates into the sediments of the Tucson Basin.

Management Alternatives: Baird, et.al. (2001) identified several management alternatives to protect the riparian resources of Rincon Creek. These alternatives include:

1. Taking legal or administrative actions to prevent further development of groundwater supplies in the middle basin area.
2. Encouraging expansion of Tucson Water Service Area to include the middle basin areas of both Tanque Verde and Rincon Creeks bringing in an additional source of water to augment the natural supply.
3. Encourage retention of septic systems and leach fields in the middle basin areas to keep natural and any additional water supplies contributing to groundwater replenishment.
4. Investigate the feasibility of using treated wastewater from a regional treatment plant to augment groundwater recharge at the upstream ends of the middle basin reaches.

Suggested Action: A hydrologic and riparian resources monitoring program should be initiated along Rincon Creek so that NPS can document any changes that occur as a result of the planned increase in groundwater pumping. This information will be vital in preventing additional increases in groundwater pumping in the future. An instream flow right will be needed for Rincon Creek to provide a basis for protesting future increases in groundwater pumping.

1. Review documents in the ADWR files related to the Rincon Water Company supply wells.
 - a. Identify the approved service area for the X-9 Ranch wells.
 - b. Plot well locations and prepare a potentiometric surface map.
 - c. Plot land ownership on maps and identify potential development areas.
2. Begin a monitoring program to document the riparian and hydrologic resources associated with Rincon Creek in the park's expansion area.
 - a. Continue operation of the Rincon Creek streamflow gaging station.
 - b. Conduct water level monitoring in shallow wells along Rincon Creek to characterize the hydrologic regime and identify impacts from pumping at the X-9 Ranch wells.
 - c. Determine the need for additional groundwater monitoring locations.
 - d. Conduct an inventory of riparian vegetation and develop a plan for stress monitoring.
3. Acquire a state-based instream flow right for Rincon Creek.

The instream flow right application should be completed immediately to acquire the best possible priority date. The remainder of the work on this issue can probably be assigned to the new NPS hydrogeologist position planned for the Tucson area.

References

Baird, Kathryn J., Robert MacNish, and D. Phillip Guertin, 2001, An Evaluation of Hydrologic and Riparian Resources in Saguaro National Park, Tucson, Arizona, Department of Hydrology and Water Resources and University of Arizona Research Laboratory for Riparian Studies, University of Arizona, HWR No. 01-010.

Drewes, Harald, 1977, Geologic Map and Sections of the Rincon Valley Quadrangle, Pima County, Arizona, USGS Miscellaneous Investigations Map Series Map I-997, 1 sheet