

# El Agua es La Vida or Water is Life

By Karl Wood

The earliest appraisals of the Southwest were far from admiration. The first US account was by Lieutenant Zebulon Montgomery Pike following his expedition of 1806 and 1807. He spoke in general terms of the barren and parched soil. "The one good purpose served by these vast eastern plains was to stem the westward migration and leave the prairies incapable of cultivation to the wandering and uncivilized aborigines of the country." Speaking specifically of New Mexico he said that except for the Rio Grande and its tributaries, all the rest of the country presents to the eye a barren wild of poor land, scarcely to be improved by culture, and appears only capable of producing a scanty subsistence of the animals that live on a few succulent plants and herbage. Following the Treaty of Guadalupe Hidalgo in 1848, a US Senator from Texas petitioned Congress to force Mexico to take back New Mexico and Arizona. That prompted the Governor of New Mexico under Mexico's rule, Manuel Armijo, to coin the phrase, "Poor New Mexico, so far from heaven, so close to Texas." Even the more modern-day cowboy philosopher Will Rogers commented that the Rio Grande was the only river he ever saw that needed irrigating.

## Anasazi: The Ancient Ones and Their Successors

North of the Little Colorado River in New Mexico was the Puebloan culture called the Anasazi, which excelled in architecture but was more primitive in irrigation technology than the Hohokam in central Arizona. The Hohokam had tremendous irrigation systems over thousands of acres. The Anasazi culture reached its peak about AD 1200 in the Four Corners area, the drainage of the San Juan River, which

encompasses the extensive remains of Chaco Canyon and Aztec in New Mexico, Mesa Verde in Colorado, Hovenweep in Utah, and Canyon de Chelly in Arizona. They were less successful than the Hohokam due in large part to a less favorable agricultural environment, with harsher weather, shorter growing seasons, and a more limited water supply.

In the early stages of development, inhabitants simply hand-carried water in jugs to supplement inadequate precipitation. In the course of time, they learned methods of ephemeral flood-water farming from catching overland flow because they only had limited access to perennial streams. Dams were small, ditches were short, and irrigated land was small by Hohokam standards. Chaco Canyon was virtually abandoned by about 1200 and the more northerly complexes were deserted within the following century. A large number of migrants found their way into the northern Rio Grande Valley as well as the western pueblos. After the Anasazi migrated to the more perennial streams along the Rio Grande and Pecos River, they practiced irrigation from stream flow. Early Spanish explorers said they observed an abundance of corn plus some beans, melons, squash, cotton, and tobacco.

The Navajos came to the Four Corners area after the Anasazi had left. They also engaged in limited agricultural activities at the time of Spanish colonization.

## Spanish in New Mexico

Spanish migrants to the New World were accustomed to water problems and practices in a dry land because their homeland in Spain was largely arid and semiarid. Many were granted lands and waters in New Mexico to stimulate rapid and stable occupancy of vacant areas. Scarcely a century after Columbus' initial voyage, Juan de Oñate



Acequia Madre at San Juan Pueblo in 1881. Photograph used by permission of the Museum of New Mexico.

founded a remote colony on the upper Rio Grande. In 1598, Oñate laid the foundation for permanent Spanish occupation of New Mexico. His impatient desire to acquaint himself immediately with the mineral potential of this province did not blind him to the need for locating his followers at a site where water was not only available but could be diverted on the land. He therefore established a settlement at San Gabriel near the mouth of the Chama River. Before the arrival of the main body of colonists who were trailing his advance force, he initiated on 11 August 1598 construction of an irrigation and water supply ditch, using 1,500 natives in the undertaking. This irrigated agriculture was connected to growing food for humans and forages for livestock. Ranges provided spring, summer, and fall forages, but in winter range livestock were fed forages grown in the summer.

Spanish colonization resembled that of New England in its dependence on the town as an instrument for expanding settlement, which included elaborate provisions relating to the founding of such frontier communities. Adjacent to towns were grants to individuals for farming and ranching that were carefully circumscribed. No firm distinction was drawn between land and water rights because they were thought to be inseparable. Grantees almost invariably selected their lands along streams where each family could have an irrigable tract of its own as well as access to common grazing lands. Insofar as possible, they chose to be near an Indian pueblo as a measure for protection against nomadic tribesmen. However, despite the strong Spanish tradition of community interest and the obvious need for tightly clustered dwellings to withstand Indian attacks, 18th-century governors experienced considerable difficulty in persuading many frontier families to settle in villages. The grantees were willing to assume the greater risk in order to live close to their lands.

