

Chapter 9: Key points regarding water resources of the Middle Rio Grande Basin

The most prominent hydrologic feature in the largely semiarid Middle Rio Grande Basin is the Rio Grande, whereas the sole source of water for municipal, domestic, and commercial supply is currently (2002) the Santa Fe Group aquifer system. The water resources of the Middle Rio Grande Basin are a combination of these surface- and ground-water systems, which are intimately linked through a series of complex interactions. These interactions often make recognizing the boundary between the two systems difficult, and changes in one system often affect the other. The most important points in our present understanding of the water resources of the Middle Rio Grande Basin are:

- When ground water is pumped from an aquifer system faster than it is recharged, ground-water levels decline, a condition known as ground-water mining. Ground-water levels have declined with the economic development of the Middle Rio Grande Basin. The effects of ground-water pumping are evident when comparing historical (1960–61) and the most recent (1994–95) ground-water-level maps; water-level declines are more than 160 feet in an area beneath east Albuquerque.
- Previous studies found the Rio Grande to be very well connected hydraulically to the Santa Fe Group aquifer system, and years of water-management policy were based on this understanding. Recent studies of the interaction between the river and aquifer (including ground-water-flow models) indicate that the hydraulic connection is less than previously thought.
- As Albuquerque grew, most of the new municipal-supply wells were completed in high-quality parts of the Santa Fe Group aquifer system. The quantity and quality of the water led to the popular belief that the entire Middle Rio Grande Basin was underlain by a high-quality aquifer; it is now known that such areas of high-quality aquifer are relatively limited and that much less water is available for pumping than previously thought.
- Geophysical studies of the Middle Rio Grande Basin in conjunction with computer modeling of the Santa Fe Group aquifer system indicate that faults are more numerous than previously thought and that they can affect ground-water movement, particularly when they juxtapose aquifer materials of substantially different hydraulic properties.
- Previous estimates of mountain-front recharge were based on indirect calculations from water budgets and computer modeling of the Santa Fe Group aquifer system. New studies using direct measurements and ground-water age dating have shown that mountain-front recharge is substantially less than previously believed.



A USGS hydrologist collecting geophysical data. Geophysical studies such as this one have contributed to understanding the Santa Fe Group aquifer system.

- The bosque assumed its present character in about the past 60 to 70 years, developing in an area that was formerly semibarren flood plain with scattered stands predominantly of cottonwood and willow. The present character was caused by the spread of exotic plant species and the construction of bank-stabilization and flood-control structures, including dams and levees. Though estimates vary, a substantial amount of ground and surface water is consumed by evapotranspiration from the bosque.

By increasing the understanding of the water resources of the Middle Rio Grande Basin, water-resource managers and planners will have additional tools to make sound, scientifically based decisions on the future of water in the basin.