Chapter 8: Important questions that remain about water resources of the Middle Rio Grande Basin

Instead of providing final, definitive answers, the study of the water resources of an area tends to lead to more questions about the system. This may be because new data conflict with the current understanding of the system or because changes in the management and use of water raise new questions. Though many of the elements listed in the plan of study by McAda (1996) have been addressed by the Middle Rio Grande Basin Study, we still do not have all the information that lawmakers and managers will ultimately need to best manage the water resources in the basin. Therefore, it is important to continue studying the Middle Rio Grande Basin to deal with the issues of today and be prepared for those of tomorrow. Among the questions that could be better defined:

How much water is pumped where and by whom?

Until the locations and pumping characteristics of the major supply wells in the Middle Rio Grande Basin are known with more certainty, estimates of these important parameters will introduce error into simulations and estimations of ground-water behavior. However, it may be impossible to know exactly the locations of all domestic-supply wells in the basin and the volumes of water pumped from each.

What are the availability and quality of water in deeper parts of the aquifer?

On the basis of limited data and similar conditions in other aquifers, ground water in the deeper parts of the aquifer is assumed to be of limited quantity and poor quality. Until more is known, however, the suitability of this water for a given use remains speculative. Few deep wells have been drilled in the basin because deep wells are expensive and because shallower wells have provided adequate supply. The expense to drill deeper may be justified in the future if deeper supplies are needed.

Upper Santa Fe Group (Ceja Member of the Arroyo Ojito Formation) sediments exposed on the northern side of the Los Lunas volcano. Much of the Santa Fe Group aquifer system in the Middle Rio Grande Basin is composed of such deposits. (Courtesy of J.C. Cole.)

How much water does vegetation in the bosque use?

As discussed in Chapter 5, estimates of evapotranspiration in the Middle Rio Grande Basin vary because it is a difficult parameter to measure directly. Because maintenance of the bosque has become a priority for esthetic and wildlife purposes, the measurement of actual evapotranspiration is of critical importance. With the availability of new techniques for quantifying evapotranspiration, several groups including Dahm and others (2000) and the Bureau of Reclamation (2001a, b, c) have begun to work to refine previous estimates of evapotranspiration.

How is the aquifer responding to pumping over the long term?

To characterize the long-term response of the aquifer to ground-water pumping, ground-water levels in the monitoring network must continue to be measured. Such long-term monitoring is perhaps the most important information that can be collected for long-term aquifer-system and water-resource management.

Another aspect of aquifer response to ground-water pumping is subsidence. By using new and traditional tools, such as interferometric synthetic aperture radar (InSAR) and repeat surveys, respectively, the onset of subsidence can be detected early.

Tamarisk (in the foreground) and cottonwood (in the background) along the Albuquerque Drain near Paseo del Norte. Such plants in the bosque account for much of the water consumption in the Middle Rio Grande Basin.

Is septic-system effluent contaminating ground water?

The possibility of effects from septic-system effluent on the quality of water from domestic-supply wells in rapidly developing rural areas will continue to raise questions. The continuing development of new methods may improve the unambiguous detection of septic-system effluent in ground water.

How will the more stringent arsenic standard affect water supplies?

The reduction in the drinking-water standard for arsenic presents new challenges for water-resource managers. To reduce treatment costs, wells pumping water with large concentrations of arsenic may need to be taken out of production or the water blended with water of an acceptable concentration. As more is learned about naturally occurring arsenic in ground water, the completion of production wells might be possible in areas or at specific depths of the aquifer with acceptable concentrations of arsenic.

Are pharmaceuticals present in ground or surface water?

Recently, pharmaceutically active compounds have been detected at very small (parts per billion) concentrations in treated wastewater either discharged to surface water or recharged to ground water. Though the effects of these very small concentrations on humans are unknown, concentrations as small as parts per trillion have been found to adversely affect fish (Sedlak, Gray, and Pinkston, 2000). In 1999 and 2000, USGS researchers sampled 139 streams in 30 States for 95 pharmaceuticals, hormones, and other organic wastewater contaminants (Kolpin and others, 2002). These compounds were detected in 80 percent of the streams sampled, and of the 95 compounds, 82 were detected in surface water. In 2000, the New Mexico Environment Department and Department of Health began analyzing ground- and surface-water samples for 28 drug residues from 24 sites throughout the State and found five different compounds at eight sites (McQuillan and others, 2000). Given concern about the silvery minnow and other fish species in the Rio Grande, as well as the planned direct use of surface water for municipal supplies, this topic will likely be investigated in more detail in the Middle Rio Grande Basin in the near future.

USGS personnel sampling shallow ground water for chemical analysis on the Rio Grande upstream from Corrales. (Courtesy of F.E. Gebhardt, USGS.)