The great majority of families lived at subsistence level, depending on their small irrigable tracts to supply them with the necessities of life. It was of vital importance, therefore, that the scant water resources be carefully husbanded and each tract allotted its equitable share. Tight community

control over the distribution and use of the available supply was inevitable. Control over the main canal, or acequia madre, was a primary function of the town fathers, involving the construction, maintenance and repair, and distribution of its waters. Supervision was delegated to an official known as the mayordomo. It was estimated that by 1700, 62 acequias were in operation in New Mexico and 102 more were added by 1800. Many operated without diversion dams. Others had temporary ones made of earth and brush. Some had wing dams to direct water into the canals. There were few permanent structures for diversion. The acequia madre fed water into lateral canals for distribution and these, in turn, were tapped by the ditches carrying water to individual tracts.

Due to the Spanish custom of subdividing the estate among all the children in a family, individually owned tracts increased in number but decreased in size. This resulted in elongated plots with narrow frontages on the ditch, a string feature of land tenure still evident in certain areas of New Mexico. Spanish colonists were directed to settle on vacant lands and not to interfere with those being cultivated by the natives. Because priority of use was a cardinal consideration, this established in the Indians a right based on their long-time use of the waters of streams that crossed or bordered their lands. Non-Indians could not maintain residence within the bounds of an Indian pueblo or graze livestock close enough to Indian fields to endanger their crops. Altruistic treatment of sedentary natives was never capable of full realization because it ran counter to the basic purpose of exploiting the newly acquired lands in the interests of the Spanish Empire and of the pioneers who had made the occupation possible. The Pueblos occupied much of the better land readily accessible to water. Disagreements frequently developed over the precise definition of boundaries, and there were chronic allegations that non-Indian livestock grazed on pueblo farmlands to the injury of crops and acequias.

Standard procedures for adjudicating water rights had been developed by the end of the 17th century. New Mexico lived under Spanish and Mexican laws for 250 yr before becoming part of the United States. When the US Army occupied what would later become New Mexico at the start of the Mexican-American War in 1846 that province had by far the oldest conscious tradition of water control and use in all of the present United States.

### Here Come the Gringos

Col. Stephen Watts Kearny and his 1,700 US Army soldiers occupied Santa Fe in August 1846. They established a civilian government within a month. A Kearny Code specifically stated that the "laws heretofore in force concerning water courses, stock marks, and brands, horses, enclosures, commons, and arbitrations shall continue in force," with authority being transferred from the village leaders to the counties. The first laws specified the primary dedication of



An example of an acequia in New Mexico.

water to agricultural purposes and the clustering of water usage around the institution of the community acequia. It empowered the owners of tillable lands to take water from the most convenient source and conduct it across the property of others. In a slight relaxation in 1880, the territorial legislature recognized that the “cultivation of native and foreign grass is a branch of agriculture of great importance,” and directed the mayordomos of ditches in northern Rio Arriba County to supply water for the irrigation of enclosed meadows.

An Anglo-American doctrine of prior appropriation and beneficial use arose in the California gold fields and Mormon settlements of the Great Basin. With rapid human population growth in New Mexico, the new doctrine was quickly adopted with claims to water going back in perpetuity with indigenous people and hundreds of years with Spanish colonists. The new law also worked well for the agricultural-stock raising society of New Mexico, which antedated the first permanent English settlement in the New World. The new water doctrine gave rights to the first appropriator who put the water to beneficial use irrespective of the location of the lands to which he diverted it, but the right had to be exercised to be kept alive. Although there were no general territorial laws in New Mexico stating the doctrine of prior appropriation before 1905, after 1846 the law gave priority as newcomers threatened to diminish water supplies of established irrigators. An interesting novel relating to acequias in northern New Mexico is John Nichols’ *The Milagro Beanfield War*. It tells of one man’s quixotic struggle as he defends his small beanfield and his community against developers, and state and federal political interests. The novel’s main character, Joe Mondragon, is no longer allowed to divert water from an irrigation ditch that runs past his property because that water is for property owners with priority, although the Mondragon family has farmed this land for over 300 yr. The story has also been made into a movie directed by Robert Redford.

The right of each state to determine the system of water laws governing private lands was unquestioned, and federal

courts uniformly sustained the states in applying their laws to public lands. However, passage of the Desert Land Act of 1877 raised questions about reserved rights on federal lands, which were to remain controversial throughout the nation until the US Supreme Court made decisions concerning a New Mexico case in the 1980s.

