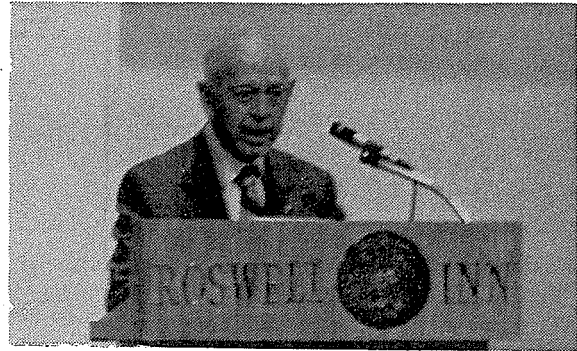


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## WATER CONSERVATION IN THE PECOS VALLEY ARTESIAN CONSERVANCY DISTRICT

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The New Mexico Surface Water Code covering the use and administration of surface waters was adopted in 1907. It was not until later that laws governing the use and administration of the state's ground waters were enacted. This lapse of time was due mainly to the fact that not much was known about the ground-water supplies of the state. Another factor was the development of pumping systems technology, which enabled the large-scale production from the ground-water supply. Initially, settlers took water from the surface streams bordering their land. The water could be ditched to their land and provided for inexpensive irrigation. When the surface sources diminished or were fully appropriated, the settlers turned to the underground source, which was a more costly method for bringing water to the surface.

The artesian aquifer of the Roswell basin is overlain by a leaky confining bed, which in turn is overlain by an alluvial water-table aquifer. The water-table aquifer is hydraulically connected to the Pecos River. Permeable zones in the artesian aquifer are generally controlled by lithologic changes in the San Andres Limestone and Grayberg Formation and by fractures in the rock. The confining bed is composed of slightly to moderately permeable rocks. The shallow aquifer is composed of permeable beds of sand and gravel.

In the Roswell basin, water recharges the artesian-aquifer system principally by infiltration from precipitation, by runoff from streams that flow eastward across the outcrop of the aquifer to the Pecos River, and by subsurface underflow. Some recharge by downward leakage to the artesian aquifer from the shallow aquifer occurs in summer. The principal means of discharge from both aquifers is through wells.

The San Andres Limestone receives its recharge from the rainfall to the west where it is close to or on the surface in its westward reaches. There are areas in the Hondo River in which the San Andres Limestone is in the river bed and the river waters flowing in this area directly recharge the artesian aquifer.

There are areas of saline water to the north and east of Roswell. When drilling and pumping of artesian wells in the Roswell basin reduces the pressure in that area, saline water encroaches on the fresh water.

In the late 1920s, some Roswell businessmen requested the Federal Land Bank to open a branch in Roswell. In a study of the Roswell area, the bankers cited the declining water levels in the Roswell basin as negatively impacting its decision to locate in Roswell. The Roswell businessmen went to the state legislature and were successful in getting

the adoption of the first Underground Water Law in 1931. The Federal Land Bank was again approached. The answer again was no. The bankers stated that a mere statute would not improve the falling water levels. They suggested some entity be created to police water use from the basin. The businessmen returned to the legislature and were successful in getting a statute authorizing the creation of an Artesian Conservancy District. The statutory definition of the district's purpose was to conserve, where necessary, the waters of the artesian aquifer. Following the statutory proceedings, the Pecos Valley Artesian Conservancy District was created. At a later date, the Federal Land Bank did establish a branch in Roswell.

It became obvious that to get the Roswell basin in balance, there had to be stringent control over the use of the basin's waters. Prior to the 1931 law, anybody who wanted to drill a well could do so, no one needed a permit. This resulted in water pressures and levels going down and it was clear something had to be done. The 1931 law only applied to an underground basin, the boundaries of which had been defined by the state engineer. No control existed outside of those areas.

Eventually, the boundaries of the Roswell basin were established with the state engineer presiding over the jurisdiction. Once the basin was declared, no further permits were issued to appropriate water from the artesian source, the deep water in the San Andres Limestone. They continued giving permits in the shallow aquifer, the valley fill overlying the San Andres Limestone. Those permits ceased in 1938.

However, to the north and west of Roswell, people began drilling wells outside the boundaries of the Roswell basin where permits were not required. The response was to extend the boundaries of the basin some four or five times. Subsequently, about 25,000 acres of irrigated land were put in use that never should have been allowed because it

overdrafted the Roswell basin. We were, in effect, mining water. We were taking out of the basin more water than was coming in to recharge it. In 1956, a suit was started in District Court of Chaves County. The state engineer and the Pecos Valley Artesian Conservancy District adjudicated all of the underground water rights of the Roswell basin.

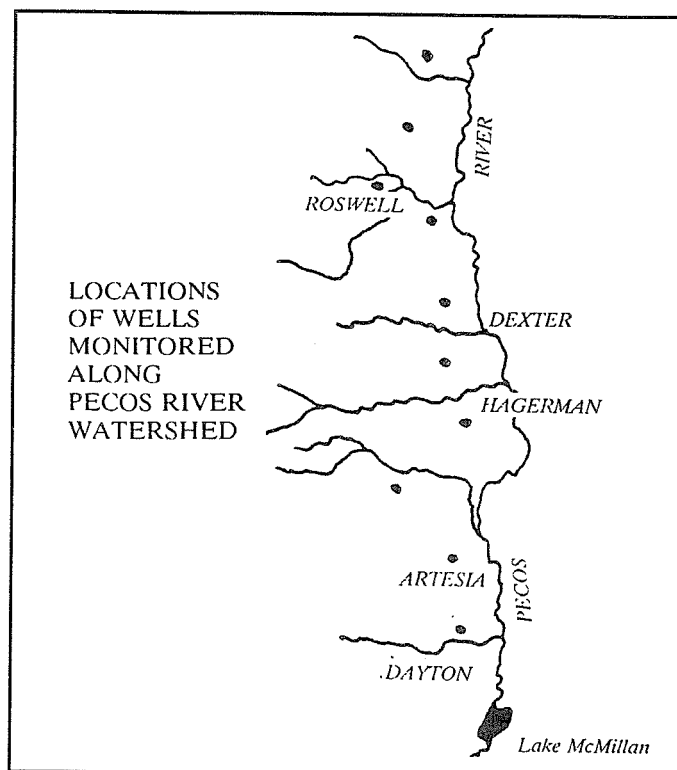
Upon motion by the district and state, a duty of water was established for 3 acre-feet per acre per annum with a carriage loss addition of 6 inches per acre per annum. A five-year accounting period was established giving the individuals 15 acre-feet per acre plus the carriage loss. Individuals could use the water in any way they wanted as long as they did not exceed the allotted 15 acre-feet per acre.

Any excess use of an allotted duty of water results in a penalty. A fine is assessed; the amount determined at the discretion of

the court. The individual must also repay from the next accounting period, twice the amount of water by which he exceeded his allotment in the prior accounting period.

A complaint is filed against any individual who tampers with his meter to prevent the recording of the actual amount of water being pumped. A hearing is held in District Court and if convicted, the individual is subject to a fine established by the court. The highest fine given so far was \$10,000.

The state and district have requested the court include in its order a requirement that all irrigation wells be metered and a court-appointed watermaster monitor the water use. Individuals must purchase and install their initial meters. Repairs and replacement of meters are provided by the district at no cost to the individual. The watermaster crew constantly monitors all meters. When an inoperative



## Water Conservation in the Pecos Valley Artesian Conservancy District

meter is discovered, a radio call is made to the district office reporting the location of the inoperative meter. The district's repair crew is dispatched to the location. A replacement meter is installed if the old cannot be repaired on the spot. The inoperative meter is then taken back to the district's repair shop, repaired and placed in inventory.

The district has paid the watermaster's expenses, since the date of appointment in 1966, totaling \$1,754,041. The watermaster's approved budget for 1989-1990 is \$153,400.

The district has also expended \$417,493 for the purchase of water meters used as replacements on individual wells. Repair parts for meters and wages for repair personnel have totaled \$852,409.