## Large Federal Government Reclamation Projects

For several decades in the late 1800s, regional and national debate occurred on how to get water onto more land to increase agriculture production. All agreed that the community acequia dominated the best lands of the Rio Grande valley but their ability to capture the waters of the Rio Grande was limited. Large dams, reservoirs, and canals were beyond their capabilities. A major problem was the inability to convince eastern investors that desert lands could be made productive. Yet reservoirs were seen as the answer to solve the problems of water shortage during dry periods and destruction from periodic rampaging floods. Several advocates for reservoirs thought that the federal government should undertake their construction. Interestingly, a US Forestry Division bulletin in 1893 called *Forest Influences* made the dramatic statement that “without forest management no national water management is possible.” Western states were quite willing for the federal government to assume major construction costs, but were reluctant to relinquish any control over reclamation once this was done. This reluctance still exists more than 100 yr later. A Senator Warren of Wyoming supported a plan for reclaiming arid lands by private enterprise under state control. Congressman Newlands of Nevada claimed that the reclamation of arid lands would succeed only under a carefully devised program in which the federal government would control the occupation of lands reclaimed as the result of its water storage facilities. A compromise was accepted in which the federal government paid for the projects, and ownership and operation eventually was transferred to land owners. A Reclamation Service in the US Geological Survey was born in 1902 and separated in 1907 to become the Bureau of Reclamation.

New Mexico’s territorial officials were excited by the prospect of converting their arid domain to economic use but gradually tempered earlier extravagant claims of its potential. Dryland farming attracted increasing attention, but storing flood waters and tapping underground sources appeared to offer greater opportunity. Passage of the Reclamation (Newlands) Act of 1902 affected New Mexico profoundly. The first project in New Mexico was in 1902 on the Rio Hondo, a tributary of the Pecos River. The project was completed in May 1907 but was never officially opened because great holes reaching diameters of up to 10 feet quickly appeared on the floor of the basin and through them the water drained into underground caverns. The project was also plagued with excessive siltation and



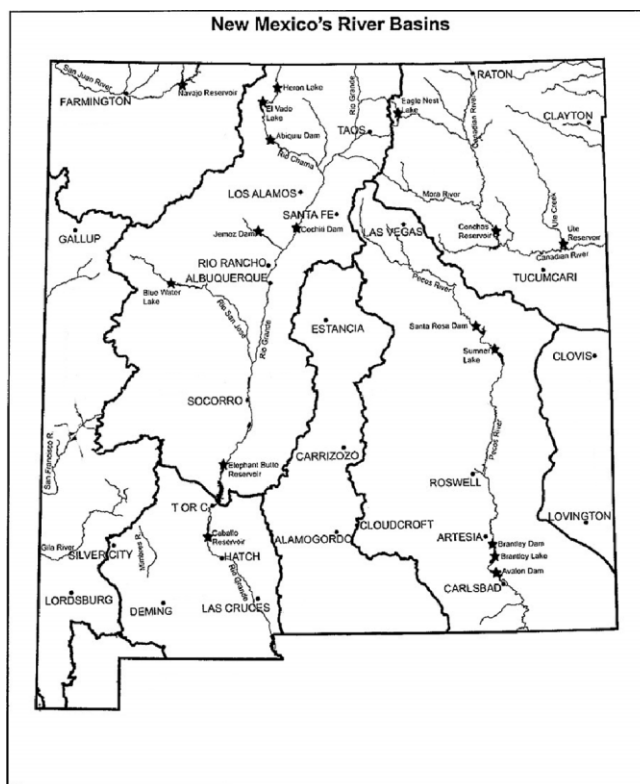
litigation over water rights. The project was abandoned as a \$375,000 failure, an example of the criticism that projects were sometimes undertaken without sufficient preliminary investigation. Further downstream, some ranchers from west Texas and Pat Garrett, the lawman of Billy the Kid fame, attempted to increase irrigated acreages by building the McMillan and Avalon reservoirs. They suffered from the same problems as with the dam on the Rio Hondo. Rehabilitation efforts by the Reclamation Service resulted in stability for the Carlsbad irrigation project. Although it was located the furthest downstream on the Pecos River in New Mexico, it held some of the most senior water rights.

On the Rio Grande, water shortages in the El Paso area caused much friction between the United States and Mexico. The shortages were attributed to newly expanded irrigation in southern Colorado and northern New Mexico. A treaty with Mexico in 1906 divided the waters of the Rio Grande based on the number of acres under irrigation in the Juarez, El Paso, and Las Cruces areas. It was estimated that on average 730,000 acre-feet of water flowed down the Rio Grande each year. Mexico was given 60,000 acre-feet in average or above average flow years. They were given proportionally less in below average years. The El Paso area was given 43% of the remainder, and the Las Cruces area was given 57% of the remainder. Again, this division was based on the proportions of irrigated acres in 1906. Today, the Juarez area has about 1.5 million people whereas the El Paso area has about 750,000 people, and the Las Cruces area has about 200,000 people. Many people in Juarez and El Paso would like to renegotiate the Treaty of 1906 based on today's needs. New Mexicans don't see the need because they have little to gain from renegotiations. There are always fears that this treaty could be used by those in power in Washington, DC and Mexico City as a trading chip while settling water disputes along other parts of the United States-Mexico border, such as that associated with the Colorado River or the area associated with the Treaty of 1944 in southern Texas. Following the Treaty of 1906, a huge reservoir was constructed near the town of Hot Springs (now called Truth or Consequences), and this reservoir holds 2.2 million acre-feet of water when full. Like on the Pecos River, the Treaty of 1906 gave the most senior water rights to those furthest downstream. In dry years this causes much dismay for those people residing in northern New Mexico acequia communities with hundreds of years of seniority because they must watch the water flow by to satisfy an international treaty that was made only 100 yr ago. Interstate compacts were eventually written for the other four major rivers that leave New Mexico. Dams and reservoirs were built on them also. While some states are removing dams for various environmental reasons, New Mexico is building at least one more on the San Juan River, a tributary of the Colorado. It is designed to primarily to meet tribal needs.

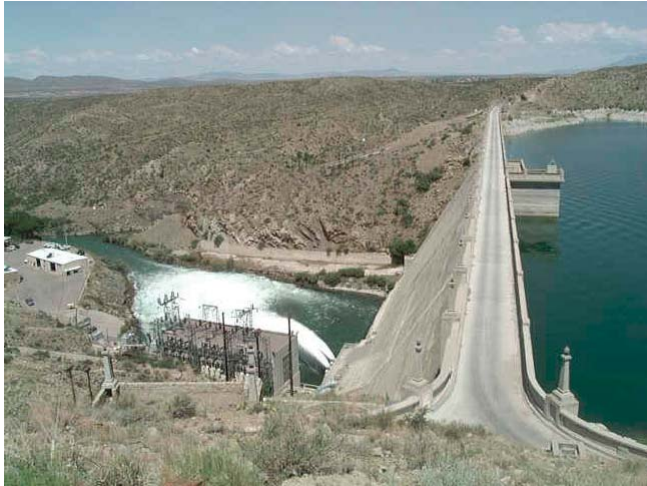
Waters of New Mexico have some unique features. The Rio Puerco is one of the dirtiest or muddiest rivers in the world. Suspended sediment during flood flows has been measured up to 267,000 parts per million. Puerco is the Spanish word for pig or dirty. It was given to this river when it was first discovered at least 400 yr ago. However, modern writers and speakers have attributed its dirtiness to livestock grazing, which was introduced only 150 yr ago. The river cuts through ancient ocean beds that are laden with fine sediments. Therefore, most of the sediment in the river is natural and not human-induced. About every 10 yr the US Congress charges a different federal agency with the task of putting together a plan for restoring the Rio Puerco watershed. They are always quite interesting.

### Administration and Regulation Today

Today water in New Mexico is strictly controlled by the Office of the State Engineer. He assures that waters are fairly apportioned based on prior appropriation and beneficial use while assuring adequate delivery downstream to meet international treaty and interstate compact obligations. Special circumstances exist for domestic and livestock uses. Anyone can use up to 1 acre-foot of water from a domestic well for inside use and noncommercial growth of trees, lawns, gardens, and landscaping around the home. This right cannot be transferred or sold, nor does it need to be because there are no limits on the number. This causes



New Mexico's River Basins.



Elephant Butte Reservoir creates an oasis in the Chihuahuan Desert.

problems in many areas of New Mexico as new housing developments get water rights that are senior to everyone else. Likewise, livestock owners can have water rights for

livestock but these can neither be transferred nor sold. New Mexico's climate is well-suited for raising livestock. Even in the Chihuahuan Desert of southern New Mexico, summers are mild compared to Arizona with very high temperatures and Texas with high humidity. Winters are mild compared to other Rocky Mountain states. As a result, the growing season is very long with seven cuttings of alfalfa being common. Much of the irrigation goes to raising forage crops. Temperatures are also favorable for low animal stress, and New Mexico is the fastest-growing dairy state. Although cow-calf operations are still prominent, winter yearling operations are possible on ranches with many yearlong grazing ranges. A sign hangs on many New Mexico homes that says, "Mi casa es su casa" which means "my house is your house." There are also signs that say, "Mi casa es su casa, pero mi agua es mi agua," with the additional meaning "but my water is my water."

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## **Grazing System Research: Focusing on Managers**

### **A Symposium at the 2009 Annual Meeting**

### **Wednesday, Feb 11, 8 am - noon**

Because of their complexity, rotational grazing systems are necessarily a contentious issue among rangeland scientists, practitioners, and advisors. However, most people will agree that a key element in a successful grazing practice is management. In this symposium, we examine potential benefits of shifting the investigation of grazing systems from a narrow ecological approach to one that encompasses multiple aspects of management, including manager behavior. The immediate challenge is integrating multiple disciplines while maintaining scientific credibility. Speakers from the disciplines of landscape ecology, rural sociology, livestock behavior, and policy will address the elements of new approaches for investigating grazing management.