In 1958, the district entered into a contract with the Interstate Stream Commission to borrow funds to loan to individual farmers. The funds can be used to develop water conservation projects on their farms. Projects qualifying for these loans include: land leveling, reservoir lining, concrete ditch lining, and sprinkler and drip irrigation systems. These loans are secured by a note and mortgage on the farm. To date, the district has borrowed and loaned to farmers \$9,008,145 for these projects.

In addition to the water conservation loan program, the district has purchased water rights from 6,875 acres of irrigated land and placed them in its water bank. None of this acreage has been returned to irrigation. The cost of these purchases was \$3,959,627.

The total expenditures by the district and individual farmers for conservation measures in the Roswell basin is \$15,991,714. This amounts to nearly \$2 million more than the settlement of the Texas suit against New Mexico for under deliveries of water under the Pecos River Compact.

In 1964, the district used five monitoring wells in the basin to determine the effects of its policies on the water levels within the basin. Five additional monitoring wells were installed between 1964 and 1970. The monitoring wells are spaced across the basin from north to south. The data are collected three times a month from the wells and provide a good picture of average water levels in the basin.

The recorded data for the wells in 1975 were compared with 1970 levels (Figure 1). Data indicated that except for a short time in January and February, the water levels were still below the 1970 levels. A further comparison was made for 1988 (Figure 2). The data showed that each month the water levels were higher than 1970 and at the end of 1988, the water level was 14 feet above the 1970 level.

These conservation programs are costly and take a long time to produce results, but they are certainly worth the time and money to improve this valuable natural resource.

The district feels its goals have not yet been fully realized. It also feels present projects will be continued whenever feasible and further commitments should be made.

John F. Russell

Figure 1. Monthly Average Water Level  
10 PVACD RECORDER WELLS

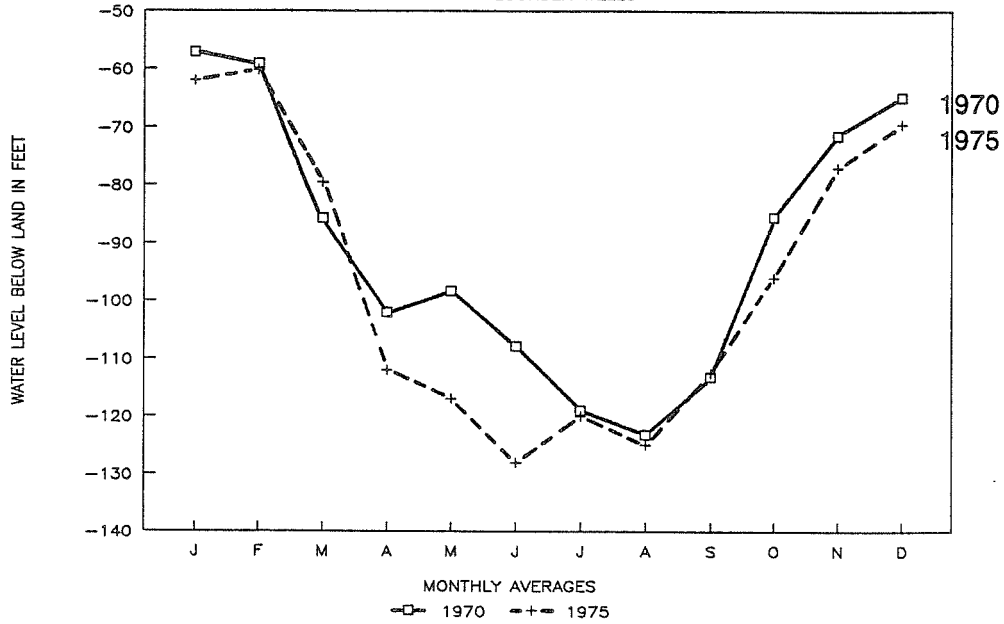


Figure 2. Monthly Average Water Level  
10 PVACD RECORDER WELLS

